

FEDERAL RAILROAD ADMINISTRATION



OFFICE OF RAILROAD SAFETY

***MOTIVE POWER AND EQUIPMENT
COMPLIANCE MANUAL***

July 2012

MOTIVE POWER AND EQUIPMENT Compliance Manual

TABLE OF CONTENTS

Chapter 1 - General Information

Introduction.....	1 - 1
Program Goals	1 - 2
Basis for Regulation and Inspection	1 - 2
Definitions and Roles	
Specialist.....	1 - 3
Motive Power & Equipment Inspector	1 - 3
State Equipment Inspector	1 - 3
Customers	1 - 3
Credentials	1 - 3
Personal Safety.....	1 - 3
Recommended Safe Work Procedures.....	1 - 4
Technical Bulletins	1 - 4
Contacts with News Media	1 - 4
Cooperation of FRA Personnel with Industry, Labor, & Other Agencies.....	1 - 5
Subpoenas	1 - 5
Operating Equipment	1 - 5
Delaying Trains.....	1 - 5
Unusual Occurrences	1 - 5
National Transportation Safety Board.....	1 - 6

Chapter 2 - Inspection and Compliance Program

Introduction.....	2 - 1
Allocation of Resources.....	2 - 1
Regular Inspection Point.....	2 - 1
Inspection / Activities Priorities.....	2 - 1
Accident Investigations.....	2 - 2
Congressional Complaints Inspections	2 - 2
Waiver Petition Investigations	2 - 2
One-Time Movement Inspections.....	2 - 5
Regular Complaint Investigations.....	2 - 8
Focused Enforcement Inspections	2 - 9
Sample Car/Locomotive Inspections	2 - 10
MP&E Safety Concern & Recommendation Report F6180.4A	2 - 14
Site-Specific (Routine) Inspections	2 - 15
Operation Life Saver Presentation	2 - 17
FRA's Jurisdiction Over Tourist And Excursion Railroads	2 - 17
Source Codes	2 - 20

Federal Railroad Administration

Activity Codes	2 - 23
----------------------	--------

Chapter 3- Enforcement Actions

General.....	3 - 1
Determining When and What Enforcement Action Is Necessary	3 - 1

Chapter 4 - Railroad Freight Car Safety Standards - Part 215

Introduction.....	4 - 1
Determining Noncompliance	4 - 2
Freight Car Safety Standards Inspection Procedures.....	4 - 3
PART 215 - Railroad Freight Car Safety Standards.....	4 - 3
Subpart A---General	
§215.3 Application.....	4 - 3
§215.5 Definitions.....	4 - 4
§215.9 Movement of defective cars for repair.....	4 - 6
§215.11 Designated inspectors	4 - 8
§215.13 Pre-Departure inspection.	4 - 8
Subpart B --- Freight Car Components	
Suspension System	
§215.103 Defective wheel	4 - 10
§215.105 Defective axle and journal	4 - 15
§215.107 Defective plain bearing box: General	4 - 16
§215.109 Defective plain bearing box: Journal lubricating system..	4 - 16
§215.111 Defective Plain Bearing	4 - 17
§215.113 Defective Plain Bearing Wedge.....	4 - 17
§215.115 Defective Roller Bearing	4 - 17
§215.117 Defective Roller Bearing Adapter	4 - 20
§215.119 Defective Freight Car Truck	4 - 21
Car Bodies	
§215.121 Defective Car Body.....	4 - 26
<u>Draft System</u>	
§215.123 Defective Couplers.....	4 - 28
§215.125 Defective Uncoupling Device.....	4 - 31
§215.127 Defective Draft Arrangement	4 - 31
§215.129 Defective cushioning device.....	4 - 33
Subpart C---Restricted Equipment	
§215.203 Restricted cars.....	4 - 33
Subpart D---Stenciling	
§215.301 General.....	4 - 34
§215.303 Stenciling of restricted cars.....	4 - 34
§215.305 Stenciling of maintenance-of-way equipment	4 - 35
Appendix D to Part 215 – Pre-Departure Inspection Procedure.....	4 – 36

Chapter 5 - Blue Signal Protection of Workmen - Part 218

Introduction..... 5 - 1

 §218.1 Purpose..... 5 - 2

 §218.3 Application..... 5 - 2

 §218.5 Definitions..... 5 - 3

 §218.21 Scope..... 5 - 8

 §218.22 Utility Employee..... 5 - 10

 §218.23 Blue signal display..... 5 - 12

 §218.24 One-person Crew 5 - 14

 §218.25 Workers on a main track 5 - 14

 §218.27 Workmen on track other than main track 5 - 15

 §218.29 Alternate methods of protection..... 5 - 18

 §218.30 Remotely controlled switches)..... 5 - 21

Chapter 6 - Rear End Marking Device--Passenger, Commuter and Freight Trains - Part 221

Introduction..... 6 - 1

 §221.3 Application..... 6 - 1

 §221.5 Definitions..... 6 - 2

 §221.13 Marking device display..... 6 - 2

 §221.15 Marking device inspection..... 6 - 3

 §221.16 Inspection procedure..... 6 - 4

 §221.17 Movement of defective equipment 6 - 4

Appendix B to Part 221—Approved Rear End Marking Devices..... 6 - 5

Chapter 7 - Safety Glazing Standards - Locomotives, Passenger Cars & Cabooses – Part 223

Guidance..... 7 - 1

Glazing Waivers..... 7 - 1

Locomotive Glazing..... 7 - 2

Passenger Equipment Glazing 7 - 2

Chapter 8 - Railroad Locomotive Safety Standards - Part 229

Introduction..... 8 - 1

Locomotive Safety Standards Inspection Procedures..... 8 - 2

Subpart A---General

 §229.1 Scope..... 8 - 3

 §229.3 Applicability 8 - 3

 §229.3 Information Collection..... 8 - 4

 §229.5 Definitions..... 8 - 4

Federal Railroad Administration

§229.7	Prohibited Acts.....	8 - 11
§229.9	Movement of non-complying locomotives.....	8 - 12
§229.11	Locomotive identification.....	8 - 16
§229.13	Control of locomotives.....	8 - 16
§229.14	Non-MU locomotive control cab locomotives.....	8 - 17
§229.17	Accident reports.....	8 - 17
§229.19	Prior waivers.....	8 - 17
Inspections and Tests		
§229.21	Daily Inspection.....	8 - 17
§229.23	Periodic inspection: General.....	8 - 21
§229.25	Tests: Every periodic inspection.....	8 - 24
§229.27	Annual tests.....	8 - 26
§229.29	Biennial tests.....	8 - 29
§229.31	Main reservoir tests.....	8 - 31
§229.33	Out-of-use credit.....	8 - 32
§229.41	Protection against personal injury.....	8 - 32
§229.43	Exhaust and battery gases.....	8 - 32
§229.45	General condition.....	8 - 33
Brake System		
§229.46	Brakes: General.....	8 - 34
§229.47	Emergency brake valve.....	8 - 34
§229.49	Main reservoir system.....	8 - 35
§229.51	Aluminum main reservoirs.....	8 - 36
§229.53	Brake gauges.....	8 - 37
§229.55	Piston travel.....	8 - 37
§229.57	Foundation brake gear.....	8 - 38
§229.59	Leakage.....	8 - 38
Draft System		
§229.61	Draft system.....	8 - 39
Suspension System		
§229.63	Lateral Motion.....	8 - 40
§229.64	Plain bearings.....	8 - 40
§229.65	Spring rigging.....	8 - 41
§229.67	Trucks.....	8 - 42
§229.69	Side bearings.....	8 - 42
§229.73	Wheel sets.....	8 - 42
§229.75	Wheel and tire defects.....	8 - 43
Electrical System		
§229.77	Current collectors.....	8 - 45
§229.79	Third rail shoes.....	8 - 45
§229.85	Doors and cover plates marked "Danger".....	8 - 46
§229.89	Jumper; cable connections.....	8 - 46
§229.91	Motors and generators.....	8 - 46
Internal Combustion Equipment		
§229.93	Safety cut-off device.....	8 - 47
§229.95	Venting.....	8 - 48

Motive Power and Equipment Compliance Manual

§229.97	Grounding fuel tanks.....	8 - 48
§229.99	Safety Hangers.....	8 - 48
§229.101	Engines.....	8 - 48
Steam Generators		
§229.103 - 113	Steam Generator.....	8 - 49
Cabs and Cab Equipment		
§229.115	Slip/slide alarms.....	8 - 50
§229.117	Speed indicators.....	8 - 51
§229.119	Cabs, floors, and passageways.....	8 - 52
§229.121	Locomotive cab noise.....	8 - 55
§229.123	Pilots, snowplows, end plates.....	8 - 56
§229.125	Headlights and auxiliary lights.....	8 - 57
§229.127	Cab lights.....	8 - 63
§229.129	Audible warning device.....	8 - 63
§229.131	Sanders.....	8 - 66
§229.133	Interim Locomotive Conspicuity Measures.....	8 - 66
§229.135	Event Recorders.....	8 - 66
§229.137	Sanitation, general requirements.....	8 - 73
§229.139	Sanitation, servicing requirements.....	8 - 77
Design Requirements		
§229.141	Body structure, MU locomotives.....	8 - 81

Chapter 9 – Steam Locomotives - Part 230

Introduction.....	9 - 1
Regulation 49 CFR Part 230.....	9 - 3
Part 230 Subpart A---General.....	9 - 3
§230.1 Purpose and Scope.....	9 - 3
§230.2 Applicability.....	9 - 3
§230.3 Implementation.....	9 - 3
§230.4 Penalties.....	9 - 4
§230.5 Preemptive Effect.....	9 - 4
§230.6 Waivers.....	9 - 4
§230.7 Responsibility for Compliance.....	9 - 4
§230.8 Definitions.....	9 - 4
§230.12 Movement of Non-Complying Steam Locomotives.....	9 - 5
§230.13 Daily Inspection.....	9 - 6
§230.14 Thirty-one (31) Service Day Inspection.....	9 - 7
§230.15 Ninety-two (92) Service Day Inspection.....	9 - 8
§230.16 Annual Inspection.....	9 - 8
§230.17 One thousand four hundred seventy-two day (1,472) service day inspection.....	9 - 8
§230.18 Service Days.....	9 - 9
§230.19 Posting of FRA Form No. 1 and FRA Form No. 3.....	9 - 9
§230.20 Alteration and Repair Report for Steam Locomotive Boilers.....	9 - 10
§230.21 Steam Locomotive Number Change.....	9 - 10

Federal Railroad Administration

Part 230 Subpart B---Boilers and Appurtenances	
§230.23 Responsibility for General Construction and Safe Working	
Pressure	9 - 10
§230.24 Maximum Allowable Stress	9 - 10
§230.27 Maximum Shearing Strength of Rivets	9 - 10
§230.28 Higher Shearing Strength of Rivets	9 - 11
<u>Inspection and Repair</u>	
§230.29 Inspection and Repair	9 - 11
§230.30 Lap-joint Seam Boilers	9 - 11
§230.31 Flues to Be Removed	9 - 11
§230.32 Time and Method of Inspection	9 - 12
§230.33 Welded Repairs and Alterations	9 - 13
§230.34 Riveted Repairs and Alterations	9 - 14
<u>Pressure Testing of Boilers</u>	
§230.35 Pressure Testing	9 - 14
§230.36 Hydrostatic Testing of Boilers	9 - 14
§230.37 Steam Test Following Repairs or Alterations	9 - 15
<u>Staybolts</u>	
§230.38 Teltale Holes	9 - 15
§230.39 Broken Staybolts	9 - 15
§230.40 Time and Method of Staybolt Testing	9 - 15
<u>Steam Gauges</u>	
§230.42 Location of Gauges	9 - 15
§230.43 Gauge Siphon	9 - 15
§230.44 Time of Testing	9 - 15
§230.45 Method of Testing	9 - 15
§230.46 Badge Plates	9 - 15
§230.47 Boiler Number	9 - 15
<u>Safety Relief Valves</u>	
§230.48 Number and capacity	9 - 16
§230.49 Setting of Safety Relief Valves	9 - 16
§230.50 Time of Testing	9 - 16
<u>Water Glasses and Gauge Cocks</u>	
§230.51 Number and Location	9 - 16
§230.52 Water Glass Valves	9 - 16
§230.53 Time of Cleaning	9 - 16
§230.54 Testing and Maintenance	9 - 16
§230.55 Tubular Type Water and Lubricator Glasses and Shields	9 - 16
§230.56 Water Glass Lamps	9 - 16
<u>Injectors, Feedwater Pumps and Flue Plugs</u>	
§230.57 Injectors and Feedwater pumps	9 - 16
§230.58 Flue Plugs	9 - 16
<u>Fusible Plugs</u>	
§230.59 Fusible Plugs	9 - 16
<u>Washing Boilers</u>	
§230.60 Time of Washing	9 - 16

Motive Power and Equipment Compliance Manual

§230.61	Arch Tubes, Water Bar Tubes, Circulators & Thermic Siphons.....	9 - 16
<u>Steam Pipes</u>		
§230.62	Dry Pipe.....	9 - 16
§230.63	Smoke Box, Steam Pipes and Pressure Parts.....	9 - 16
<u>Steam Leaks</u>		
§230.64	Leaks Under Lagging.....	9 - 17
§230.65	Steam Blocking View of Engine Crew.....	9 - 17
Part 230 Subpart C---Steam Locomotives and Tenders		
§230.66	Design, Construction and Maintenance.....	9 - 17
§230.67	Responsibility for Inspection and Repairs.....	9 - 17
<u>Speed Indicators</u>		
§230.68	Speed Indicators.....	9 - 17
<u>Ash Pans</u>		
§230.69	Ash Pans.....	9 - 17
<u>Brake and Signal Equipment</u>		
§230.70	Safe Condition.....	9 - 17
§230.71	Orifice Testing of Compressors.....	9 - 17
§230.72	Testing Main Reservoirs.....	9 - 17
§230.73	Air Gauges.....	9 - 17
§230.74	Time of Cleaning.....	9 - 17
§230.75	Stenciling Dates of Tests and Cleaning.....	9 - 17
§230.76	Piston Travel.....	9 - 17
§230.77	Foundation Brake Gear.....	9 - 17
§230.78	Leakage.....	9 - 17
§230.79	Train Signal System.....	9 - 17
<u>Cabs, Warning Signals, Sanders and Lights</u>		
§230.80	Cabs.....	9 - 17
§230.81	Cab Aprons.....	9 - 17
§230.82	Fire Doors.....	9 - 18
§230.83	Cylinder Cocks.....	9 - 18
§230.84	Sanders.....	9 - 18
§230.85	Audible Warning Device.....	9 - 18
§230.86	Required Illumination.....	9 - 18
§230.87	Cab Lights.....	9 - 18
<u>Throttle and Reversing Gear</u>		
§230.88	Throttles.....	9 - 18
§230.89	Reverse Gear.....	9 - 18
<u>Draw Gear and Draft Systems</u>		
§230.90	Draw Gear Between Steam Locomotive and Tender.....	9 - 18
§230.91	Chafing Irons.....	9 - 18
§230.92	Draw Gear and Draft Systems.....	9 - 18
<u>Driving Gear</u>		
§230.93	Pistons and Piston Rods.....	9 - 18
§230.95	Guides.....	9 - 18
§230.96	Main, Side and Valve Motion Rods.....	9 - 18

Federal Railroad Administration

§230.97 Crank Pins.....	9 - 18
<u>Running Gear</u>	
§230.98 Driving, Trailing and Engine Truck Axles.....	9 - 18
§230.99 Tender Truck Axles.....	9 - 18
§230.101 Steam Locomotive Driving Journal Boxes.....	9 - 19
§230.102 Tender Plain Bearing Journal Boxes.....	9 - 19
§230.103 Tender Roller Bearing Journal Boxes.....	9 - 19
§230.104 Driving Box Shoes and Wedges.....	9 - 19
§230.105 Lateral Motion.....	9 - 19
<u>Trucks, Frames and Equalizing System</u>	
§230.106 Steam Locomotive Frame.....	9 - 19
§230.107 Tender Frame and Body.....	9 - 19
§230.109 Tender Trucks.....	9 - 19
§230.110 Pilots.....	9 - 19
§230.111 Spring Rigging.....	9 - 19
<u>Wheels and Tires</u>	
§230.112 Wheels and Tires.....	9 - 19
§230.113 Wheels and Tire Defects.....	9 - 19
§230.114 Wheel Centers.....	9 - 19
<u>Steam Locomotive Tanks</u>	
§230.115 Feedwater Tanks.....	9 - 19
§230.116 Oil Tanks.....	9 - 19
Appendix A to Part 230 – Inspection Requirements	9 - 19

Chapter 10 - Railroad Safety Appliance Standards - Part 231

Introduction.....	10 - 1
Inspection Guidance.....	10 - 4
(MP&E 98-7) Errors in US DOT Safety Appliance Booklet	10 - 4
(MP&E 98-13) Interpretation of Sill Step Application.....	10 - 5
(MP&E 98-36) Judgment in the Enforcement of the Safety Appliance Standards.....	10 - 5

Locomotive Applications and Guidance

(MP&E 98-68) Locomotives Used in Switching Service-Location End Handholds .	10 - 7
(MP&E 98-48) Securement of Handrail to the Locomotive Carbody	
North American Cab Structure	10 - 7
(MP&E 98-25) Burro Crane Requirements	10 - 7
(MP&E 98-71) Self Propelled Vehicles Considered to Be Locomotives.....	10 - 8
§ 231.15 Steam Locomotives Used in Road Service.....	10 - 9
§ 231.15 Specifications Common to all Steam Locomotives.....	10 - 9
§ 231.16 Steam Locomotives Used in Switching Service	10 - 9
§ 231.30 Locomotives Used in Switching Service	10 - 10
§ 231.29 Road Locomotives with Corner Stairways	10 - 10

Motive Power and Equipment Compliance Manual

Freight & Passenger Car Applications & Guidance

(MP&E 98-14) Safety Appliance Fasteners	10 - 10
(MP&E 98-22) Adjustable Handhold/Ladder Tread	10 - 12
(MP&E 98-49) Dimensions Applicable to Handles of Uncoupling Levers	10 - 12
(MP&E 98-51) Definition of Left and Right / A and B end.....	10 - 13
(MP&E 98-18) Aluminum Safety Appliances	10 - 17

Handbrakes

(MP&E 98-53) Handbrake Chains	10 - 17
(MP&E 98-26) Handbrakes - Articulated Cars	10 - 18
(MP&E 98-35) Multi-Unit Articulated Flat Cars- Crossover Platforms	10 - 19
(MP&E 98-5) Standard Level and Low Level Auto Rack Cars	10 - 19

Flat Cars

(MP&E 98-16) DODX 4000 Series Flat Cars	10 - 20
(MP&E 98-69) Safety Appliance Arrangements on Flat Cars	10 - 20
(MP&E 00-07) Safety Appliance Arrangements on Flat Cars with Low-Mounted Side Hand Brakes.....	10 - 21

Covered Hopper Cars

(MP&E 98-23) Covered Hopper Cars - Running Board Extensions	10 - 22
Roof Hatch/Walkway Blockage	10 - 22

Cars of Special Construction

(MP&E 98-17) Bulkhead Flat Cars	10 - 23
(MP&E 98-19) "Differential" 100-Ton Covered Hopper Cars Built by the Thrall Car Mfg Co.....	10 - 23
Safety Appliance Interpretation of Coil Steel Cars.....	10 - 23

Tank Car

(MP&E 98-31) Safety Chains on Tank Cars	10 - 25
(MP&E 00-06) Manufacture and Repair of Operating Platforms and Operating Platform Safety Railings on Tank Cars without Underframes.....	10 - 26

Chapter 11 - Brake System Safety Standards for Freight & Other Non-Passenger Trains & Equipment: End-of-Train Devices - Part 232

Introduction	11 - 1
§232.3 Applicability	11 - 3
§232.5 Definitions.....	11 - 3

Federal Railroad Administration

§232.9	Responsibility for Compliance	11 - 5
§232.11	Penalties	11 - 6
§232.15	Movement of Defective Equipment.....	11 - 6
§232.17	Special Approval Process	11 - 9
§232.103	General Requirements for All Train Brake Systems	11 - 9
§232.105	General Requirements for Locomotives	11 - 13
§232.107	Air Source Requirements.....	11 - 13
§232.109	Dynamic Brake Requirements	11 - 14
§232.111	Train Handling Information.....	11 - 16
§232.203	Training Requirements.....	11 - 16
§232.205	Class I Test Initial Terminal Inspection.....	11 - 17
§232.207	Class IA Brake Tests - 1,000 Mile Inspection	11 - 26
§232.209	Class II Brake Test - Intermediate Inspection.....	11 - 27
§232.211	Class III Brake Test - Trainline Continuity Inspection.....	11 - 28
§232.213	Extended Haul Trains	11 - 28
§232.215	Transfer Train Brake Tests	11 - 29
§232.217	Train Brake System Tests Conducted Using Yard Air.....	11 - 29
§232.219	Double Heading and Helper Service.....	11 - 30
Subpart D	Periodic Maintenance and Testing Requirements	11 - 30
(MP&E 98-63)	Subpart E End-of-Train Devices	11 - 32
(MP&E 98-62)	Two-Way End-of-Train Device Flow Chart	11 - 38
Subpart G	Electronically Controlled Pneumatic (ECP) Brake Systems	11 - 40
§232.602	Applicability	11 - 46
§232.605	Training Requirements.....	11 - 46
§232.607	Inspection and Testing requirements	11 - 46
§232.609	Handling of defective equipment with ECP brake systems.....	11 - 48
§232.611	Periodic maintenance.....	11 - 50
§232.613	End-of-Train (EOT) devices.....	11 - 50
Guidance for Appendix B to Part 232 – Part 232 Prior to May 31, 2001 as Clarified Effective April 10, 2002		11 - 51
(MP&E 98-59)	Train Brake Inspection	11 - 51
(MP&E 98-45)	Initial Terminal Air Brake Tests at Remote Locations	11 - 52
(MP&E 99-01)	Clarification for Initial Terminal Road Train Air Brake Tests	11 - 52
(MP&E 00-01)	Enforcement Guidance for Inspecting & Testing Brakes on Cars on Shop or Repair Tracks	11 - 53
(MP&E 98-40)	1,000-Mile Interpretation - 49 CFR §232.12(b)	11 - 54
(MP&E 98-46)	Hauling of Defective Cars at Intermediate Inspection Locations ...	11 - 54
U.S.C. §20303		11 - 56
(MP&E 98-6)	Bottom Rod Safety Support	11 - 57
(MP&E 98-8)	Air Brake System - Reservoir Connecting Pipes	11 - 57
(MP&E 98-11)	Testing of Handbrakes on Locomotives Equipped with an Air Release Valve	11 - 57
(MP&E 98-15)	Air Flow Method as an Alternative to Leakage Tests for Trains ...	11 - 57
(MP&E 98-27)	Locomotive Handbrakes - Stencil Requirements for Canadian Railroads	11 - 59
(MP&E 98-41)	Locomotive Brake Cylinder Pressure	11 - 59

Motive Power and Equipment Compliance Manual

(MP&E 98-55) Brake Hoses on Cars Equipped with 15" End-of-Car Cushioning Units	11 - 60
(MP&E 98-56) Sloan Model 3050-A and 3200-A Angle Cocks	11 - 60
Guidance on truck mounted brakes and indicators	11 - 62

Chapter 12 - Passenger Equipment Safety Standards - Part 238

§238.3 Introduction	12 - 1
§238.5 Applicability	12 - 2
§238.5 Definitions.....	12 - 2
§238.5 Private Railcars Regulatory Compliance: Q&A.....	12 - 4
§238.9 Responsibility for Compliance	12 - 5
§238.15 Movement of Passenger Equipment with Power Brake Defects	12 - 6
§238.17 Movement of Pass. Equipment with Other Than Power Brake Defects.....	12 - 7
§238.109 Training Qualification, and Designation.....	12 - 7
§238.119 Rim-Stamped Straight Plate Wheels.....	12 - 8
§238.303 Exterior Calendar Day Mechanical Inspection of Pass. Equip.....	12 - 8
§238.305 Interior Calendar Day Mechanical Inspection of Cars	12 - 9
§238.307 Periodic Mechanical Inspections	12 - 9
(MP&E 07-02) Guidance for Record Keeping of Annual Periodic Inspection of the Hand or Parking Brake on Passenger Cars and Unpowered Vehicles Used in Passenger Trains, 49 CFR Section 238.307(d)(2)..	12 - 10
§238.309 Periodic brake equipment maintenance	12 - 10
§238.311 Single Car Test.....	12 - 11
§238.313 Class I Brake Test	12 - 12
§238.315 Class IA Brake Test	12 - 12
§238.317 Class II Brake Test	12 - 14
§238.503 Inspection, Testing and Maintenance Requirements	12 - 15

Chapter 13 - Passenger Train Emergency Preparedness - Part 239

Guidance to be developed and published in the near future.

Chapter 14 - Reflectorization of Rail Freight Rolling Stock - Part 224

Introduction.....	14 - 1
§224.107(a)(1) Implementation schedule	14 - 1
§224.107(a)(2)(i) Existing cars without retroreflective sheeting.....	14 - 1
§224.5 Definitions.....	14 - 2
§224.106 Location of retroreflective sheeting.....	14 - 2
§224.105 Sheeting dimensions and quantity	14 - 3
§224.103 Characteristics of retroreflective sheeting	14 - 3

Federal Railroad Administration

Chapter 15 - Guidelines for Enforcement of Mechanical Requirements for Rail Grinding Equipment

Introduction.....	15 - 1
Guidelines for Enforcement of Mechanical Requirements.....	15 - 1
Guidelines for Enforcement of Roadway Maintenance Machine Requirements.....	15 - 3
Guidelines for Enforcement of Operating Practices Requirements.....	15 - 3
Application of 49 CFR Part 214, Subpart D.....	15 - 4

Chapter 16 - Wayside Detector/Train Inspection Guidance

AAR and Class I Railroad Initiatives.....	16 - 1
Future Considerations for Wayside Detectors.....	16 - 4
Waiver(s) Issued.....	16 - 5
Wayside Detector Glossary of Terms.....	16 - 5
Wayside Detector Treaties.....	16 - 7
Preliminary Guidance for Interpreting Wayside Detector Data in Derailment Cause Finding / Prevention Related to Car/Equipment Only.....	16 - 24

Appendix A - Instructions for Completing MP&E Violation Reports

The RISPC Program, F6180.96 and Forms F6180.109; F6180.67 Forms.....	A - 2
Submission of Photographs as Evidence.....	A - 2
Statements of Witness or Reports of Interview.....	A - 2
Copies of Railroad's Records.....	A - 2
Digital Violation Master File.....	A - 3
Case Type List.....	A - 3
List of Exhibits Requirements.....	A - 4
Identification of Exhibits.....	A - 4
Sequence of Master Digital Violation.....	A - 4
PDF Violation Package – Bookmarking Documents.....	A - 4
Violation Package.....	A - 4
Digitally Signing the Completed violation Package.....	A - 5
Motive Power & Equipment Violation Report Form F 6180.109.....	A - 5
Digital Violations FAQ.....	A - 12

Appendix B - Waivers - MP&E Related

Electronic Locomotive Brakes	
EPIC Locomotive Brakes 2002-13397 (Formerly H-92-3).....	B - 1
CCB Locomotive Brakes 2000-7367 (Formerly H-95-3.....	B - 2
CSX Transportation - CCB Test Waiver 1999-6252.....	B - 4
Amtrak Electronic Brakes for HHP8 Electric Locomotives 2001-10596.....	B - 5
Locomotive Brakes	
AAR 26-L Brake 1,104 days to 48 Months 2005-21325.....	B - 6
Locomotive Record-Keeping	

Motive Power and Equipment Compliance Manual

Electronic Daily Inspection - BNSF Railway Company 2000-7782	B - 7
Electronic Daily Inspection - Union Pacific Railroad 2001-11014	B - 8
Electronic Daily Inspection - Norfolk Southern Corp. 2005-22822	B - 9
Electronic Blue Card - BNSF Railway Company 2003-16440	B - 11
Electronic Blue Card - Canadian National Railway 2004-18960	B - 11
Electronic Blue Card - Union Pacific Railroad 2004-17308	B - 11
Electronically Controlled Pneumatic (ECP) Brake Requirements BNSF and NS 2006-26435	B - 12
Blue Signal	
BNSF - Two-Way EOT - Removal & Replacement of batteries by Train and Yard Crew Members and Utility Employees 2001-10660	B - 15
Two-Way End-of-Train Device	
TrainLink II - ATX EOT Telemetry With Power Supplied by An Air Generator 2001-9270	B - 16
Quantum EOT 2006-25794.....	B - 18
TrainLink II Head of Train Device (HTD)	B - 19
American Short Line Regional Railroad Association - Restrictions on Heavy Grade Operation without Two-Way EOT PB-97-12.....	B - 20
Passenger Equipment Standards	
Passenger Brakes	B - 21
AAPRCO 2003-15340	B - 21
Highway Rail Vehicles Such As RoadRailers®, RailRunner®, Etc.	
BNSF Railway Company 1999-5895	B - 22
CN/IC Railroad 2000-8089.....	B - 26
NS Corporation 2002-11896.....	B - 28
CSX Transportation SA-87-4 & PB-87-5.....	B - 32
Texas Mexican Railway 2000-7040	B - 34
Safety Appliances	
NS Corporation 2008-0029.....	B - 37
CSX Transportation 2008-0039.....	B - 38
Twin Cities & Western Railroad 2008-0154.....	B - 39
Escanaba & Lake Superior Railroad Company 2008-0155.....	B - 41
Canadian Pacific Railroad 2008-0163.....	B - 43

Appendix C - Safety Appliance Plates - Locomotives

Illustrative Locomotive Plates

Plate "S-1"	Steam Locomotives used in Switching Service	C - 1
Plate "S-2"	Tenders of Steam Locomotives used in Switching Service.....	C - 1
Plate "S-3"	Steam Locomotives used in Road Service.....	C - 2
Plate "S-4"	Tenders of Steam Locomotives used in Road Service.....	C - 2
Plate "S-5"	Tenders of Vanderbilt Type	C - 3

Federal Railroad Administration

Appendix D - Safety Appliance Plates - Freight Cars

Illustrative Freight Car Plates

Plate A - Handbrake.....	D - 1
Plate B - Couplers.....	D - 2
Plate C - Box & Other House Cars.....	D - 3
Plate D - Box & Other House Cars with platform end sills.....	D - 4
Plate E - Hopper Cars & High Side Gondolas with fixed ends.....	D - 5
Plate F - Hopper Cars & High-Side Gondolas with fixed ends.....	D - 6
Plate G - Drop-End High-Side Gondola Cars.....	D - 7
Plate H - Drop-End High-Side Gondola Cars with platform end sills.....	D - 8
Plate I - Fixed-End Low-Side Gondola & Low-Side Hopper Cars.....	D - 9
Plate J - Fixed-End Low-Side Gondola & Low-Side Hopper Cars with end sills.....	D - 10
Plate K - Drop End Low-Side Gondola Cars.....	D - 11
Plate L - Drop-End Low-Side Gondola Cars with platform end sills.....	D - 12
Plate M - Flat Cars.....	D - 13
Plate N - Tank-Cars with Side Platforms.....	D - 14
Plate O - Tank Cars without side sills & Tank Cars short side sills & end platforms.....	D - 15
Plate P - Tank Cars without End-Sills.....	D - 16
Plate Q - Caboose Cars with Platforms.....	D - 17
Plate R - Caboose Cars without Platforms.....	D - 18
Plate S - Tank Cars without Underframes.....	D - 19
Plate T - Box & Other House Cars with Roofs \geq 10 inches above top of rail.....	D - 20
Plate U - Box & Other House Cars without Roof Hatches.....	D - 21
Plate V - Box & Other House Cars with Roof Hatches.....	D - 22

Appendix E – Statistically Driven Inspection Guidance for MP&E Inspectors & Safety Specialists

Overview.....	E - 2
Background.....	E - 2
Applicability.....	E - 2
Pilot Project.....	E - 4
Pilot Project Summary.....	E - 2
“Drill-down” Procedure.....	E - 5
Focused Enforcement.....	E - 7
Interpretation of the Nationwide Mechanical Equipment Accident/Incident Statistics & Trends (Bi-annual Report).....	E - 8

Chapter 1

General Information

Introduction

The Motive Power and Equipment Compliance Manual (Compliance Manual) provides guidance to Federal and State Motive Power & Equipment (MP&E) inspectors that ensure compliance with Federal safety laws. Findings of noncompliance with Federal safety laws may result in enforcement action and civil penalty. Discussions of the safety standards in this manual provide interpretations and policies related to specific regulatory sections. The information contained in this manual does not modify, alter, or revise Federal law. This manual is the property of the Federal Railroad Administration (FRA) and is intended to be used by only FRA personnel. The information in this manual is intended to provide internal guidance and does not provide any basis for a private party to challenge FRA's exercise of enforcement discretion in a particular case. The contents of this manual may be revoked or modified without prior notice at any time by FRA. This manual supersedes all previous MP&E Enforcement Manuals.

This manual is a complement to the *Office of Railroad Safety's General Manual*, as revised in August 2009. The General Manual provides detailed information regarding FRA's overall operations, history and statutory authority, rulemaking process, and inspection and investigation procedures. Both manuals are specifically intended for the safety inspectors and technical specialists throughout the country who monitor compliance with Federal safety laws and standards that apply to the railroad industry. Using both manuals will achieve uniformity and consistency, as well as enable FRA's front-line representatives to successfully promote the agency's safety mission.

Inspectors should use the Compliance Manual as an aid to help gain a better understanding of the laws governing the safety of railroad rolling equipment. However, having a thorough knowledge and understanding of the laws and regulations alone is not enough to be a good inspector. The success and effectiveness of FRA's safety assurance and compliance programs hinge on the ability of the inspector to use good judgment and strategies with the railroad industry, so that compliance with the regulations is achieved. Inspectors have considerable enforcement discretion and this manual should be used to guide the individual on how to exercise that discretion. If the manual does not provide adequate guidance for a particular situation, or if there is any doubt as to the meaning of any of the information provided in this manual, the inspector should seek the assistance of the regional MP&E specialist.

Compliance with the directives in this manual will result in uniform application and enforcement of federal laws and safety regulations throughout the Nation. This uniformity is necessary for effective program management and is mandated by the Federal Railroad Safety Act of 1970 (P.L. 91-458). These directives will also help to achieve maximum effective use of the limited available resources.

All activities shall be conducted in accordance with the FRA's Goals of improving railroad safety contained in the General Inspection Principles in Chapter 3 of the General Manual.

Federal Railroad Administration

Questions about information or interpretations contained in this manual should be referred to the MP&E Headquarters Staff (RRS-14) for a prompt response. Suggested improvements or corrections to the manual should also be submitted to regional specialists, who will then forward them to RRS-14.

Program Goals

The goal of the MP&E inspection program is to administer an effective safety program and to achieve safe operating and mechanical practices in the railroad industry, through compliance with all Federal laws that are designed to promote railroad safety as it relates to employees, passengers, and the general public. The MP&E inspection program is primarily responsible for monitoring compliance for the following railroad safety regulations, found in Title 49 Code of Federal Regulations (CFR):

Part 210 - Railroad Noise Emission Compliance Regulations

Part 215 - Railroad Freight Car Safety Standards

Part 218 - Railroad Operating Practices

Subpart B - Blue Signal Protection of Workers

Subpart D – Prohibition Against Tampering with Safety Devices

Part 221 - Rear End Marking Device - Passenger, Commuter and Freight Trains

Part 223 - Safety Glazing Standards - Locomotives, Passenger Cars, and
Cabooses

Part 224 – Reflectorization of Rail Freight Rolling Stock

Part 229 - Railroad Locomotive Safety Standards

Part 230 - Steam Locomotive Inspection and Maintenance Standards

Part 231 - Railroad Safety Appliance Standards

Part 232 - Brake System Safety Standards for Freight and Other Non-Passenger
Trains and Equipment: End-of-train Devices

Part 238 - Passenger Equipment Safety Standards

Part 239 - Passenger Train Emergency Preparedness

§239.101(6) On-board Emergency Equipment

§239.107 Emergency Exits

Basis for Regulation and Inspection

The Statutory authority for the regulations and inspections conducted by the MP&E inspectors comes from various Acts of the United States Congress. For a detailed discussion on this authority please read the Brief History and Organization of the Federal Railroad Administration in Chapter 1 of the General Manual.

Definitions and Roles

Specialist: As used hereafter in this manual, refers specifically to regional MP&E railroad safety specialists. The specialist is responsible for technical evaluation and oversight of all motive power and equipment inspections, analyses, and activities within the region and provides technical guidance, training, and advice in the MP&E areas. Headquarters specialists are subject to the same requirements and guidance of this manual.

Inspector: As used hereafter in this manual, refers to a Federal MP&E inspector or a qualified State equipment inspector. Inspectors are the front-line representatives of the agency and must be thorough while conducting themselves in a safe, professional, ethical, and courteous manner.

State Equipment Inspector: As used hereafter in this manual refers to either a qualified State car inspector, qualified State locomotive inspector, or qualified State MP&E inspector who has been certified by the FRA to conduct equipment inspections in a Participating State.

Stakeholders: Includes those the agency regulates as well as those it serves. Some partner with FRA to develop safety initiatives and technology, while others help review, develop, and/or enforce FRA's safety regulations. **All stakeholders** depend on FRA to fulfill its mission to *promote a safe, environmentally sound, successful railroad transportation to meet current and future needs.*

Credentials

Inspectors must have their credentials on their person while on duty. Any request to provide identification should be complied with in a prompt and courteous manner. Inspectors should not permit their credentials to be photocopied. Additionally, inspectors are encouraged to obtain and provide business cards to stakeholders, as conditions warrant. Inspectors should consult with their supervisors on procedures for procuring the cards, as conditional reimbursement is permitted.

Personal Safety

The inspector's first concern is for his or her own safety and that of any accompanying personnel. Inspectors should always remain alert to the dangers of moving equipment and third rail/electrified equipment.

Inspectors must comply with any railroad's request to use safety equipment, such as hard hats, safety shoes, safety glasses, etc. Inspectors should also comply with all of the railroad's safety

Federal Railroad Administration

rules, to the extent that it would not materially interfere with FRA's capability to conduct investigations. FRA inspectors are **not** required to establish blue signal protection while conducting inspection activities.

Inspectors should read and be familiar with the Federal Railroad Administration Safety Policy, Procedures, and Recommendations. Copies of this pamphlet are available either from your regional or Headquarters managers, or from an FRA industrial hygienist, as well as in the REG-Trieve program.

Recommended Safe Work Procedures

Each inspector is encouraged to refer to a booklet published by the FRA called *Recommended Safe Work Procedures* to assist in the performance of his/her duties. By adhering to the information contained in the booklet, staying alert, and never taking your work environment for granted, you will reduce injury to yourself and others. Work procedures and practices are defined as the suggested safe way to perform a job. The potential for injuries increases when the prescribed procedures are not properly followed.

Rules and regulations are nothing new to us. FRA has compiled a comprehensive set of safe work procedures for the inspector to follow in the day-to-day work activities. They were developed from a study of existing railroad safety rules, and by FRA colleagues in their participation in the various Job Safety Analysis activities. If the information in the booklet is not clear or if it does not provide enough material to make a sound decision, the inspector should contact the Collateral Duty Officer or a supervisor for additional guidance. Remember, no job is so important and no service is so urgent that we cannot take time to perform all work safely.

Technical Bulletins

The Office of Safety Assurance and Compliance periodically issues Technical Bulletins (TBs) to provide instructions and guidance on a variety of general and discipline-oriented issues.

MP&E inspectors must maintain a current file of all general and MP&E-related TBs, which must be readily available to them. It is suggested that current TBs be kept with this manual.

Contacts With News Media

Inspectors are not authorized to grant interviews or respond to representatives of the news media regarding FRA activities. If approached by news media personnel, inspectors should refer such personnel to FRA's Office of Public Affairs (202-493-6024) for handling. This applies to all news organizations including television and radio news stations, as well as newspapers, magazines, Web-based news outlets, and academic. Additionally, this applies to all industry trade publications. ***Inspectors must not provide the news media with information or opinions as to a probable cause of an accident or incident.***

Any requests for information, made under the Freedom of Information Act, should be forwarded to the FRA Office of Chief Counsel.

See **Contacts with News Media under Communication Guideline** in Chapter 4 of the General Manual for more guidance regarding requests for information.

Cooperation of FRA Personnel with Industry, Labor, and Other Agencies

The inspector should maintain a cordial relationship with the railroads, manufacturers of railroad equipment, labor union personnel, and other public or governmental agencies. The inspector must obtain authority from his/her regional supervisor or their representative before cooperation or participation in any project with any of the aforementioned groups or individuals is conducted.

Subpoenas

Please read the **Responding to Subpoenas and Other Requests for Information or Testimony** in Chapter 2 of the General Manual which provides important information regarding responding to requests and demands to testify or produce documents to outside parties.

Additionally, it is important to know that, if subpoenaed or otherwise notified to appear as a witness in any court proceeding, inspectors must immediately notify their regional office and provide information as to the date, place and time of the subpoena served; title of case; party by whom subpoenaed; name and address of that party's attorney; name of court; place, date and time of trial, and circumstances of the incident for which subpoenaed. This also applies to railroad disciplinary investigations. The inspector **must not** respond to any of these requests independently.

Operating Equipment

An inspector shall never operate any piece of railroad equipment. ***There is no exception to this rule!*** However, an inspector may request that a railroad representative move or operate a piece of equipment, or perform a test for investigation purposes.

Delaying Trains

Inspectors have no authority to prohibit the departure or movement of any train, locomotive, car, etc. Inspectors can issue a Special Notice for Repairs and should point out any hazardous conditions that could result in an accident should the defective train, locomotive, or car depart without appropriate attention. If a railroad elects to move equipment without taking appropriate action, the inspector should notify their regional office immediately and develop information to pursue civil penalties against the railroad and/or initiate enforcement action against an individual. Especially, if a Special Notice for Repairs has been issued and ignored.

Please also read **Intervening When Railroad Employees Perform Unsafe Acts** in Chapter 2 of the General Manual.

Federal Railroad Administration

Unusual Occurrences

Please read **Handling Deterrents to Inspections** in Chapter 2 of the General Manual.

National Transportation Safety Board

Please read the **National Transportation Safety Board (NTSB)** section in Chapter 4 of the General Manual for guidance.

The “Independent Safety Board Act of 1974” established the National Transportation Safety Board (NTSB) as an independent agency. The NTSB is authorized to investigate railroad accidents and make recommendations based upon the findings of their investigations. If NTSB Investigators arrive on the scene during an accident investigation, FRA inspectors should introduce themselves and promptly contact the regional office to advise of the NTSB’s presence. However, unless instructed otherwise, FRA investigation activities should continue independently.

It is the Office of Railroad Safety’s policy to extend full cooperation to the NTSB in all matters related to railroad safety and accident investigation. If an inspector is assigned to assist in an NTSB accident investigation, the inspector must keep the Regional Administrator informed about the progress of the NTSB’s investigation.

Chapter 2

Inspection and Compliance Program

Introduction

The General Manual provides detailed information regarding general inspection and investigative procedures, along with a good discussion about the rulemaking process. However, there are some policies and procedures that are specific to the MP&E Discipline and warrant inclusion in this manual.

Allocation of Resources

The regional supervisors, including the MP&E specialist, are responsible for coordinating *special* MP&E assignments and activities within the region using national and regional safety data to allocate inspector resources. The regional supervisors, through the MP&E specialist, shall establish priorities appropriate to the urgency and seriousness of any alleged complaint, violation, or incident.

Inspectors are responsible for coordinating daily inspection activities to ensure adequate coverage of their territory. The inspector should plan to visit all assigned inspection points within their territories as circumstances warrant, unless directed otherwise by regional management.

Regular Inspection Point

Each inspector will prepare and maintain an accurate regular inspection point (RIP) list of inspection points for railroads within his/her assigned territory. The RIP list, and any subsequent changes to the list, shall be forwarded to the regional specialist. The specialist is responsible for reviewing regional RIP lists for accuracy.

Inspection/Activities Priorities

The allocation of resources will often deviate from the desired goal because of unforeseen events. When these events occur, Regional Administrators, Deputy Regional Administrators, specialists and inspectors will base their decisions on the following priorities:

1. Accident investigations
2. Congressional complaint investigations
3. Waiver petition investigations
4. One-time movement investigations (receives higher priority if the OTM is for clearing major accident site)
5. Regular complaint investigations

Federal Railroad Administration

6. National Safety Program Plan (NSPP) inspection
7. Focused enforcement inspection
8. Sample locomotive/car inspections
9. Steam locomotive - Boiler inspections
10. Site-Specific (Routine) inspections
11. Operation Life Saver presentations

Accident Investigations

Refer to the **Accident Investigation Guidelines** in Chapter 4 of the General Manual, for agency policies and procedures. The following resources are available for assessing commodity hazards and rail equipment damage and can be provided to the On-Scene Coordinator:

Emergency Assistance:

Chemtrec	800-424-9300
Chlorep	703-527-3887
NACA Pesticide Safety	888-663-2155
Bureau of Explosives	202-639-2910
Poison Control Center	800-222-1222
National Response Center	800-424-8802
FEMA	202-646-2044
Nuclear Regulatory Commission	301-951-0550
Transportation Crisis Mgt Center	202-366-5270
FRA Public Affairs Office	202-493-6024

Congressional Complaints Inspections

Refer to the **Compliant Investigations** of Chapter 5 in the General Manual. Remember, the inspector has **10 days** to complete the investigation and submit a written report of the findings to the regional office.

Waiver Petition Investigations

All MP&E waiver petitions must be processed through the Washington, DC, headquarters Office. Headquarters will assign a Docket Number and publish the request in the *Federal Register* and transmit the request to the region for investigation. The region will then assign the waiver petition to an inspector for investigation. Waiver petitions are handled pursuant to Title 49 CFR Part 211, which states that waiver decisions must be made not later than 9 months after receipt of the request. Therefore, the waiver investigation must be conducted in a timely manner.

Motive Power and Equipment Compliance Manual

The inspector will prepare an Inspector Report Form for MP&E Petitions and submit it to the regional office within 30 days. If the waiver petition investigation requires more than 30 days to complete, the inspector will submit a memorandum or e-mail to the regional office detailing the reason for the delay. All recommendations from the inspector and region must be supported with *factual* evidence, proof, and/or data, *not opinions*. CAUTION: The inspector should never disclose to the petitioner what the recommendation will be, as the Railroad Safety Board has the final say.

Refer to the **Waiver Investigations including Signal Applications** in Chapter 5 of the General Manual for more details of the waiver process.

Inspectors shall use the Form “Inspector Report Form for MP&E Petitions” shown below to report the findings of his/her investigation.

<p>DEPARTMENT OF TRANSPORTATION FEDERAL RAILROAD ADMINISTRATION</p> <p><u>Inspector Report Form for MP&E Petitions</u></p>
--

Petition No.	Date Petition Filed
Inspector	Date of Report
Railroad/Co. Filing Petition	
Inspection/Investigation Date	Location
Railroad/Co. Representative Name & Title	

Synopsis of Petition and Inspector Recommendation	
Furnish the Following Information - (choose one only with X for (a))	
(a)	Description of proposed changes or relief sought, locations with respect to place and distance between designated points is correctly stated in Public Notice, or
	should be changed to read as follows.
(b)	Name of any other railroads affected by proposed changes not shown in Public Notice and manner in which affected.

Federal Railroad Administration

(c)	1) Description of motive power or equipment involved.
	2) Describe condition of motive power or equipment involved relative to compliance with 49 CFR Part(s) 215, 223, 229, 230, 231, 232 or 238.
	3) Description of operations for which waiver of compliance is sought.
	4) Information relative to the proposed relief not fully described in the Public Notice.
	5) Present method of operation, number of trains or other movements per day, and speed authorizations and restrictions.
	6) Summary of accidents/incident reports reviewed relative to proposed relief.
	7) Other pertinent facts or remarks.
(d)	List of any prints, bulletins, orders, timetables, etc., obtained during investigation.
(e)	List the specific sections from which relief are sought (e.g. 49 CFR Part 223, 229).
	1) Reason(s) proposed relief from compliance with the regulations is necessary.
	2) If any of the proposed changes have been placed in service, give description of such changes, date such changes were placed in service and the reasons for making the changes before approval of the petition.
(f)	Inspector analysis - The proposed relief will <i>(choose one only with X for (f))</i>

Motive Power and Equipment Compliance Manual

	Reduce protection and safety.
	Provide adequate protection for existing and operating conditions without materially reducing safety.
	Maintain existing protection and safety.
	Increase protection and safety.
	State Reasons:
(g)	Inspector's recommendation regarding disposition of this application, (explain and state reasons).

One-Time Movement Inspections

From time to time, railroads or equipment owners will request that FRA issue a “one-time movement authority” (OTM) to allow a noncomplying cars or locomotives to be moved for a specific purpose under specified conditions ensuring for safety of the movement. It should be noted that FRA considers an OTM to be an exercise of its enforcement discretion in a limited number of specialized circumstances, and the granting of such authority does not relieve a party from any statutory liability applicable to such movements.

This authority is not necessary for equipment that can be moved under 49 CFR § 215.9, § 229.9, or §§ 238.15 & .17 authority. FRA will *consider* granting OTM movement authority on the following basis:

- Positioning - For example, an over-age car or noncomplying locomotive being moved to a railroad museum for permanent display, or noncomplying equipment moved to ports for shipment to a foreign country.
- Dismantling - A wreck-damaged car or locomotive that is deemed to be not economically repairable, or an over-aged or retired car or locomotive that needs to be moved to a scrap yard for dismantling.
- Repair - Movement for repair requests are the most common, and also the most often denied of the four categories. For FRA to consider issuing authority for movement of noncomplying equipment for repair, the circumstances related to the movement must be unique and/or the necessary repairs must require specialized facilities or personnel skills. For example, the nearest facility may not be equipped to fully effect the necessary repairs, such as heavily wreck-damaged locomotives or tank cars.
- Prototypes - Special demonstrations and testing of prototype equipment.

Federal Railroad Administration

To obtain one-time movement authority from FRA, the requestor must submit a letter on company letterhead to:

Director
Office of Safety Assurance and Compliance
1200 New Jersey Avenue, SE,
West Building, Third Floor, Mail Stop 25
Washington, DC 20590

If the OTM is strictly within the boundaries of a single FRA region (considered a “Regional-Local” OTM), the petitioner may submit the request to the attention of the Regional Administrator of the particular region, as follows:

FRA REGIONAL OFFICE ADDRESSES:

Regional Administrator
Federal Railroad Administration, Region 1
55 Broadway, Room 1077
Cambridge, MA 02142
(617) 494-2302
(617) 494-2967 FAX
(800) 724-5991

Regional Administrator
Federal Railroad Administration, Region 2
Baldwin Tower, Suite 660
1510 Chester Pike
Crum Lynne, PA 19022
(610) 521-8200
(610) 521-8225 FAX
(800) 724-5992

Regional Administrator
Federal Railroad Administration, Region 3
Atlanta Federal Center
61 Forsyth Street, S.W, Suite 16T20
Atlanta, GA 30303-3104
(404) 562-3800
(404) 562-3830 FAX
(800) 724-5993

Regional Administrator
Federal Railroad Administration, Region 4
200 West Adams Street, Suite 310
Chicago, IL 60606
(312) 353-6203
(312) 886-9634 FAX
(800) 724-5040

Regional Administrator
Federal Railroad Administration, Region 5
4100 International Plaza, Suite 450
Fort Worth, TX 76109
(817) 862-2200
(817) 862-2204 FAX
(800) 724-5995

Regional Administrator
Federal Railroad Administration, Region 6
901 Locust Street, Suite 464
Kansas City, MO 64106
(816) 329-3840
(816) 329-3867 FAX
(800) 724-5996

Regional Administrator
Federal Railroad Administration, Region 7
801 I Street, Suite 466
Sacramento, CA 95814
(916) 498-6540
(916) 498-6546 FAX
(800) 724-5997

Regional Administrator
Federal Railroad Administration, Region 8
500 East Broadway, Suite 240
Vancouver, WA 98660
(360) 696-7536
(360) 696-7548 FAX
(800) 724-5998

All request letters must contain the following information:

- The reporting mark/number and the type of equipment (e.g. locomotive, covered hopper car, passenger car), for which the OTM is requested, along with the corresponding Federal Safety Regulation [e.g., 49 CFR § 215.203(a)(1) *Restricted Cars*].
- The status of the equipment, to include all noncomplying components. State the cause of any damage (e.g., collision/sideswipe, grade crossing collision, derailment). Also, address any precautions taken to ensure the safety of railroad personnel during the move, such as removal of sharp edges, loose or crushed components, addition of temporary safety appliances and/or caution tape, roped-off stairway, etc.
- The point of origin and final destination of the equipment, including the specific route, to include any stops or layovers (such as for unloading and cleaning of tank cars) and all railroads that will be involved with the movement with the approximate distance of the movement.
- The rationale for the request (why the repairs cannot be made at the current or nearest repair location).
- Any restrictions the railroad or car owner believes should be applied to the movement.
- The point of contact (name, address, telephone, e-mail address and fax number) where the subject equipment is located, so that an FRA inspector can schedule an inspection.
- Name, title, address, telephone, e-mail address and fax number of the person requesting the OTM.

How to Expedite:

In order to expedite the process, the OTM request may be faxed to FRA's headquarters in Washington, DC, at (202) 493-6309, or if it is a Regional-Local OTM, the request can be faxed to the appropriate regional office as noted above. The fax cover sheet should be addressed to the attention of the Staff Director, Motive Power & Equipment Division, or the Regional Administrator, accordingly. However, the signed original request letter must *in all cases* be addressed to the Director of the Office of Safety Assurance and Compliance and mailed to the appropriate address, either headquarters or the appropriate regional office.

Note: All OTMs that are to be made between regions, and any export movements, must be submitted to and processed by headquarters in Washington, DC.

OTMs that come through headquarters will be handled by the headquarters staff. Headquarters will contact the appropriate region for an inspection of the equipment. The region will develop a report of findings, along with any recommendations regarding safety conditions or concerns. Headquarters will draft the final response letter and provide a copy of the letter to the relevant region prior to the movement taking place.

“Regional-Local” OTM authority that is *only* within the boundaries of a *single FRA Region* can be approved by the regional management. The region granting the OTM must provide an e-mail

Federal Railroad Administration

and/or fax copy of the original request letter, along with a copy of the letter granting the authority to move the equipment (or denial), to the Director of the Office of Safety Assurance and Compliance, prior to the movement. The letter must use the same or similar format used by headquarters for OTMs, containing the following information:

- The reporting mark/number and the type of equipment (e.g. locomotive, covered hopper car, passenger car), for which the relief is requested, along with the corresponding Federal regulation for the OTM.
- The status of the equipment, to include all noncomplying components. State the cause of any damage (e.g., collision/sideswipe, grade crossing collision, derailment). Also, address all precautions required to ensure the safety of railroad personnel during the move, such as removal of sharp edges, loose or crushed components, addition of temporary safety appliances and/or caution tape, roped-off stairway, etc.
- The point of origin and final destination of the equipment, including the specific route, to include any stops or layovers (such as for unloading and cleaning of tank cars) and all railroads that will be involved with the movement with the approximate distance of movement.
- Any restrictions the railroad or car owner believes should be applied to the movement.
- The FRA point of contact (name, address, telephone and fax number) for the requestor to call in case there is an incident or to notify when the OTM is completed.

Regions must consult with headquarters for appropriate OTM restrictions if mechanical engineering issues are in question.

Regular Complaint Investigations

Refer to the **Complaint Investigations** in Chapter 5 of the General Manual for detailed procedures.

Complaints are generally filed by railroad employees, labor organizations, or the general public. The complaint may be submitted by either formal letter, e-mail, telephonic, or verbal format. Complaints may be referred by other State or Federal agencies. The inspector assigned to a complaint investigation normally knows the identity of the complainant and the names of potentially helpful contacts.

Attention: The complaint investigation must be conducted without revealing to anybody that a complaint is or was under investigation. An inspector may not, under any circumstances, reveal the identity of the complainant to anyone not employed by the FRA, unless:

- The complainant authorizes such disclosure in writing; or
- FRA refers the matter to the Attorney General (AG) for enforcement, discussion limited to persons within the AG's office. See 49 U.S.C. 20109.

The region will assign the complaint to an inspector, who will complete the investigation within 60 days. If a complaint investigation cannot be completed in 60 days, the inspector will write a memorandum or e-mail to the regional office explaining the reasons for the delay. Each five days thereafter, until completion of the complaint, the inspector will submit a memorandum or e-mail to the regional office explaining the status of the complaint.

Complaint investigation must be thoroughly investigated the first time. Job pressures must not interfere with the investigation, even if it is thought that the investigation is taking an inordinate amount of time.

Focused Enforcement Inspections

Focused enforcement entails concentrating enforcement efforts primarily on the types of violations most likely to cause an actual train accident or injury. FRA's accident/injury database provides a wealth of information on what these leading causes of accidents and injuries are. The basic principle here is allocating our finite enforcement resources on those areas where improvements in compliance are most likely to produce maximum safety benefits. The principle is the same with regard to allocating inspection resources; as discussed in a separate document on inspections, we need to use available information on safety risk criteria to better guide our selection of inspection priorities.

FRA inspectors shall utilize FRA's accident, injury, and inspection data to gain better insight into the types of violations that are actually causing large numbers of accidents and injuries. While much of the information is already available to the field, FRA will distribute to the field data summaries showing the leading causes of train accidents and injuries by safety discipline, cause code, and regulatory section. The data will be industry-wide and broken down by railroad. With this information, inspectors will be better equipped to weigh the discretion criteria concerning the inherent seriousness of violations and the level of risk posed in specific circumstances. This is not to suggest that enforcement decisions are to become entirely driven by data. Direct observations and experience will always be necessary elements of these decisions. However, because the agency has adopted certain performance goals linked directly to reducing the rate of certain unsafe events, we need to make better use of the data we collect to help guide our achievement of those goals.

In-depth accident analyses are conducted to determine if any laws, rules, or orders within FRA's jurisdiction have been violated and what remedial action should be taken. In addition, inspectors must study accident trends in their inspection territory, especially those attributed to human factors and mechanical practices; to include inspections, tests, and repairs. Information is available for each railroad in the inspector's territory and will be helpful in outlining inspection plans and setting safety priorities. Site-specific inspections should be performed on the basis of each inspector's knowledge of enforcement areas requiring more attention to ensure safety. An inspector's knowledge of each railroad within the inspection territory should determine the types of inspections which must be performed. For example, if a recent human factors-caused accident was related to an improper air brake inspection, concentrated inspections of the railroad's air brake inspections should be conducted at various times throughout a 24-hour period, to include

Federal Railroad Administration

weekends. Where inspectors are focusing on leading causes of accidents and injuries, their violation reports should summarize the factors underlying their decision.

In the meantime, inspectors are encouraged to make use of data already at their disposal, including accident data, inspection data, and their own experience about the most important safety hazards. Inspectors should give this information great weight and strongly consider enforcement action whenever these especially unsafe conditions occur, with a goal of maximizing the safety return on enforcement efforts. While some enforcement actions will continue to be necessary on matters that are not likely to actually cause accidents or injuries but violate regulations that are important underpinnings of an effective regulatory program (e.g., recordkeeping), those matters that are serious safety concerns are more likely to be the prime candidates for enforcement actions. Reporting, recordkeeping, and inspection violations become more important to the extent they are widespread and/or bear directly on compliance with substantive requirements.

Over time, this more careful focus on how enforcement discretion is exercised should significantly improve FRA's utilization of limited resources regarding compliance oversight. On the other hand, as we refine the process, we may decide to adopt a "zero tolerance" (i.e., always enforce) policy for the most egregious and flagrant violations. The goal is not to achieve a particular volume of enforcement actions on the high or low side. The goal is a compliance program in which enforcement discretion is routinely exercised in a commonsense way to address important problems that more cooperative enforcement methods have not resolved.

Sample Locomotive/Car Inspections

Inspectors should review the training CD that was disseminated to them prior to conducting the sample car inspection for detailed information and procedures.

Sample car/locomotive inspections are performed as a courtesy to the manufacturers, to ensure that the equipment is built in accordance with **all** applicable Federal regulations and requirements. Car builders that desire to have the FRA review their equipment for compliance with safety appliance standards are to submit their safety appliance arrangement drawings, prints, etc., to the FRA Office of Safety Assurance and Compliance for review, at least 60 days prior to construction. All requests and drawings should be submitted to the following address:

Director
Office of Safety Assurance and Compliance
1200 New Jersey Avenue, SE
West Building, Third Floor, Mail Stop 25
Washington, DC 20590

FRA will review the documents submitted and advise the builder as to the status. The builder should then notify the Office of Safety Assurance and Compliance at least 30 days in advance of when the sample equipment will be ready for inspection. Once the request is received, headquarters will coordinate with the appropriate regional office as to the date and location of a

Motive Power and Equipment Compliance Manual

scheduled sample car/locomotive inspection. The Regional Administrator will appoint an experienced inspector to conduct the inspection.

If the location of the sample car/locomotive inspection is in Canada, the regional office shall coordinate the inspection activity with representatives from Transport Canada so that a joint inspection can be conducted.

The individual assigned to perform the sample car/locomotive inspection shall review in advance the current MP&E Sample Car/Locomotive Inspection Procedure Guidelines, pertinent regulations covering the type of car or locomotive to be inspected, and (if possible) the current Association of American Railroads (AAR) Manual of Standards and Recommended Practices or the American Public Transit Association (APTA) Standards applicable to the car or locomotive to be inspected. Inspectors should have the necessary equipment to perform the inspection (i.e., appropriate regulations and standards, gauges, camera, ruler, measuring devices, and the checklist which is provided in appendix.

The equipment inspected must strictly comply with the applicable sections of:

- 49 CFR Part 215 Freight Car Safety Standards
- 49 CFR Part 223 Safety Glazing Standards
- 49 CFR Part 224 Reflectorization
- 49 CFR Part 229 Locomotive Safety Standards
- 49 CFR Part 231 Safety Appliance Standards
- 49 CFR Part 232 Power Brake Systems
- 49 CFR Part 238 Passenger Car Equipment Safety Standards
- 49 CFR Part 239 Passenger Train Emergency Preparedness

In addition to regulatory requirements, the equipment should be examined from a standpoint of overall operational safety. Conditions not covered by regulations should be addressed in the assessment of the equipment. Photograph and describe in detail any condition detrimental to safety, or that has the potential to become a detriment to safety.

While performing the inspection of the brake system, it is important to examine the location of pertinent brake components which must be observed during the performance of required brake inspections by railroad inspectors. The brake must be designed so that a railroad inspector can observe from a safe position, either the piston travel, an accurate indicator which shows piston travel, or any other means by which the brake system is actuated. The design shall not require the railroad inspector to place himself or herself on, under, or between components of the equipment to observe the brake actuation or release during a required train air brake inspection.

Unsafe and questionable conditions must be identified and reported to the car/locomotive manufacturer during the inspection.

FRA Form F6180.4, *Special Inspection of Safety Appliance Equipment*, will be completed for each type of equipment inspected. Normally a sample car inspection does not require an FRA F6180.96 report. A computerized version of the F6180.4 report, in WordPerfect format, has been developed for use.

Federal Railroad Administration

Each block of the F6180.4 shall be completed. Enter “N/A” in spaces that do not apply. If an appliance deviates from the standards, enter the dimensions or description in the appropriate space on the front of the form. Any deviation from FRA regulations must be documented on the F6180.4 report and reported to the builder’s representative for corrective action. If necessary, a memorandum may be used to supplement the F6180.4.

The Hand Brake entry should include the manufacturer and model number.

The Handhold and Ladder Tread entries should show clear, usable length.

The Power Brake block should show the type of brake applied, such as WABCO - ABDWXL, or NYAB - ABDW, or an ECP brake system. Additional information may be included describing the brake system (i.e., 12 -inch cylinder, empty-load sensing equipped, stand-alone or overlay ECP system, etc.).

A minimum of six photographs must be supplied that clearly show the safety appliance arrangements and any noncomplying conditions, to include each corner of the car and both ends of the car. Also, any defect noted should have a photo to support it.

The inspector should use the “sample car inspection checklist” when performing the sample car inspection and submit a copy of the check list with the F6180.4 report in the package to headquarters. The inspector should also try to obtain a copy of the golden shoe test report, along with any other brake test reports, slewing reports, etc., and include the copies in the package that will be forwarded to headquarters.

At the conclusion of the inspection, the inspector should inform the car builder of the findings. However, the inspector **is not to advise the builder that the “sample car” meets all Federal requirements.** Headquarters will advise the builder and the region on the car’s status of compliance or noncompliance. The Office of Safety Assurance and Compliance will provide the car builder, in writing, the results of the sample car inspection.

MP&E Safety Concern & Recommendation Report F6180.4A

During regular inspection of railroad rolling stock equipment, the inspector may or may not be sure compliance has been achieved when encountered by a potential safety concern or systemic safety condition. Conditions where compliance is in question and that warrant further investigation without removal of equipment from service should be reported by using this form. Answers to questions such as “Has previous relief been provided by waiver, sample car inspection, or other regulatory process?” when performing field inspections usually are not readily available. Inspectors are encouraged to complete this form by filling out any potential unsafe condition(s) that he/she believes there is no clear guidance on compliance.

The inspector shall contact his/her MP&E specialist to determine if there may be a valid safety concern. The regional MP&E inspector and MP&E specialist will contact MP&E headquarters

to discuss the safety concern. If warranted, headquarters will provide an FRA control number to identify the safety concern.

Once the regional specialist and headquarters determine that the condition is a safety concern, a Form F6180.4A will be completed. The Form F6180.4A, MP&E Safety Concern & Recommendation Report, will be completed for each potentially unsafe condition for tracking of each reportable defect. This F6180.4A, MP&E Safety Concern and Recommendation Report, is located at the end of Chapter 2.

Once a control number has been assigned, the Form F6180.4A report will be completed. Enter the information contained within the report; all blocks must be completed. Each field is expandable to assist the inspector in including additional information.

Photographs of a safety concern along with other tools necessary to help determine the condition should be included by attaching text or photography to the report.

Once the F6180.4A has been received at headquarters, the staff specialist will contact the appropriate parties to discuss the issue and make recommendations to bring the equipment into compliance or discuss other regulatory processes for resolution. In the event relief has been provided, a response will be sent to the MP&E specialist and the matter will be considered closed.

F6180.4A reports submitted will be entered into the headquarters database, and will be placed on the FRA secure site to monitor progress of each reported incident.

Federal Railroad Administration

OMB No. 2130-0565

 U.S. Department of Transportation Federal Railroad Administration MP&E SAFETY CONCERN & RECOMMENDATION REPORT			
Inspector(s) Name:		Inspector ID: Date:	Region: FRA Control No.:
Built Date:		Type: (e.g. B, CH, AC, etc. use code from F6180.96 / RISPC table)	
Name of Builder and/or Owner:		Location of Builder and/or Owner: (City & State)	
Initial:	Number:	Were Concern(s) Recorded On F6180.96:	<input type="checkbox"/> Yes <input type="checkbox"/> No
		If Yes, Indicate Inspector Initials Followed by Inspection Report No.(s):	
Approximate Number Of Units With	0	Reporting Marks:	
If Known, Approximate Number Of Units In Service With The Concern(s) Described Below:			
CFR Section And Text Reference: (Cite Complete CFR Section, TB, and Corresponding Text Description)			
Description Of Concern(s):			
Cite Any Safety Concerns, Known History Of Injuries/Fatalities/Derailments, etc. Associated With This Issue: (Names, Dates, Location, etc.)			
Inspector Recommendation(s):			

FRA F 6180.4a (11/04)

Public reporting burden for this information collection is estimated to average 60 minutes per response. This estimate includes the time for completing the inspection and filling-out this form. According to the paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this collection of information is 2130-0565.

Site-Specific (Routine) Inspections

Refer to the General Manual, Chapter 3 for detailed information regarding regular inspection activities.

MP&E inspectors are **not** required to announce their presence on railroad property, nor are they required to provide advance notice of an inspection, investigation, follow-up, or surveillance activity. However, advance notice may be necessary to ensure the availability of records, equipment, carrier representatives, and/or persons to be interviewed.

Upon completion of an inspection, the inspectors shall confer with a railroad representative to advise them of any noncomplying conditions or practices discovered by the inspection. The inspector should cite the defective conditions and the applicable regulation that is in noncompliance. If time permits, a written report will be given to a railroad representative before the inspector leaves the railroad's property. If the railroad representative is not present or the inspector does not have sufficient time to complete a written report, then one shall be completed during the next work period and delivered or forwarded to the railroad representative.

When conducting an inspection at a remote location where no railroad representative is available, a railroad official shall be contacted at the completion of the inspection and advised of the results.

The RISPC Program, F6180.96: Form F6180.96 inspection report preparation *is mandatory* for all inspections where civil penalty action (a violation report) is recommended. Federal regulations (Ref. 49 CFR § 209.405(a)) require railroads to submit Report of Remedial Action to FRA for all violations 30 days after the end of the calendar month in which notice of violation occurred. To complete the regulatory cycle, inspectors should complete the Remedial Action portion of the inspection report, as soon as the report (railroad copy), is received from the railroad. Inspectors are required to update all inspection reports containing violations as soon as possible. This helps ensure the integrity of FRA's inspection report database and the regulatory requirements.

All defective conditions must be listed on FRA Form 6180.96. Inspectors must **not** create a separate F6180.96 report for each violation taken during an inspection activity. The F6180.96 report is designed so that the inspector can list all of the defects taken for an inspection activity and identify which defect is being recommended for civil penalty by checking the appropriate box. When the violation box is checked "Yes" on the F6180.96 inspection report line item, some of the information is automatically transferred from the F6180.96 inspection report to the FRA Form F6180.109 violation report.

FRA Form F 6180.109: This report replaces all other MP&E violation reports previously used in connection with violation reporting of MP&E type violations, *except* for those associated with Parts 218 and 221. FRA Form F6180.109 is a component of the RISPC program and can be accessed from within RISPC or via a shortcut icon. FRA Form F6180.109 will be used for the following violations:

Federal Railroad Administration

- Part 209 - Railroad Safety Enforcement Procedures
- Part 210 - Railroad Noise Emission Compliance Regulations
- Part 215 - Railroad Freight Car Safety Standards
- Part 223 - Safety Glazing Standards-Locomotives, Passenger Cars and Cabooses
- Part 224 - Reflectorization of Rail Freight Rolling Stock
- Part 229 - Railroad Locomotive Safety Standards
- Part 230 - Steam Locomotive Inspection and Maintenance Standards
- Part 231 - Railroad Safety Appliance Standards
- Part 232 - Brake System Safety Standards for Freight and Other Non-passenger Trains and Equipment; End-of-Train Devices
- Part 238 - Passenger Equipment Safety Standards
- Part 201 (40 CFR - Certain Noise Violations)
- Statutory Violations – U.S.C. 49 Subtitle V Chapters 203 & 207

Note: A narrative section is still required and must be inserted in Item 44 (Violation Narrative) of the form. In most cases, the narrative will require the use of attachments. It is recommended that in Item 44 (Violation Narrative) the word “Attachments” be included at the bottom of the page, followed by a Table of Contents page, then followed by all subsequent pages of attachments.

FRA Form F6180.67: The Violation of Federal Railroad Safety Regulations form is used to submit violation reports in connection with 49 CFR Part 218 - Subpart C, Blue Signal Protection of Workers, and Part 221 - Rear End Marker Devices. FRA Form F6180.67 is also used for other operating practices violations. Detailed instructions similar to these are also embedded in the RISPC program. Refer to those instructions for completing FRA Form F6180.67. This form behaves in the same manner as FRA Form F6180.109 and resides within the RISPC program.

Submission of Photographs as Evidence: Photographs provide strong evidence in support of a violation. If photographs are included in the violation, the inspector will attach (mount) each photograph to a piece of paper and explain what each photograph shows (*be certain that the photo clearly depicts the defect and location of the defect(s) in question*). If photographs are part of the evidence, both the original and second copy of each violation report must have mounted photographs when they are submitted to FRA’s Office of Chief Counsel. This is required so that when one copy is furnished to the respondent, the respondent will have the same evidence that the FRA has in its possession. Copies of digital photographs are acceptable, provided the inspector makes a statement in his/her violation report indicating the digital photographs have not been altered in any way. Photographs that have been altered in any way must not be included as violation evidence.

Note: Refer to MP&E Technical Bulletin MP&E 05-01 for Violation Report Form F 6180.109, Item and Field description and required information

Statements of Witness or Reports of Interview: Unless a violation is substantiated by an inspector’s personal knowledge or by records the FRA requires railroads to maintain, the violation report should be accompanied by statements of witness reports obtained from railroad

employees, railroad officials, or other persons who know the circumstances surrounding the noncomplying act or condition. If a statement is the only proof of noncompliance, the use of a witness statement is required.

Copies of Railroads' Records: When applicable, the violation report must be accompanied by legible copies of the railroad's applicable records, containing information that will provide the FRA Office of Chief Counsel with substantiating documentation and a clear understanding of the violation of Federal safety regulations.

This information may be submitted in the form of duplicated copies of the railroad's records or through comprehensive, word-for-word extracts taken from the railroad's records.

Operation Life Saver Presentations

Refer to the General Manual, Chapter 6, for certification requirements and presentation guidelines.

FRA's Jurisdiction Over Tourist and Excursion Railroads

Please refer to "Safety Jurisdiction over Tourist Railroads" section on Page 30 and 31 of the General Manual for additional information.

As with many agencies of the federal government, the FRA does not extend the "full reach" of most of its regulations as far as the statute permits for either resource or policy reasons. To identify the agency's current policy regarding the scope of regulatory enforcement for certain types of railroads, FRA developed a set of guidelines. These guidelines are meant to clarify the extent of and proper application for the jurisdiction that the agency chooses to exercise. The purpose for this chapter is to provide enforcement guidance for tourist and excursion railroads.

Guidance:

FRA will exercise jurisdiction over all tourist operations, whether or not they operate over the general railroad system, except those that are (1) less than 24 inches in gage and/or (2) insular. The FRA considers an operation insular if it is limited to a separate enclave in such a way that there is no reasonable expectation that the safety of any member of the public, except for a business guest, a licensee of a tourist operation or an affiliated entity, or a trespasser, would be affected by the operation. Therefore, an operation will not be considered insular if one or more of the following exists on its line:

- A public highway-rail crossing that is in use.
- An at-grade rail crossing that is in use.
- A bridge over a public road or waters used for commercial navigation; or
- A common corridor with a railroad, i.e., its operations are within 30 feet of those of any railroad.

Thus, the mere fact that a tourist operation is not connected to the general railroad system would not make it insular under these criteria. While these criteria will tend to sort out the insular

Federal Railroad Administration

theme parks and museums, there will still be a need to do case-by-case analysis in some close situations.

Regulation:

Tourist railroads are not required to comply with the requirements of either Title 49 CFR Parts 238 or 239. However, tourist railroads that operate on the general system must comply with all statutes and all regulations, unless and until any appropriate waiver has been applied for and granted. Of course, FRA generally lacks authority to waive statutory requirements.

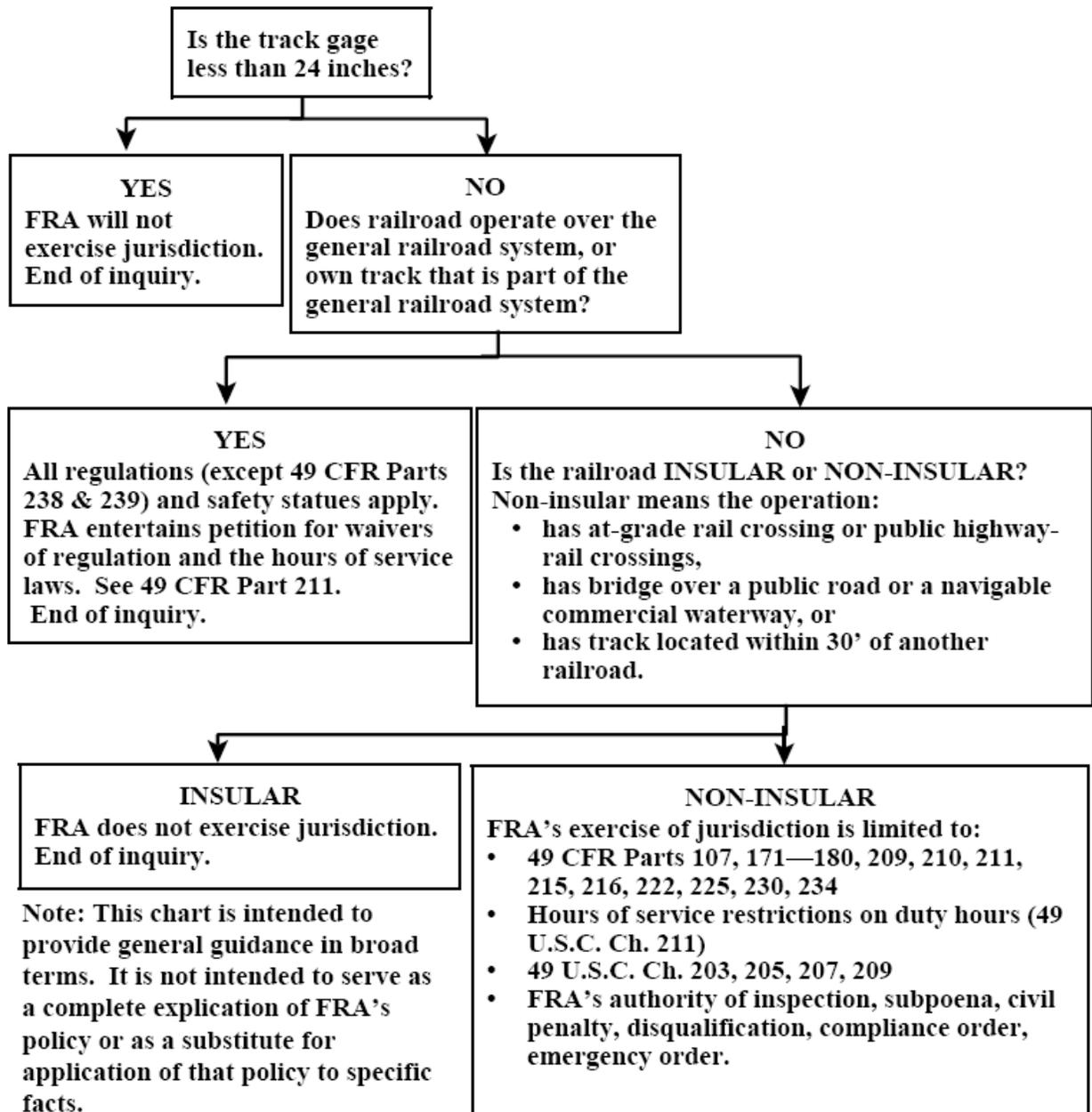
Some tourist railroads are neither insular nor part of the general system (i.e. stand-alone lines with no freight traffic.). In these instances only the following statutes apply:

- 49 USC §§ 20102, 20301, 20302, 20303, 20502-20505, 20701, 20902, 21302, 21304 (formerly 45 USC §§ 1, 2, 4, 9, 11, 13, of the Safety Appliance Act and 45 USC 22 *et seq.* of the Locomotive Inspection Act); and
- Federal signal inspection laws, 49 USC §§ 20102, 20502-20505, 20902, 21302, 21304

However, FRA's emergency order authority permits the agency to address a true safety emergency arising from specific conditions. Thus, even "off-the-system" tourist railroads should understand that FRA has the jurisdiction to inspect their operations, and to take emergency action if those operations pose an imminent hazard of death or injury.

The chart below provides a general guidance in deciding the scope of compliance.

**Tourist Railroads
Federal Railroad Administration's (FRA) Exercise-of-Jurisdiction
Decision Tree**



Federal Railroad Administration

Source Codes

The following source codes are the only source codes to be used by MP&E inspectors. When applying the appropriate source code on inspection reports, the inspectors should remember that FRA must, at all times, focus on the quality of inspection efforts. For many years, our estimates have indicated that we have the ability to actively monitor about two-tenths of one percent (i.e. 0.2%) of railroad operations. Current data shows a similar relationship between railroad operations and FRA inspection capacity.

Please note that according to Technical Bulletin G-07-03, the selectable Source Codes have been reduced in the RISPC. Five codes have been eliminated and will generate error messages in the inspection reports if they are used. Those codes are:

- F – Federal Assistance Investigation
- G – Other
- K – Inspection from Train
- W – Focused Inspection
- Y – Inbound Extended Haul Trains

In place of codes F, G and W, please use Source Code D, Special Investigation. Source Code D requires that the File Number box be filled in. The previously used Source Code W for Focused Inspections or for Audits will now need to use Source Code D along with unique File Number. The File Number should be descriptive and mean something to you. The File Number box has 18 characters to work with.

The most recent revision of the Source Codes took place on February 29, 2008. It should now be error-free. If Source Code W is used after February 29, 2008, you would get an error message. If the report does not recommend a violation, then simply change the Source Code D to add a File Number, and then save the report. If the report contains a recommended violation and the report is locked, please call ActioNet at 703-204-0090 x 248, and ask for assistance in getting that changed without having to delete the violation report.

MP&E Source Codes

- A:** Regular inspection – A periodic inspection activity conducted by Federal and State railroad safety inspectors, in accordance with established procedures, to determine railroad, shipper, consignee, contractor, and manufacturing facility compliance with Federal statutes, rules, regulations, orders and standards within the jurisdiction of FRA.
- B:** Complaint Investigation – Any inspection initiated for the purpose of performing a complaint investigation. A complaint file number must be assigned and indicated on the inspection report when this code is used.
- C:** Accident Investigation – Any inspection resulting from an accident/incident investigation. An accident file number must be assigned and indicated on the inspection report when this code is used.
- D:** Special Inspections or Investigations – Inspections initiated for a specific reason or purpose not otherwise identified. A file number must be assigned and indicated on the inspection report when this code is used.
- E:** Waiver Investigation – Inspections resulting from investigating requests for temporary relief from Federal regulations. A waiver investigation file number must be assigned and indicated on the inspection report when this code is used.
- F:** ECP Brake-Equipped Trains (MP&E) – Inspectors must complete a separate inspection report using Source Code G, along with all related inspection activity associated with the ECP brake-equipped trains (e.g., Parts 215, 231, 232, etc.). Source Code G must also be used when inspection activities, such as Parts 218, 223, 229, etc., involve ECP brake-equipped trains and equipment.
- H:** Nuclear Route Shipment – Inspections of nuclear routes or shipments as specified in the Safety Compliance Oversight Program (SCOP) Plan.
- R:** Re-inspection – Inspection activity carried out to examine, monitor, or further develop previously conducted work. Inspectors must use good judgment when deciding the appropriate interval for the re-inspection, taking into consideration factors such as the inherent seriousness of the noncompliance and the railroad’s general level of current compliance as revealed by the original inspection as a whole. Signal and Train Control inspectors and Track inspectors must also be governed by discipline specific guidelines. The File Number field must contain the Inspector ID and previous Inspection Report Number.
- V:** Inspection of or at Manufacturer’s Facility – Inspection activities for the purpose of conducting a sample car or sample locomotive inspection at the manufacturing facility, in accordance with established procedures, to ensure that the equipment is built in accordance with all applicable Federal statutes, regulations, and requirements.

Federal Railroad Administration

Z: Outbound Extended Haul Trains – Any inspection activity conducted on an extended haul train at the designated outbound inspection point by Federal and State railroad safety inspectors, in accordance with established procedures, to determine railroad and/or contractor’s compliance with Federal regulations as prescribed in 49 CFR 232.213(a)(2) through (a)(5). This code shall also be used for any inspection activity at locations where cars are added en route to an extended haul train.

Activity Codes

The activity codes to be used by MP&E inspectors can be found in the “Multi-discipline Code Table of Definitions shown at the end of this section.

When applying the appropriate activity code on inspection reports, inspectors should remember that the quality of the inspections and how the information regarding the inspections is captured is paramount to the inspection process. The information obtained from FRA’s inspections are used to support rulemakings, waiver decisions, deployment of inspections, trend analysis, research and development projects, accident/incident analyses, and the overall condition of our Nation’s railroads. In order to ensure that the data used for compiling statistics or for any analysis work is precise and consistent, inspectors need to adhere to the following guidelines when reporting the results of any inspections.

When conducting inspections for compliance with the following parts, inspectors are required to inspect the entire car/locomotive/train in order to count that activity as a unit for the unit count of the inspection report:

- Part 215 Freight Cars
- Part 224 Reflectorization
- Part 229 Locomotives
- Part 230 Steam Locomotives
- Part 231 Safety Appliances
- Part 232 Power Brakes
- Part 238 Passenger Car Equipment

However, there will be times when only one side of the car, locomotive, or train can be inspected. This constitutes a partial inspection, which is the exception, not the normal inspection practice. If an inspector is unable to inspect the entire car, locomotive, or train, the inspector must describe why only a partial inspection was performed in the line item description field (narrative) and the letter **P** must be entered in the class box of the line item. When the letter **P** is placed in the class box, every activity code used on the report will be captured as a partial inspection. Therefore, if the inspector performs an entire inspection of the locomotives on a train, but only inspects one side of the train (Parts 215, 224, 231, or 232), two inspection reports need to be made; one report for activity that received a complete inspection and one report for all activity that only received a partial inspection. Two inspection reports should be generated when activity codes for Part 218, *Blue Signal Protection*, Part 221, *Rear Markers*, and Part 223, *Glazing*, are used in conjunction with partial inspections.

Federal Railroad Administration

Multi-discipline Code Table of Definitions Revised January 7, 2012

Activity	Discipline	Definition	Comments
174A	H, M	General Requirements – The purpose of this inspection is to determine compliance with §§174.3, 174.5, 174.9, 174.14, 174.16 and 174.50. Record one unit for the inspection of each car transporting hazardous materials.	
174B	H, O	General Operating Requirements – The purpose of this inspection is to review a train crew’s documentation for each railcar containing hazardous material, including any changes in placement of the car. The inspection should include determining compliance with the basic hazardous materials shipping paper descriptions as required in §174.26. Record one unit for each train consist inspected, and one subunit for each inspection of the basic shipping paper description of each car containing hazardous materials. Note 1: Inspectors must use activity code TPLH to record inspections associated with train placement requirements. Note 2: Inspectors must use this code instead of code 172C when inspecting shipping papers specific to a particular train.	
209	ALL	Remedial Action – The purpose of this inspection is to report a railroad that has not complied with a requirement to provide a remedial action as noted in a previous inspection report. Record one unit for each remedial action not in compliance. (See General Manual for additional guidance).	
215D	H, O, S, T	Freight Car Mechanical Inspection – The purpose of this inspection is for any inspector <u>other than an MPE inspector</u> to determine compliance with § 215, including Appendix D. The inspection includes those performed by an FRA inspector or when an FRA inspector observes railroad employees performing this inspection. MPE inspectors should reference activity code 215. Record one unit for each freight car inspected or observed inspected for compliance with §215. For articulated cars, count each platform as one unit. Note 1: HM and OP inspectors should use this activity code HM for ALL of their Part 215 inspections. Note 2: Properly stenciled Maintenance-of-way equipment is exempt from Part 215.305(b).	

Motive Power and Equipment Compliance Manual

Activity	Discipline	Definition	Comments
217E	ALL	Emergency Order – The purpose of this inspection is to determine compliance with a current Emergency Order. Record each unit and subunit as directed by the unique instructions issued by FRA HQ regarding each specific Emergency Order. Inspectors must thoroughly explain the inspection in the inspection report’s narrative.	

Federal Railroad Administration

Activity	Discipline	Definition	Comments
2170	ALL	<p>Other Operations Observations - The purpose of this inspection is to observe railroad employees of any craft performing duties regarding railroad operating rules (ROR), and railroad safety rules(RSR). It will include all related RORs, RSRs, railroad bulletins, and any written railroad policy not otherwise covered in Federal regulations. Noncompliance will be recorded as a Non-FRA defect under this activity code. Record one unit for an entire yard or equivalent facility monitored, and one subunit for each crewmember, yardmaster, contractor, track employee, mechanical employee, signal maintainer, etc, that the inspector continually observed a sufficient amount of time to determine compliance or noncompliance.</p> <p>Note: Unlike noncompliance with Federal regulations, it is FRA policy that inspectors provide information recorded under this activity code regarding noncompliance of an ROR/RSR <u>without identifying the noncompliant employee by name</u> in the Federal inspection report. See the General Manual for a further explanation.</p> <p>Example 1: An FRA Track Inspector observes a <u>20</u> person section gang working for approximately 45 minutes when the inspector observes a track employee sitting on the rail. The FRA inspector intervenes by addressing the employee’s noncompliance with an RSR, and then discusses the noncompliance with the employee’s supervisor. The inspection report will include the recording of one occurrence of a Non-FRA defect for a track employee’s failure to comply with the specific RSR that prohibits employees from sitting on a rail. The inspector will record the inspection as one unit and <u>20</u> subunits</p> <p>Example 2: An FRA MPE Inspector observes <u>four</u> persons working on a railroad car with proper Blue Signal protection for approximately 10 minutes when the inspector observes one of the workers perform a task while not wearing the required protective equipment. The FRA inspector intervenes by addressing the employee’s noncompliance with a RSR by discussing it with the employee’s supervisor. The inspection report will include the recording of a Non-FRA defect for a car shop employee’s failure to comply with the specific RSR that prohibits performing the task without the proper protective equipment. The inspector will record the inspection as one unit and <u>four</u> subunits.</p>	

Motive Power and Equipment Compliance Manual

Activity	Discipline	Definition	Comments
218C	O,S,T	<p>Camp Car Protection - The purpose of this inspection is to determine compliance with camp car protection. Record one unit for each track inspected that requires camp car protection.</p>	
218M	M, O	<p>Blue Signal Protection on Main or Other than Main Track - The purpose of this inspection is to determine if the protection provided railroad employees requiring Blue Signal protection in accordance with §§ 218.25, 218.27, and 218.30. Record one unit for each track that requires Blue Signal protection. If the track requiring Blue Signal protection has more than one train or cut of cars requiring protection record one unit for the entire track.</p> <p>Regarding inspecting compliance with Blue Signal regulations involving a remotely controlled switch. Record one unit for all associated recordkeeping requirements at that location, and one subunit for each track associated with those records.</p> <p>Note 1: Except for stub tracks, both ends of the track must be inspected for compliance with the Blue Signal regulations.</p> <p>Note 2: There is a drop-down FRA observation code inspectors may use in lieu of writing a comment when there are not any exceptions noted.</p>	

Federal Railroad Administration

Activity	Discipline	Definition	Comments
2180	ALL	<p>Part 218 Subpart F – The purpose of this inspection is to determine a railroad’s compliance with Part 218 Subpart F, including the requirement for a railroad to have complying railroad operating rules as indicated in the regulation. Record one unit for each day, or partial day, spent reviewing relevant railroad rules or for each yard or equivalent facility monitored. Record one subunit for each crewmember, yardmaster, contractor, track employee, mechanical employee, signal maintainer, etc, that the inspector continually observed a sufficient amount of time to determine compliance or noncompliance.</p> <p>Note: It is FRA policy that inspectors provide information regarding incidents recorded under this activity code as noncompliance of a Federal regulation. It will include <u>identifying the noncompliant individual by name</u> in the inspection report. See the General Manual for a further explanation.</p> <p>Example 1: An FRA Track Inspector observes a <u>12</u> person section gang working for approximately 45 minutes when the inspector observes a track employee throwing a switch with equipment in the foul of the switch. The FRA inspector intervenes by addressing the employee’s noncompliance with §218 Subpart F, and then discusses the noncompliance with the employee’s supervisor. The inspection report will include the recording of the noncompliance for the track employee’s failure to comply with Part 218 Subpart F, and the name of the employee in noncompliance. The inspector will record the inspection as one unit and <u>12</u> subunits.</p> <p>Example 2: An FRA MPE Inspector observes <u>six</u> persons switching railcars in a car shop for approximately 10 minutes when the inspector observes one of the workers fail to properly protect a shoving movement. The FRA inspector intervenes by addressing the employee’s noncompliance with §218 Subpart F, and then discusses the noncompliance with the employee’s supervisor. The inspection report will include the recording of the noncompliance for the car shop employee’s failure to comply with the Part 218 Subpart F, and the name of the employee in noncompliance. The inspector will record the inspection as one unit and <u>six</u> subunits.</p> <p>Example 3: An inspector reviews the railroad rules to determine if they are in compliance with the requirements set forth regarding railroad equipment in the foul and operating switches. The inspection report will include the recording of one unit for this inspection and will also reference the precise railroad rule(s), or lack thereof, in the inspection report’s narrative.</p>	

Motive Power and Equipment Compliance Manual

Activity	Discipline	Definition	Comments
218S	M, O	<p>Blue Signal Protection Locomotive or Car Shops - The purpose of this inspection is to determine compliance with regulations requiring Blue Signal protection in a locomotive servicing track area, a car shop repair track area, or a track that has been designated as a repair track or expedite track. Record one unit for each area inspected.</p> <p>If § 218.29(c), <i>Alternative methods of protection</i>, applied in a car shop repair track area or a locomotive servicing track area, one unit is recorded for the entire area, regardless of the number of tracks in the area or the number of cars or locomotives on those tracks.</p> <p>Note 1: Except for stub tracks, both ends of the track, or each entrance to the area must be inspected for compliance with the regulation. Workers must be on, under, or between equipment, inspecting, testing repairing, or servicing before recording a unit for this activity.</p> <p>Note 2: There is a drop-down FRA observation code inspectors may use in lieu of writing a comment when there are not any exceptions noted.</p>	
221	M, O	<p>Rear End Markers – The purpose of this inspection is to monitor compliance with Part 221. This activity code <u>should not be used</u> when inspecting an End of Train (EOT) device under Part 232. Record one unit for each train, locomotive (including DPU’s) or caboose inspected for compliance.</p> <p>The inspection of each rear end marking device in rooms or locations where rear end marking devices are stored and/or recharged and maintained is one unit. Each rear end marker ID must be recorded in the line item along with the appropriate observation. Individual marking devices that are not attached to trains or in storage areas not subject to service are not recorded as a unit.</p> <p>Note: There is a drop-down FRA observation code inspectors may use in lieu of writing a comment when there are not any exceptions noted.</p>	

Federal Railroad Administration

Activity	Discipline	Definition	Comments
227N	IH	<p>227N - Occupational Noise Exposure - The purpose of this inspection is to determine compliance with Part 227 regarding occupational noise exposure in the <u>locomotive cab</u>. It will include audiometric test records, employee noise exposure monitoring plan and monitoring records, cab noise monitoring records, postings of monitoring results, training plans and records, or interviewing persons regarding noise exposure. Record one unit for each day or partial day of an inspection and one subunit for each Part 227 record reviewed.</p> <p>Note: This activity may only be claimed when accompanied by a member of the Industrial Hygiene staff.</p>	
228	O, S	<p>Hours of Service Records Inspection – The purpose of this inspection is to determine if Hours of Service (HOS) records are in compliance with Part 228. Record one unit for each day or partial day of inspection, and one subunit for each HOS record reviewed. This activity code includes any examination of HOS logs, HOS report forms, HOS documents, interviewing employees regarding HOS, and any other HOS records review activity. This activity code is not used to document an employee exceeding the HOS.</p> <p>Note: Reports <u>taking exception to</u> an employee exceeding the hours of service should <u>not</u> be recorded under this activity code, please reference the proper activity code associated with the employee’s type of work or discipline. Example: Activity Code 228P, 211, or HSL.</p>	
228C	O,S	<p>Construction of Employee Sleeping Quarters – The purpose of this inspection is to determine compliance with Part 228 Subpart C. Record one unit for each day, or partial day, spent reviewing relevant facilities regarding Part 228 Subpart C.</p>	
229X	H, O	<p>Locomotive Inspection in Operations – The purpose of this inspection is for any inspector, other <u>than an MP&E inspector</u>, to determine a railroad’s compliance with Part 229. Record one unit for any locomotive inspected. The inspection may include, but is not limited to, the locomotive daily inspection, any passageway tripping hazards, cab sanitation, cab lighting, speed indicator check, etc.</p>	

Motive Power and Equipment Compliance Manual

Activity	Discipline	Definition	Comments
232E	M, O	<p>End of Train Device – The purpose of this inspection is to inspect an End of Train (EOT) device for compliance of §232. The inspection must include verifying that the information on the calibration sticker is legible, and that it contains the date, name of person, and location of the last calibration. This activity also includes comparing the quantitative values between the front and rear unit, and the ability of the rear unit to effect an emergency application in response to an emergency application initiated from the front unit. Record one unit for each EOT inspected or observed for compliance.</p> <p>Note: This activity code will be used when citing defects on the Head End Device (HED) associated with the End of Train device (EOT).</p>	
232O	H, O, S, T	<p>Freight Train Brake Test Observation – The purpose of this inspection is for any inspector, <u>other than an MP&E inspector</u>, to determine compliance with Part 232 not covered in activity code 232E or 232X. It includes any airbrake test required by Part 232. Airbrake test inspections should include in the narrative of the inspection report if the inspector was observing or accompanying a railroad employee or contractor employee performing the airbrake test. Record one unit for each observation or inspection, and one subunit for each railcar involved.</p>	

Federal Railroad Administration

Activity	Discipline	Definition	Comments
232X	M, O	<p>Securement of Locomotive and Cars – The purpose of this inspection is to determine if railroad equipment is in compliance with §232.103 (n). Record units as follows:</p> <ol style="list-style-type: none"> 1. Record one unit for an inspection of unattended equipment that consists of a single locomotive or locomotive consist, either attached to cars or not. This inspection includes determining compliance with the requirements for throttle position, status of the reverse lever, position of the generator field switch, status of the independent brakes, position of the isolation switch, handbrake, and position of the automatic brake valve. 2. Record one unit for an inspection of unattended equipment NOT attached to locomotives that are required to be secured under this regulation. This unit includes inspections for bottled air. <p>Note 1: If a train is separated to avoid blocking any type of crossing it should have each section of the equipment recorded as a separate unit.</p> <p>Note 2: The inspection report that records a defect or recommended violation indentified should clearly state the number of handbrakes found to be applied, the number of handbrakes required to be applied, and the current operating rule in place that indicates the precise number of handbrakes required to be applied.</p> <p>Note 3: This inspection also includes an inspector reviewing railroad rules for compliance of this part.</p> <p>Example: If 30 unattended railcars are found on a track that is required to have seven hand brakes applied but the inspection reveals that only has one handbrake is applied, it will be recorded as one unit with one occurrence for the failure to have the other six handbrakes applied.</p>	
238O	H,O, S, T	<p>Passenger Equipment Inspection (Partial) – The purpose of this inspection is for any inspector, <u>other than an MP&E inspector</u>, to determine compliance with Part 238 that is not covered in activity codes 232X or 238T. Record one unit for each inspection and a subunit for each passenger car inspected.</p>	

Motive Power and Equipment Compliance Manual

Activity	Discipline	Definition	Comments
238T	M, O	<p>Passenger Train Brake Test Observation – The purpose of this inspection is to document an observation of a passenger train airbrake test, excluding tourist equipment. Record one unit for each entire brake test observed for compliance with §238, and one subunit for each railroad record associated with the Class I airbrake test.</p> <p>Note: There is a drop-down FRA observation code inspectors may use in lieu of writing a comment when there are not any exceptions noted.</p>	
238X	M, O	<p>Passenger Equipment Securement – The purpose of this inspection is to determine if passenger or commuter equipment is properly secured (excluding tourist equipment). Record one unit for each train, whether or not a locomotive is attached.</p>	
BWS	S,T	<p>Bridge Worker Safety – An inspection concerning Part 214 Subpart B, Bridge Worker Safety Standards. Record one unit for each bridge gang or work group, and one subunit for each member of the gang or work group.</p>	New activity code
FC	H, M	<p>Inspection of Freight Containers, General Handling and Loading Requirements – The purpose of the inspection includes inspecting the railcar for markings, placards, structural integrity, and securement. Record one unit for each <u>exterior</u> inspection of a container, and one subunit for each comprehensive inspection of a package. In addition to the above inspection criteria, a comprehensive inspection includes the inspection of the <u>interior</u> of the container for blocking & bracing and loading segregation requirements. This activity code may only be used when assessing compliance with §§ 174.55, 174.61, 174.81, 177.834.</p> <p>Note 1: Use BP codes to record intermodal tank inspections.</p>	

Federal Railroad Administration

Activity	Discipline	Definition	Comments
NOIR	ALL	<p>Noise Test Records – The purpose of this inspection is to document a review of a locomotive’s noise testing session, or a locomotive’s noise testing record. Record one unit for each locomotive’s noise testing session monitored and/or all noise testing records associated with the locomotive tested.</p> <p>Example 1: A short line railroad has three records on file documenting a locomotive horn test performed on locomotive SP 1234. Record one unit for the examination of all three records.</p> <p>Example 2: A short line railroad has three records on file documenting a locomotive horn test performed on locomotive SP 1234, and two records on SP 2345. Record two units for the inspection of the noise testing records for two locomotives.</p> <p>Example 3: An inspector monitors three noise testing sessions on SP 4567, and then reviews three noise testing records regarding that same locomotive. Record one unit for the locomotive and testing records involved.</p> <p>Note 1: This activity code should only be used by inspectors who have been trained to inspect locomotive horn testing records.</p> <p>Note 2: This activity code should not be used with Part 227 Occupational Noise Exposure inspections, (activity code 227N), or when performing a noise test (activity code NOIS).</p>	New activity code
NOIS	ALL	<p>Noise Tests – The purpose of this inspection is to perform a noise test in accordance with Federal regulations. This activity code should only be used by inspectors who have attended the FRA training course regarding the equipment used to conduct these inspections. Record one unit for each day or partial day of an inspection.</p> <p>This activity code should not be used with Part 227 Occupational Noise Exposure inspections, (activity code 227N), or when reviewing noise records (activity code NOIR).</p>	

Motive Power and Equipment Compliance Manual

Activity	Discipline	Definition	Comments
RADX	H, O, T	<p>Radar Speed Monitoring – The purpose of this inspection is to monitor and/or accurately validate the speed of trains and railroad equipment for compliance with Federal regulations and/or railroad operating rules. Record one unit for each speed monitoring session and one subunit for each locomotive, train, or railroad equipment on the rail monitored. Non-compliance with railroad operating rules should be recorded under activity code 2170.</p> <p>Note 1: When entering this code, the inspector must indicate the initials and number of the lead locomotive, or a locomotive within the consist, in the Train # / Site Field. This Field permits the entry of 15 characters. Each train or piece of equipment monitored will require a new line item.</p> <p>Note 2: FRA and participating state employees must not perform radar monitoring sessions unless they received a certificate of qualification from an FRA employee who holds a current certificate as a stationary radar trainer. See Chapter 3 of the General Manual for a complete discussion of FRA policy.</p>	Revised 2-26/2011
RMM	T, S	<p>Roadway Maintenance Machine & Hi-Rail – The purpose of this inspection is to document an observation or inspection concerning § 214 Subpart D, On-Track Roadway Maintenance Machines and Hi-Rail Vehicles. Record one unit for each Roadway Maintenance Machine or Hi-Rail Vehicle inspected.</p> <p>Example: If a large scale tie unit consisting of 20 roadway maintenance machines and one Hi-Rail vehicle is operating on the tracks, and only five of those machines are inspected, then record five units.</p> <p>Note: If a machine operator fails to comply with railroad rules not covered by Part 214 or any Federal regulation the inspector must note the non-compliance by recording it using a Non-FRA defect under activity code 2170, as provided in the guidelines of that activity code.</p>	

Federal Railroad Administration

Activity	Discipline	Definition	Comments
RULE	ALL	<p>Rulebook Review - The purpose of this inspection is to record an inspector's review or formal discussion with a railroad manager, regarding railroad rules that will determine if they accurately correlate with current FRA regulations. Record one unit for each day, or partial day, spent reviewing a railroad rule(s) for compliance with Federal regulations. Record a subunit for each CFR section involved. Only comments should be recorded under this activity code. Any defects should be recorded under the proper corresponding activity code.</p> <p>Note: Inspections regarding reviewing railroad rules to ensure compliance regarding §232.103 (n) and Part 218 Subpart F should not be recorded under this activity code. Inspectors should reference activity code 232X and 218O respectively for those railroad rule inspections.</p> <p>Example 1: An inspection of NEBR railroad's rulebook determined that railroad rules regarding signal systems (Part 234 and Part 236) comply with Federal regulations. Record one unit and two subunits.</p> <p>Example 2: An inspection that included discussions with railroad managers regarding NEBR railroad's rulebook and bulletins determined that the railroad's rules regarding Part 217 and Part 220 Subpart C, correlated with FRA regulations. Record one unit and two subunits.</p>	

Motive Power and Equipment Compliance Manual

Activity	Discipline	Definition	Comments
RWP	O, S, T	<p>Roadway Worker Protection – The purpose of this inspection is to determine compliance with Part 214 Subpart C, Roadway Worker Protection (RWP). Record one unit for an individual worker or group of employees (with a roadway worker in charge) at a specific location. This will include attending a job briefing with a group of RWP employees. Record each train required to provide an audible warning signal as a separate unit, and each employee requiring RWP as a subunit.</p> <p>Note: When performing multi-point inspection work with the same employee (or group of employees), record only one unit for determining compliance, and one subunit for each employee of the workgroup per day.</p> <p>Example 1: When observing or inspecting a large production crew, record a separate unit for each different location where an employee (or group of employees) is monitored for compliance. E.g. large projects may have multiple teams or workgroups at various locations along the right of way, record each worker, team or workgroup at each different location as a separate unit.</p> <p>Example 2: You observe an RWP crew consisting of <u>one</u> employee-in-charge and <u>20</u> track employees together at a single location. Record one unit for the location and <u>21</u> subunits for the entire RWP work group.</p>	
TC	H, M	<p>Tank Car Inspection – The purpose of this inspection includes inspecting for markings, placards, and structural integrity. Record one unit for each ground level inspection that did <u>not</u> include a top level inspection. Record one subunit for each <u>comprehensive</u> inspection of a tank car. In addition to the above inspection criteria, a comprehensive inspection includes a ground level inspection of <u>both sides</u> and a <u>top level</u> inspection as well. This activity code may only be used when assessing compliance with §§172.302(a)(1), 172.304, 172.502(a)(1)(i), 172.516(c)(2) and (6), 173.31, 174.50, 179, & 180.</p>	
TPLH	H, M, O	<p>In-Train Placement of Placarded Rail Cars, Transport Vehicles, and Freight Containers - The purpose of this activity is to determine compliance with positioning in-train of placarded cars, §§174.84 and 174.85. Record one unit for each train inspected.</p>	

Chapter 3

Enforcement Actions

General

An MP&E inspector is not required to initiate formal enforcement proceedings each time a noncomplying condition is discovered. To achieve compliance, the inspector has a choice of the following actions:

- **Exception.** This means documenting the noncomplying condition on the proper form and requiring only that the condition be corrected before using the equipment.
- **Violation.** Used in conjunction with the requirements of an exception, a monetary penalty violation can be issued against the railroad.
- **Special Notice for Repairs.** Used in conjunction with the requirements of issuing a violation, equipment not in compliance with 49 CFR parts 215, 229, 230, or 238 can be removed from service until it is in compliance. (See 49 CFR part 216.)
- **Individual Liability.** Action can be taken against individuals in conjunction with the requirements of an exception and *with or without* issuing a violation or special notice for repairs against the railroad. This topic is discussed extensively later in this manual.

Determining When and What Enforcement Action is Necessary

Please read the [General Manual](#) both Chapter 3 - **Inspections and Civil Penalty Recommendations** and the memorandum - **Improvements in Civil Penalty Enforcement Memo – Dated June 18, 2009** in the *General Technical Bulletins and Other Guidance Documents* for guidance.

Chapter 4

Railroad Freight Car Safety Standards, Part 215

Introduction

In accordance with the provisions of the Federal Railroad Safety Act of 1970, FRA issued Freight Car Safety Standards (49 CFR Part 215). The standards became effective on January 1, 1974. Since 1974, there have been several amendments to Part 215. The railroad industry is constantly changing and FRA recognizes additional amendments will be needed to stay current with the changes. Advances in new technology, high-speed rail, the increasing number of articulated cars in service, new concepts in freight car construction, and the changing railroad environment will lead to changes to the Federal regulations. On the following pages, you will find interpretive guidance related to the freight car safety standards—as established by the agency—that will aid the inspector in the performance of freight car safety standards inspections. For convenience the guidance is organized in numerical order by section.

In addition to Federal regulations, inspectors should be familiar with the Association of American Railroads (AAR) Interchange Rules and the AAR Manual of Standards and Recommended Practices. FRA does not have authority to enforce the AAR Interchange Rules or the AAR Manual of Standards and Recommended Practices. However, the AAR requirements provide valuable insight into railroad equipment and operations as they exist in the industry.

Federal and State inspectors must be able to assess an ever increasing variety of conditions and ascertain the necessity and type of corrective procedures to be initiated. Although § 215.7, Prohibited Acts, provides for strict liability, inspectors should always be governed by the seven factors listed in Part 209 Appendix A.

MP&E inspectors must determine whether conditions observed acutely impact the safe operation of the freight equipment. When freight equipment is inspected and deficiencies exist, the inspector must decide whether the defect:

- Is a Part 215 defect;
- Should be documented on the F6180.96 - Inspection Report;
- Warrants the issuance of a violation;
- Warrants the issuance of a Special Notice for Repair; and/or
- Should be reported to the railroad as an unsafe condition that is not encompassed in Federal regulations. (This could be either the railroad's standards or AAR standards.)

Note: In many instances, AAR requirements are more restrictive than Federal requirements. The following discussion summarizes guidelines to be used by Federal and State inspectors conducting field inspections for compliance or enforcement activity. Enforcement policies must be adhered to by each inspector conducting inspections of freight cars. It is the inspector's responsibility to determine whether each unit is inspected, tested, maintained, or operated by railroad personnel complies with Federal regulations and is safe to operate over the general railroad system.

Federal Railroad Administration

Determining Noncompliance

When an inspection reveals a noncomplying condition, the inspector must examine and determine the particular details of the condition in order to assess whether it conforms with the current interpretations and guidelines issued by FRA. Before recording the condition as a defect, the inspector must weigh each essential factor to determine whether the condition meets, exceeds, or is noncompliant with Federal regulations. If the inspector determines that a condition is unsafe or creates an imminent hazard and is not covered by Federal regulations, he or she should inform a responsible railroad official of the need for corrective action. This could be based on the railroad's standard or an AAR requirement.

When a measurement is required to determine compliance or noncompliance and such measurement cannot be accurately stated as meeting or exceeding those measurements contained in the applicable regulation, then that condition must not be reported as a defect.

When the inspector determines and documents that a freight car is noncompliant with Federal regulations, he or she should consider filing appropriate reports (based on the situation). To determine what enforcement action to employ, the inspector should consider the compliance history at the location and whether or not the railroad immediately initiates corrective action. If the inspector concludes a violation is warranted, then only one written violation report can be issued per car. The violation report can contain multiple counts for defective conditions, **but do not issue multiple violation reports for an individual car**. If the noncomplying condition for a violation can be proven to have existed for multiple days, then the one violation report should indicate how many days the car was in violation. Do not issue a separate violation report for each day the car is determined to be in noncompliance.

Additionally, if the inspector determines that a freight car is noncompliant with Federal regulations, is unsafe, and presents an imminent safety hazard; and if the inspector has reason to believe that the railroad will not take immediate corrective action, a **Special Notice for Repair** should be issued to the railroad. The inspector should enumerate each serious condition in the notice. See 49 CFR part 216. *Except in rare circumstances, a violation report must be submitted with a Special Notice for Repair.*

Inspection of freight cars that have been **repaired and released** by car repair facilities should be done on a regular basis. These freight cars should be suitable for service and free of **all** defects. If defects are found, violations should be submitted. This inspection must take place after the car is moved from the shop or repair track area.

An individual who willfully authorizes movement or operation of noncomplying or unsafe equipment, with knowledge of the circumstances, can be held personally liable for such action. Inspectors should carefully weigh all pertinent facts before considering a willful violation of Federal regulations and/or an individual liability action. The inspector must communicate with the FRA regional office prior to advising a railroad employee that he or she will be cited with an individual liability violation.

Freight Car Safety Standards Inspection Procedures

Upon arrival at an inspection point, inspectors should notify the local railroad representative of their presence and intentions, determine what equipment will be inspected, and ask the railroad representatives if they plan to accompany the inspection. However, it is not always advantageous to be accompanied on inspections or notify the railroad of FRA presence, especially if an inspection is related to a complaint or investigation.

Generally, inspectors should focus Part 215 inspection activities on cars after the railroad's personnel or agents have had an opportunity to perform their inspection of the cars. However, performing inspections on inbound trains can be advantageous to determine the quality of inspections at previous locations where cars are placed in trains. Inspections should also be performed at any location where cars are routinely picked up and placed in trains.

Inspectors must be properly attired and comply with the railroad's safety requirements (e.g., safety glasses, hard hat, safety shoes, etc.). Inspectors should also have in their possession the necessary gauges, flashlight, ruler and/or tape measure, camera, and a current copy of the regulations. Do not use the railroad's gauges for enforcement activities.

It is not necessary for FRA or State inspectors to establish blue signal protection in order to perform inspection activity. However, inspectors should never place themselves in a position where the unexpected movement of equipment subjects them to the danger of personal injury. Railroad representatives accompanying the inspector during the inspection must obtain blue signal protection if those individuals engage in activities that require them to work on, under, or between the equipment.

Regulation

PART 215 - Railroad Freight Car Safety Standards

§215.3 Application

- (a) Except as provided in paragraphs (b) and (c) of this section, this part applies to each railroad freight car in service on:
 - (1) Standard gage track of a railroad; or
 - (2) Any other standard gage track while the car is being operated by, or is otherwise under the control of a railroad.

- (b) Sections 215.15 and 215.303 of this part do not apply to any car:
 - (1) Owned by a Canadian or Mexican Railroad; and
 - (2) Having a Canadian or Mexican reporting mark and car number.

- (c) This part does not apply to a railroad freight car that is:
 - (1) Operated solely on track inside an industrial or other non-railroad installation; or
 - (2) Used exclusively in dedicated service as defined in §215.5(d) of this part; or

Federal Railroad Administration

(3) Maintenance-of-way equipment (including self-propelled maintenance-of-way equipment) if that equipment is not used in revenue service and is stenciled in accordance with §215.305 of this part.

§215.5 Definitions.

As used in this part:

- (a) *Break* means a fracture resulting in complete separation into parts;
- (b) *Cracked* means fractured without complete separation into parts, except that castings with shrinkage cracks or hot tears that do not significantly diminish the strength of the member are not considered to be “cracked,”
- (c) *Railroad freight car* means a car designed to carry freight, or railroad personnel, by rail and includes a:
 - (1) Box car;
 - (2) Refrigerator car;
 - (3) Ventilator car;
 - (4) Stock car;
 - (5) Gondola car;
 - (6) Hopper car;
 - (7) Flat car;
 - (8) Special car;
 - (9) Caboose car;
 - (10) Tank car; and
 - (11) Yard car.

Guidance

A ventilator car is a car that is arranged for ventilation and suitable for the transportation of produce or other foodstuffs not requiring refrigeration. A special car includes articulated cars, scale cars, intermodal-carless equipment (RoadRailer™), and any car not listed in this section. A yard car is any car used exclusively in yard service. In intermodal-carless equipment operations, the highway trailer is treated as the car body for the purposes of Part 215 when it is attached to the bogie on the rail. **Part 215 does not apply to any type of car operated in a passenger train that is inspected, tested, maintained, and operated pursuant to the requirements contained in the Passenger Equipment Safety Standards, Part 238.**

Regulation

(d) *Dedicated service* means the exclusive assignment of cars to the transportation of freight between specified points under the following conditions:

- (1) The cars are operated—
 - (i) Primarily on track that is inside an industrial or other non-railroad installation; and
 - (ii) Only occasionally over track of a railroad;
- (2) The cars are not operated—
 - (i) At speeds of more than 15 miles per hour; and
 - (ii) Over track of a railroad—
 - (A) For more than 30 miles in one direction; or
 - (B) On a round trip of more than 60 miles;
- (3) The cars are not freely interchanged among railroads;
- (4) The words “Dedicated Service” are stenciled, or otherwise displayed, in clearly legible letters on each side of the car body;
- (5) The cars have been examined and found safe to operate in dedicated service;
- (6) The railroad must—
 - (i) Notify the FRA in writing that the cars are to be operated in dedicated service;
 - (ii) Identify in that notice—
 - (A) The railroad affected;
 - (B) The number and type of cars involved;
 - (C) The commodities being carried; and
 - (D) The territorial and speed limits within which the cars will be operated; and
 - (iii) File the notice required by this paragraph not less than 30 days before the cars operate in dedicated service;

(e) *In service* when used in connection with a railroad freight car, means each railroad freight car subject to this part unless the car:

- (1) Has a “bad order” or “home shop for repairs” tag or card containing the prescribed information attached to each side of the car and is being handled in accordance with §215.9 of this part;
- (2) Is in a repair shop or on a repair track;
- (3) Is on a storage track and is empty; or
- (4) Has been delivered in interchange but has not been accepted by the receiving carrier.

Federal Railroad Administration

Guidance

The Federal Register Notice dated April 21, 1980 (45 FR 26709), states that “FRA has amended 215.5(e)(4) to provide that a car that has been delivered in interchange is not ‘in service’ until the receiving railroad accepts the car by moving it or otherwise exercising control over it. It should be noted, however, that the delivering railroad remains liable for each defective car it tenders in interchange.” (MP&E 98-34)

Regulation

(f) *Railroad* means all forms of non-highway ground transportation that run on rails or electromagnetic guide-ways, including (1) commuter or other short-haul rail passenger service in a metropolitan or suburban area, and (2) high speed ground transportation systems that connect metropolitan areas, without regard to whether they use new technologies not associated with traditional railroads. Such term does not include rapid transit operations within an urban area that are not connected to the general railroad system of transportation.

(g) *State inspector* means an inspector who is participating in investigative and surveillance activities under section 206 of the Federal Railroad Safety Act of 1970 (45 U.S.C. 435).

§215.9 Movement of defective cars for repair.

(a) A railroad freight car which has any component described as defective in this part may be moved to another location for repair only after the railroad has complied with the following:

- (1) A person designated under §215.11 shall determine:
 - (i) That it is safe to move the car; and
 - (ii) The maximum speed and other restrictions necessary for safely conducting the movement;
- (2)
 - (i) The person in charge of the train in which the car is to be moved shall be notified in writing and inform all other crew members of the presence of the defective car and the maximum speed and other restrictions determined under paragraph (a)(1)(ii) of this section.
 - (ii) A copy of the tag or card described in paragraph (a)(3) of this section may be used to provide the notification required by paragraph (a)(2)(I) of this section.
- (3) A tag or card bearing the words “bad order” or “home shop for repairs” and containing the following information, shall be securely attached to each side of the car:
 - (i) The reporting mark and car number;
 - (ii) The name of the inspecting railroad;
 - (iii) The inspection location and date;
 - (iv) The nature of each defect;
 - (v) Movement restrictions;
 - (vi) The destination for shopping or repair; and
 - (vii) The signature of a person designated under §215.11.

Motive Power and Equipment Compliance Manual

- (b) (1) The tag or card required by paragraph (a)(3) of this section may only be removed from the car by a person designated under §215.11 of this part.
- (2) A record or copy of each tag or card attached to or removed from a car shall be retained for 90 days and, upon request, shall be made available within 15 calendar days for inspection by FRA or State inspectors.
- (3) Each tag or card removed from a car shall contain a notification stating the date, location, reason for its removal, and the signature of the person who removed it from the car. These recordkeeping requirements have been approved by the Office of Management and Budget in accordance with the Federal Reports Act of 1942.
- (c) Movement of a freight car under paragraph (a) of this section may be made only for the purpose of effecting repairs. If the car is empty, it may not be placed for loading. If the car is loaded, it may not be placed for unloading unless unloading is consistent with determinations made and restrictions imposed under paragraph (a)(1) of this section and—
- (1) The car is consigned for a destination on the line of haul between the point where the car was found to be defective and the point where repairs are made; or
- (2) Unloading is necessary for the safe repair of the car.
- (d) Nothing in this section authorizes the movement of a freight car subject to a Special Notice for Repairs unless the movement is made in accordance with the restrictions contained in the Special Notice.

Guidance

If the car is prepared as outlined under §215.9, it may be moved to any location designated by the railroad for the purpose of effecting repairs. This **does not** have to be the nearest or next repair location. The car may be moved to another railroad and can be moved past repair locations. The car must be inspected and cards applied to both sides of the car by a designated inspector, as defined in §215.11, before movement can take place. Movement authority by §215.9 applies only to Part 215 defects, **not** safety appliance or power brake defects. Failure to observe any condition for movement set forth in §215.9(a) and (c) deprives the railroad of the benefit of the “movement-for-repair” provision and makes the railroad and any responsible individual liable for penalty under the particular regulatory sections that apply to the defective condition. For example, a car with a defective roller bearing adapter travels beyond the repair location designated on the “bad order” card.

Do not issue a violation for the movement of defective equipment; instead, issue the violation for the defective condition – defective roller bearing adapter. The regulation does not prevent the railroad from changing the repair location, as long as all of the conditions of §215.9 are satisfied. The purpose of the defect tag is to notify the operating crews and mechanical department personnel of the defective condition, and that the car is safe to move, along with any movement restrictions. Inspectors should periodically check defect tags to verify that they are completely filled out by a person designated under §215.11.

Federal Railroad Administration

Regulation

§215.11 Designated inspectors.

(a) Each railroad that operates railroad freight cars to which this part applies shall designate persons qualified to inspect railroad freight cars for compliance with this part and to make determinations required by §215.9 of this part.

(b) Each person designated under this section shall have demonstrated to the railroad a knowledge and ability to inspect railroad freight cars for compliance with the requirements of this part and to make determinations required by §215.9 of this part.

(c) With respect to designations under this section, each railroad shall maintain written records of:

- (1) Each designation in effect; and
- (2) The basis for each designation.

Guidance

The railroad must maintain a record that contains the names of the inspectors that are designated under §215.11, which can be readily produced for FRA review. This includes contractors, train crew members, or any individual that has demonstrated to the railroad the knowledge and ability to perform all of the functions listed in Part 215. Only persons that are listed as designated inspectors can make the determinations required by §215.9. The railroad establishes the basis for each designation in effect. A person performing an Appendix D inspection cannot make the determination for movement under §215.9. However, if a train crew member is listed as a designated inspector, he or she can make the determination for movement under §215.9, but would be required to perform a full inspection for compliance with this Part, not an Appendix D inspection.

Regulation

§215.13 Pre-departure inspection.

(a) At each location where a freight car is placed in a train, the freight car shall be inspected before the train departs. This inspection may be made before or after the car is placed in the train.

(b) At a location where an inspector designated under §215.11 is on duty for the purpose of inspecting freight cars, the inspection required by paragraph (a) of this section shall be made by that inspector to determine whether the car is in compliance with this part.

(c) At a location where a person designated under §215.11 is not on duty for the purpose of inspecting freight cars, the inspection required by paragraph (a) shall as a minimum, be made for those conditions set forth in Appendix D to this part.

(d) Performance of the inspection prescribed by this section does not relieve a railroad of its liability under §215.7 for failure to comply with any provision of this part.

Guidance

The language of §215.13 is very explicit. FRA has consistently interpreted this language to require a pre-departure inspection each time a car is placed in a train. Moreover, although the regulations do not specify the physical actions necessary to conduct a proper inspection, a railroad may fulfill the inspection requirements only when its inspectors position themselves in a way that permits the required observations to be made. In order to conduct a proper freight car safety standards inspection, both sides of a car must be inspected.

Section 215.13 does not permit block swapping. At some locations a common misinterpretation of the words “placed in a train” has led to the practice of allowing new outgoing trains to be built from large blocks of cars from two or more incoming trains without performing a pre-departure inspection. Within the industry, this practice is called “block swapping.” This misinterpretation of the regulation apparently assumes that a car that remains in a block of cars when it is removed from one train is not “placed in a train” when the block is added to a new train. That assumption is incorrect. Whether singly or in groups, cars that are taken from one train and placed in another are “placed in a train” and must be inspected at the location from which the new train departs. Of course, an inspection pursuant to §215.13 is not required when intact trains move from railroad to railroad.

However, as with any regulatory requirement, inspectors should exercise discretion in how §215.13(a) is enforced, so that our limited resources can remain focused on matters likely to produce the greatest safety benefit. The general criteria for determining when enforcement action is appropriate, and which action to take, are set forth in 49 CFR Part 209, Appendix A. The railroad’s history of compliance with the relevant set of regulations, especially at the specific location involved, must be considered along with the kind and degree of potential safety hazard a condition poses in light of the immediate factual situation. Where compliance with the Freight Car Safety Standards is poor and improper inspections or no inspections are being performed, the failure to inspect or improper inspection can be (along with the physical defects found on the cars) strong enforcement candidates. Conversely, if a railroad is generally doing a good job in terms of compliance with the Freight Car Safety Standards at a particular location, the one-time failure to conduct a proper inspection at that point is more likely not a condition that poses a significant safety hazard. **(MP&E 98-57)**

Section 215.13(a) requires an inspection at each location where a freight car is placed in a train. However, in some circumstances the inspection may be performed by a person not qualified or designated under §215.11. The law does not require that a “designated inspector” under §215.11 be assigned or employed at every location where cars are added to trains. Consequently, a train crewmember who is not a designated inspector under §215.11 can perform an inspection of freight cars added to a train pursuant to Part 215, Appendix D, at a location where a person designated under §215.11 is not on duty for the purpose of inspecting freight cars. However, if a location does not have a person designated under §215.11 on duty for the purpose of inspecting

Federal Railroad Administration

freight cars and the railroad elects to conduct such an inspection with a non-designated person pursuant to Part 215, Appendix D, and if such an inspection uncovers a condition not in compliance with Part 215 or Appendix D, then in order to move the car for repair under §215.9, a designated person under §215.11 must determine whether it is safe to move the car and, if so, under what conditions.

Part 215 does not dictate when and where railroads must have designated inspectors on duty for the purpose of inspecting freight cars. Section 215.13 merely requires that, where such a person is not on duty for that purpose, the railroad must conduct an Appendix D inspection. Where there is a dispute between a railroad and its employees as to which employee is on duty for what purpose, that issue must be resolved as a collective bargaining matter. Absent such a binding resolution from a body duly authorized to render such rulings, FRA is in no position (under current law) to conclude that an employee is on duty for the purpose of inspecting freight cars, if the railroad contends that the person is not on duty for that purpose. Once a final, binding determination is obtained, it would presumably be enforceable on its own terms by those who sought it. Although Part 215 was not intended to put FRA in the position of dictating where a railroad uses its designated inspectors, it is clear that the railroad must designate qualified inspectors, keep records of the designations, and at the very least, use such inspectors to make the determinations required under §215.9 before a defective car can be moved.

At locations where cars are inspected by railroad personnel who are not designated inspectors, the options for handling the defective cars are limited to: (1) Setting the car out, (2) repairing the car, or (3) bringing in a designated inspector to either repair the car or prepare the car for movement to a repair facility in accordance with §215.9.

The regulation states that the pre-departure inspection may be made before or after the car is placed in the train. Therefore, the requirements for this inspection can be met by performing an inbound inspection before the cars are classified and placed into a new train.

Regulation

§215.15 Periodic inspection. - This part is no longer applicable.

Suspension System.

§215.103 Defective wheel.

A railroad may not place or continue in service a car, if-

- (a) A wheel flange on the car is worn to a thickness of $\frac{7}{8}$ of an inch, or less, at a point $\frac{3}{8}$ of an inch above the tread of the wheel;
- (b) The height of a wheel flange on the car, from the tread to the top of the flange, is $1\frac{1}{2}$ inches, or more;
- (c) The thickness of a rim of a wheel on the car is $1\frac{1}{16}$ of an inch, or less;

- (d) A wheel rim, flange, plate, or hub area on the car has a crack or break;
- (e) A wheel on the car has a chip or gouge in the flange that is 1½ inches in length and ½ inch in width, or more;
- (f) A wheel on the car has——
 - (1) A slid flat or shelled spot that is more than 2½ inches in length; or
 - (2) Two adjoining flat or shelled spots each of which is more than two inches in length;
- (g) A wheel on the car shows evidence of being loose such as oil seepage on the back hub or back plate;
- (h) A wheel on the car shows signs of having been overheated as evidenced by a reddish brown discoloration, to a substantially equal extent on both the front and the back face of the rim, that extends on either face more than four (4) inches into the plate area measured from the inner edge of the front or back face of the rim; or,
- (i) A wheel on the car has been welded unless the car is being moved for repair in accordance with §215.9 of this part.

Guidance

The specified wheel measurements are the minimum safety requirements and are designed to prevent wheel failures and train derailments. Wheel measurements must be carefully taken to assure accuracy. To determine if a locomotive or freight car wheel is in compliance, a standard application of wheel gages is equally as important as having standard gages.

To gage a wheel for thin flange, the 7/8-inch opening of the AAR 34401 gage should slip over the flange of the wheel when the gage is held with the flat surface at the top, perpendicular to the tread (see **Figure 1**). The unused bulk of the gage must be suspended behind the back face of the rim. Gaging in a chipped area is not acceptable.

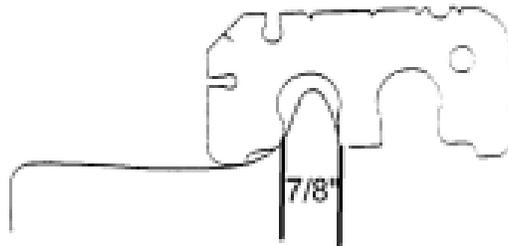


Figure 1: Gaging wheel thin flange

Federal Railroad Administration

A high flange wheel shall be gaged with a simplified steel wheel gage (hook gage) (see **Figure 2**). The shank, or long flat portion of the gage, must be held flat against the back face of the rim and parallel to the radius of the wheel. The defective flange will contact the hook portion of the gage, and the tip of the gage will contact the tread of the wheel or be held clear from the tread. Gaging in a flat spot or shelled spot is not acceptable.

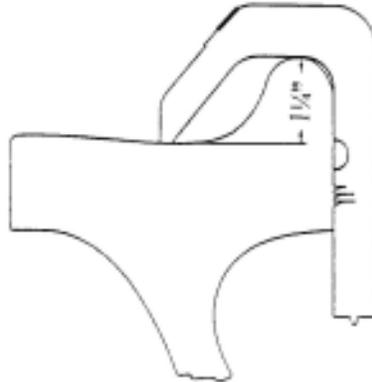


Figure 2: Gaging of wheel high flange

A thin rim wheel can be properly gaged with a W804 gage. It is suggested that if the inspector does not have a W804 gage, they should mark a simplified steel wheel gage 1/16 of an inch above the 3/4-inch mark. This will allow them to make a close evaluation of an 11/16-inch rim. However, it is not recommended that a violation be submitted when using a non-calibrated gage. The gage is to be applied to the wheel in the same manner as that used for gaging a high flange, and the gaging point would be the abrupt angle at the inside of the back face of the rim. With the gage held firmly against the back face of the rim, parallel to the radius and the point resting on the tread of the wheel, the reading should be 11/16 of an inch or less for a defective condition (see **Figure 3**). Gaging with the tip or point of the gage in a flat spot or shelled spot is not acceptable.

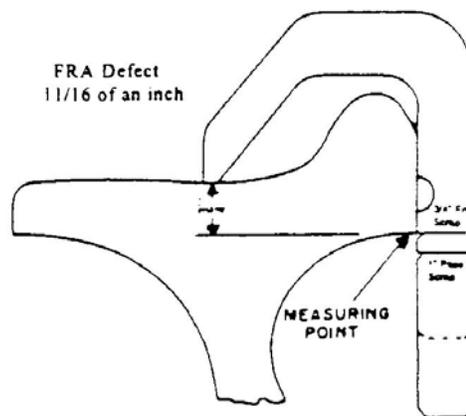


Figure 3: Gaging of when thin flange.

A flat spot on a wheel may be gaged with AAR gage 34401. The flat portion of the gage is marked in such a way that a 2½-inch flat spot can be easily measured. This portion of the gage must be applied to the flat spot on the wheel with absolutely no rocking motion allowable within the 2½-inch area (see **Figure 4**). Two adjoining flat spots, 2 or more inches in length, are measured using the same method.

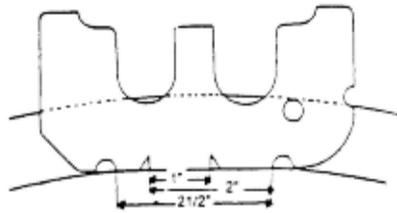


Figure 4: Gaging of flat spot

The overheated wheel requires a higher degree of judgment because of the varying degrees of discoloration. A reddish-brown discoloration that extends into the wheel plate more than 4 inches on both sides of the wheel indicates an overheated condition. The discoloration should come toward the center of the wheel 4-inches inside the rim before exceptions are taken. The 4-inch measurement is to be made from the bottom of the back face of the rim. A rust condition of the wheel should not be considered as a reddish brown discoloration.

There is currently a waiver in place that exempts “heat treated-curved plate” (HT-CP) wheels from the requirements of §215.103(h), provided the HT-CP wheel is clearly identified by an “H” painted or stencilled on the outside plate of the wheel.

Welded wheels. Regulations allow the welding of wheels only as an emergency measure to enable the car to be moved to a repair facility. A welded wheel is not a prohibited defect if the car is tagged and being moved in accordance with §215.9 for the purpose of replacing the wheel.

It is not acceptable to place a gage on a wheel in such a way that it takes a combination of two or more conditions to condemn it as defective (i.e., gaging for high flange in a flat spot). **(MP&E 98-10)**

Regions shall ensure that their inspectors have calibrated wheel gages and know how the gages are to be applied to the wheel in order to determine if the wheel is in compliance with the regulations.

After finding a statistically elevated number of vertical split rim failures (see **Figure 5**) on 36-inch Southern wheels of various ages, the AAR has issued instructions that all 36-inch Southern wheels are to be pulled from service when at a wheel shop. Also, Southern CH-36 wheels made

Federal Railroad Administration

in 1995 are to be pulled from service when on a shop or repair track for any reason. Failure to follow these AAR instructions is not an FRA defect, but if observed, should be brought to the attention of the railroad.



Figure 5: Split rim wheel failure

Other Wheel Failures

Shattered rims (see **Figure 6**) occur due to subsurface defects in the wheel. They are often first observable as a crack on the side of the rim, running basically parallel to the tread, (as shown between the chalk marks in the picture on **Figure 7**). Telltale rust streaks can help to identify them. The failure is not always as benign as the one shown here, with only a small portion of the tread missing. Often, major sections of the tread break away, similar to the vertical split rim shown above. Occasionally, the plate of the wheel also fails and there is not much left except the hub.



Figure 6: Shattered rim wheel



Figure 7: A crack on the side of the rim and runs parallel to the tread could lead to shattered rim

Wheel Thermal Cracks and Heat Checks

The distinction between thermal cracks and heat checks on the tread of a wheel has been a difficult one to make. Due to recent disputes between at least one major railroad and car owner over billing for wheel replacements it is currently under study by the AAR's Wheels Axles Bearings and Lubrication (WABL) Committee.

A wheel that has been severely overheated loses its residual compressive stress in the tread surface and develops cracking parallel to the axle. Since the surface has gone into tension, the cracks open and can be felt with a fingernail running over the surface. Less severe overheating can result in *heat checks*, which are visible lines on the tread surface that do not open into cracks since the wheel has *not* been overheated to the point that the residual compressive stress in the tread is lost. These lines do not feel rough when a fingernail dragged over them. They are typically not parallel to the axle, but instead run at an angle across the tread. Heat checks may develop into shelled tread, but they are not believed to develop into cracks unless further severe overheating of the wheel occurs.

Recently, considerable controversy has arisen over lines which were found parallel to the axle, like thermal cracks, but which remained closed like heat checks. Wheel experts from the Transportation Technology Center determined that since there was no evidence of the surface being in tension, these lines were heat checks. A Technical Action Group (TAG) was formed by the WABL Committee to settle this dispute. All concerned agree that the pictures contained in the current edition of the AAR Field Manual are inadequate and will need to be replaced.

Regulation

§215.105 Defective axle and journal

Federal Railroad Administration

A railroad may not place or continue in service a car, if -

- (a) An axle on the car has a crack or is broken;
- (b) An axle on the car has a gouge in the surface that is -
 - (1) Between the wheel seats; and
 - (2) More than one-eighth inch in depth;
- (c) An axle on the car, used in conjunction with a plain bearing, has an end collar that is broken or cracked;
- (d) A journal on the car shows evidence of overheating, as evidenced by a pronounced blue-black discoloration; or
- (e) The surface of the plain bearing journal on the axle, or the fillet on the axle, has-
 - (1) A ridge;
 - (2) A depression;
 - (3) A circumferential score;
 - (4) Corrugation;
 - (5) A scratch;
 - (6) A continuous streak;
 - (7) Pitting;
 - (8) Rust; or
 - (9) Etching.

§215.107 Defective plain bearing box: General.

A railroad may not place or continue in service a car, if the car has-

- (a) A plain bearing box that does not contain visible free oil;
- (b) A plain bearing box lid that is missing, broken, or open except to receive servicing;
or
- (c) A plain bearing box containing foreign matter, such as dirt, sand, or coal dust, that can be reasonably be expected to-
 - (1) Damage the bearing; or
 - (2) Have a detrimental effect on the lubrication of the journal and the bearings.

Guidance

A plain bearing box that contains a significant amount of water should be treated as foreign matter. The journal should be inspected with a wire feeler hook to determine if there is pitting.

Regulation

§215.109 Defective plain bearing box: Journal lubricating system.

Motive Power and Equipment Compliance Manual

A railroad may not place or continue in service a car, if the car has a plain bearing box with a lubricating pad that-

- (a) Has a tear extending half the length or width of the pad, or more;
- (b) Shows evidence of having been scorched, burned, or glazed;
- (c) Contains decaying or deteriorated fabric that impairs proper lubrication of the pad;
- (d) Has-
 - (1) An exposed center core (except by design); or
 - (2) Metal parts contacting the journal; or
- (e) Is-
 - (1) Missing; or
 - (2) Not in contact with the journal.

Guidance

Currently, AAR Interchange Rule 88 requires that all hazardous material tank cars in service must be equipped with roller bearings. Also, **all** freight cars offered for interchange service must be equipped with roller bearings. Although this is not a Federal defect, the railroad should be made aware of the situation whenever it is detected.

Regulation

§215.111 Defective Plain Bearing.

A railroad may not place in service or continue in service a car, if the car has a plain bearing-

- (a) That is missing, cracked or broken;
- (b) On which the bearing liner-
 - (1) Is loose; or
 - (2) Has a broken-out piece; or
- (c) That shows signs of having been overheated, as evidenced by-
 - (1) Melted babbitt;
 - (2) Smoke from hot oil; or
 - (3) Journal surface damage.

§215.113 Defective Plain Bearing Wedge.

A railroad may not place or continue in service a car, if a plain bearing wedge on that car is-

- (a) Missing;
- (b) Cracked;
- (c) Broken; or
- (d) Not located in its design position.

§215.115 Defective Roller Bearing.

Federal Railroad Administration

A railroad may not place or continue in service a car, if the car has-

- (1) A roller bearing that shows signs of having been overheated as evidenced by-
 - (i) Discoloration; or
 - (ii) Other telltale signs of overheating such as damage to the seal or distortion of any bearing component;
- (2) A roller bearing with a-
 - (i) Loose or missing cap screw; or
 - (ii) Broken, missing, or improperly applied cap screw lock; or
- (3) A roller bearing with a seal that is loose or damaged, or permits leakage of lubricant in clearly formed droplets.
 - (b)(1) A railroad may not continue in service a car that has a roller bearing whose truck was involved in a derailment unless the bearing has been inspected and tested by:
 - (i) Visual examination to determine whether it shows any sign of damage; and
 - (ii) Spinning freely its wheel set or manually rotating the bearing to determine whether the bearing makes any unusual noise.
- (4) The roller bearing shall be disassembled from the axle and inspected internally if-
 - (i) It shows any external sign of damage;
 - (ii) It makes any unusual noise when its wheel set is spun freely or the bearing is manually rotated;
 - (iii) Its truck was involved in a derailment at a speed of more than 10 miles per hour; or
 - (iv) Its truck was dragged on the ground for more than 200 feet.
- (5) Each defective roller bearing shall be repaired or replaced before the car is placed back in service.

Guidance

Some loss of lubricant through “seepage” around a roller bearing seal may not be hazardous and should not be reported as a defect. A seal that “permits leakage of a significant amount of lubricant in clearly formed droplets” is defective. “Clearly formed droplets” means a **fresh** accumulation of grease/oil (not dirty or dried) that continually leaks out from the bearing and/or slowly forms into beads. A careful examination should be made of any roller bearing from which “fresh” or “new” lubricant is thrown onto wheels, truck components, or the car body. A seal that is “loose, damaged, or non-functioning” is considered to be defective.

A loose backing ring is **not** to be reported as a defective bearing, but should be brought to the attention of the railroad, as the AAR identifies this condition as cause for removal in their Interchange Rules. Additionally, the inspector should note this condition as a comment on the F6180.96 report.

Motive Power and Equipment Compliance Manual

When a railroad opts to rotate the roller bearing manually, rather than rotating the wheel assembly to detect a defective condition due to a derailment, care must be exercised because the presence of lubricant and the fact that the bearing is not under load tend to reduce sounds made by small defects. When the wheel assembly is rotated, the weight on the bearing magnifies the sound.

NOTE: During an inspection on a shortline railroad, it was discovered that some tank cars equipped with roller bearings were derailed and sustained damages. These cars were not repaired and the roller bearings were not examined as required prior to delivery to a connecting railroad. Also, the shortline railroad did not advise the receiving railroad of the derailment damage and associated damages. If a train crew performing an Appendix D inspection at the interchange point did not detect the defective condition of these cars, the cars would have continued in service in a defective condition.

Many shortline railroads operate over “Excepted Track” that often is the cause of derailments. Further, some shortline railroads do not have qualified inspectors or repair facilities to address defective conditions. Some shortlines have agreements with the interchange railroads to effect repairs to defective cars that fall under their responsibility. Due to the seriousness of a car with a defective bearing condition continuing in service and/or the possible failure of a shortline to notify the receiving railroad of a potential defective car, inspectors should review the proper handling of derailed cars and defective cars with each shortline railroad within their territory. **(MP&E 98-29)**

As recently as 2008, overheated journal bearings (Reporting Code E53C) were the most common mechanical cause of derailments, despite the presence of many hot box detectors on the railroads. Within the following years, the number of derailments caused by hot journal boxes has been significantly reduced, as shown in the table that follows.

Year	2008	2009	2010	2011
E53C Journal (roller bearing) overheated	27	25	12	2 (Jan)

Railroad representatives to AAR’s WABL Committee attribute this to the increased effectiveness of wayside detector systems, including hot box detectors and wheel impact load detectors (WILD). Although hot box detectors have been in use for many years, it is only recently that the railroads have been networking the detectors and analyzing the data in real time to identify dangerous temperature trends and set out “warm” bearings before they burn off. This technology remains unable to predict “quick burns,” an issue that the industry is still attempting to address. Although a relationship has not been proven, the WILD detectors are thought to be benefiting bearings because they identify high-impact wheels so they can be removed from service before the pounding causes bearing damage.

Federal Railroad Administration

Regulation

§215.117 Defective Roller Bearing Adapter.

A railroad may not place or continue in service a car, if the car has a roller bearing adapter that is-

- (a) Cracked or broken;
- (b) Not in its design position; or
- (c) Worn on the crown of the adapter to the extent that the frame bears on the relief portion of the adapter.

Guidance

Appropriate enforcement action must be taken if a car has a roller bearing adapter that is out of place or has excessive wear on the crown of the adapter. Either condition can cause uneven load distribution on the bearing and result in bearing failure.

Roller bearing adapter pads designed with a square surface depression of about 5 inches and about 3/16 inch deep were at one time common on articulated equipment. They had a high failure rate and an effort was made to replace them with a specially designed adapter. The pad was designed to fit in the 5-inch square depression of the roller bearing adapter and act as the crown for proper contact with the truck side frame roof. There were at least three pad designs. The two with the highest failure rate were made to look like a square plate about 3/8-inch thick, and consisted of metal plates and a plastic material which was found to crush and deteriorate. The other pad design was a rounded plate about 3/8-inch thick with squared shoulders for retention in the adapter depression. Complete failure of the pad will leave a flat surface on the top side of the adapter where the crowned surface should be in contact with the truck side frame roof. Partial failure will tend to concentrate the off-center loading to the part of the pad that has not failed. This creates a potential roller bearing failure. Defective conditions can be easily detected by close inspection. There should be a void between the adapter and the side frame roof, except where the pad is the buffer between the two. The pad should provide enough thickness in the center to act as the crown of the adapter. If these pads are found defective they should be reported on the appropriate inspection report using code 215.117(E)(1) "Roller bearing adapter resilient wear plate (vertical isolation pad) defective or not in its designed position."
(MP&E 98-21)

Adapter wear plates (roof liners) should be examined as to their condition and effectiveness. Since the regulation requires the roller bearing adapter to be in its designed position, if a problem exists, a defect should be taken.

There are cars in service that are designed to operate with a single axle wheel set at each end. The truck bearing cup filler blocks, commonly referred to as roller bearing adapter blocks, are located beneath the roller bearing rather than on top of the bearing, as found on conventional freight car equipment, and are secured in place by a single bolt or pin and cotter key (see **Figure-8**). When the adapter block is missing, the adapter may become unseated from its designed

location or be missing completely. When this condition is detected, take appropriate action and report the condition as set forth in 49 CFR §215.117 (roller bearing adapters).

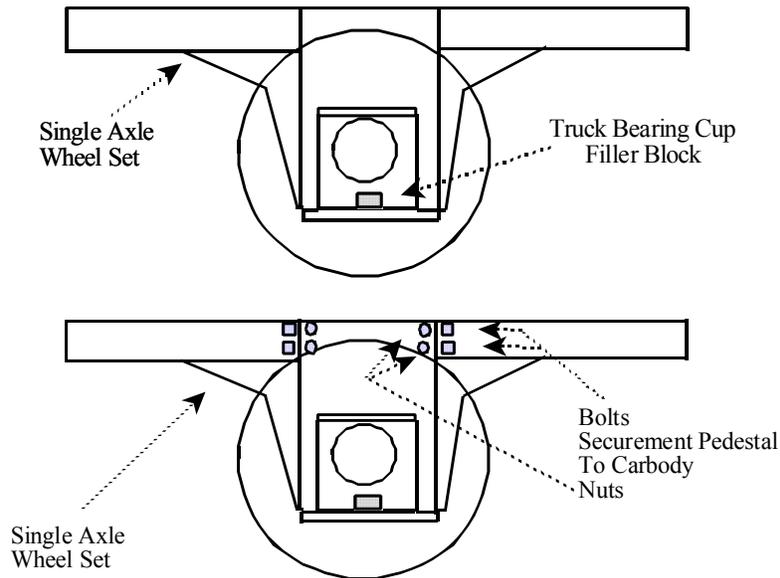


Figure 8:
Single axle

wheel set's carbody-pedestal securement and bearing cup filler block

Another condition that has been discovered with this type of truck is loose and missing pedestal securement bolts. Each side of the pedestal is attached to the car body, **see Figure 8**, by four bolts measuring $4\frac{7}{8}$ inch each. Bolts have been found loose, broken, and missing. This noncomplying condition can be reported on Form F6180-96 using code 215.121(F)(1). **(MP&E 98-42)**

The vertical isolation pads (adapter pads) that were primarily found on articulated 125 ton double stack cars are now prohibited in interchange by the AAR.

Regulation

§215.119 Defective Freight Car Truck.

A railroad may not place or continue in service a car, if the car has-

(a) A side frame or bolster that-

(1) Is broken; or

Federal Railroad Administration

- (2) Has a crack of $\frac{1}{4}$ of an inch or more in the transverse direction on a tension member
- (b) A truck equipped with a snubbing device that is ineffective, as evidenced by-
 - (1) A snubbing friction element that is worn beyond a wear indicator;
 - (2) A snubber wear plate that is loose, missing (except by design) or worn through;
 - (3) A broken or missing snubber activating spring; or
 - (4) Snubber unit that is broken, or in the case of hydraulic units, is leaking clearly formed droplets of oil or other fluid;
- (c) A side bearing in any of the following conditions:
 - (1) Part of the side bearing assembly is missing or broken;
 - (2) The bearings at one end of the car, on both sides, are in contact with the body bolster (except by design);
 - (3) The bearings at one end of the car have a total clearance from the body bolster of more than $\frac{3}{4}$ of an inch; or
 - (4) At diagonal opposite sides of the car, the bearings have a total clearance from the body bolsters of more than $\frac{3}{4}$ of an inch;
- (d) Truck springs-
 - (1) That do not maintain travel or load;
 - (2) That are compressed solid; or
 - (3) More than one outer spring of which is broken, missing, in any spring cluster;
- (e) Interference between the truck bolster and the center plate that prevents proper truck rotations; or
- (f) Brake beam shelf support worn so excessively that it does not support the brake beam.

Guidance

Truck Side Frame or Bolster

Freight car trucks side frame or truck bolster “broken” means it is separated into parts.

Extensive cracking must be reported immediately as this condition can lead to rapid failure.

A tension member (the diagonal portion of the side frame extending from the pedestal to the base of the spring pocket) must be cracked more than $\frac{1}{4}$ inch in a transverse direction (right angle) before it can be considered defective.

Snubbing Devices

The terms *snubbing units*, *attachments*, and *wear plates*, where used collectively, have been consolidated into one term: *snubbing device*. Friction-style snubbing devices with activating springs broken are defective.

“Clearly formed droplets,” means a **fresh** accumulation of grease/oil (not dirty or dried) which **continually** leaks out and forms into beads. If it is just wet looking, it is not a defect.

A car that has ineffective or broken snubbing devices will respond more violently to track irregularities and may cause a derailment. This would include the condition of a loose, missing, or worn through snubber wear plate. FRA has reviewed laboratory analyses on the subject of friction wedges that have added friction material, which are used on ABC-NACO Swing Motion trucks. The lab reports provided adequate evidence to conclude that there is no safety issue with composition friction material that is cracked, degraded, or missing from the wedge. Wedges that have loose composition layers provide adequate damping forces. Although new wedges generate greater damping forces than used wedges that have polished wear surfaces, a composition wedge that has all of its composition material removed still retains the damping characteristics of an all-metal wedge. Therefore, FRA will not take exception to degraded friction material condition on friction wedges used on ABC-NACO Swing Motion trucks. The wear indicator on the metal wedge is the qualifier.

Hydraulic snubbing devices equipped with a “sight gauge” or “inspection window” that visibly indicates the presence of oil or other fluid when in a normal vertical position will not be considered as defective, regardless of presence of clearly formed droplets. The effectiveness of the device should be examined for tension, compression, movement, etc.

Side Bearings

A missing or broken side bearing generates an uneven load distribution in the suspension system that could shift the lading. This, in turn, would cause the car to sway and derail.

All side bearing measurements should be made when the car is placed on tangent and level track. All measurements must be made from the top of the truck side bearing roller or bearing surface in the cage, to the car body side bearing surface. This measurement is taken at opposite sides of the car or at one end of the car. The sum of either of the two measurements may not exceed 3/4 inch.

Although Federal regulations do not address specific measurement standards for constant contact side bearings, measurements have been established by the industry. The industry has developed special gages for qualifying constant contact side bearings. When inspectors identify constant contact side bearings that are worn beyond the manufacturer’s limits, then they are not in contact as designed and appropriate enforcement action should be taken. This is based on the language found in §215.119(c)(2) “...*except by design.*” All measurements must be taken on tangent level track.

Guidance

Constant Contact Side Bearings

Federal Railroad Administration

Constant contact side bearings (CCSB) become condemnable when the measurements described below do not meet the specifications specified in the 2012 Field Manual of the Association American Railroads (AAR) Interchange Rules, Rule 62.

1. All side bearing height measurements must be taken:
 - A. On tangent and level track
 - B. Vertically between side bearing mounting surface and car body wear plate surface.
 - C. As close to the center of the side bearing as possible.

2. CARS WITH 5 1/16 INCH SETUP HEIGHT AND 8 1/2" MOUNTING HOLES
(Typically found on 4 axle cars and end trucks of articulated cars)
 - A. Empty or loaded cars
 - B. Side bearing is noncompliant if the "Sum-of-the-Pairs Measurement" is:
 - (1). LESS than 9 3/4 inch
 - (2). GREATER than 10 1/2 inch
 - C. For articulated cars Sum-of-the-Pairs refers to side bearings laterally across from each other.
 - D. For standalone cars, the following pairs must be summed:
 - (1). AL+AR
 - (2). BL+BR
 - (3). AL+BR
 - (4). BL+AR
 - E. Measure as shown in **Figure 9** below.

3. ARTICULATED CARS AT THE ARTICULATED TRUCK LOCATIONS:
 - A. Side bearing is noncompliant if the "Sum-of-the-Pairs Measurement" is:

Articulated Connector	Nominal Set-Up Height Or as stenciled on car	Sum-of-the-Pairs Measurement
-----------------------	---	------------------------------

Female	5 1/6 inch	Less than 9 3/4 inch Greater than 10 3/8 inch
Male	5 3/16 inch	Less than 9 3/4 inch Greater than 10 5/8 inch
Female / Male	Any Other	Less than 9 3/4 inch Greater than 1/4 inch above 2 times the stenciled set-up height
The Sum-of-the-Pairs refers to side bearings laterally across from each other.		

B. Measure as shown in **Figure 9** below:

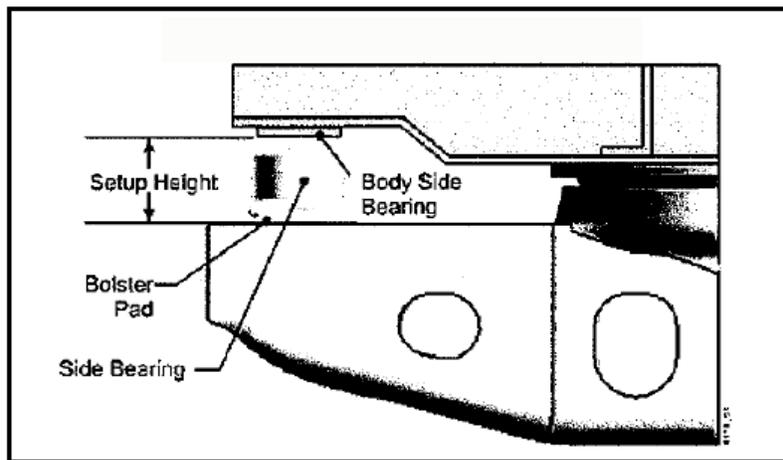


Figure 9: Measurement of constant contact side bearing typically found on 4-axle cars and end trucks of articulated cars

4. CARS WITH LOW PROFILE OR STANDARD HEIGHT SOLID BLOCK STYLE SIDE BEARING POCKETS. (Integral cast or welded on ring)

A. Side bearing is noncompliant if the “Sum-of-the-Pairs Measurement” is:

Side Bearing Manufacture	Sum-of-the-Pairs Measurement (condemning limit)
A. Stucki	Less than 1 inch Greater than 1 3/4 inch
Miner / Standard Truck	Less than 7/8 inch Greater than 1 5/8 inch
For standalone cars, the following pairs must be summed: AL+AR - BL+BR - AL+BR - BL+AR	

B. Measure as shown on **Figure 10** below:

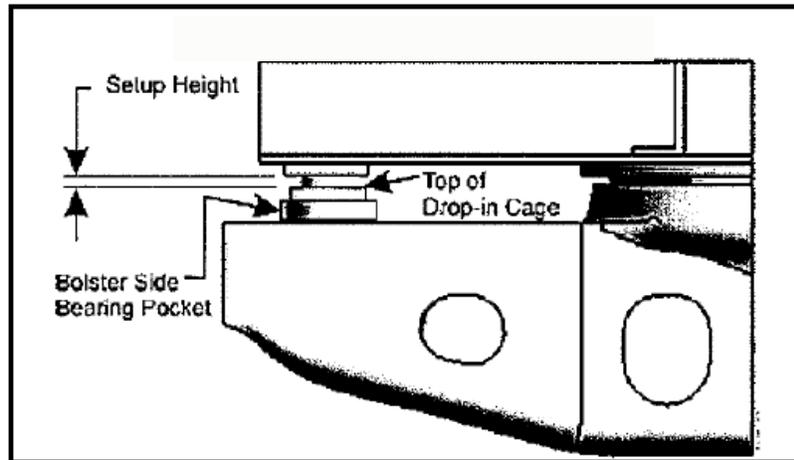


Figure 10: Measurement of constant contact side bearing on cars with low profile or standard height solid block style side bearing pocket

Truck Springs

Inner coil springs are not to be taken as a defect regardless of the number broken. One broken outer truck spring in a cluster does not create enough of an uneven load distribution to remove the car from service. Appropriate enforcement action must be taken if a car has more than one missing or broken outer truck spring within any cluster, or if the remaining truck springs are fully compressed. If the inspector detects evidence of springs oscillating in the spring nest, this is an indication that there is possible “truck hunting” problem and the inspector should make a comprehensive inspection of all truck components.

Regulation

Car Bodies

§215.121 Defective Car Body.

A railroad may not place or continue in service a car, if:

- (a) Any portion of the car body, truck, or their appurtenances (except wheels) has less than a 2½ inch clearance from the top of the rail;
- (b) The car center sill is:
 - (1) Broken;
 - (2) Cracked more than 6 inches; or
 - (3) Permanently bent or buckled more than 2½ inches in any six foot length;
- (c) The car has a coupler carrier that is:
 - (1) Broken;

- (2) Missing;
 - (3) Non-resilient and the coupler has a type F head.
- (d) After December 1, 1983, the car is a box car and its side doors are not equipped with operative hangers, or the equivalent to prevent the doors from becoming disengaged.
- (e) The car has a center plate:
- (1) That is not properly secured;
 - (2) Any portion of which is missing; or
 - (3) That is broken; or
 - (4) That has two or more cracks through its cross section (thickness) at the edge of the plate that extend to the portion of the plate that is obstructed from view while the truck is in place; or
- (f) The car has a broken sidesill, crossbearer, or body bolster.

Guidance

The requirement for maintaining car body clearance of 2½ inches is to ensure that car body items, including air hoses, are prevented from dragging on road crossings or track structures, which are a safety hazard. Heavy, depressed flat cars used in hauling heavy loads should be carefully inspected.

Center Sills

A center sill is generally the central longitudinal member of the underframe of a car from striker to striker, which forms the backbone of the underframe and transmits buff and draft forces.

A center sill “broken” means a fracture resulting in complete separation into parts. A condition of this nature could result in train separation or derailment.

A center sill that is cracked more than 6 inches is defective. The integrity of the sill is compromised which can lead to total failure.

A center sill bent or buckled more than 2½ inches in any 6-foot length may undermine the integrity of the sill and result in a center sill failure.

Similarly, in “sliding sill” designs, a single hydraulic unit is installed at the center of the car and acts to control longitudinal forces received at either end of an auxiliary center sill, which is free to travel longitudinally within a fixed center sill. This type of center sill should be inspected for defects such as, cracks more than 6 inches, bent or buckled more than 2½ inches in any 6-foot length or broken.

Coupler Carrier

Federal Railroad Administration

The design of an “F” type coupler head requires a spring loaded coupler carrier due to its locking characteristics.

Door Safety Hangers

FRA considers door safety hangers to be one of the most critical safety requirements. A number of personal injuries and fatalities have occurred which involved doors falling off box cars. Door safety hangers must be capable of restraining the side door when the side door is in an open position and the bottom rollers of the door are off the door tracks.

Regulation

Draft System

§215.123 Defective Couplers

A railroad may not place or continue in service a car, if-

- (a) The car is equipped with a coupler shank that is bent out of alignment to the extent that the coupler will not couple automatically with the adjacent car;
- (b) The car has a coupler that has a crack in the highly stressed junction area of the shank and head as shown in the figure below (see figure 2).
- (c) The car has a coupler knuckle that is broken or cracked on the inside pulling face of the knuckle.
- (d) The car has a knuckle pin or knuckle thrower that is:
 - (1) Missing; or
 - (2) Inoperative; or
- (e) The coupler has a retainer pin lock that is-
 - (1) Missing; or
 - (2) Broken; or
- (f) The car has a coupler with any of the following conditions:
 - (1) The locklift is inoperative;
 - (2) The coupler assembly does not have anti-creep protection to prevent unintentional unlocking of the coupler lock; or
 - (3) The coupler lock is-
 - (i) Missing;
 - (ii) Inoperative;
 - (iii) Bent;
 - (iv) Cracked; or
 - (v) Broken.

Guidance

Based on laboratory test results, the following clarification is provided with respect to enforcement guidance for the removal of cracked couplers from service:

A railroad may not place or continue in service a car that has a coupler that has a crack:

- that extends beyond the shaded areas labelled (A) in **Figure 10a**; or
- that extends 2 inches in length, or in additive length if more than one crack is present, within a panel 2 inches wide as indicated by the shaded areas labelled (B) in **Figure 10b**; or
- that extends beyond the radius area between the horn and the shank as indicated by the shaded area labelled (C) in **Figure 10c**; or
- that extends 2 inches in length, or in additive length if more than one crack is present, within the radius area between the horn and shank as indicated by the shaded areas labelled (C) in **Figure 10c**; or
- that is present in the unshaded areas of **Figure 10a, 10b, and 10c**.

Additionally, inspectors who find couplers having a section broken out within the shaded areas labeled (B) or (C) in **Figures 10b** and **10c**, must be removed from service. If couplers have a section broken out within the other shaded areas, the inspector should bring this condition to the attention of the railroad, as the AAR identifies this condition as cause for removal in their Interchange Rules. **(MP&E 98-43)**

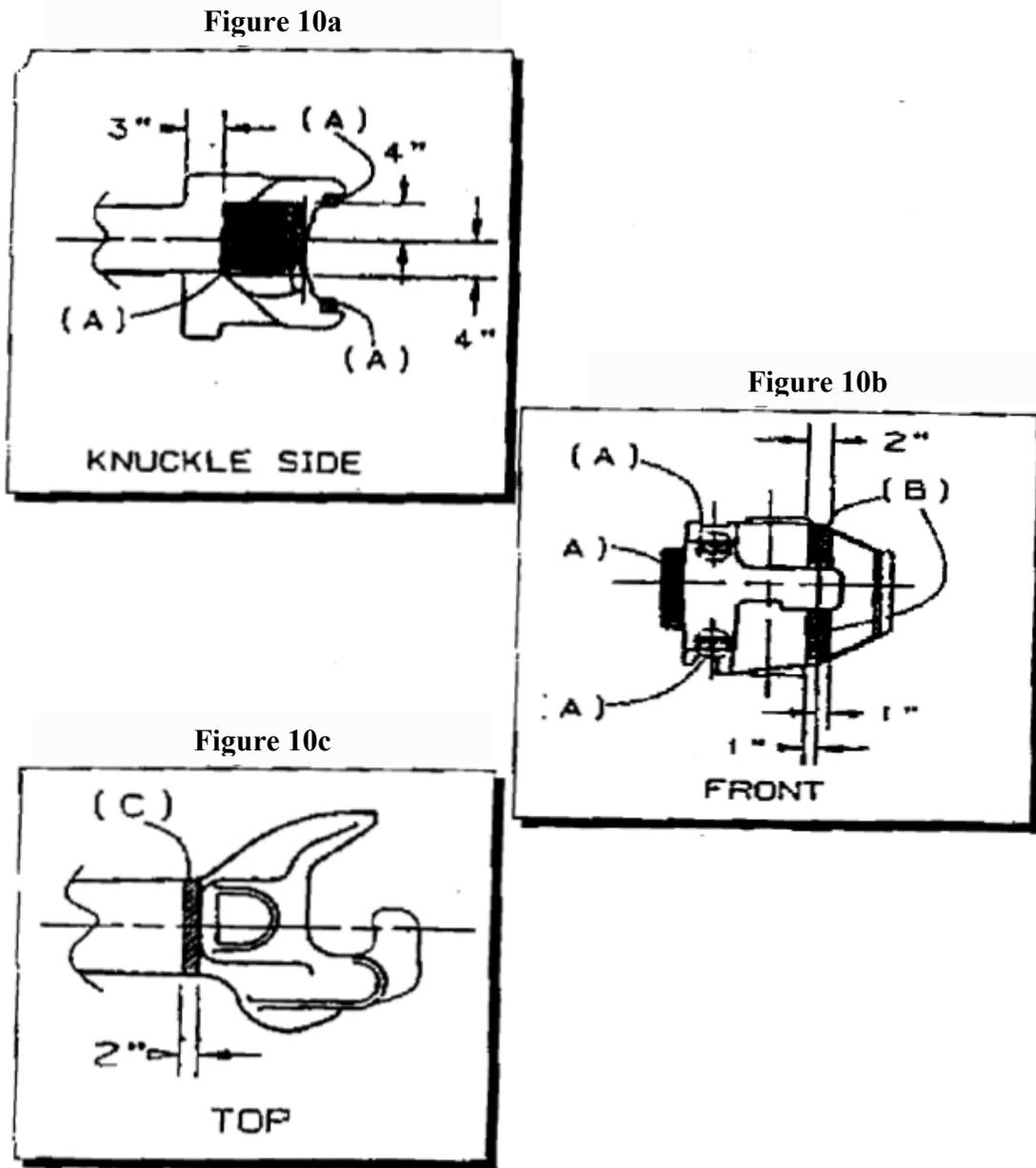


Figure 10: Enforcement guidance for the removal of cracked couplers from service

The regulation is specific in that the coupler knuckle must be broken or cracked on the inside pulling face of the knuckle.

The anti-creep protection should be capable of preventing the unintentional unlocking of the coupler lock. A coupler lock lift slightly raised may raise the coupler lock and nullify the anti-creep protection of the coupler. When inspection is made for anti-creep, the car should not be in draft or buff and should be on level, tangent track. The lack of "rod-eye" clearance does not necessarily mean there is no anti-creep protection.

Regulation

§215.125 Defective Uncoupling Device.

A railroad may not place or continue in service a car, if the car has an uncoupling device without sufficient vertical and lateral clearance to prevent-

- (a) Fouling on curves; or
- (b) Unintentional uncoupling.

Guidance

Toggle clearance should be closely examined.

Regulation

§215.127 Defective Draft Arrangement.

A railroad may not place or continue in service a car, if-

- (a) The car has a draft gear that is inoperative;
- (b) The car has a broken yoke;
- (c) An end of car cushioning unit is-
 - (1) Leaking clearly formed droplets; or
 - (2) Inoperative;
- (d) A vertical coupler pin retainer plate-
 - (1) Is missing (except by design); or
 - (2) Has a missing fastener;
- (e) The car has a draft key or draft key retainer, that is-
 - (1) Inoperative; or
 - (2) Missing; or
- (f) The car has a missing or broken follower plate.

Guidance

Whenever the draft gear unit is not performing its intended function of absorbing shocks and impact forces as designed, the unit is defective.

A striker casting that exhibits **fresh** “batter marks” is generally an indication of a defective draft system component.

Federal Railroad Administration

An **end-of-car** cushioning unit is defective if it is inoperative and not performing its intended function of absorbing shocks and impacts, or is leaking clearly formed droplets. A cushioning unit should not be considered defective if it is losing only a minute amount of fluid through seepage. The primary concern is an excessive loss of fluid that could render the cushioning unit inoperative. Therefore, a cushioning unit is defective if it is leaking fluid in clearly formed droplets. “Clearly formed droplets” means a **fresh** accumulation of oil (not dirty or dried) which continually forms into beads.

Based on technical data presented at an MP&E Technical Resolution Committee, FRA has determined that cushioning unit pressure indicators are **not** sufficiently reliable to determine the operating status of cushioning units. The unreliability of the indicators is due to the variable buff and draft forces exerted on cushioning devices while freight cars are in use in train yards. Therefore, FRA inspectors should not rely on cushioning unit pressure indicators to determine the operational status of a cushioning device. Thus, if clearly formed droplets are present the cushioning unit is defective and must be repaired, regardless of the indication provided by the pressure indicator. However, once a freight car is placed on a repair track, the railroad may use the pressure indicator to aid in determining the operating status of the cushioning unit. **(MP&E 00-03)**

A unit is defective if the front or rear lugs are broken or missing.

Of the three return springs, more than one defective spring constitutes a defective condition. Inspectors should be aware that some tank cars have sustained a failed stub sill assembly, resulting in the train parting and going into emergency. In one case, FRA investigations revealed that the head block, which normally is attached by welding to the tank head and stub sill, was not attached to the stub sill and was actually “floating” (only attached to the tank head). The top of the stub sill assembly showed signs of the head block rubbing. The stub sill failed at the rear of the draft gear, completely separated, including the end cross over platform. The broken stub sill remained attached to the adjacent car by the top and bottom shelf coupler, which prevented it from falling to the track structure.

There have been similar problems with fabricated stub sill dual diameter tank cars. Some cars built between 1962 and 1969 have exhibited minor crack indications in the weld connecting the cradle pad to the tank. Those cars with verified cracks revealed that the cracks always initiated in the weld attachment to the top cover plate and did not propagate through the top cover plate to the sill.

Motive Power and Equipment Compliance Manual

Due to the described experiences, a close inspection is to be made to **all tank cars with stub sills**. The installation should be carefully examined at the stub sill securement for any signs of stress. If the inspection of any tank car equipped with stub sills reveals any defect of the stub sill, the inspector is to notify the regional MP&E Specialist providing the following information:

Date: _____ Railroad _____ Shipper _____ Location _____
Initial & Car number _____ Built date _____ DOT Spec. _____
Waybill No. and Date, Commodity _____ Routing _____
Description of defect _____
Action taken by the railroad _____
Any other information _____

The MP&E specialist should forward this information to the MP&E Staff Director.
(MP&E 98-24)

Regulation

§215.129 Defective cushioning device.

A railroad may not place or continue in service a car if it has a cushioning device that is-

- (a) Broken;
- (b) Inoperative; or
- (c) Missing a part-

unless its sliding components have been effectively immobilized.

Guidance

A **center of car** cushioning unit should not be considered defective if it is losing only a minute amount of fluid through seepage. The primary concern is an excessive loss of fluid that could render the cushioning unit inoperative. A leaking cushioning unit is defective if it is leaking fluid in clearly formed droplets. **Note:** "Clearly formed droplets" means a **fresh** accumulation of oil (not dirty or dried) which continually and/or slowly forms into beads. If the area is just wet in appearance, it should not be taken as a defective condition.

Regulation

Subpart C-Restricted Equipment

§215.203 Restricted cars.

- (a) This section restricts the operation of any railroad freight car that is-
 - (1) More than 50 years old, measured from the date of original construction;

Federal Railroad Administration

- (2) Equipped with any design or type component listed in appendix A to this part; or
- (3) Equipped with a Duryea under-frame constructed before April 1, 1950, except for a caboose which is operated as the last car in a train.

(b) A railroad may not place or continue in service a railroad freight car described in paragraph (a) of this section, except under conditions approved by the Federal Railroad Administrator.

(c) A railroad may petition the Administrator to continue in service a car described in paragraph (a) of this section. Each petition shall be:

- (1) Submitted not less than 90 days before the car is to be operated;
- (2) Be submitted in triplicate; and
- (3) State or describe the following:
 - (i) The name and principal business address of the petitioning railroad.
 - (ii) The name and address of the entity that controls the operation and maintenance of the car involved.
 - (iii) The number, type, capacity, reporting marks, and car numbers of the cars, their condition, status and age measured from the date of original construction.
 - (iv) The design, type component, or other item that causes the car to be restricted.
 - (v) The maximum load the cars would carry.
 - (vi) The maximum speed at which the cars would be operated.
 - (vii) That each car has been examined and found to be safe to operate under the conditions set forth in the petition.
 - (vii) The territorial limits within which the cars are to be operated and the name of each railroad that will receive the cars in interchange.

Guidance

The inspector should be aware that there are many approvals (some mistakenly call these waivers) in place allowing the continued operation of 50-year old cars only in approved territorial limits with unique operating conditions. Cars operating over the 50-year limit must be stenciled with the letter **R**, as required in the next subpart.

Regulation

Subpart D-Stenciling

§215.301 General

The railroad or private car owner reporting mark, the car number, and built date shall be stenciled, or otherwise displayed, in clearly legible letters and numbers not less than seven inches high, except those of the built date which shall not be less than one (1)-inch high:

- (a) On each side of each railroad freight car body; and
- (b) In the case of a tank car, in any location that is visible to a person walking at track level beside the car.

§215.303 Stenciling of restricted cars.

Motive Power and Equipment Compliance Manual

- (a) Each restricted railroad freight car that is described in §215.205(a) of this part shall be stenciled, or marked-
- (1) In clearly legible letters; and
 - (2) In accordance with paragraphs (b) and (c) of this section.
- (b) The letter “R” shall be-
- (1) Placed immediately below or to the right of the car number;
 - (2) The same color as the reporting mark; and
 - (3) The same size as the reporting mark.
- (c) The following terms, to the extent needed to completely indicate the basis for the restricted operation of the car, shall be placed on the car following the symbol “R” in letters not less than one inch high:
- (1) Age
 - (2) Coupler.
 - (3) Draft.
 - (4) Bearings.
 - (5) Truck.
 - (6) Under-frame.
 - (7) Wheels.
 - (8) Yoke.

§215.305 Stenciling of maintenance-of-way equipment.

- (a) Maintenance-of-way equipment (including self-propelled maintenance-of-way equipment) described in §215.3(c)(3) shall be stenciled, or marked-
- (1) In clearly legible letters; and
 - (2) In accordance with paragraph (b) of this section.
- (b) The letters “MW” must be-
- (1) At least 2 inches high; and
 - (2) Placed on each side of the car.

Guidance

Maintenance-of-way (MOW) equipment is equipment owned/operated for railroad maintenance purposes and must be stenciled with **MW**. MOW equipment cannot be used to haul commodities which will generate revenue for the railroad. Canadian MOW cars are stenciled with **RSE** (Railway Service Equipment) in lieu of the **MW**. FRA has granted a waiver to allow **RSE** stencil instead of the **MW** stencil on MOW cars based out of Canada.

If vandals have painted graffiti on the car and obscured the identification marks, the inspector should point the defect out to the railroad for corrective action, but not issue a violation unless these actions become rampant.

Federal Railroad Administration

Inspectors should ensure that maintenance-of-way equipment is used for maintenance-of-way activities, and not used for revenue service.

Regulation

Appendix D to Part 215 – Pre-Departure Inspection Procedure

At each location where a freight car is placed in a train and a person designated under §215.11 is not on duty for the purpose of inspecting freight cars, the freight car shall, as a minimum, be inspected for the imminently hazardous conditions listed below that are likely to cause an accident or casualty before the train arrives at its destination. These conditions are readily discoverable by a train crew member in the course of a customary inspection.

1. Car body
 - (a) Leaning or listing to side.
 - (b) Sagging downward.
 - (c) Positioned improperly on truck.
 - (d) Object dragging below.
 - (e) Object extending from side.
 - (f) Door insecurely attached.
 - (g) Broken or missing safety appliance.
 - (h) Lading leaking from a placarded hazardous material car.
2. Insecure coupling.
3. Overheated wheel or journal.
4. Broken or extensively cracked wheel.
5. Brake that fails to release.
6. Any other apparent safety hazard likely to cause an accident or casualty before the train arrives at its destination.

Guidance

There have been instances of pre-departure mechanical inspections being conducted improperly. FRA is particularly concerned about the practice of conducting pre-departure inspections pursuant to Appendix D of Part 215, while the equipment is moving (i.e., a “roll by” inspection) or by conducting such inspections from locomotives on an adjacent track. While regulations do not specify the physical actions necessary to conduct a proper inspection, FRA believes such inspections require that inspectors position themselves in such a manner that all of the required observations can be safely made.

Motive Power and Equipment Compliance Manual

Such observations cannot be safely made while equipment is moving or when the inspector is positioned on a locomotive on an adjacent track. While some of the individual conditions may be observable while a train is moving, others are not, and a person cannot reasonably be expected to see all of them as a train is rolling by.

FRA inspectors should strongly consider issuing violations whenever they observe the above inspection practices being performed instead of a proper Appendix D inspection. In appropriate circumstances, the inspector may assess a civil penalty for each car in a train that does not receive the proper pre-departure mechanical inspection. These violations should be treated as violations separate and distinct from and in addition to any substantive violation conditions found on individual cars. **(MP&E 98-58)**

The regulations allow for a car to go to destination on an Appendix D inspection.

A person performing an Appendix D inspection cannot make the determination for movement under §215.9. However, if a train crew member is listed as a designated inspector, he or she can make the determination for movement under §215.9, but would be required to perform a full inspection for compliance with this Part, not an Appendix D inspection.

Chapter 5

Blue Signal Protection of Workmen, Part 218

Introduction

The minimum requirements for **Blue Signal Protection of Workmen** are prescribed in 49 CFR Part 218, Subpart B. An example of a blue signal sign is shown in **Figure 1**. This Subpart B requires railroads to take certain measures to protect their employees when engaged in inspection, testing, repair, and servicing of rolling equipment. It is designed to reduce the number of serious accidents resulting from human factors. A railroad may prescribe additional and/or more stringent requirements than those found in this regulation.



Figure 1: Blue signal sign attached to snow-covered track in a train yard

On the following pages, you will find the sections of the regulation that have interpretive guidance and related information to aid the inspector in the performance of blue signal inspections. After each section of the regulation is an interpretation or policy as established by FRA.

Federal Railroad Administration

Reports of blue signal inspections are to be made on the Inspection Report, F6180.96. Violations are to be submitted on Form F6180.67.

On some occasions, it may be necessary to devote a major portion of the inspection day to conducting blue signal observations; however, in most instances, inspectors should incorporate blue signal inspections with their routine inspection activities. For example, during a locomotive inspection at a locomotive repair facility, observations of that facility's blue signal protection would be appropriate.

Before conducting any blue signal inspections, you will need knowledge of any permissible alternative methods of providing the required protection. For instance, using the above example, it is the railroad's option whether to use the procedures listed in § 218.27 or in § 218.29 to protect a locomotive servicing track area. Before entering a particular location, you must also be aware of any waivers of the regulations applicable to that location.

Remember, it is the railroad's obligation to provide blue signal protection. Inspectors shall not order railroad personnel to stop working, nor should the inspector establish blue signal protection. It is the inspector's responsibility to monitor and determine whether blue signal protection is being applied correctly. If it is not being applied correctly, the inspector must take appropriate enforcement action to correct the situation. Noncompliance with blue signal regulations is serious and can lead to injury or death.

Part 218 – Subpart A, General

218.1 Purpose.

This part prescribes minimum requirements for railroad operating rules and practices. Each railroad may prescribe additional or more stringent requirements in its operating rules, timetables, timetable special instructions, and other special instructions.

218.3 Application.

(a) Except as provided in paragraph (b) of this section, this part applies to railroads that operate rolling equipment on standard gage track which is part of the general railroad system of transportation.

(b) This part does not apply to --

(1) A railroad that operates only on track inside an installation which is not part of the general railroad system of transportation, or

(2) Rapid transit operations in an urban area that are not connected with the general railroad system of transportation.

Guidance

Motive Power and Equipment Compliance Manual

Blue signal regulations apply only to railroads that operate rolling equipment on standard gage track that is part of the general railroad system of transportation. It **does not** apply to a railroad that operates only on tracks inside an installation that is not part of the general railroad system, or a railroad that operates only on tracks used exclusively for urban rapid transit. However, if a **railroad employee** is working on, under, or between rolling equipment on a track located inside an industry or plant served by a railroad, blue signal protection must be established. It does not apply to contractors, even if they are working on rolling equipment on standard gage track that is part of the general railroad system of transportation.

218.5 Definitions.

Absolute block means a block in which no train is permitted to enter while it is occupied by another train.

Blue signal means a clearly distinguishable blue flag or blue light by day and a blue light at night. When attached to the operating controls of a locomotive, it need not be lighted if the inside of the cab area of the locomotive is sufficiently lighted so as to make the blue signal clearly distinguishable.

Camp car means any on-track vehicle, including outfit, camp, or bunk cars or modular homes mounted on flat cars used to house rail employees. It does not include wreck trains.

Car shop repair track area means one or more tracks within an area in which the testing, servicing, repair, inspection, or rebuilding of railroad rolling equipment is under the exclusive control of mechanical department personnel.

Controlling locomotive means a locomotive arranged as having the only controls over all electrical, mechanical and pneumatic functions for one or more locomotives, including controls transmitted by radio signals if so equipped. It does not include two or more locomotives coupled in multiple which can be moved from more than one set of locomotive controls.

Designated crew member means an individual designated under the railroad's operating rules as the point of contact between a train or yard crew and a utility employee working with that crew.

Effective locking device when used in relation to a manually operated switch or a derail means one which is:

- (1) Vandal resistant;
- (2) Tamper resistant; and
- (3) Capable of being locked and unlocked only by the class, craft or group of employees for whom the protection is being provided.

Group of workers means two or more workers of the same or different crafts assigned to work together as a unit under a common authority and who are in communication with each other while the work is being done.

Federal Railroad Administration

Locomotive means a self-propelled unit of equipment designed for moving other railroad rolling equipment in revenue service including a self-propelled unit designed to carry freight or passenger traffic, or both, and may consist of one or more units operated from a single control.

Locomotive servicing track area means one or more tracks, within an area in which the testing, servicing, repair, inspection, or rebuilding of locomotives is under the exclusive control of mechanical department personnel.

Main track means a track, other than an auxiliary track, extending through yards or between stations, upon which trains are operated by timetable or train order or both, or the use of which is governed by a signal system.

Rolling equipment includes locomotives, railroad cars, and one or more locomotives coupled to one or more cars.

Switch providing access means a switch which if traversed by rolling equipment could permit that rolling equipment to couple to the equipment being protected.

Train or yard crew means one or more railroad employees assigned a controlling locomotive, under the charge and control of one crew member; called to perform service covered by Section 2 of the Hours of Service Act; involved with the train or yard movement of railroad rolling equipment they are to work with as an operating crew; reporting and working together as a unit that remains in close contact if more than one employee; and subject to the railroad operating rules and program of operational tests and inspections required in §§217.9 and 217.11 of this chapter.

Utility employee means a railroad employee assigned to and functioning as a temporary member of a train or yard crew whose primary function is to assist the train or yard crew in the assembly, disassembly or classification of rail cars, or operation of trains (subject to the conditions set forth in §218.22 of this chapter).

Worker means any railroad employee assigned to inspect, test, repair, or service railroad rolling equipment, or their components, including brake systems. Members of train and yard crews are excluded except when assigned such work on railroad rolling equipment that is not part of the train or yard movement they have been called to operate (or been assigned to as “utility employees”). Utility employees assigned to and functioning as temporary members of a specific train or yard crew (subject to the conditions set forth in §218.22 of this chapter), are excluded only when so assigned and functioning.

Note: Servicing does not include supplying cabooses, locomotives, or passenger cars with items such as ice, drinking water, tools, sanitary supplies, stationery, or flagging equipment. Testing does not include (i) visual observations made by an employee positioned on or alongside a caboose, locomotive, or passenger car; or (ii) marker inspections made in accordance with the provisions of §221.16(b) of this chapter.

Guidance

Motive Power and Equipment Compliance Manual

Blue signal means a clearly distinguishable blue flag, blue sign, or blue light. The effectiveness of the blue signal is dependent upon the device being clearly distinguishable to the operator in control of the movement of rolling equipment; therefore, compliance must be evaluated with this in mind. A badly deteriorated blue signal or one that is covered with oil or dirt, cannot be considered to be in compliance. A blue light with a weak battery, broken lens, and/or a blue signal which is obviously inadequate in size or intensity and cannot be clearly distinguishable, is not in compliance with the requirements of the regulation. A blue signal used at night must be illuminated, unless an unlighted device is attached to the controls of a locomotive and the cab of the locomotive is adequately lighted so as to make the blue signal **clearly distinguishable**. The law allows a blue light to be used by day, but the inspector should determine that it is **clearly distinguishable** by either its size or intensity. Inspectors should also consider the intensity of lights at night. If a floodlight washes out the effectiveness of a blue light, an exception should be taken. Small lights that are designed to be used in the cab of a locomotive should not be used in the gage of the track unless the intensity of the light makes it clearly distinguishable to the operator in control of rolling equipment.

Car shop repair track area means one or more tracks within an area in which the testing, servicing, repair, inspection, or rebuilding of railroad rolling equipment is under the exclusive control of the mechanical department personnel. It includes heavy repair tracks located within buildings, as well as tracks where total erecting or rebuilding of the rolling equipment occurs.

Controlling Locomotive means the locomotive that is controlling from its cab the propulsion system, sanders, and power brake system of each locomotive that is pneumatically, electrically, and mechanically connected together in a consist. “*Electrically*” can be either by a jumper cable or by a radio signal. “*Mechanically*” means that the locomotive units are physically coupled together. “*Pneumatically*” means the appropriate air hoses that control the operation of the brakes are connected and cut in.

Effective locking device means a device that can be locked and unlocked only by the class, craft, or group of workmen performing work on the rolling equipment. It must be of substantial construction or technically designed so that it is vandal-resistant and tamper-resistant. A rail clamp or switch point blocking device that cannot be locked does not comply with the requirements of this regulation. Train and yard crews should not be able to unlock switches or derails protecting workmen, unless they are the group of workers performing work or tasks that requires blue signal protection. If train or yard crews need to apply blue signal protection, a standard operating department switch lock will not satisfy the requirements of this regulation. An “other than standard” switch lock can be used, as long as other train and yard crews cannot unlock it. A remotely controlled switch must have a plug, key, or cover properly applied to the control panel which immobilizes the switch control lever that is being secured to establish protection. It must be applied in such a manner that the control lever cannot be thrown for the route into the protected track without first removing the device. A written tag alone, attached to the button or lever, does not comply. Any remotely controlled switch that can be overridden in the field by use of a manual lever, without establishing prior authority and taking that switch out of power, must to be treated as a manual switch and effectively locked in the field. Inspectors should physically examine and test the locking device to ensure the lock functions as intended.

Federal Railroad Administration

Group of workers means two or more workers from the same or different crafts that are assigned to work together as unit or group under a common authority (such as a lead man, roundhouse foreman, or car shop foreman) and all members of the group are in some form of communication with each other while the work is being performed.

Locomotive means a self-propelled, on-track piece of equipment designed for moving revenue freight and passenger cars over the railroad. It may be a traditional locomotive powered by electricity, diesel-electric, turbine, or steam. It could also be in the form of a self-propelled hi-rail vehicle used in revenue service. Based upon the definition as written for this regulation, an MU car would be a locomotive, but a control-cab of a suburban push-pull passenger train operation would not, unless a locomotive were attached to it and the controls of the control-cab were cut in. Blue signal protection for remote controlled locomotives is handled in the same manner as a traditional locomotive.

What is required to establish blue signal protection for remote controlled locomotives?

Place the locomotive into manual operation and establish blue signal protection as if it were a regular locomotive.

Locomotive servicing track area means one or more tracks within an area that is under exclusive control of mechanical department personnel. It includes tracks known as the “back shops” and tracks within the area that are located inside of buildings where major overhauling or rebuilding of locomotives occurs. Access to, from, and within the protected area would have to come from the mechanical department personnel in charge of that area.

Main track has been used in railroad operating rule books for many years and should have a common meaning throughout the industry to the extent that there should be no mistaking it from tracks commonly known by such other defined terms as “yard tracks” or “siding” in judging compliance with this regulation. The fact that the authority for movement on a track is Rule 93, “Yard limits” rule, has no bearing on this interpretation. Therefore, any track that does not meet the definition of a main track is other than a main track.

Rolling equipment refers to locomotives or railroad cars, or any combination of such.. It is not meant to include, for the purposes of this regulation, maintenance-of-way on-track equipment that is protected by other means. Also, derailment situations do not require blue signal protection.

Switch providing access: When protected equipment is standing on an entrance switch so as to prevent other equipment from entering the track through that switch, it ceases to be an access switch. However, once the switch becomes exposed so as to permit other equipment to enter the protected track and couple to the protected cars, it becomes a switch providing access.

Train or yard crew: Train or yard crew members are permitted to work on, under, or between any railroad rolling equipment they are called to operate, without establishing blue signal protection. **Note:** The train and yard crew exclusion only applies to the equipment they are called to operate. They cannot assist another crew, unless blue signal protection is established (if the task warrants blue signal protection) **or** the entire crew (including the locomotive) is

Motive Power and Equipment Compliance Manual

involved assisting another crew, provided that both crews are in communication with each other and are aware of the movements to be made.

Can a train crewmember perform a mechanical repair (change a brake shoe) without establishing blue signal protection?

YES, if the repairs are performed on the equipment the crew member is called to operate and if the crew member is not working as a utility employee.

Can members of one crew assist another crew, such as making a coupling at a road crossing, replacing or changing EOT batteries, or changing a brake hose without establishing blue signal protection?

NO - It would have to involve the entire crew, to include using the locomotive, to handle the equipment and assist the other crew. If only a few crewmembers assist the other crew, then blue signal protection must be established.

Utility Employee (UE) is not restricted to any particular craft or job title. The UE may be any railroad employee, provided that all of the prerequisites contained in § 218.22(a) are met.

Worker means railroad employees assigned to inspect, test, repair, or service railroad rolling equipment and their components, including brake systems. Train and yard crews are excluded, except when assigned to perform such work on railroad rolling equipment that is not part of the train or yard movement they have been called to operate. The train and yard crewmember exclusion is based on the rationale that the crew members working together as an operating crew, with their assigned locomotive engineer at the controls of the locomotive, would have complete control over the movement of any rolling equipment on which they are working.

Railroad security forces or clerical personnel who board railroad cars for the purpose of checking lading for pilferage or vandalism, or store house employees loading or unloading cars (even when using a forklift) are not considered to be *workers* as defined in this part because they are not assigned to inspect, test, repair, or service the railroad rolling equipment. Therefore, blue signal protection is not required under the regulation. Fueling and sanding locomotives does not require blue signal protection, provided the tasks do not require the individual to go on, under, or between the locomotive.

The law only applies to “railroad workers.” The term *railroad worker* means an employee who is employed and paid directly by the railroad. Non-railroad employees (**contractors**, suppliers, etc.) are not required to use blue signal protection under Federal regulations. Although many railroads require these individuals to comply with blue signal regulations as part of the conditions of their contracts, FRA cannot enforce the contractor’s use of blue signal protection. However, an inspector should advise the railroad of noncompliance when it is known that the railroad expects the contractors to comply.

Servicing, as noted in the footnote under this definition, does not include supplying cabooses, locomotives, or passenger cars with such items as ice, drinking water, tools, sanitary supplies, stationery, or flagging equipment.

Federal Railroad Administration

Testing does not include visual observations made by an employee positioned inside or alongside a caboose, locomotive, or passenger car. A worker involved in these specific work activities is not deemed to be in a hazardous position should the equipment inadvertently move.

Part 218 – Subpart B, Blue Signal Protection of Workers.

218.21 Scope.

This Subpart prescribes minimum requirements for the protection of railroad employees engaged in the inspection, testing, repair, and servicing of rolling equipment whose activities require them to work on, under, or between such equipment and subjects them to the danger of personal injury posed by any movement of such equipment.

Guidance

Initially, the rationale in developing the language of this subsection was that these general work categories (inspecting, testing, repair, and servicing) usually require an employee to go on, under, or between rolling equipment. In so doing, the employee would be in close proximity to the equipment, where he or she would be vulnerable to the possibility of a serious personal injury if an unexpected movement of the equipment were to occur. However, in identifying those general work activities and positions in relation to railroad rolling equipment in such broad terms, it was inevitable that they would encompass a number of specific jobs which definitely do not expose the worker to personal injury. FRA realized the predicament, and revised the language in 1979 by inserting the word “and” in the regulatory language -

“...**and** subjects them to the danger of personal injury...”

Therefore, it is not solely the work being done (inspecting, testing, repairing, or servicing) and where the employee is positioned in relation to the equipment (on, under, or between), but also whether this causes the employee to be placed in a potentially hazardous position.

Generally, non-hazardous work will be combined with work that is hazardous, and blue signal protection is required. However, there may be times when certain non-hazardous work can be isolated in such a manner that blue signal protection would not be required. For example, equipment inspections that can be made by an employee from a position on the ground alongside the equipment does not represent a hazardous situation. Seated at the controlling locomotive and manipulating the air brake handles or throttle or setting the MU valve on the control stand does not represent a hazardous situation. Testing of an air brake system, when purely visual in nature and requires an employee to observe the position of air brake piston while standing on the ground beside the cars, is another example of a non-hazardous situation that would not require blue signal protection. If the employee has to go under the equipment to observe the piston travel, as with many truck-mounted brake systems, blue signal protection is required. A Part 215 pre-departure inspection would require blue signal protection, because the individual making the inspection would have to go under and between the equipment to properly conduct the inspection. A train crew making an Appendix D inspection would not have to establish blue signal protection **if** it is the equipment they are called to operate.

When conducting a purely visual inspection of a locomotive, as long as the employee does not go under the locomotive, step into the engine compartment, or go onto the roof of the locomotive, the employee would not be in a hazardous situation. For example, gaging wheels would require blue signal protection because the individual would be under the equipment. An employee could open engine compartment doors and look inside to inspect for oil or water leaks, exhaust leaks, check the cooling water sight glass, and check engine oil as long as the employee does not physically step inside the engine compartment and does not do anything beyond visual checks—all without establishing blue signal protection. If the locomotive engineer is conducting the inspection on locomotives he or she is called to operate, no blue signal protection is required.

Certain servicing activities can be carried out without exposure to danger. Examples of such activities would be:

- Bleeding of the air brake system on cars, oiling journal boxes, passenger coach interior and exterior cleaning not requiring the use of ladders.
- Evacuating and recharging passenger car soil holding tanks.
- Supplying passenger cars with water or supplying locomotives with water and fuel by attaching a hose to an exterior outlet.
- Changing radios and HTDs on locomotives that use quick disconnect fittings and do not require the use of tools.
- In instances where sanding a locomotive can be accomplished by attaching the sanding hose to a side filler cap without physically going on the locomotive.

Similarly, certain supplying activities such as supplying locomotives and cabooses with ice, water, fuses, stationery and paper toweling can be carried out without exposure to danger. These and similar activities, when effectively confined to the specific non-hazardous work function, do not require blue signal protection.

There are certain activities that definitely call for the display of blue signals. Examples of such activities (when performed by non-train or non-yard crew members) are:

- Breaking or making air hose connections.
- Connecting or disconnecting electric control cables between equipment.
- Installing/removing/servicing/repair of rear end devices (markers and telemetry units).
- Any air brake test requiring an employee to go under or between rolling equipment.
- Replacing broken windows.
- Changing brake shoes.
- Activities that require the use of a ladder.
- Performing electrical repairs that involve work partially or wholly within the confines of an electrical cabinet.
- Inspecting the undercarriage from a pit.
- Repairing and closing doors on a car if tools are required.

All these and certain other activities do cause the workers to position themselves in such a way that they are vulnerable to personal injury if unexpected movement of the equipment occurred.

Federal Railroad Administration

In the event a worker has to position himself or herself between the rails at the end of a car, as when changing a knuckle or air hose, blue signal protection is required. When repairs require the worker to be on, under, or between rolling equipment, then blue signals unquestionably are required. It is the function or nature of the work being performed that determines the protective provisions of the rule, **not** the craft or title of the employee.

The blue signal regulation **does not** apply to derailment situations. Assuring protection for workers involved in such operations is the responsibility of the individual railroad in accordance with its own operating rules. Such operations are usually well coordinated, controlled operations under the direction of a wreck master and/or transportation supervisor at the scene. Requiring blue signals under these circumstances would unreasonably hamper re-railing operations. Unlike routine operations, all personnel involved in this type of work are aware of the special conditions that exist and are familiar with the necessary precautions to take when equipment moves take place.

Mechanized track maintenance operations **do not** require blue signal protection, as these operations are addressed by railroad operating rules and other regulations. Under railroad operating rules, flags of another color have been designated for this purpose, and those rules specify the exact manner in which they are to be displayed to provide protection for such operations.

Taking a track “out of service” does not provide relief to this regulation. Blue signal protection would have to be established on out-of-service tracks if the work being performed requires it.
§218.22 Utility employee.

(a) A utility employee shall be subject to the Hours of Service Act, and the requirements for training and testing, control of alcohol and drug use, and hours of service record keeping provided for in parts 217, 219, and 228 of this chapter.

(b) A utility employee shall perform service as a member of only one train or yard crew at any given time. Service with more than one crew may be sequential, but not concurrent.

(c) A utility employee may be assigned to and serve as a member of a train or yard crew without the protection otherwise required by Subpart D of part 218 of this chapter only under the following conditions:

(1) The train or yard crew is assigned a controlling locomotive that is under the actual control of the assigned locomotive engineer of that crew;

(2) The locomotive engineer is in the cab of the controlling locomotive, or, while the locomotive is stationary be replaced in the cab by another member of the same crew;

(3) The utility employee established communication with the crew by contacting the designated crew member on arriving at the train (as defined for the purpose of this section as one or more locomotives coupled, with or without cars) and before commencing any duties with the crew.

Motive Power and Equipment Compliance Manual

(4) Before each utility employee commences duties, the designated crew member shall provide notice to each crew member of the presence and identity of the utility employee. Once all crew members have acknowledged this notice, the designated crew member shall advise the utility employee that he or she is authorized to work as part of the crew. Thereafter, communication shall be maintained in such a manner that each member of the train or yard crew understands the duties to be performed and whether those duties will cause any crew member to go on, under, or between the rolling equipment; and

(5) The utility employee is performing one or more of the following functions: set or release hand brakes; couple or uncouple air hoses and other electrical or mechanical connections; prepare rail cars for coupling; set wheel blocks or wheel chains; conduct air brake tests to include cutting air brake components in or out and position retaining valves; inspect, test, install, remove or replace a rear end marking device or end of train device. Under all other circumstances a utility employee working on, under, or between railroad rolling equipment must be provided with blue signal protection in accordance with §§218.23 through 218.30 of this part.

(d) When the utility employee has ceased all work in connection with that train and is no longer on, under, or between the equipment, the utility employee shall notify the designated crew member. The designated crew member shall then provide notice to each crew member that the utility employee is being released from the crew. Once each crew member has acknowledged the notice, the designated crew member shall then notify the utility employee that he is released from the train or yard crew.

(e) Communications required by §218.22(c)(4) and (d) shall be conducted between the utility employee and the designated crew member. This communications shall be conducted either through direct verbal contact, by radio in compliance with part 220 of this chapter, or by oral telecommunication of equivalent integrity.

(f) No more than three (3) utility employees may be attached to one train or yard crew at any given time.

(g) Any railroad employee who is not assigned to a train or yard crew, or authorized to work with a crew under the conditions set forth by paragraph (b) of this section, is a worker required to be provided blue signal protection in accordance with §§218.23 through 218.30 of this part.

(h) Nothing in this section shall affect the alternative form of protection specified in §221.16 of this chapter with respect to inspection of rear end marking devices.

Guidance

When an individual is working as a utility employee (UE), he or she is working as a temporary member of a specific train or yard crew. This allows the UE to be excluded from the blue signal protection requirements only when performing the tasks listed in § 218.22(c)(5). Under all other circumstances, a UE working on, under, or between rolling equipment must be provided with blue signal protection.

Federal Railroad Administration

As defined in § 218.5, the UE is not restricted to any particular craft or job title. The UE may be any “railroad” employee, provided that the prerequisites contained in § 218.22(a) are met, namely that the UE is subject to: (1) the railroad’s operating rules, (2) the hours of service laws, and (3) Federal drug and alcohol regulations. If the UE is a mechanical department employee (carman, machinist, etc.), an abbreviated version of the instructions for operating rules can be given to satisfy the requirements of Part 217.

The regulation limits the assignment of the UE to only one crew at a time. This is necessary to prevent confusion as to the location and duties of that employee, and to ensure that the employee is, in fact, a member of the crew to which he or she is assigned for the duration of the assignment.

A train or yard crew member cannot become a UE and work with another train or yard crew, unless the train or yard crew he or she originally started with has completed its tour of duty or has been reconstituted as a new assignment.

When conducting inspections for compliance regarding the use of UEs, the inspector should monitor the following:

- Communication between the UEs and ranking crew member. UEs and crew members must follow the required operating procedures when attaching to and/or detaching from the crew. Was the communication made face-to-face, by radio, telephone, or by some other form of communication?
- Presence of locomotive engineer or other crew member in the control compartment or at the controls of the controlling locomotive when the UE performs duties on the rolling equipment assigned to that train or yard crew.
- Nature of the work performed by the UE. Ensure the employee does not perform duties other than those listed in the regulation that require blue signal protection. There are no restrictions on tasks the UE can perform with the crew that do not require blue signal protection.
- No more than three UEs can be assigned to a train or yard crew at the same time.
- UEs are not assigned to or working with more than one train or yard crew at a time.
- Inspection of the UE’s hours of service records.
- The UE has to be in the general vicinity of the crew. The UE cannot be working at a remote site without the locomotive and the rest of the crew nearby.

Regulation

§218.23 Blue signal display.

Motive Power and Equipment Compliance Manual

(a) Blue signals displayed in accordance with §218.25, 218.27, or 218.29 signify that workers are on, under, or between rolling equipment. When so displayed --

- (1) The equipment may not be coupled to;
- (2) The equipment may not be moved, except as provided for in §218.29;
- (3) Other rolling equipment may not be placed on the same track so as to reduce or block the view of a blue signal, except as provided for in §218.29 (a), (b) and (c); and
- (4) Rolling equipment may not pass a displayed blue signal.

(b) Blue signals must be displayed in accordance with §218.25, 218.27, or 218.29 by each craft or group of workers prior to their going on, under, or between rolling equipment and may only be removed by the same craft or group that displayed them.

Guidance

The regulation states that blue signals may only be removed by the same craft or group that displayed them. It need not be the same individual, just the same craft or group. If a particular worker is not a part of a group, as indicated by the regulation's definition of "group of workers", then the individual would have to display his or her own blue signal. If a railroad chooses to adopt the policy of having different crafts or groups attach an individual disc to a common blue signal and having the last worker removing his disc also remove the common blue signal, that practice would comply with the the regulation.

Can a supervisor remove a blue signal if the worker forgot to remove the blue signal and has gone home? A supervisor can remove a blue signal displayed, but only if it is **known** that workers are not on, under, or between rolling equipment and are clear of the protected equipment, and if he or she is the supervisor of the same craft or group of workers.

The use of blue signals and derails by industries served by railroads as called for under Department of Labor, Occupational Safety and Health Administration (OSHA) and hazardous materials regulations for the protection of industry employees involved in the loading and unloading of railroad cars, **is not part of** Subpart B - Blue Signal Protection for Workmen. However, once a blue signal is displayed on tracks or on rolling equipment, regardless under whose authority that signal is displayed, railroad employees must respect the signal as though it was displayed in accordance with the requirements of this regulation. Blue signals displayed by industry employees must not be removed by railroad employees. Also, when a **railroad employee** is working on, under or between rolling equipment inside an industry or plant served by a railroad, blue signal protection must be established.

A blue signal displayed at or near a manually operated switch providing access to the track must be displayed no farther into the track than the fouling (clearance point) of that entrance switch. Once the blue signal is properly displayed, there can be **NO** movement of the equipment, except as provided for in § 218.29.

Federal Railroad Administration

Regulation

§218.24 One-person crew.

Guidance

Per §218.24, the one-person crew provision, was suspended effective May 15, 1995. Railroads are not required to comply with any part of this section. During the stay, until a revised rule is issued, FRA's policy regarding single person crews (i.e., locomotive engineer working alone, such as in hostler or in helper service) is as follows:

While working on, under, or between equipment they are called to operate, no blue signal protection is required for single person crews. However, if a single person RCO crew does not have the OCB in his or her possession when going on, under, or between equipment, or if for any other reason he or she no longer has control of the equipment he or she was called to operate per the definition of a "train or yard crew" member at 218.5, blue signal protection would be required for the single person crew.

Regulation

§218.25 Workers on a main track.

When workers are on, under, or between rolling equipment on a main track:

- (a) A blue signal must be displayed at each end of the rolling equipment; and
- (b) If the rolling equipment to be protected includes one or more locomotives, a blue signal must be attached to the controlling locomotive at a location where it is readily visible to the engineman or operator at the controls of that locomotive.
- (c) When emergency repair work is to be done on, under, or between a locomotive or one or more cars coupled to a locomotive, and blue signals are not available, the engineman or operator must be notified and effective measures must be taken to protect the workers making the repairs.

Guidance

The important thing to realize when observing blue signal protection on a main track is that the regulation does not require lined and locked switches, or the application of derails. However, blue signals must be displayed at **each end** of the rolling equipment to be protected. *Ends of the equipment* refers to placement of a blue flag or blue light in the knuckle or on the coupler of the car or locomotive. The inspector should check to see if this has been done with an appropriate blue signal. (See "blue signal" definition.) The blue signal displayed at each end of the rolling equipment may be attached to the ends of the equipment or it may be displayed on the track ahead and behind the equipment in such a manner that there is no doubt about the track and/or equipment to which it applies. If one or more locomotives are among the protected equipment, then a blue signal must **also** be attached to the controlling locomotive at a location where it is readily visible to someone seated at the controls of that locomotive. The inspector should

Motive Power and Equipment Compliance Manual

evaluate how visible and obvious the blue signal is to someone seated at the controls of the locomotive. This requirement is in addition to the blue signals displayed at each end of the equipment. The signal should be placed so that the operator does not have to look for it. A clamp hanging from the window sill with the blue signal positioned low on the car body of the locomotive would not comply. In other words, the signal must be immediately visible to the operator without any effort on his part. The absence of a blue signal at any one of the required locations (ahead, behind, and/or on the controlling locomotive) means that the equipment is unprotected and other than the assigned train crew, employees may not work on, under, or between that equipment.

Remotely controlled switches cannot be used to fulfill the requirements of § 218.25(a)-(b) to provide protection on “main track”, as § 218.30 “Remotely controlled switches” references only § 218.27 “Other than main track.” While it is permissible for remotely controlled switches to be lined and locked against movement to the main track by a control operator or dispatcher in order to provide additional protection during a situation requiring blue signal protection on a main track, such action does not fulfill the requirements of 218.25.

Normally, there are very few locations that routinely perform work requiring blue signal protection on a main track. An exception to this is when a railroad maintains fuel and servicing facility on a main line for through trains. At a location such as this, first determine if any work is being done that requires blue signal protection. Remember that there are certain exceptions to what constitutes servicing and testing, and fueling is considered one of these exceptions. A fuel hose stretched over a track does not require blue signal protection.

The emergency provisions were intended to allow railroads flexibility when a train is stopped on the **main track** under emergency circumstances. Under these conditions, the provision can be used when blue signals are not available, provided that the train and engine crew has full control over train movement. The provisions were not intended to be used for convenience or simply because the carrier neglected to maintain a sufficient supply of blue signals for normal use by the mechanical personnel. The “emergency provision” provides an alternative means of providing protection for workers whenever a train is stopped under emergency circumstances and blue signals are not available. This provision does not apply to a train that has any portion of its consist in a yard, unless there are no mechanical department employees working in the yard and there are no blue signals available.

When “emergency” repair work is to be done on, under, or between a locomotive and/or one or more cars coupled to a locomotive, and blue signals are not available, the locomotive engineer or an operator at the controls of the controlling locomotive must be notified and effective measures must be taken to protect the workers making the repairs. The emergency must occur when the train movement is being controlled by the assigned train crew. A mechanical department employee assigned to accompany a train between terminals to monitor the performance of the equipment or accompany a dimensional load can use the emergency provision as long as a train crew member is at the controls of the locomotive.

Regulation

§218.27 Workers on track other than main track.

Federal Railroad Administration

When workers are on, under, or between rolling equipment on track other than main track –

(a) A blue signal must be displayed at or near each manually operated switch providing access to that track;

(b) Each manually operated switch providing access to the track on which the equipment is located must be lined against movement to that track and locked with an effective locking device; and

(c) The person in charge of the workers¹ must have notified the operator of any remotely controlled switch that work is to be performed and have been informed by the operator that each remotely controlled switch providing access to the track on which the equipment is located has been lined against movement to that track and locked as prescribed in §218.30.

(d) If rolling equipment requiring blue signal protection as provided for in this section is on a track equipped with one or more crossovers, both switches of each crossover must be lined against movement through the crossover toward that rolling equipment, and the switch of each crossover that provides access to the rolling equipment must be protected in accordance with the provisions of paragraphs (a) and (b), or (c) of this section.

(e) If the rolling equipment to be protected includes one or more locomotives, a blue signal must be attached to the controlling locomotive at a location where it is readily visible to the engineman or operator at the controls of that locomotive.

Guidance

This is the type of blue signal protection used in train yards and sidings. It can also be used in a locomotive service track area or car shop repair area.

An appropriate blue signal (see “blue signal” definition) displayed at or near a manually operated switch providing access to the track must be displayed no farther into the track than the fouling point of that entrance switch. If a car or locomotive is positioned almost to the fouling point of the entrance switch, the blue signal display can be attached to the ends of the rolling equipment. Either way, the blue signal must be displayed in such a manner that there is no doubt about the track and/or equipment to which it applies. However, if a derail is used, the blue signal must be displayed at each derail. See 49 C.F.R. § 218.29(c). The absence of a blue signal at any of the manually operated switches providing access to a track renders the track unprotected and workers cannot work on, under, or between equipment on that track. The absence of the blue signal at a derail also renders the track unprotected. Similarly, any unlocked derail, or manual or remotely controlled switch providing access to the track on which equipment is standing means that the equipment on the track is unprotected and workers cannot work on, under, or between that equipment.

¹ See FRA’s letter of clarification to CSX Transportation at Willard Yard, Ohio, dated May 18, 2009, at the end of this section.

Rolling equipment may **not** enter or depart a protected track. Exception: Only after all work activity has ceased, and the workers have been notified to stand clear and the blue signal protection has been removed from the switch through which the equipment will move, may rolling equipment enter or depart a “protected” track. When using a derail locked in the derauling position with the proper blue signal displayed at the derail, the protected track is the area between the locked derails. Therefore, other rolling equipment may enter and depart from that track, but **cannot** enter or depart the protected area of the track. Once blue signal protection is established, there can be **no** movement of rolling equipment within the protected area. In a situation involving a worker working a train under blue signal protection, road power could be added to the train by removing the blue signal on the head end only, thereby eliminating the need to walk to the rear. Similarly, this same worker can allow a train to depart after he removes the blue signal from the head end of the train. In both instances, work must stop while the blue signal has been removed. After the train has departed from the track, the remaining blue signal protection must be immediately removed.

When a crossover switch leads into the track on which protected equipment is standing, the switches at both ends of the crossover must be lined against entry into the protected track. The switch at the end of that crossover which connects directly to the protected track must be locked, and blue signal must be displayed at that locked switch. However, if protected equipment is standing on the switch of such a crossover so as to block other equipment moves from entering the protected track through that crossover, the switch need not be locked or blue signal displayed.

When workmen are engaged in work on a train with the rear portion standing on a track other than a main track, and the head end portion is on a main track, then the rear portion must be protected in accordance with § 218.27, “Workmen on track other than a main track,” while the head end would be protected by a blue signal ahead of the locomotive and one attached to the controlling locomotive in accordance with § 218.25, “Workmen on main track.”

If one or more locomotives are among the protected equipment, then a blue signal must be displayed on the controlling locomotive at a location where it is readily visible to someone seated at the controls of that locomotive. The inspector should evaluate how visible and obvious the blue signal is to someone seated at the controls of the locomotive. The signal should be placed so that the operator does not have to look for it. A clamp hanging from the window sill with the blue signal positioned low on the car body of the locomotive would not comply. In other words, the signal must be immediately visible to the operator without any effort on his part. The absence of a blue signal at any one of the required locations means that the equipment is unprotected and workers may not work on, under, or between that equipment.

If there is a single locomotive on one end of a yard track and a locomotive consist (with or without cars) is located on the other end of the same yard track and workers are replacing a brake shoe on the single locomotive, but no work is being performed on the other consist, the controlling locomotive of the consist and the single locomotive would both have to be blue flagged.

Regulation

Federal Railroad Administration

§218.29 Alternate methods of protection.

Instead of providing blue signal protection for workers in accordance with §218.27, the following methods for blue signal protection may be used:

(a) When workers are on, under, or between rolling equipment in a locomotive servicing track area:

- (1) A blue signal must be displayed at or near each switch providing entrance to or departure from the area;
- (2) Each switch providing entrance to or departure from the area must be lined against movement to the area and locked with an effective locking device; and
- (3) A blue signal must be attached to each controlling locomotive at a location where it is readily visible to the engineman or operator at the controls of that locomotive;
- (4) If the speed within this area is restricted to not more than 5 miles per hour a derail, capable of restricting access to that portion of a track within the area on which the rolling equipment is located, will fulfill the requirements of a manually operated switch in compliance with paragraph (a)(2) of this section when positioned at least 50 feet from the end of the equipment to be protected by the blue signal, when locked in a derailing position with an effective locking device, and when a blue signal is displayed at the derail;
- (5) A locomotive may be moved onto a locomotive servicing area track after the blue signal has been removed from the entrance switch to the area. However, the locomotive must be stopped short of coupling to another locomotive;
- (6) A locomotive may be moved off of a locomotive servicing area track after the blue signal has been removed from the controlling locomotive to be moved and from the area departure switch;
- (7) If operated by an authorized employee under the direction of the person in charge of the workers², a locomotive protected by blue signals may be repositioned within this area after the blue signal has been removed from the locomotive to be repositioned and the workers on the affected track have been notified of the movement; and
- (8) Blue signal protection removed for the movement of locomotives as provided in paragraphs (a) (5) and (6) of this section must be restored immediately after the locomotive has cleared the switch.

(b) When workers are on, under, or between rolling equipment in a car shop repair track area:

² See FRA's letter of clarification to dated May 18, 2009, at the end of this chapter.

Motive Power and Equipment Compliance Manual

1. A blue signal must be displayed at or near each switch providing entrance to or departure from the area; and
2. Each switch providing entrance to or departure from the area must be lined against movement to the area and locked with an effective locking device;
3. If the speed within this area is restricted to not more than 5 miles per hour, a derail capable of restricting access to that portion of a track within the area on which the rolling equipment is located will fulfill the requirements of a manually operated switch in compliance with paragraph (a)(2) of this section when positioned at least 50 feet from the end of the equipment to be protected by the blue signal, when locked in a derailing position with an effective locking device and when a blue signal is displayed at the derail;
4. If operated by an authorized employee under the direction of the person in charge of the workmen, a car mover may be used to reposition rolling equipment within this area after workers on the affected track have been notified of the movement.

(c) Except as provided in paragraphs (a) and (b) of this section, when workers are on, under, or between rolling equipment on any track, other than a main track:

1. A derail capable of restricting access to that portion of the track on which such equipment is located, will fulfill the requirements of a manually operated switch when positioned no less than 150 feet from the end of such equipment; and
2. Each derail must be locked in a derailing position with an effective locking device and a blue signal must be displayed at each derail.

(d) When emergency repair work is to be done on, under, or between a locomotive or one or more cars coupled to a locomotive, and blue signals are not available, the engineman or operator at the controls of that locomotive must be notified and effective measures must be taken to protect the workers making the repairs.

Guidance

This section provides a railroad with an alternate method of establishing blue signal protection for equipment occupying tracks in locomotive servicing areas and car shop repair track areas. At these locations, a railroad may establish blue signal protection in accordance with either § 218.27, “Workers on track other than main track,” or in accordance with this section. The inspector must know whether § 218.27 or § 218.29 is being used before taking any kind of enforcement action.

Federal Railroad Administration

Basically, § 218.27 requires blue signal protection be established for each individual track, while § 218.29 permits blue signal protection to be established for the area as a whole. It provides greater flexibility for movement of equipment within, as well as to and from, the area. This section also authorizes use of locked derails to fulfill the requirements of a manually operated switch on any track, other than a main track, when placed at a minimum distance of 150 feet from the end of the protected equipment. If speed is restricted to less than 5 mph, then this distance may be **reduced** to no less than 50 feet when used in locomotive servicing and car shop repair track areas, per 218.29(a) and (b). The 5 mph restriction may be conveyed by a physical sign or by a written bulletin or timetable instruction. If a derail is used, it must be locked in a derailing position with an effective locking device and a blue signal must be displayed at the derail.

Blue signals must be attached to the controlling locomotive whenever workers are on, under, or between that locomotive or any rolling equipment attached to that locomotive.

A locomotive not blue flagged within the area can be moved without removing blue signals displayed at the entrance switches provided:

1. The locomotive does not impact or couple to a locomotive on which a blue signal is displayed.
2. The locomotive is operated by an authorized employee under the direction of the person in charge of the workers.
3. The workers on the affected track(s) where the movement will take place have been notified of the movement.

When locomotives are moved into and out of the locomotive servicing area, the workers **do not** have to stop work on locomotives that have a blue signal properly displayed. The blue signal protection must be immediately restored after any movement into or out of the servicing area.

When inspecting for the adequacy of the blue signal protection in a locomotive servicing or car repair track area, first determine if workers are on, under, or between rolling equipment. Then determine if protection provided at each switch providing a means of entrance into the area is proper. Are the blue signals properly displayed? Physically test any locks, manual switches, and derails to ensure that they are secure. Next, observe the operations inside the area for compliance.

Keep in mind when using the alternate method in locomotive servicing areas, every locomotive that has a worker working on, under, or between requires a blue signal attached to each controlling locomotive where it is readily visible to the operator at the controls of that locomotive. This means that if the locomotive is by itself (not coupled to another locomotive) it must have a blue signal displayed at its controls. If the locomotive being worked on was coupled to three other locomotives, then one of the following applies:

1. If the four locomotives were pneumatically, electrically, and mechanically coupled together so that all four respond to the controls of only one locomotive (the lead unit), then only the controlling (lead) unit requires a blue signal displayed at the controls.

2. If the four locomotives are coupled together but control cables and/or MU hoses are not connected so that all of the locomotives respond to one controlling locomotive, then all four locomotives would require a blue signal displayed at their controls.
3. If the four locomotives are coupled together with the intent to make them a four-unit consist controlled from one locomotive, FRA has determined that the brake hoses and jumper cables could be connected after the automatic brake valve is cut out and the MU valves are placed in the trail position on three of the locomotives, and the controlling locomotive (automatic brake valve cut in) has a blue signal displayed at the controls.

Note: Unless the automatic brake valve is cut out and the MU valve is placed in the trail position, a blue signal has to be attached to all locomotives that are capable of being used as a controlling unit before the locomotive controls cables and MU cables are connected.

Additionally, a worker cutting the automatic brake valve in or out and setting the MU valve is not considered a worker on the equipment.

Remember, this provision has been made in the regulation for using alternate methods to reposition rolling equipment within the area. However, this may only be done when all conditions of the regulation are met.

Regulation

§218.30 Remotely controlled switches.

(a) After the operator of the remotely controlled switches has received the notification required by §218.27(c), he must line each remotely controlled switch against movement to that track and apply an effective locking device to the lever, button, or other device controlling the switch before he may inform the employee in charge of the workers that protection has been provided.

(b) The operator may not remove the locking device unless he has been informed by the person in charge of the workers³ that it is safe to do so.

(c) The operator must maintain for 15 days a written record of each notification which contains the following information:

(1) The name and craft of the employee in charge who provided the notification;

(2) The number or other designation of the track involved;

(3) The date and time the operator notified the employee in charge that protection had been provided in accordance with paragraph (a) of this section; and

(4) The date and time the operator was informed that the work had been completed, and the name and craft of the employee in charge who provided this information.

³ See FRA's letter of clarification, dated May 18, 2009, at the end of this chapter.

Federal Railroad Administration

Guidance

The operator referred to in this section is the employee who has been delegated the responsibility for the proper and safe operation of the control board.

When the term *effective locking device* is used in reference to a remotely controlled switch, it need not be a padlock, but may be a plug or key that, when properly inserted into the control panel of the installation, serves to immobilize the switch control lever being used to establish protection. The device must be applied in such a manner that the control lever cannot be thrown for the route into the protected track without first removing the locking device. Whatever type locking device is utilized to immobilize the switch lever or button, it must effectively prevent it from being moved. A written tag alone, attached to the lever or button, that does not prevent the lever or button from being manipulated, would not comply. Any remotely controlled switch that can be overridden in the field by use of a manual lever without obtaining prior authority and taking that switch out of power would have to be treated as a manual switch and be locked in the field.

Occasionally, a track on which blue signal protection is to be applied will have one or more switches that provide access to that track remotely controlled. If this is the case, certain measures must be taken by the carrier to insure adequate protection. When you find a location like this, check where these switches are being controlled.

An inspection should be made of the written records the railroad is required to maintain. The written records should be inspected for their completeness as to: (1) the date and time the operator received notification of the work to be performed (Note: Item (1) is not a regulatory requirement. It is a suggestion as a good practice); (2) the name and craft of the employee in charge who provided the notification; (3) the number or other designation of the track involved; (4) the date and time the operator notified the employee in charge that protection has been provided in accordance with paragraph (a) of this section; and (5) the date and time the operator was informed that the work had been completed, and the name and craft of the employee in charge who provided this information. Such written records should be made at once and never from memory or memoranda.

Check if effective locking devices are being applied to remotely controlled switches. Traditionally, levers, buttons, and similar devices have been used to control these switches. Mechanical locking devices, e.g., pins, clamps, sleeves, buttons or toggles would then be applied to these devices to prevent accidental removal of the protection.

Increasingly, computer programs are now being used in place of levers, buttons, etc., to operate remotely controlled switches. The safeguard against accidental movement of a protected switch may not be so obvious with these systems. Applying a padlock, plug, or key would be impractical. The generally used method is for the computer program to require one or more extra entries with the computer's keyboard before releasing the switch for movement. If only one additional step is required, evaluate whether it forces the operator to realize he or she is attempting to move a switch that has had blue signal protection applied to it. If you have a question concerning sufficient protection being provided, ask the operator to describe what steps

Motive Power and Equipment Compliance Manual

he she must take. Can the operator provide and remove switch protection for each individual group of workers, or only for all employees at once?

Regardless of the method used to operate remotely controlled switches, remember that the intent of the locking device provision is to force the operator to make some special effort to move a protected switch. This causes the operator to recall that there are workers on rolling equipment on the track. Use good judgment in determining if this has been accomplished.

Inspections of remotely controlled switches will require a different reporting procedure. In most cases, blue signal inspection reporting may be entered on FRA Form F6180.96 together with any equipment-related inspection results. This is true for any blue signal inspections, except when remotely controlled switches are involved. The reason for this is that in most cases, control of blue signal protection is under the direct supervision of the mechanical department. Therefore, blue signal and equipment can be combined on the same report and presented to the responsible mechanical department official for handling. However, in the case of remotely controlled switches, a separate report on FRA Form F6180.96 with its own number will be required.

It is best to leave a copy of your report with the railroad official directly responsible for the type of condition found. Remotely controlled switches are usually under the control of the transportation department, and defects must be handled with them for correction. Equipment conditions should be handled separately with a mechanical official, which is why there is a need for separate reports. The inspector should also leave a copy of this separate report with the mechanical department supervisor, because a failure in protection of a remotely controlled switch will most likely impact mechanical personnel.

Federal Railroad Administration



U.S. Department
of Transportation
**Federal Railroad
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

MAY 18 2009

Mr. Richard A. Johnson
General President, Brotherhood of Railway Carmen Division
Transportation Communications International Union
3 Research Place
Rockville, MD 20850

Dear Mr. Johnson:

Thank you for your March 16, 2009, letter in which you requested that the Federal Railroad Administration (FRA) review the CSX Transportation Company's (CSXT) notice, dated September 22, 2008, for Blue Signal Protection of carmen at the Willard, Ohio, yard facility.

The FRA understands that you believe that CSXT's change of procedures regarding Blue Signal Protection on remotely controlled switches violates Title 49 Code of Federal Regulations Section 218.27(c). This regulation requires that the person in charge of workers contact an operator of a remotely controlled switch, and ensures that the switch is lined against movement when work is to be done. A corresponding regulation, § 218.30, requires the operator to lock the switch, wait for notification from the person in charge of workers to ensure it is safe to remove the lock, and create a record of the interaction.

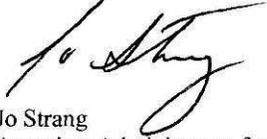
The FRA has not defined what constitutes a "person in charge of workers." Therefore, individual employees may be considered "the person in charge" in the application of § 218.27(c). It has been FRA's longstanding policy to allow multiple individuals, even within the same group, to be considered such persons. FRA believes requiring multiple individuals to contact the operator to ensure on-track protection provides a higher level of safety than what our regulation requires. If a railroad chooses to define a person in charge of workers under Part 218 to include multiple individuals within the same group, FRA does not consider that a violation. It is FRA's understanding that the notice at issue is an attempt by CSXT to implicitly define such individuals as persons in charge of workers.

Motive Power and Equipment Compliance Manual

2

The FRA believes CSXT has met the burden of providing the best protection for its employees at Willard Yard and does not take exception to the September 2008 CSXT bulletin.

Sincerely,

A handwritten signature in black ink, appearing to read "Jo Strang". The signature is written in a cursive style with a large, sweeping initial "J".

Jo Strang
Associate Administrator for Railroad Safety/Chief Safety Officer

Chapter 6

Rear End Marking Device—Passenger, Commuter, and Freight Trains, Part 221

Introduction

This regulation was first published in January 1977 to reduce the risk of rear-end train collisions. This regulation requires that at least one highly visible marker be displayed at the trailing end of a passenger, commuter, and freight train during specified times and under certain weather conditions. The requirements of the regulation are generally self-explanatory.

The regulation applies to railroads that operate more than one train at any given time on standard gage main track that is a part of the general railroad system of transportation. A railroad that operates only trains consisting of historical or antiquated equipment for excursion, educational, or recreational purposes, and urban rapid transit operations (not connected to the general railroad systems of transportation), are also excluded.

In 1986, the regulation was amended in response to railroad operational changes (e.g., elimination of cabooses) and the development of newer technologies. The amended regulation allows:

- Railroads to use personnel, other than train crew members, to perform rear marking device inspections (See Title 49 Code of Federal Regulations (CFR) Section 221.15(c)).
- Railroads the use of radio telemetry in lieu of conducting a visual observation (See 49 CFR § 221.15(d)).
- Alternative procedures for establishing worker protection while performing a rear marker inspection on main track (See 49 CFR § 221.16(b)).

Part 221 – Subpart A, General

§ 221.3 Application.

(a) Except as provided in paragraph (b) of this section, this part applies to passenger, commuter, and freight trains when operated on a standard gage main track which is part of the general railroad system of transportation.

(b) This part does not apply to:

- (1) A railroad that operates only trains consisting of historical or antiquated equipment for excursion, educational, or recreational purposes;
- (2) A train that operates only on track inside an installation which is not part of the general railroad system of transportation;

Federal Railroad Administration

(3) Rapid transit operations in an urban area that are not connected with the general railroad system of transportation;

(4) A railroad that operates only one train at any given time.

Guidance

Paragraph (b)(1) excludes railroads that only operate trains consisting of historical or antiquated equipment. A railroad that conducts regular freight and/or passenger train service, but occasionally operates a train consisting of historic or antiquated equipment, would be required to comply with the rule.

Paragraph (b)(4) applies to railroads that operate only one train at any given time. It does not exclude trains operated on a railroad's branch line.

§ 221.5 Definitions.

As used in this part:

(a) *Train* means a locomotive unit or locomotive units coupled, with or without cars, involved in a railroad operation conducted on a main track. It does not include yard movements.

Guidance

The term “yard movements,” as used in paragraph (a), references movements of on-track rail equipment within the designated limits of a yard. By including such language, the rule excludes most switching operations when performed solely within the confines of a railroad yard. If, for example, if a yard job with the locomotive in the lead pulled out onto a main track for headroom only in order to make a shove, the rear of the train wouldn't be on the main track and the train wouldn't require a marker. If the trailing end of the rear car makes it onto the main line outside the designated yard limits, then the equipment becomes a “train” for the purposes of Part 221 and the requirements of the regulation would apply.

§ 221.13 Marking device display.

(a) During the periods prescribed in paragraph (b) of this section, each train to which this part applies that occupies or operates on main track shall (1) be equipped with, (2) display on the trailing end of the rear car of that train, and (3) continuously illuminate or flash a marking device prescribed in this subpart.

(b) Unless equipped with a functional photoelectric cell activation mechanism complying with paragraph (c) of this section, the marking devices prescribed by this subpart shall be illuminated continuously or flash during the period between one hour before sunset and one hour after sunrise, and during all other hours when weather conditions so restrict visibility that the end

silhouette of a standard box car cannot be seen from ½ mile on tangent track by a person having 20/20 corrected vision.

(c) Marking devices prescribed by this part and equipped with a functioning photoelectric cell activation mechanism shall illuminate or flash the device continuously when there is less than 1.0 candela per square meter of ambient light.

(d) The centroid of the marking device must be located at a minimum of 48 inches above the top of the rail.

Guidance

An operating rear end marking device is required to be displayed at the rear end of trains operating on, or occupying, a main line track during periods of restricted visibility. If part of a train is within the yard limits, but the rear car of the train still occupies the main track, a marking device would be required to be displayed until such time as the rear car of the train no longer occupied the main track. Per § 221.14(c), when a locomotive is operated singly, or at the rear of a train (including at the rear of a lite locomotive consist), the rear headlight of the locomotive illuminated on low beam will satisfy the rear end marking device requirement.

§ 221.15 Marking device inspection.

(a) Each marking device displayed in compliance with this part shall be examined at each crew change point to assure that the device is in proper operating condition.

(b) This examination shall be accomplished either by visually observing that the device is functioning as required or that the device will function when required by either:

(1) repositioning the activation switch or

(2) covering the photoelectric cell.

(c) This examination shall be conducted either by the train crew or some other qualified person, provided that, if a non-train crewmember performs the examination, that person shall communicate his or her findings to the locomotive engineer of the new train crew.

(d) When equipped with a radio telemetry capability, a marker displayed in accordance with this part may be examined by observing the readout information displayed in the cab of the controlling locomotive demonstrating that the light is functioning as required in lieu of conducting a visual observation.

Guidance

Most (but not all) rear end marking devices are equipped with a photoelectric cell that will illuminate the marking device during reduced ambient lighting conditions. The device should operate as intended and its operation should be examined at each crew change point. The

Federal Railroad Administration

examination can be accomplished either visually or (when equipped) by using radio telemetry. If a visual examination is performed by personnel other than a train crew member assigned to the train, the results of the examination must be communicated to the locomotive engineer.

§ 221.16 Inspection procedure.

(a) Prior to operating the activation switch or covering the photoelectric cell when conducting this test, a non-train crew person shall determine that he is being protected against the unexpected movement of the train either under the procedures established in part 218 of this chapter or under the provisions of paragraph (b) of this section.

(b) In order to establish the alternative means of protection under this section,

(1) the train to be inspected shall be standing on a main track;

(2) the inspection task shall be limited to ascertaining that the marker is in proper operating condition; and

(3) prior to performing the inspection procedure, the Inspector shall personally contact the locomotive engineer or hostler and be advised by that person that they are occupying the cab of the controlling locomotive and that the train is and will remain secure against movement until the inspection has been completed.

Guidance

This section of the regulation provides the procedures for establishing protection for non-train crew members while performing rear end marking device examinations as required by § 221.15(a) discussed above. If the train is standing on a main track and the task is limited to ascertaining the proper operation of the device, prior to performing the inspection the non-train crew member must personally contact the locomotive engineer positioned in the cab of the controlling locomotive and receive assurances from the locomotive engineer that the train will remain secure from movement until the inspection is completed. However, this section is not applicable if the proper operation of the device can be ascertained without positioning the non-train crew member in danger of injury due to unexpected movement of the equipment, and without the train crew member having to operate the activation switch or cover the photoelectric cell when conducting the test. Finally, if it becomes necessary for the railroad employee to perform tasks other than ascertaining the proper operation of the device, or if the train is located on other than main track, then the provisions of Subpart B of Part 218 (Blue signal protection of workers) would instead apply.

§ 221.17 Movement of defective equipment.

(a) Whenever the marking device prescribed in this part becomes inoperative enroute, the train may be moved to the next forward location where the marking device can be repaired or replaced.

(b) Defective rolling equipment which, because of the nature of the defect, can be placed only at the rear of a train for movement to the next forward location at which repairs can be made need not be equipped with marking devices prescribed in this part.

(c) When a portion of a train has derailed, and a portable marking device is not available, the remainder of the train may be moved to the nearest terminal without being equipped with the marking device prescribed in this part.

Guidance

The expectation of the rule is that railroads will maintain a sufficient number of approved rear end marking devices on their system to comply with the regulation. FRA safety inspectors should become sufficiently familiar with each railroad operation within their assigned inspection territory, to determine where marking devices are maintained and available. The regulation allows a railroad to continue the movement of a train that experiences a marking device failure while en route. The inoperative device must be repaired or replaced at the next forward location where such replacement or repairs can be made.

Although most end-of-train devices (EOT) incorporate a rear end marking device that is built into the EOT, the separate regulatory requirements for the two devices can be misinterpreted. Each device accomplishes a separate function; the rear end marker increases visibility of trains during low ambient lighting conditions, while the EOT transmits information to the head-end of the train, via radio telemetry. Another distinction is that all trains are required to have an operating rear end marking device (during specified low ambient lighting conditions), but not all trains are required to be equipped with an EOT. It is especially important to become familiar with and understand the differences between the “en route failure” requirements specified in both regulations (See Part 232, Subpart E). Deficiencies and/or recommendations for civil penalty should reference the appropriate regulation (Part 221 for rear end marking device, or Part 232 for EOT).

Approved Rear End Marking Devices

Part I—Approved Devices Tested For or By Manufacturers

Star Headlight & Lantern Co.; 168 West Main Street; Honeoye Falls, NY 14472.
FRA identification Nos. FRA-PLE-STAR-845-F (flasher) and FRA-PLE-STAR-845-C (steady burn).

Julian A. McDermott Corp.; 1639 Stephen Street; Ridgewood, Long Island, NY 11227.
FRA identification Nos. FRA-MEC-MCD-100-C (steady burn), FRA-MEC-MCD-100-F (flasher), FRA-MEC-MCD-300-C (steady burn), and FRA-MEC-MCD-300-F (flasher).

American Electronics, Inc.; 140 Essex Street; Hackensack, NJ 07601.

NOTE: Yankee Metal Products Corp. previously produced these devices.

FRA identification Nos. FRA-DRGW-YANK-300 (portable strobe), FRA-WP-YANK-301R (flashing), FRA-WP-YANK-305R (flashing), and FRA-WP-YANK-306R (steady burn).

Federal Railroad Administration

PART II—Approved Devices Tested For or By Rail Carriers

1. Carrier: Atchison, Topeka & Santa Fe Railway Co.; Technical Research & Development Department; 1001 Northeast Atchison Street; Topeka, KS 66616.
Manufacturer: Trans-Lite, Inc.; P.O. Box 70; Milford, CT 06460.
FRA identification Nos. FRA-ATSF-TL-875-150, FRA-ATSF-TL-875-60, FRA-ATSF-TL-875-4412, and FRA-ATSF-TL-200.

2. Carrier: Amtrak (National Railroad Passenger Corporation), 400 North Capitol Street NW; Washington, DC 20001.
Manufacturer: (a) Trans-Lite, Inc.; P.O. Box 70; Milford, CT 06460.
FRA identification Nos. FRA-ATK-TL-3895-1, FRA-ATK-TL-4491-2, FRA-ATK-TL-4491-3, and FRA-ATK-TL-FM-4491-1.

Manufacturer: (b) Luminator Division of Gulfon Industries, Inc.; 1200 East Dallas North Parkway; Plano, TX 75074.
FRA identification No. FRA-ATK-LUM-0101890-001.

Manufacturer: (c) Whelen Engineering Co., Inc.; Deep River, CT 06417.
FRA identification No. FRA-ATK-WHE-WERT-12.

Guidance

Since the regulation was published, FRA has approved additional devices. The following supplement is a listing of the current approved marking devices:

Manufacturer	Model Number
ALLCOM Products LLC 695 Sundown Road South Eglin, IL 60177	#RRP-265 Series LED
American Electronics, Inc. ¹ 40 Essex Street Hackensack, NJ 07601	#300, #301, #305, #306
R. E. Deitz Company 225 Wilkinson Street Syracuse, NY 13201	#70-21/NAPA 510
DPS Electronics 2435 Outlaw Lane Belgrade, MT 59714	#DPS HVM II

¹ Yankee Metal Products Corp. previously produced these devices.

Motive Power and Equipment Compliance Manual

Dialight Corporation 1501 Route 34 South Farmington, NJ 07727	#PAR46 LED Rail Car Marker Light
Donovan Associates P.O. Box 212 Exton, PA 19341	#21079
Dynamic Sciences Limited 359 St. Croix Blvd. St. Laurant, Quebec H4N 2I3 Canada	HVM-401 (also integrated in Digital Unit)
Federal Sign and Signal Co. 140 East Tower-Burridge Chicago, IL	#372
General Electric P.O. Box 1262 Reading, PA 10603	—1 (60 PAR/2/R)
Grimes Manufacturing Co. Midland Ross Corp. 515 North Russell Street Urbana, OH 43078	85-0583-3, 85-0602-1
Illinois Central Gulf ² Two Illinois Center 233 North Michigan Avenue Chicago, IL 60601	High Liner-P 36
Julian A. McDermott Corp. 1639 Stephan Street Long Island, NY 11227	Series 100 (Flasher) ; Series 100 (Steady) Series 300 (Flasher) ; Series 300 (Steady)
Liteco, Inc. 205 Main Street Chester, NJ 07930	36F and REI 36F-2A
Luminator Division Gulfton Industries Inc. 1200 East Dallas North Parkway, Plano, TX 75074	#103086, #0101890-001
Matrix Railway Corporation 69 Nancy Street West Babylon, NY 11704	P21926-2 (LED)

² 1437 Marker Light Manufactured by Adams and Westlake Co., Elkhart, Indiana and redesigned by Signal-Stat Co., 1200 Commerce Avenue, Union New Jersey 07803

Federal Railroad Administration

Power Parts Co. 1860 N. Wilmot Avenue Chicago, IL 60647	#12155
Pulse Electronics, Inc. 5706 Frederick Ave. Rockville, MD 20852	FRA-BN-Pulse 4401 RTP (Portable) FRA-BN-Pulse Train line II
Pyle National 1334 North Kostner Chicago, IL 60651	20585DCJ (200PAR56)
Quantum Engineering, Inc. 352 Stowe Avenue Orange Park, FL 32073	Q348x (LED)
Railhead Corporation 10721 S. Western Avenue Chicago, IL 60643	#MK III USA
Safety Products Co. 6144 North Avenue Chicago, IL	#6551-77RTVL
Star Headlight and Lantern Co. 168 West Main Street Honoye Falls, NY 14472	845 (Flasher), #845 (Steady) 845S 860-F, #861-F Portables

Motive Power and Equipment Compliance Manual

<p>Translite Incorporated P.O. Box 70 Milford, CT 06460</p>	<p>FM-875-2 (GE-4413R PAR 46) FM-875-2 (GE 60 PAR/2/R) FM-3895-1, (GE 60 PAR/2/R) F-875 (150 PAR 46) F-875 (60 PAR 46) F-875 (4412 PAR 46) C-1785(200 PAR 56) FM-4 491-1 FM-4491-2 FM-4491-3 RC-4193 FM-886 FM-886A FM-5050-1 FM-5050-2 FM-5050-3 RC-2412 FM-5060-1 FM-2304 FM-5051-75 V FM-5051-32V FM-5158 FM-5403 FM-6227 M - 46-1 (LED)</p>																								
<p>Union Switch & Signal Inc. P.O. Box 539 Batesburg, SC 29006</p>	<p>(Digitar) 6695 Rear Telemetry Unit</p>																								
<p>Utah Transit Authority 3600 South 700 West P.O. Box 30810 Salt Lake City, UT 84130</p>	<p>Motive Power Inc. application of the General Electric (GE) 60PAR/2/R TRAIN sealed beam lamp Luminator Rear End Marking Device P/N 110103-001</p>																								
<p>Wabtec Railway Electronics 21200 Dorsey Mill Road Germantown, MD 20876</p>	<table border="0"> <tr> <td>22161P</td> <td>22415P</td> <td>22810P</td> <td>22899P</td> </tr> <tr> <td>23131P</td> <td>23743P</td> <td>23792P</td> <td>24071P</td> </tr> <tr> <td>24186P</td> <td>24201P</td> <td>24261P</td> <td>24262P</td> </tr> <tr> <td>24973P</td> <td>25244P</td> <td>25455P</td> <td>26062P</td> </tr> <tr> <td>26482P</td> <td>26494P</td> <td>26495P</td> <td>26621P</td> </tr> <tr> <td>27340P</td> <td>27385P</td> <td></td> <td></td> </tr> </table>	22161P	22415P	22810P	22899P	23131P	23743P	23792P	24071P	24186P	24201P	24261P	24262P	24973P	25244P	25455P	26062P	26482P	26494P	26495P	26621P	27340P	27385P		
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24186P	24201P	24261P	24262P																						
24973P	25244P	25455P	26062P																						
26482P	26494P	26495P	26621P																						
27340P	27385P																								
<p>Whalen Engineering Co., Inc. Deep River, CT 06417</p>	<p>WERT-12</p>																								

Chapter 7

Safety Glazing Standards– Locomotives, Passenger Cars, and Cabooses, Part 223

Guidance

The Safety Glazing Standards contained in part 223 establish minimum safety requirements for glazing materials in the windows of locomotives, passenger cars, and cabooses in order to reduce the risk of death or serious injury for railroad crew members and railroad passengers from flying objects, including bullets. Although the actual regulation is relatively self-explanatory, there are some items of interest that inspectors need to know to help with compliance activities.



Figure 1: Locomotive with FRA-approved Types I (front-facing) & II (side-facing).



Figure 2: Coach car with FRA-approved Type II (side-facing) glazing.

There have been questions raised concerning the rule language in §223.9 *Requirements for new or re-built equipment* does not contain the requirement of Type I or Type II glazing for locomotives and passenger cars. Please be advised that such requirements can be found in the Appendix A to this Part, at item (10) and (11) for Type I (see Figure 1) and Type II (see **Figures 1 and 2** above), respectively.

Glazing Waivers

Inspectors should ask their regional specialist whether a railroad or equipment owner has a glazing waiver before pursuing any enforcement action. Numerous glazing waivers have been granted by FRA's Railroad Safety Board in accordance with the requirements contained in 49 CFR part 211. Glazing waivers exempt specific equipment, owned by specific railroads or equipment owners from the requirements of part 223. If additional information related to an existing waiver is need, a railroad or equipment owner should produce evidence related to the waiver, including FRA's letter granting their waiver request.

When an inspector is assigned to investigate a waiver request for glazing, the following information is needed by the Railroad Safety Board in order to process the waiver:

Federal Railroad Administration

- (Note: Paragraph concerning obtaining written estimate for glazing waivers has since been deleted. It is based on Railroad Safety Board decision reached on September 23, 2011).
- A description of the operating environment, including the areas of operation (city or rural), any grade crossings, the maximum authorized speed, and the specific route(s).
- Information regarding the history for window breakage and/or vandalism.
- The date the equipment was built; and,
- Any other pertinent information. The information must be fact, not opinion.

Locomotive Glazing

Locomotives that have supplementary bay windows added to the side of the locomotive are not required to meet the safety glazing standards. These windows are normally used only during periods of adverse weather and are intended to improve crew visibility without exposing the crew to the adverse weather. It was never FRA's intent to include these supplementary windows, since they are used as an addition to existing glazing that must meet the impact requirements of this regulation.

Carbody type locomotives, such as model numbers F-9, F-40PH, E-9, SD40C, etc., have windows and portholes in the end doors and the side carbody that enclose the motor. Since these are areas that are not in close proximity to the railroad worker during normal locomotive operations, such windows do not require the use of impact resistant glazing. Only windows located in the cab areas are required to have the safety glazing materials.

Passenger Equipment Glazing

The Passenger Equipment Safety Standards have included additional requirements for glazing applications in 49 CFR § 238.221 for Tier I equipment. This section basically addresses the performance of the frame that attaches to the car body. It is intended to ensure the glazing stays in place when subjected to air pressure differences caused when two trains pass at the minimum separation for two adjacent tracks. It also secures the window glazing in place so it can resist spalling when struck by a projectile, and also resist being knocked out of the window frame.

The Passenger Equipment Safety Standards have included additional requirements for glazing applications in 49 CFR § 238.421 for Tier II equipment. These standards are far more stringent standards than prescribed in part 223. This section applies to all passenger equipment that operates at speeds in excess of 125 mph, not to exceed 150 mph.

Application of the Glazing Safety Standards

In 49 CFR § 223.3(b)(3), FRA's interpretation of the terms "historical," "antiquated," and "excursion" are as follows:

Motive Power and Equipment Compliance Manual

Historical equipment refers to locomotives, passenger coaches, or cabooses that have historical significance. For example, the Ferdinand Magellan, U.S.A.-1 passenger car used by President Roosevelt is considered historical equipment.

Antiquated equipment FRA considers passenger cars built prior to the end of World War II (1945 or earlier) to be antiquated.

Excursion means an operation that transports passengers to one or more points of interest and returns them to the original point of departure.

Chapter 8

Railroad Locomotive Safety Standards, Part 229

Introduction

In 1980, the Federal Railroad Administration (FRA) revised the sections of Title 49 Code of Federal Regulations (CFR) part 230 related to non-steam locomotive inspection and maintenance standards, and moved them into part 229.

The following guidelines are to be used by Federal and State inspectors when conducting inspections of locomotives for compliance with Federal safety laws. To ensure uniform enforcement of the Federal safety laws, it is important that inspectors adhere to all agency enforcement policies when conducting inspections.

The procedures and guidance provided in both this manual and the General Manual should be observed when determining appropriate corrective actions in response to noncompliance with part 229 or other safety defects. When a Motive Power and Equipment (MP&E) inspector finds a safety defect, the inspector should decide if the defect(s):

- (a) Is a noncompliant condition based on the requirements of part 229.
- (b) Should be documented on the FRA Form F6180.96, Inspection Report.
- (c) Warrants the issuance of a violation, and assessment of a civil penalty.
- (d) Warrants the issuance of a Special Notice for Repair (Special Notice), as provided for in 49 CFR part 216.
- (e) Should be reported to the railroad as an unsafe condition(s) that is not specifically encompassed in Federal regulation.

MP&E inspectors will conduct most of their locomotive inspections at either a facility where periodic, annual, and biennial tests are performed; or at a location where locomotives are serviced and prepared for train service. However, with the increase of locomotive calendar-day inspections being performed by railroad transportation department employees away from mechanical facilities, it is important that the MP&E inspectors schedule time to monitor these practices for full compliance with Federal safety laws.

A locomotive should comply with all requirements contained in part 229 and be free from any safety defects. Keep in mind, a locomotive may not be absolutely clean and free from all accumulations of oil, but still be in compliance. Part 229 addresses conditions that create an unsafe working environment, an unsafe condition, or an unsafe locomotive. It does not address housekeeping practices of a railroad. Anytime a locomotive has been recently released from a periodic test and is found with a noncompliant condition, a violation should strongly be considered.

Federal Railroad Administration

When an inspector discovers and substantiates a noncompliant condition that he/she believes makes a locomotive unsafe and not fit for service, a **Special Notice, as provided for by 49 CFR part 216**, may be issued to the railroad. The Special Notice should describe the condition or conditions for which it was issued. Except in rare circumstances, a violation must be submitted with any Special Notice for Repair.

Any railroad employee who authorizes the willful movement or operation of a noncomplying or unsafe locomotive, and who has knowledge of the circumstances, can be held personally responsible for the action. The inspector should judge all pertinent facts and determine if it can be documented that the railroad employee can be cited for willful noncompliance with Federal safety laws. Prior to advising a railroad employee that he/she will be cited for a willful violation, the inspector must coordinate such action in accordance with established procedures. **(See General Manual.)**

Locomotive Safety Standards Inspection Procedures

Upon arrival at an inspection point where mechanical department personnel are assigned to perform locomotive inspection, testing, and repair, the inspector should notify the local railroad supervisor of his/her presence and intentions. The railroad will determine whether an employee will accompany the inspector. However, in some instances, it is not always advantageous to notify the railroad of FRA's presence, especially if an inspection is related to a complaint or investigation.

It is not necessary for FRA inspectors to obtain "blue signal" protection when conducting any type of inspection activity. However, inspectors should be alert and not place themselves in a position where the unexpected movement of equipment subjects them to the danger of personal injury. Railroad representative(s) accompanying the inspector during the inspection must obtain blue signal protection if they engage in activities that require them to work on, under, or between the equipment.

Testing or operating any railroad equipment shall be performed by railroad personnel, **not** FRA inspectors. Where practical, the inspector should observe tests of the air brakes, speed indicators, high-voltage ground protection, and wheel slip/slide protection. The inspector should point out any observed conditions, whether covered by the regulations or not, that would jeopardize employee safety and/or the safe operation of the equipment.

After the inspection, advise the proper railroad representative of all noncomplying conditions. The inspector must use discretion in evaluating the condition of the equipment and whether to cite the defects on his/her inspection report. Although a railroad need not have knowledge of a noncomplying condition on a locomotive to be assessed a civil penalty under the Locomotive Safety Standards, each inspector is expected to use sound judgment along with the guidance outlined in the General Manual when deciding whether the issuance of a violation report is appropriate under the circumstances. The purpose of the civil penalty is to promote compliance, not punish a railroad for each and every noncomplying condition regardless of the circumstances. Accordingly, each inspector should limit the issuance of violation reports to situations where civil penalties will promote compliance. If a railroad makes a serious, good-faith effort to

comply with the standards, the filing of a violation report for an isolated, difficult to detect, noncomplying condition would serve no valid enforcement purpose.

The railroad should be notified of all cited conditions in a timely manner, so that appropriate corrective action can be taken. Inspectors do not have the option or authority to authorize a railroad to use a noncomplying locomotive once a defective condition is cited. The Inspection Report should be completed and appropriate copies given to the railroad representative. If the inspection report cannot be prepared immediately after the inspection, then one must be completed during the next work period and delivered or forwarded to a railroad representative.

Subpart A – General

§ 229.1 Scope.

This part prescribes minimum Federal safety standards for all locomotives except those propelled by steam power.

§ 229.3 Applicability.

(a) Except as provided in paragraph (b) through (e) of this section, this part applies to all standard gage railroads.

(b) This part does not apply to:

(1) A railroad that operates only on track inside an installation which is not part of the general railroad system of transportation; or

(2) Rapid transit operations in an urban area that are not connected with the general railroad system of transportation.

(c) Paragraphs (a) and (b) of § 229.125 do not apply to Tier II passenger equipment as defined in § 238.5 of this chapter (i.e., passenger equipment operating at speeds exceeding 125 mph but not exceeding 150 mph).

(d) On or after November 8, 1999, paragraphs (a)(1) and (b)(1) of § 229.141 do not apply to “passenger equipment” as defined in § 238.5 of this chapter; unless such equipment is excluded from the requirements of §§ 238.203 through 238.219, and § 238.223 of this chapter by operation of § 238.201(a)(2) of this chapter.

(e) Paragraphs (a)(2) through (a)(4), and (b)(2) through (b)(4) of § 229.141 do not apply to “passenger equipment” as defined in § 238.5 of this chapter that is placed in service for the first time on or after September 8, 2000, unless such equipment is excluded from the requirements of §§ 238.203 through 238.219, and § 238.223 of this chapter by operation of § 238.201(a)(2) of this chapter.

Guidance

Federal Railroad Administration

Section (b)(1): The inspector should be aware that if a locomotive(s) of a private industry operates over a portion of a general railroad system's yard or tracks, such locomotives must be in compliance with the Locomotive Safety Standards and other appropriate regulations. Legal action could be taken against the industrial railroad if their locomotives are not in compliance, but FRA usually holds the general railroad responsible and liable for the industrial locomotives which it permits to be used on its lines. If an industry leases a track in an adjacent railroad yard for its exclusive use, it may operate over that track as if it was part of the industrial facility and the locomotives do not come under the Locomotive Safety Standards. (See 49 CFR § 209 Appendix A.) Whenever there is a question as to whether a railroad's operation and/or equipment fall under the requirements of Part 229, the regional office should be contacted for confirmation.

§ 229.4 Information Collection.

Guidance

This part relates to information collection under part 229, which was reviewed by the Office of Budget and Management. No enforcement action is attached to this part.

§ 229.5 Definitions.

As used in this part—

Break means a fracture resulting in complete separation into parts.

Cab means that portion of the superstructure designed to be occupied by the crew operating the locomotive.

Carrier means *railroad*, as that term is in this section.

Commuter service means the type of railroad service described under the heading "Commuter Operations" in 49 CFR Part 209, Appendix A.

Commuter work train is a non-revenue service train used in the administration and upkeep service of a commuter railroad.

Control cab locomotive means a locomotive without propelling motors but with one or more control stands.

Controlling remote distributed power locomotive means the locomotive in a distributed power consist that receives the coded signal from the lead locomotive consist of the train whether commanded automatically by the distributed power system or manually by the locomotive engineer.

Motive Power and Equipment Compliance Manual

Crack means a fracture without complete separation into parts, except that castings with shrinkage cracks or hot tears that do not significantly diminish the strength of the member are not considered to be cracked.

Cruise control means a device that controls locomotive power output to obtain a targeted speed. A device that functions only at or below 30 miles per hour is NOT considered a “cruise control” for purposes of this part.

Data element means one or more data point or value reflecting on-board train operations at a particular time. Data may be actual or “passed through” values or may be derived from a combination of values from other sources.

Dead locomotive means—

- (1) A locomotive, other than a control cab locomotive, that does not have any traction device supplying tractive power; or
- (2) A control cab locomotive that has a locked and unoccupied cab.

Distributed power system means a system that provides control of a number of locomotives dispersed throughout a train from a controlling locomotive located in the lead position. The system provides control of the rearward locomotives by command signals originating at the lead locomotive and transmitted to the remote (rearward) locomotives.

DMU locomotive means a diesel-powered multiple unit operated locomotive with one or more propelling motors designed to carry passenger traffic.

Electronic air brake means a brake system controlled by a computer which provides the means for control of the locomotive brakes or train brakes or both.

Event recorder means a device, designed to resist tampering, that monitors and records data, as detailed in § 229.135(b), over the most recent 48 hours of operation of the electrical system of the locomotive on which the device is installed. However, a device, designed to resist tampering, that monitors and records the specified data only when the locomotive is in motion meets this definition if the device was installed prior to November 5, 1993 and if it records the specified data for the last eight hours the locomotive was in motion.

Event recorder memory module means that portion of the event recorder used to retain the recorded data as detailed in § 229.135(b).

High voltage means an electrical potential of more than 150 volts.

In-service event recorder means an event recorder that was successfully tested as prescribed in § 229.27(d) and whose subsequent failure to operate as intended, if any, is not actually known by the railroad operating the locomotive on which it is installed.

Lead locomotive means the first locomotive proceeding in the direction of movement.

Federal Railroad Administration

Lite locomotive means a locomotive or a consist of locomotives not attached to any piece of equipment or attached only to a caboose.

Locomotive means a piece of on-track equipment other than hi-rail, specialized maintenance, or other similar equipment—

- (1) With one or more propelling motors designed for moving other equipment;
- (2) With one or more propelling motors designed to carry freight or passenger traffic or both; or
- (3) Without propelling motors but with one or more control stands.

Mandatory directive means any movement authority or speed restriction that affects a railroad operation.

Modesty lock means a latch that can be operated in the normal manner only from within the sanitary compartment that is designed to prevent entry of another person when the sanitary compartment is in use. A modesty lock may be designed to allow deliberate forced entry in the event of an emergency.

MU locomotive means a multiple unit operated electric locomotive—

- (1) With one or more propelling motors designed to carry freight or passenger traffic or both; or
- (2) Without propelling motors but with one or more control stands.

Other short-haul passenger service means the type of railroad service described under the heading “Other short-haul passenger service” in 49 CFR Part 209, Appendix A.

Potable water means water that meets the requirements of 40 CFR Part 141, the Environmental Protection Agency’s Primary Drinking Water Regulations, or water that has been approved for drinking and washing purposes by the pertinent state or local authority having jurisdiction. For purposes of this part, commercially available, bottled drinking water is deemed potable water.

Powered axle is an axle equipped with a traction device.

Railroad means all forms of non-highway ground transportation that run on rails or electromagnetic guideways, including (1) commuter or other short-haul rail passenger service in a metropolitan or suburban area, and (2) high speed ground transportation systems that connect metropolitan areas, without regard to whether they use new technologies not associated with traditional railroads. Such term does not include rapid transit operations within an urban area that are not connected to the general railroad system of transportation.

Motive Power and Equipment Compliance Manual

Remanufactured locomotive means a locomotive rebuilt or refurbished from a previously used or refurbished underframe (“deck”), containing fewer than 25 percent (25%) previously used components (weighted by dollar value of the components).

Sanitary means lacking any condition in which any significant amount of filth, trash, or human waste is present in such a manner that a reasonable person would believe that the condition might constitute a health hazard; or of strong, persistent, chemical or human waste odors sufficient to deter use of the facility, or give rise to a reasonable concern with respect to exposure to hazardous fumes. Such conditions include, but are not limited to, a toilet bowl filled with human waste, soiled toilet paper, or other products used in the toilet compartment, that are present due to a defective toilet facility that will not flush or otherwise remove waste; visible human waste residue on the floor or toilet seat that is present due to a toilet that overflowed; an accumulation of soiled paper towels or soiled toilet paper on the floor, toilet facility, or sink; an accumulation of visible dirt or human waste on the floor, toilet facility, or sink; and strong, persistent chemical or human waste odors in the compartment.

Sanitation compartment means an enclosed compartment on a railroad locomotive that contains a toilet facility for employee use.

Self-monitoring event recorder means an event recorder that has the ability to monitor its own operation and to display an indication to the locomotive operator when any data required to be stored are not stored or when the stored data do not match the data received from sensors or data collection points.

Serious injury means an injury that results in the amputation of any appendage, the loss of sight in an eye, the fracture of a bone, or the confinement in a hospital for a period of more than 24 consecutive hours.

Switching service means the classification of railroad freight and passenger cars according to commodity or destination; assembling cars for train movements; changing the position of cars for purposes of loading, unloading, or weighing; placing locomotives and cars for repair or storage; or moving rail equipment in connection with work service that does not constitute a train movement.

Throttle position means any and all of the discrete output positions indicating the speed/tractive effort characteristic requested by the operator of the locomotive on which the throttle is installed. Together, the discrete output positions shall cover the entire range of possible speed/tractive effort characteristics. If the throttle has continuously variable segments, the event recorder shall capture either: (1) the exact level of speed/tractive effort characteristic requested, on a scale of zero (0) to one hundred percent (100%) of the output variable or (2) a value converted from a percentage to a comparable 0 to 8 digital signal.

Time means either “time-of-day” or “elapsed time” (from an arbitrarily determined event) as determined by the manufacturer. In either case, the recorder must be able to convert to an accurate time-of-day with the time zone stated unless it is Greenwich Mean Time (GMT) or Coordinated Universal Time (UTC).

Federal Railroad Administration

Toilet facility means a system that automatically or on command of the user removes human waste to a place where it is treated, eliminated, or retained such that no solid or non-treated liquid waste is thereafter permitted to be released into the bowl, urinal, or room and that prevents harmful discharges of gases or persistent offensive odors.

Transfer service means a freight train that travels between a point of origin and a point of final destination not exceeding 20 miles and that is not performing switching service.

Unsanitary means having any condition in which any significant amount of filth, trash, or human waste is present in such a manner that a reasonable person would believe that the condition might constitute a health hazard; or strong, persistent, chemical or human waste odors sufficient to deter use of the facility, or give rise to a reasonable concern with respect to exposure to hazardous fumes. Such conditions include, but are not limited to, a toilet bowl filled with human waste, soiled toilet paper, or other products used in the toilet compartment, that are present due to a defective toilet facility that will not flush or otherwise remove waste; visible human waste residue on the floor or toilet seat that is present due to a toilet that overflowed; an accumulation of soiled paper towels or soiled toilet paper on the floor, toilet facility, or sink; an accumulation of visible dirt or human waste on the floor, toilet facility, or sink; and strong, persistent chemical or human waste odors in the compartment.

Washing system means a system for use by railroad employees to maintain personal cleanliness that includes a secured sink or basin, water, antibacterial soap, and paper towels; or antibacterial waterless soap and paper towels; or antibacterial moist towelettes and paper towels; or any other combination of suitable antibacterial cleansing agents.

Guidance

Section (c): *Carrier* The designation “carrier” should not be used in referring to a railroad. The Rail Safety Improvement Act of 1988 (RSIA 88) did away with the phrase “common carrier,” and required that the word “railroad” be inserted in all FRA regulations that previously used the word carrier or common carrier.

Section (d): *Control Cab Locomotive* This could be either a passenger coach with a control stand located at one end, where the operator can operate a passenger train with the locomotive pushing/pulling the train; or a caboose or car equipped with remote control equipment that provides an interface between the remote control transmitter (RCT) and a locomotive for remote control operation. Only those portions of the control cab locomotive that have appurtenances and items listed in part 229 have to be in compliance with part 229.

Section (f): *Dead Locomotive* A dead locomotive can have the diesel engine either idling or shut down. It cannot supply tractive effort. It must be “off-line.”

Section (k): *Locomotive* A hi-rail vehicle is defined as a truck, automobile, or machinery with retractable flanged wheels, so that it may be used on either the highway or railroad track. Specialized maintenance or other similar equipment includes track motor cars, cranes, derricks,

pile drivers, rail grinders, ballast cleaners, etc. Periodically, FRA receives inquiries about equipment requirements for self-propelled vehicles used to haul revenue freight on the main line. These vehicles include those built by Trackmobile Inc., Shuttle Wagon, Mitchell Equipment Corporation and Brandt RoadRailer®. Self-propelled vehicles are used in a variety of railroad functions. When self-propelled vehicles are used only in the performance of typical maintenance-of-way functions, or if they are used to move cars or equipment within the confines of repair facilities, they are to be considered specialized maintenance equipment and are exempt from many FRA regulations. When a self-propelled vehicle is used to move freight over the railroad, outside the limits established for maintenance-of-way operations and repair facilities, it will be considered a locomotive and must comply with applicable regulations. Even though these vehicles do not resemble a standard locomotive, the purpose for which they are being used requires compliance with 49 CFR parts 223, 229, 231, and 232. The self-propelled vehicles are unique in construction, appearance, and use.

Many of these vehicles currently being used have already been modified by the manufacturers (as closely as construction would permit) to bring them into compliance with Federal regulations. FRA acknowledges that this equipment has a place in a well-rounded rail transportation system.

In an effort to recognize the unique characteristics of these vehicles, FRA inspectors should exercise enforcement discretion and good judgment in analyzing an operation where self-propelled vehicles are used for train movements. Items deemed to be safety-related, that cannot meet specified requirements, will have to be addressed through the waiver process. The following specifications should be used by inspectors for enforcement guidance:

1. The vehicle glazing material must comply with part 223.
2. Each self-propelled vehicle shall be inspected each calendar day when used, and an inspection report and record shall be completed as described in section 229.21.
3. Each self-propelled vehicle shall receive a periodic inspection as described in section 229.23, and all pertinent data is to be entered on an FRA Form F6180.49A, Locomotive Inspection and Repair Report, which shall be displayed under a transparent cover in a conspicuous place in the cab of the vehicle.
4. The vehicle's air brake equipment must be cleaned and tested as often as conditions require, but not less frequently than required in sections 229.25, 229.27, and 229.29.
5. The main air reservoir must comply with section 229.31 regarding either hammer and hydrostatic testing or pre-drilling of the reservoir.
6. The vehicle must meet general safety requirements of sections 229.41, 229.43, and 229.45.
7. Fuel safety cut-off devices must follow Section 229.93.

Federal Railroad Administration

8. The vehicle must have a speed indicator if it is operated at a speed that exceeds 20 mph according to section 229.117.
9. Interior cab noise must comply with section 229.121.
10. Vehicle headlights must be fully functional; and, if operated at speeds in excess of 20 mph over one or more public highway-rail grade crossings, must comply with auxiliary light requirements according to section 229.125.
11. The vehicle must be equipped with a horn according to section 229.129.
12. If operated at speeds in excess of 30 mph while hauling cars, the vehicle must be equipped with working event recorder in compliance with section 229.135.
13. Switching steps as defined in section 231.30.
14. Four horizontal handholds shall be secured to the front and back ends of the vehicle, and shall be secured by bolts or other acceptable mechanical fastener (see Section 231.30).
15. The vehicle should have vertical handholds painted in contrasting colors and secured by bolts or other acceptable fasteners in compliance with section 231.30.
16. The vehicle must be equipped with automatic couplers, to prevent the necessity of someone going between the vehicle and car for the purpose of coupling or uncoupling in compliance with section 231.30.
17. If conditions warrant, a two-way end-of-train device must be used in compliance with sections 232.401–232.409.
18. As with any train movement, the vehicle must be equipped with a brake system that permits the operator to apply and release the brakes on cars being hauled. The brake equipment must also be arranged so that proper air brake leakage tests can be conducted as applicable in compliance with sections 232.12 and 232.13. **(MP&E 98-71.)**

Despite the fact that the Burro Crane is excluded from the definition of “locomotive” under § 229.5(I) of the Locomotive Safety Standards as a piece of specialized maintenance equipment, and is not subject to those Standards, the Burro Crane is nevertheless subject to the statutory requirements of the Locomotive Inspection Act, in particular, the requirement that it is safe. In the preamble to the final locomotive rules, FRA explicitly recognizes the applicability of the Act by stating that “FRA will continue to implement the basic statutory safety requirements with respect to such work equipment by using the Special Notice when appropriate.” 45 FR 21093. **(MP&E 98-25.)**

Section (I): *MU Locomotive* This refers to the self-propelled transit cars in commuter service in various large urban centers around the country. This section does not apply to the common vernacular of the railroad industry, whereby MU locomotive is a generic term given to any

locomotive that can be coupled in a consist with other locomotives and controlled from a single control location.

§ 229.7 Prohibited Acts.

(a) The Locomotive Inspection Act (45 U.S.C. 22-34) makes it unlawful for any carrier to use or permit to be used on its line any locomotive unless the entire locomotive and its appurtenances –

- (1) Are in proper condition and safe to operate in the service to which they are put, without unnecessary peril to life or limb; and
- (2) Have been inspected and tested as required by this part.

(b) Any person (an entity of any type covered under 1 U.S.C. 1, including but not limited to the following: a railroad; a manager, supervisor, official, or other employee or agent of a railroad; any owner, manufacturer, lessor, or lessee of railroad equipment, track, or facilities; any independent contractor providing goods or services to a railroad; and any employee of such owner, manufacturer, lessor, lessee, or independent contractor) who violates any requirement of this part or of the Locomotive Inspection Act or causes the violation of any such requirement is subject to a civil penalty of at least \$500 and not more than \$11,000 per violation, except that: Penalties may be assessed against individuals only for willful violations, and, where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury, a penalty not to exceed \$22,000 per violation may be assessed. Each day a violation continues shall constitute a separate offense. See appendix B to this part for a statement of agency civil penalty policy.

Guidance

Paragraph (a) of this section is the regulatory codification of the general statutory language previously contained in the Locomotive Inspection Act, re-codified at 49 U.S.C. § 20701. This section should only be cited when defective conditions of a locomotive's appurtenances are disclosed on items not specifically covered by other provisions contained in part 229. For example, this provision should be used to report a defective appurtenance such as a warning bell or alerter equipment. Defective equipment associated with remote control locomotive (RCL) operations should be addressed under this section. The remote control transmitter (RCT), when operating a locomotive in remote mode, becomes an appurtenance to that locomotive and is subject to the provisions of this section. Also, any lights added to an RCL that indicate the locomotive is operating in the remote control mode is an appurtenance. Therefore, if any of the equipment associated with RCL operations is found defective **at any time** during remote mode operation, appropriate enforcement action should be taken.

The inspector may consider filing a violation under this section if the following is evident:

Federal Railroad Administration

1. The locomotive is not in safe or proper condition for the service in which it will be placed.
2. The involved condition endangers the railroad personnel and/or the public by exposing them to unnecessary peril to life or limb.

If an inspector seeks a violation under this provision, the inspector must fully describe the defective part or appurtenance, and must fully explain how the defective part or appurtenance endangers the safety of the crew and/or the general public. This section should not be cited if the condition or defective appurtenance is specifically addressed in another provision contained in part 229, the more specific provision should be used.

Paragraph (b) of this section recognizes FRA's ability to use individual liability as an enforcement tool in circumstances where a railroad employee willfully allows the use of a locomotive with a noncomplying condition covered by this part. Inspectors must exercise care in these circumstances, ensuring that all the concerns and guidelines discussed in Chapter 3 of this manual and in Appendix A to 49 CFR part 209 are followed and addressed before pursuing enforcement action against an individual.

§ 229.9 Movement of non-complying locomotives.

(a) Except as provided in paragraphs (b), (c) and § 229.125(h), a locomotive with one or more conditions not in compliance with this part may be moved only as a lite locomotive or a dead locomotive after the carrier has complied with the following:

(1) A qualified person shall determine –

(i) That it is safe to move the locomotive; and

(ii) The maximum speed and other restrictions necessary for safely conducting the movement;

(2) (i) The engineer in charge of the movement of the locomotive shall be notified in writing and inform all other crew members in the cab of the presence of the non-complying locomotive and the maximum speed and other restrictions determined under paragraph (a)(1)(ii) of this section.

(ii) A copy of the tag described in paragraph (a)(3) of this section may be used to provide the notification required by paragraph (a)(2)(I) of this section.

(3) A tag bearing the words “non-complying locomotive” and containing the following information, shall be securely attached to the control stand on each MU or control cab locomotive and to the isolation switch or near the engine start switch on every other type of locomotive –

- (i) The locomotive number;
 - (ii) The name of the inspecting carrier;
 - (iii) The inspection location and date;
 - (iv) The nature of each defect;
 - (v) Movement restrictions, if any;
 - (vi) The destination; and
 - (vii) The signature of the person making the determinations required by this paragraph.
- (b) A locomotive that develops a non-complying condition enroute may continue to utilize its propelling motors, if the requirements of paragraph (a) are otherwise fully met, until the earlier of –
- (1) The next calendar day inspection, or
 - (2) The nearest forward point where the repairs necessary to bring it into compliance can be made.
- (c) A non-complying locomotive may be moved live or dead within a yard, at speeds not in excess of 10 miles per hour, without meeting the requirements of paragraph (a) of this section if the movement is solely for the purpose of repair. The carrier is responsible to insure that the movement may be safely made.
- (d) A dead locomotive may not continue in use following a calendar day inspection as a controlling locomotive or at the head of a train or locomotive consist.
- (e) A locomotive does not cease to be a locomotive because its propelling motor or motors are inoperative or because its control jumper cables are not connected.
- (f) Nothing in this section authorizes the movement of a locomotive subject to a Special Notice for Repair unless the movement is made in accordance with the restrictions contained in the Special Notice.
- (g) Paragraphs (a), (b), (c) of this section shall not apply to sanitation conditions covered by §§ 229.137 and 229.139. Sections 229.137 and 229.139 set forth specific requirements for the movement and repair of locomotives with defective sanitation compartments.

Guidance

Federal Railroad Administration

Section (a): When a noncomplying condition under part 229 is found by either the railroad's inspector or an MP&E inspector (except as provided in paragraphs (b) and (c)), the railroad may only move the locomotive as a lite locomotive or dead locomotive under whatever conditions that the qualified person and the railroad deem suitable for a safe move (except as provided in paragraphs (b) and (c)). The locomotive may be moved to any location the railroad designates to have it brought into compliance. If the FRA inspector believes that the movement of the locomotive by the railroad under this section constitutes an immediately unsafe situation (such as possible derailment) a Special Notice for Repairs, FRA Form F6180.8, may be issued to effectively remove the locomotive from service. In addition to describing the immediate unsafe condition, the inspector must also note that the movement restrictions or lack of (e.g., speed, distance, etc.), as proposed by the railroad, would create an additional unsafe problem. The inspector should never dictate to a railroad conditions for the movement of any noncomplying locomotive, unless the condition is so deplorable that movement at any speed would create an unsafe condition. Any restrictions are the railroad's responsibility.

Section (b) allows for the continued use of a locomotive that develops an en route noncomplying condition until the earlier of (1) the next calendar-day inspection, or (2) the nearest forward point where the repairs necessary to bring it into compliance can be made. Use of a locomotive under this provision is permitted only if the requirements of § 229.9(a) are fully met, which means a "noncomplying tag" that is properly filled out must be in the cab of the noncomplying locomotive.

If the noncomplying condition can be brought into compliance by shifting the position of the locomotive in the consist, the noncomplying condition should be rectified by doing so at the next forward location where this can be accomplished. This could be a siding, a wye, or any location where it is physically possible to reposition the locomotive. Railroad employees performing this task may do so if it does not endanger the safety of the employees, locomotives, or trains. This location should not be construed or designated as a repair point.

Section (a)(1) requires that, "A qualified person shall determine - (i) That it is safe to move the locomotive; and (ii) The maximum speed and other restrictions necessary for safely conducting the movement. "Difficulty in the interpretation and enforcement of Section 229.9 arises as this section does not provide guidance with respect to the criteria used to "qualify" a person to make the determination required above. The decisions to continue the use of a noncomplying locomotive in some cases are being made by persons not qualified to make these decisions. A person qualified to perform a daily inspection may not necessarily possess the qualifications to make the determination that it is safe to move a defective locomotive.

The qualified person must have demonstrated to the railroad, at a minimum, the knowledge and ability to inspect locomotives and provide recommendations regarding the criteria listed in Section (a). This does not imply that the qualified person must possess intimate knowledge of and experience with all of the components and functions of a locomotive. Additionally, there are varying levels of qualified persons. As an example, a journeyman electrician may not have the necessary knowledge to make safety recommendations concerning locomotive running gear.

Motive Power and Equipment Compliance Manual

However, that person should be qualified to address problems associated with the electric control apparatus.

Section 240.123 requires that each railroad provide for initial and continuing education of certified locomotive engineers to ensure that each engineer maintains the knowledge, skills, and ability with respect to (among other areas) the mechanical condition of equipment. As such, the locomotive engineer is considered qualified to provide safety recommendations concerning certain en route noncomplying conditions. Normally, these conditions are limited to those that are evaluated during the daily inspection required by Section 229.21, such as headlights, speed indicators, cab seats, air brakes, wipers, and alerter malfunctions. The locomotive engineer would also be expected to identify certain obvious mechanical problems such as major wheel defects and some running gear problems. However, the engineer would not be expected to properly assess the safety implications of continued movement of the locomotive for most mechanical defects. In these cases, recommendations regarding the continued safe movement of a noncomplying locomotive (in accordance with § 229.9(a)(1)) need to be made by a person that is more qualified, such as a mechanical department employee. These recommendations may be based on telephone or radio conversations between the engineer and the more qualified individual. If the noncomplying condition cannot be resolved solely via voice communication, a qualified individual must conduct a physical onsite inspection to identify all appropriate restrictions for continued safe movement of the locomotive.

While it is the transportation/operating department that controls the daily operation of the railroad, operating personnel may not possess the qualifications and technical expertise to make safety recommendations regarding noncomplying locomotives. When investigating an issue involving enforcement of § 229.9, MP&E inspectors must carefully examine the qualifications of the individual who made the safety recommendations to determine if the railroad acted in compliance with the regulations.

Certain noncomplying conditions require a locomotive to be removed from the lead position at the first available location, but would not require it to be removed from service. Examples of such conditions include, but are not limited to: speed indicators, headlights, cab windows, and audible warning devices. When conditions such as these exist, the railroad must, in order to be in compliance, remove the locomotive from the lead position. Inspectors must exercise sound judgment. For example, a defective cab heater during warm weather would not necessitate removal of the locomotive from the lead or controlling position. In the interest of safety, when a locomotive is repositioned from the lead position to correct a noncomplying condition, the “noncomplying locomotive tag” should remain attached to the locomotive until repairs are made.

Section 229.9 is silent on the repair location question. It depends on the power penalty built into the regulation to convince the railroad to maintain the locomotive fleet. Movement of a lite or dead locomotive not only limits the power available, but adds tonnage to the train.

Where an MP&E inspector has knowledge that a railroad permits locomotives (that develop noncomplying conditions en route) to continue in service past mechanical facilities where repairs can be made, he/she should investigate to determine that the railroad is complying with the requirements of Section (a). If the inspector is made aware that a noncomplying locomotive was

Federal Railroad Administration

moved beyond a forward repair location that has previously demonstrated the ability to effect repairs of the noncomplying condition, he or she must ensure that the subject locomotive would no longer be used as a propelling or lead locomotive. There is no implication in subsection (b) that each repair location must be capable of repairing all en route noncomplying conditions that can occur.

Section 229.9 allows a railroad to move a noncomplying locomotive as a lite or dead locomotive to a more distant repair point of its choice, provided it meets all other requirements of § 229.9 and such action does not endanger the safety of employees, locomotives, or trains.

Section 229.9 only permits the movement of a noncomplying locomotive with a part 229 defect. Nothing in § 229.9 authorizes the movement of a locomotive with power brake or safety appliance defects. Such locomotives can only be moved under provisions of Section 20303 of the Public Law 103-272 (July 5, 1994) and/or the Power Brake Regulations. **(MP&E 98-50)** It is the responsibility of the railroad to ensure that any locomotive that is moved with a noncomplying defect is in accordance with the applicable law. If there is any doubt, the railroad should contact FRA. The move may require the railroad to submit for one-time movement authority. (See Chapter 2)

Subsection (d) restricts the use of a dead locomotive as a controlling locomotive following a calendar-day inspection. If a noncomplying condition occurs en route that renders the locomotive dead, it can continue to control the locomotive consist until a daily inspection is performed. The intent of this restriction is to ensure that crew members are not permitted or required to occupy the cab of a noncomplying locomotive over an extended period of time.

Section (e) means that a locomotive is a locomotive at all times and must be in full compliance when in service or tagged as required by Section 229.9(a).

§ 229.11 Locomotive Identification.

(a) The letter “F” shall be legibly shown on each side of every locomotive near the end which for identification purposes will be known as the front end.

(b) The locomotive number shall be displayed in clearly legible numbers on each side of each locomotive.

Guidance

If vandals have painted graffiti on the locomotive and obscured the identification marks, the inspector should point the defect out to the railroad and use appropriate discretion to gain compliance. Railroad initials do not have to be clearly legible on a locomotive. The regulation does not require railroad initials, only a number.

The “F” is very important in remote control locomotive operations.

§ 229.13 Control of locomotives.

Except when a locomotive is moved in accordance with § 229.9, whenever two or more locomotives are coupled in remote or multiple control, the propulsion system, the sanders, and the power brake system of each locomotive shall respond to control from the cab of the controlling locomotive. If a dynamic brake or regenerative brake system is in use, that portion of the system in use shall respond to control from the cab of the controlling locomotive.

Guidance

This requirement also applies to controls of distributed power locomotives (DPU), which are controlled from a lead locomotive by either a radio signal, or an electrical signal through a hard wire. This also applies when a locomotive consist is operated via remote control, using a belt pack. The belt pack is treated the same as the cab of the controlling locomotive when remote control locomotive operation is in effect.

§ 229.14 Non-MU locomotive control cab locomotives.

On each non-MU control cab locomotive, only those components added to the passenger car that enable it to serve as a lead locomotive, control the locomotive actually providing tractive power, and otherwise control the movement of the train, are subject to this part.

Guidance

Only those components added to a passenger car or an “RCL caboose” that make it function as a locomotive (e.g., the controller, speed indicator, etc.), related to controlling speed and braking of a train, are subject to this part.

§ 229.17 Accident reports.

§ 229.19 Prior Waivers

§ 229.21 Daily Inspection.

(a) Except for MU locomotives, each locomotive in use shall be inspected at least once during each calendar day. A written report of the inspection shall be made. This report shall contain the name of the carrier; the initials and number of the locomotive; the place, date and time of the inspection; a description of the non-complying conditions disclosed by the inspection; and the signature of the employee making the inspection. Except as provided in §§ 229.9, 229.137, 229.139, any conditions that constitute non-compliance with any requirement of this part shall be repaired before the locomotive is used. Except with respect to conditions that do not comply with § 229.137 or § 229.139, a notation shall be made on the report indicating the nature of the repairs that have been made. Repairs made for conditions that do not comply with § 229.137 or § 229.139 may be noted on the report, or in electronic form. The person making the repairs shall sign the report. The report shall be filed and retained for at least 92 days in the office of the carrier

Federal Railroad Administration

at the terminal at which the locomotive is cared for. A record shall be maintained on each locomotive showing the place, date and time of the previous inspection.

(b) Each MU locomotive in use shall be inspected at least once during each calendar day and a written report of the inspection shall be made. This report may be part of a single master report covering an entire group of MU's. If any non-complying conditions are found, a separate, individual report shall be made containing the name of the carrier; the initials and number of the locomotive; the place, date, and time of the inspection; the non-complying conditions found; and the signature of the inspector. Except as provided in §§ 229.9, 229.137, 229.139, any conditions that constitute non-compliance with any requirement of this part shall be repaired before the locomotive is used. Except with respect to conditions that do not comply with § 229.137 or § 229.139, a notation shall be made on the report indicating the nature of the repairs that have been made. Repairs made for conditions that do not comply with § 229.137 or § 229.139 may be noted on the report, or in electronic form. The person making the repairs shall sign the report. The report shall be filed in the office of the carrier at the place where the inspection is made or at one central location and retained for at least 92 days.

(c) Each carrier shall designate qualified persons to make the inspections required by this section.

Guidance

The purpose of the calendar-day inspection is to ascertain that the locomotive is safe to operate in the service for which it is used, and is in total compliance with part 229 prior to being placed in service. It is a visual walk-around inspection of the locomotive that provides an opportunity, every day the locomotive is used, to find and correct incipient problems before they lead to an accident or safety incident. An effective locomotive calendar-day inspection requires that the individual performing the inspection be alert for telltale signs of any condition or defect that is a potential hazard.

After a daily inspection is performed, the locomotive should be free of any noncomplying conditions before it is offered for service. The locomotive cannot legally be used until all Federal defects are corrected.

If the inspector continues to find recurrent defects or a pattern of noncomplying conditions at a particular location, he/she should monitor the performance and the results of the daily inspections, as well as question the individual(s) performing the inspections, to ascertain if the individual(s) has the knowledge and ability to perform such inspections.

If daily inspection reports reflect noncomplying conditions on a locomotive and the inspector finds the conditions were not corrected by the railroad, and the locomotive continues to be used, violations should be submitted. Such violations should be accompanied by all of the documentation available, with a complete explanation regarding the railroad operation at the location.

Failure to complete, or produce a record or report, in and of itself is not sufficient evidence to establish that a railroad failed to perform an inspection. It is a “records” violation, unless other evidence (e.g., witness statements, interviews, event recorder downloads, visual observations, etc.) is obtained to establish the failure to conduct the inspection. If the only evidence available merely establishes a failure to complete the cab card or a failure of a railroad to produce a required inspection report, then the appropriate section to cite for civil penalty is § 229.21(a)(2), Report not properly executed or retained. Use the “lack of a record and/or report” to **support** the other evidence obtained to establish a “failure to perform an inspection” violation.

Section (a): A daily inspection is required by this section for each day a locomotive is in use. A written report and record are required when the inspection is performed. The inspection can be conducted at any time during the calendar day. It can be done just before midnight or just after midnight. If an inspection were performed just after midnight, the locomotive can be legally used for almost 48 hours before the next inspection is required. An inspection is not needed unless the locomotive is used during the calendar day. If a locomotive completes an assignment prior to the expiration of the calendar day and is not returned to service for several days, it would need a daily inspection before midnight of the day it is put back into service. This regulation has a number of ambiguities that each inspector must be aware of when judging the inspection status of any given locomotive.

Sections (a) and (b): The inspection reports are to be filed and retained for 92 days at the terminal where the locomotive is maintained. FRA allows railroads to keep the reports at a central location, and waivers have been granted to individual railroads that allow for these reports to be electronically generated and kept. Whether it is a written or electronic report, it must contain the name of the railroad; initial and number of the locomotive; the place, date, and time of the inspection; a description of any noncomplying conditions; and the signature of the inspector. An inspector has the right to request the reports for a specific locomotive(s) for the past 92 days and the railroad is obligated to provide such reports in a timely manner. A written or electronic record of the previous inspection must be physically kept on each locomotive until the next inspection is performed. The record must contain the place, date, and time of the previous inspection.

FRA has determined that § 229.21(a) permits railroads to make either a single written report for each locomotive inspected or a single written report that covers multiple locomotives (usually an entire consist); provided, the report contains the necessary information and is properly retained as indicated below.

When FRA proposed and adopted the locomotive inspection reporting requirements currently contained in § 229.21(a), FRA specifically eliminated the previously existing requirement for an approved reporting form. (See 44 FR 29613, May 21, 1979) When proposing the existing reporting requirements, FRA specifically stated that a railroad could adopt any type of written report as long as it included the required information. (See 44 FR 29613) Consequently, FRA will permit railroads to use a single written report that covers multiple locomotives to meet the written reporting requirements contained in § 229.21(a). However, in order to ensure that all of the required information is contained on such reports and to ensure their proper retention, the

Federal Railroad Administration

following conditions must be met if multiple locomotives are addressed on a single daily inspection report:

- (a) Each multiple locomotive daily inspection report provides a space for the initials and number of each locomotive inspected; the place, date, and time of the inspection; and the signature of inspector.
- (b) The inspection report contains a space for entering the initial and number of each noncomplying locomotive adjacent to the noncomplying condition(s) disclosed by the inspection. There also must be a space to enter the corrective action(s) taken and the signature of person making the repairs.
- (c) A copy of the multiple locomotives inspection report is made for each locomotive entered on the report and retained for at least 92 days at a location designated by the railroad.
- (d) A written record is maintained on each locomotive, indicating the date, time and location of the previous calendar-day inspection.
- (e) Any condition that constitutes noncompliance with any requirement contained in part 229, Locomotive Safety Standards, is repaired before the locomotive is used, or the locomotive must be tagged and moved in accordance with § 229.9.

When performing records inspections, the FRA inspectors should review the railroad's calendar-day inspection report procedures. If the FRA inspectors make a request for inspection reports, and the railroad is unable to provide a copy for each individual locomotive, appropriate enforcement action should be taken. **(MP&E 00-04)**

Section (c): This section gives the railroad sole prerogative to designate qualified persons to perform the required inspections. FRA has not set forth any qualification standards for the railroad's designated inspector.

Inspectors should consider issuing a violation report if any of the following questions are answered in the affirmative:

- (a) Were noncomplying conditions previously reported on the calendar-day inspection report not repaired?
- (b) Does the railroad have a history of ignoring the requirements of the calendar-day inspection regulation?
- (c) Can a violation be documented from railroad records for the use of a locomotive overdue calendar-day inspection?
- (d) Does the overdue inspection create an immediate hazard?

If an inspector finds a locomotive being used, with multiple, obvious defects after it just received an inspection, a violation can be submitted for both the defective condition(s) and failure to perform a proper inspection.

Remote Control Locomotive (RCL)

A locomotive operating as a RCL is given the same daily inspection as a conventional locomotive. The only difference between the two would be the operating controls. If the locomotive is operating in manual mode during the inspection, the brakes would be tested from the controls of the locomotive. If the locomotive is operating in remote mode during the inspection, the brakes would be tested from the remote control transmitter (RCT). Additionally, all features on the RCT would be tested to determine that they are functioning properly.

If the RCL received its daily inspection when the locomotive was operating in the manual mode, and later a crew links the RCT to operate the locomotive in remote mode, the transmitter must be tested to determine that it functions as intended prior to commencing remote control operations. No additional reporting is required, with regards to the daily inspection report.

The RCT, when operating the locomotive, becomes an appurtenance to that locomotive and is subject to the provisions of Section 229.7. Therefore, if an RCT is found to be defective during the calendar-day inspection, it may not be used. Since the transmitter is not permanently mounted to the locomotive, if found to be defective it can be removed from service and another RCT can be linked to the locomotive after receiving a proper test and inspection.

If the RCL equipment that is permanently mounted to the locomotive becomes defective, the defect and repairs made must be noted on the locomotive daily inspection report. RCTs are portable and are interchangeable. If the transmitter is found to be defective, it does not affect the locomotive if the locomotive can still be operated manually or another transmitter can be linked to the RCL. Since the RCT can operate with several locomotives, the defective transmitter does not need to be reported on the locomotive inspection report. To satisfy the requirement to tag and track defective equipment (49 CFR § 229.21), the railroad should develop a means to (1) readily identify defective RCTs, (2) record defective conditions, (3) indicate repairs made, (4) name the person making the repairs, and (5) maintain that record for 92 days.

The requirement to maintain the onboard record does not change. If the RCT is inspected and tested as part of the daily inspection, the onboard record is inclusive of this. If the RCT is added to the locomotive some time after the daily inspection, the device must be tested and inspected to ensure that the brakes, throttle, and all safety features function as intended. **(MP&E 02-01)**

§ 229.23 Periodic Inspection: General.

- (a) Each locomotive and steam generator shall be inspected at each periodic inspection to determine whether it complies with this part. Except as provided in § 229.9, all non-complying conditions shall be repaired before the locomotive or the steam generator is used. Except as provided in § 229.33, the interval between any two periodic inspections may not exceed 92 days. Periodic inspections shall only be made where adequate

Federal Railroad Administration

facilities are available. At each periodic inspection, a locomotive shall be positioned so that a person may safely inspect the entire underneath portion of the locomotive.

(b) The periodic inspection of the steam generator may be postponed indefinitely if the water suction pipe to the water pump and the leads to the main switch (steam generator switch) are disconnected, and the train line shut-off-valve is wired closed or a blind gasket applied. However, the steam generator shall be so inspected before it is returned to use.

(c) After April 30, 1980, each new locomotive shall receive an initial periodic inspection before it is used. Except as provided in § 229.33, each locomotive in use on or before April 30, 1980, shall receive an initial periodic inspection within 92 days of the last 30-day inspection performed under the prior rules (49 CFR 230.331 and 230.451). At the initial periodic inspection, the date and place of the last tests performed that are the equivalent of the tests required by §§ 229.27, 229.29, and 229.31 shall be entered on Form FRA F 6180-49A. These dates shall determine when the tests first become due under §§ 229.27, 229.29, and 229.31. Out of use credit may be carried over from Form FRA F 6180-49 and entered on Form FRA F 6180-49A.

(d) Each periodic inspection shall be recorded on Form FRA F 6180-49A. The form shall be signed by the person conducting the inspection and certified by that person's supervisor that the work was done. The form shall be displayed under a transparent cover in a conspicuous place in the cab of each locomotive.

(e) At the first periodic inspection in each calendar year the carrier shall remove from each locomotive Form FRA F 6180-49A covering the previous calendar year. If a locomotive does not receive its first periodic inspection in a calendar year before April 2 because it is out of use, the form shall be promptly replaced. The Form FRA F 6180-49A covering the preceding year for each locomotive, in or out of use, shall be signed by the railroad official responsible for the locomotive and filed as required in § 229.23(f). The date and place of the last periodic inspection and the date and place of the last test performed under §§ 229.27, 229.29, and 229.31 shall be transferred to the replacement Form FRA F 6180-49A.

(f) The mechanical officer of each railroad who is in charge of a locomotive shall maintain in his office a secondary record of the information reported on Form FRA F 6180-49A under this part. The secondary record shall be retained until Form FRA F 6180-49A has been removed from the locomotive and filed in the railroad office of the mechanical officer in charge of the locomotive. If the Form FRA F 6180-49A removed from the locomotive is not clearly legible, the secondary record shall be retained until the Form FRA F 6180-49A for the succeeding year is filed. The Form F 6180-49A removed from a locomotive shall be retained until the Form FRA F 6180-49A for the succeeding year is filed.

Guidance

Motive Power and Equipment Compliance Manual

Section (a): The 92-day cycle begins (day 1) on the date entered on FRA Form F6180.49A. The 92-day cycle ends 11:59 p.m. on day 92, unless there is legitimate out-of-service time as defined in § 229.33. Some Class 1 railroads are performing inspections and reporting them on the FRA Form F6180.49A report at intervals shorter than 92 days. FRA takes no exception to this practice but the inspector should take sufficient time to examine the report to determine that all tests have been performed within the required time periods. The term “adequate facilities” is deliberately not spelled out in the regulation. The regulation does not mandate that a pit is required, but it must be possible to thoroughly inspect the underneath portion of the locomotive safely. This allows small shortline railroads, which may not have a pit, the flexibility to place or arrange a locomotive in some position or location so that a person can safely inspect under the locomotive.

Section (b): This section, for all practical purposes, is obsolete given that all of the passenger trains used by Amtrak and the commuter railroads use head end electric power for heating their trains. There may be some steam generators in use on the trains used on some seasonal tourist or historical operations.

Section (d): The FRA Form F6180.49A must be signed by the worker performing the inspection and the supervisor in charge of the workers. A signature is required. On some small railroad operations, the owner, supervisor, and worker may be one individual. Therefore, one individual would sign as the worker and the supervisor.

Some railroads have gone to a computer-generated FRA Form F6180.49A, which is replaced at each periodic inspection. This form must bear the original signatures of the personnel involved with the most recent inspection and tests. The computer-generated form and the form used at intervals of less than 92 days will require inspectors to spend more time to determine if the locomotive is in compliance with time elements in §§ 229.23, 229.25, and 229.27.

If an inspector finds locomotives without an FRA Form F6180.49A displayed in the locomotive cab, he/she shall make inquiry of the railroad as to the reason. If the inspector is satisfied with the railroad’s backup records and the form was lost or destroyed, the railroad is allowed to fax a copy of the form to be placed on the locomotive. The faxed copy would have to be legible, with all pertinent information and signatures.

Section (f): Unless requested, a railroad does not have to forward an FRA Form F6180.49A to the Washington, DC, Office of Safety Assurance and Compliance.

Periodic Inspections – Locomotives that operate outside of the United States

With the increase of railroad traffic at both the U.S./Canadian border and the U.S./Mexican border, inspectors should be governed by the following information relative to required daily and periodic inspections and tests for locomotives.

Locomotives that operate outside of the United States are governed by the laws of the country where they operate. Neither Canada nor Mexico requires the types of inspections that are commensurate with the tests and inspections described in Sections 229.21, 229.23, 229.25,

Federal Railroad Administration

229.27, and 229.29. However, FRA requires that all locomotives that operate in the United States must be in full compliance with Federal laws and regulations.

Therefore, FRA requires that all locomotives entering the United States from either Canada or Mexico must not be used until all the tests and inspections required by Section 229.21, et al., have been completed and properly recorded. Those inspections and tests must be done either at the point of entry into the United States, or arranged to be done within Canada or Mexico, prior to entry into this country. If the inspections and tests are not properly performed and/or the locomotive is not in compliance with FRA regulations upon entry into the United States, the locomotive may be moved only under the provisions of Section 229.9 as a dead or lite locomotive. **(MP&E 98-37)**

§ 229.25 Tests: Every Periodic Inspection.

Each periodic inspection shall include the following:

(a) All mechanical gauges used by the engineer to aid in the control or braking of the train or locomotive, except load meters used in conjunction with an auxiliary brake system, shall be tested by comparison with a dead-weight tester or a test gauge designed for this purpose.

(b) All electrical devices and visible insulation shall be inspected.

(c) All cable connections between locomotives and jumpers that are designed to carry 600 volts or more shall be thoroughly cleaned, inspected, and tested for continuity.

(d) Each steam generator that is not isolated as prescribed in § 229.23(b) shall be inspected and tested as follows:

(1) All automatic controls, alarms and protective devices shall be inspected and tested.

(2) Steam pressure gauges shall be tested by comparison with a dead-weight tester or a test gauge designed for this purpose. The siphons to the steam gauges shall be removed and their connections examined to determine that they are open.

(3) Safety valves shall be set and tested under steam after the steam pressure gauge is tested.

(e) Event Recorder. A microprocessor-based self-monitoring event recorder, if installed, is exempt from periodic inspection under paragraphs (e)(1) through (e)(5) of this section and shall be inspected annually as required by § 229.27(d). Other types of event recorders, if installed, shall be inspected, maintained, and tested in accordance with instructions of the manufacturer, supplier, or owner thereof and in accordance with the following criteria:

(1) A written or electronic copy of the instructions in use shall be kept at the point where the work is performed and a hard-copy version, written in the English language, shall be made available upon request of a governmental agent empowered to request it.

(2) The event recorder shall be tested before any maintenance work is performed on it. At a minimum, the event recorder test shall include cycling, as practicable, all required recording elements and determining the full range of each element by reading out recorded data.

(3) If the pre-maintenance test does not reveal that the device is recording all the specified data and that all recordings are within the designed recording elements, this fact shall be noted, and maintenance and testing shall be performed as necessary until a subsequent test is successful.

(4) When a successful test is accomplished, a copy of the data-verification results shall be maintained in any medium with the maintenance records for the locomotive until the next one is filed.

(5) A railroad's event recorder periodic maintenance shall be considered effective if 90 percent (90%) of the recorders on locomotives inbound for periodic inspection in any given calendar month are still fully functional; maintenance practices and test intervals shall be adjusted as necessary to yield effective periodic maintenance.

Guidance

Section (a): Many railroads use a portable air gauge test device that allows testing without removal of the gauges. The use of such a device is acceptable as long as the gauge is tested throughout its entire range. These requirements do not apply to electronic displays, as they are checked annually.

Section (b): Sufficient inspection covers are to be removed from traction motors, traction generators, and electrical cabinets in order to thoroughly inspect such equipment for general safety conditions and safety defects.

Section (e): Inspectors are advised to inquire about and monitor the periodic inspection, maintenance practices, and test intervals used by the railroads for event recorders when performing routine inspections at locomotive facilities. **(MP&E 98-2)**

1. Requires replacement, by October 1, 2009, of each event recorder using magnetic tape as a storage medium with a certified crashworthy event recorder memory module (ERMM) capable of recording at least the same data elements as the recorder it replaces. Any magnetic tape recorder replaced after October 1, 2005, must be replaced with a certified crashworthy event recorder memory module.

Federal Railroad Administration

2. Requires all new lead locomotives, lead manned helper locomotives, and controlling distributive power locomotives (ordered after October 1, 2006, or placed in service after October 1, 2009) to be equipped with a certified crashworthy ERMM capable of recording up to 25 data elements for traditional locomotives and 22 data elements for MU and DMU locomotives.
3. Requires all remanufactured locomotives after October 1, 2007, to be equipped with a certified crashworthy ERMM capable of recording at least the same data elements as the event recorder on that locomotive prior to remanufacture.
4. Requires event recorders originally manufactured after January 1, 2010, and installed on a covered locomotive, to be equipped with a certified crashworthy ERMM.
5. Contains specific performance criteria for determining the crashworthiness of an ERMM. This includes criteria for fire, impact shock, static crush, fluid immersion, and hydrostatic pressure; and contains testing sequence requirements. The criteria are based on existing crashworthiness standards of the Institute of Electrical and Electronics Engineers, Inc. (IEEE), modified for the locomotive environment.
6. Requires preservation of event recorder data for a period of 1 year for any locomotive involved in an accident or incident required to be reported to FRA under part 225.
7. Provides relief from the periodic inspection requirements for microprocessor-based event recorders with self-monitoring features. Requires inspection of these types of event recorders annually.

§ 229.27 Annual tests.

A locomotive, except for a DMU or MU locomotive, shall be subjected to the tests and inspections prescribed in paragraphs (a), (b), and (c) of this section. A DMU locomotive and an MU locomotive shall be subjected to the tests and inspections prescribed in paragraphs (b) and (c) of this section. A locomotive, including a DMU locomotive and an MU locomotive, equipped with a microprocessor-based event recorder that includes a self-monitoring feature, shall be subjected to the tests and inspections prescribed in paragraph (d) of this section, at intervals that do not exceed 368 calendar days.

(a)(1) The filtering devices or dirt collectors located in the main reservoir supply line to the air brake system shall be cleaned, repaired, or replaced.

(2) Brake cylinder relay valve portions, main reservoir safety valves, brake pipe vent valve portions, feed and reducing valve portions in the air brake system (including related dirt collectors and filters) shall be cleaned, repaired, and tested.

(3) The date and place of the cleaning, repairing, and testing shall be recorded on Form FRA F 6180-49A and the person performing the work and that person's supervisor shall sign the form. A record of the parts of the air brake system that

are cleaned, repaired, and tested shall be kept in the carrier's files or in the cab of the locomotive.

(4) At its option, a carrier may fragment the work required by this paragraph. In that event, a separate air record shall be maintained under a transparent cover in the cab. The air record shall include the locomotive number, a list of the air brake components, and the date and place of the last inspection and test of each component. The signature of the person performing the work and the signature of that person's supervisor shall be included for each component. A duplicate record shall be maintained in the carrier's files.

(b) The load meter shall be tested. Each device used by the engineer to aid in the control or braking of the train or locomotive that provides an indication of air pressure electronically shall be tested by comparison with a test gauge or self-test designed for this purpose. An error of greater than five percent or three pounds per square inch shall be corrected. The date and place of the test shall be recorded on Form FRA F 6180-49A and the person conducting the test and that person's supervisor shall sign the form.

(c) Each steam generator that is not isolated as prescribed in § 229.23(b), shall be subjected to a hydrostatic pressure at least 25 percent above the working pressure and the visual return water-flow indicator shall be removed and inspected.

(d) A microprocessor-based event recorder with a self-monitoring feature equipped to verify that all data elements required by this part are recorded, requires further maintenance only if either or both of the following conditions exist:

(1) The self-monitoring feature displays an indication of a failure. If a failure is displayed, further maintenance and testing must be performed until a subsequent test is successful. When a successful test is accomplished, a record, in any medium, shall be made of that fact and of any maintenance work necessary to achieve the successful result. This record shall be available at the location where the locomotive is maintained until a record of a subsequent successful test is filed.

(2) A download of the event recorder, taken within the preceding 30 days and reviewed for the previous 48 hours of locomotive operation, reveals a failure to record a regularly recurring data element or reveals that any required data element is not representative of the actual operations of the locomotive during this time period. If the review is not successful, further maintenance and testing shall be performed until a subsequent test is successful. When a successful test is accomplished, a record, in any medium, shall be made of that fact and of any maintenance work necessary to achieve the successful result. This record shall be kept at the location where the locomotive is maintained until a record of a subsequent successful test is filed. The download shall be taken from information stored in the certified crashworthy crash hardened event recorder memory module if the locomotive is so equipped.

Federal Railroad Administration

Guidance

Section (a): The MU locomotives are only required to comply with Sections (b) and (c) if so equipped.

Locomotives equipped with 26-L type brake equipment qualify for an industry-wide waiver (H80-7) that has been in effect since 1985, which extends the time requirement for §§ 229.27(a)(2) and 229.29(a) to 1,104 days. In 2005, the industry was granted another waiver that extends the time requirement to 1,472 days for locomotives equipped with 26-L type brake equipment **and** a functioning air dryer. Under this waiver, the air dryer must be maintained and all air brake filtering devices must be cleaned or replaced annually. See waiver FRA-2005-21325.

Note: All other provisions of § 229.27 are performed on a 368-day cycle. Therefore, main reservoir filtering devices or dirt collectors in the supply line shall be cleaned, repaired, or replaced on an annual cycle. Form FRA F6180-49A should indicate the waiver under which the locomotive is operating.

The following components should receive attention on the 1,104-day or the 1,472-day cycle:

26-C Brake Valve	Reducing Valves
SA-26 Ind. Brake Valve	MU-2A Valves
F-1 Selector Valve	26-D & 26-F Control Valve
A-1 CCOP Valve	J Type Relay Valve
BP Strainer	# 8 or KM Vent Valves
Foot Valve	MR Safety Valves
Double Check Valves	MR Check Valves
H Type Relayair Valves	Magnet Valves
P-2-A Brake Application Valve	

The 30-CDW Console Mounted Brake Valve is considered to be the same as the 26-C and SA-26 brake valve.

Any other deviations in the brake valve, control valve, relay valve, or brake application valve exclude the entire equipment from the extension. For example, if there is a distributing valve in the system, the locomotive does not qualify for either the 1,104- or 1,472-day extension. RCL brake valves added to 26L type brake equipment are not part of the general industry-wide waivers and have to be inspected accordingly.

Locomotives equipped with either the EPIC or CCB electronic brake system have been granted waivers that extend the time requirement to a 5-year cycle. However, these waivers are conditional and require that all of the filtering devices be cleaned, repaired, or replaced; and the brake pipe vent valve be inspected, cleaned, repaired, and tested on a 368-calendar-day interval. Recently, another test waiver was granted to the Association of American Railroads (AAR) to extend the time requirement beyond the 5-year period. Please be governed by the Form FRA F6180-49A - Blue Card on the locomotive.

Section (a)(4): Fragmentation of air brake clean, repair, and test (maintenance) is becoming more common due to electronic air brake waivers granted to several railroads under the umbrella of AAR waiver FRA-2005-21613. Specific conditions related to fragmenting may be listed in the waiver approval letter applicable to an individual railroad. Whether or not there is an applicable waiver, a railroad that implements a fragmented schedule of locomotive air brake maintenance, as permitted by 229.27(a)(4), is required to have an air record (an “air card” or other documentation) in the cab of the locomotive that lists the various air brake components and the date that each component went through its most recent clean, repair, and test cycle. The line on the Blue Card that is labeled “Airbrake 229.27” may be left blank or filled in with the word “Fragmented” or “Fragmented - See air card,” or it may be labeled as applicable to “Filters only” under Section 229.27(a)(1), if maintenance of the filters is recorded here and not on the air card. Entries on the “Air Brake 229.27” line for a locomotive that has a fragmented schedule of air brake maintenance are permissible, if the “Test date and Place” are provided for the oldest component (among those listed in 229.27(a)(1) or (a)(2)) shown on the air card.

Section (b): Displays that provide an indication of air pressure electronically shall be tested.

Indicators used as load meters are required to be tested. Often there are questions pertaining to the requirement for testing load meters on locomotives equipped with AC traction motors, which use a computer screen to display loading information. Since an analog load meter indicating the current or amperage being applied to the traction motors is not included or required on the AC locomotive control stand, the regulation **does not apply**. The information provided to an engineer operating an AC locomotive is the electric power output, as indicated by tractive effort in pounds. In many cases, a bar graph displays the tractive effort as a percentage of the locomotive’s total output.

The direct current traction motor analog load meter indicates short-time high amperage zones, which alert the engineer to possible overheating of the traction motor. The AC traction motor has no commutator or brushes, thus full current can be applied without damage because the computers automatically control loading at proper levels to prevent motor damage. **(MP&E 98-54)**

§ 229.29 Biennial tests.

(a) Except for the valves and valve portions on non-MU locomotives that are cleaned, repaired, and tested as prescribed in § 229.27(a), all valves, valve portions, MU locomotive brake cylinders and electric-pneumatic master controllers in the air brake system (including related dirt collectors and filters) shall be cleaned, repaired, and tested at intervals that do not exceed 736 calendar days. The date and place of the cleaning, repairing, and testing shall be recorded on Form FRA F 6180-49A, and the person performing the work and that person’s supervisor shall sign the form. A record of the parts of the air brake system that are cleaned, repaired, and tested shall be kept in the carrier’s files or in the cab of the locomotive.

Federal Railroad Administration

(b) At its option, a carrier may fragment the work required by this section. In that event, a separate air record shall be maintained under a transparent cover in the cab. The air record shall include the locomotive number, a list of the air brake components, and the date and place of the inspection and test of each component. The signature of the person performing the work and the signature of that person's supervisor shall be included for each component. A duplicate record shall be maintained in the carrier's files.

Guidance

Locomotive air dryers ("air dryers") are not specifically addressed by Federal safety laws (*see* 49 CFR part 229 and 49 U.S.C. § 20107), nor has FRA determined that air dryers are an appurtenance to the locomotive for purposes of 49 CFR § 229.7. Because air dryers are not addressed by Federal safety laws, no violations should be taken for defective air dryers.

In a number of the waivers granted by FRA's Safety Board ("Safety Board") to extend the intervals between brake maintenance (similar to the cleaning, repairing, and testing commonly referred to as COT&S) on both freight (49 CFR § 229.29, Biennial test) and passenger (49 CFR § 238.309, Periodic brake equipment maintenance), the Safety Board required a functioning air dryer as a condition to the waiver. If a locomotive covered by a waiver that requires a functioning air dryer, is beyond the current brake maintenance interval in the regulation, and is found to have a defective air dryer, the locomotive would be noncompliant under 49 CFR §§ 229.29 or 238.309 because of the overdue brake maintenance, and not for the defective air dryer. The waivers do not explain how FRA will determine whether an air dryer is defective. Violation reports must explain the basis for the inspector's determination that the air dryer is defective. As a note, inspectors should not rely only on the air dryer's color indicator to make the determination.

Section (a): This section refers to all other valves in the air brake system. As noted in the guidance for § 229.27, a waiver was granted in 1985 that allows any locomotive with a 26-L type air brake system to go a total of 1,104 days between the required cleaning, repairing, and testing. Locomotives equipped with either the EPIC or CCB electronic brake system have been granted conditional waivers that extend the time requirement for cleaning, repairing, and testing valves and valve portions to a 5-year cycle.

When part 229 was promulgated, MU locomotives were subject to a 2-year inspection interval and this was not changed until the Passenger Equipment Safety Standards were written. It is still 736 days, except as provided in § 238.309(b)(2) "Every 1,104 days if the MU locomotive is part of a fleet that is 100% equipped with air dryers and is equipped with PS-68, 26-C, 26-L, PS-90, CS-1, RT-2, RT-5A, GRB-1, CS-2, or 26-R brake systems."

Section (b): Handle similarly to fragmentation of brake maintenance under 229.27(a)(4) above, however in this case all components will be covered on the air card so the "Airbrake 229.29" line on the Blue Card should be left blank or labeled "Fragmented" or "Fragmented - See air card." Entries on the Air Brake 229.29 line on a locomotive with fragmented air brakes are permissible, if the "Test date and Place" are provided for the oldest component shown on the air card. Recently, another test waiver was granted to the AAR to extend the time requirement beyond the 5-year period. Please be governed by the Form FRA F6180-49A - Blue Card on the locomotive.

§ 229.31 Main reservoir tests.

(a) Except as provided in paragraph (c) of this section, before it is put in service and at intervals that do not exceed 736 calendar days, each main reservoir other than an aluminum reservoir shall be subjected to a hydrostatic pressure of at least 25 percent more than the maximum working pressure fixed by the chief mechanical officer. The test date, place, and pressure shall be recorded on Form FRA F 6180-49A, and the person performing the test and that person's supervisor shall sign the form.

(b) Except as provided in paragraph (c) of this section, each main reservoir other than an aluminum reservoir shall be hammer tested over its entire surface while the reservoir is empty at intervals that do not exceed 736 calendar days. The test date and place shall be recorded on Form FRA F 6180-49A, and the person performing the test and that person's supervisor shall sign the form.

(c) Each welded main reservoir originally constructed to withstand at least five times the maximum working pressure fixed by the chief mechanical officer may be drilled over its entire surface with telltale holes that are three-sixteenths of an inch in diameter. The holes shall be spaced not more than 12 inches apart, measured both longitudinally and circumferentially, and drilled from the outer surface to an extreme depth by the formula displayed in the current 49 CFR part 229. One row of holes shall be drilled lengthwise of the reservoir on a line intersecting the drain opening. A reservoir so drilled does not have to meet the requirements of paragraphs (a) and (b) of this section, except the requirement for a hydrostatic test before it is placed in use. Whenever any such telltale hole shall have penetrated the interior of any reservoir, the reservoir shall be permanently withdrawn from service. A reservoir now in use may be drilled in lieu of the tests provided for by paragraphs (a) and (b) of this section, but it shall receive a hydrostatic test before it is returned to use.

(d) Each aluminum main reservoir before being placed in use and at intervals that do not exceed 736 calendar days thereafter, shall be --

(1) Cleaned and given a thorough visual inspection of all internal and external surfaces for evidence of defects or deterioration; and

(2) Subjected to a hydrostatic pressure at least twice the maximum working pressure fixed by the chief mechanical officer, but not less than 250 psi. The test date, place, and pressure shall be recorded on Form FRA F 6180-49A, and the person conducting the test and that person's supervisor shall sign the form.

Guidance

Section (c): The word "drilled" is to be inserted in the hammer and hydro block on the FRA Form F6180.49A. The exterior of the drilled reservoirs are to be examined for their general condition.

Federal Railroad Administration

§ 229.33 Out-of-use-credit.

When a locomotive is out of use for 30 or more consecutive days or is out of use when it is due for any test or inspection required by § 229.23, 229.25, 229.27, 229.29, or 229.31, an “out-of-use” notation showing the number of out-of-use days shall be made on an inspection line on Form FRA F6180-49A. A supervisory employee of the carrier who is responsible for the locomotive shall attest to the notation. If the locomotive is out of use for one or more periods of at least 30 consecutive days each, the interval prescribed for any test or inspection under this part may be extended by the number of days in each period the locomotive is out of use since the last test or inspection in question. A movement made in accordance with § 229.9 is not a use for purposes of determining the period of the out-of-use credit.

Guidance

The out-of-use credit inserted on an inspection line of the FRA Form F6180.49A accounts for the continuous record of a locomotive’s use for a calendar year. These random days cannot be accumulated nor used to extend the intervals prescribed for any test or inspection under this part, unless the time period is for 30 or more consecutive days. The creditable out-of-use time of 30 or more days, which is used to extend the test or inspection intervals, must be recorded in Block Number 11 on the FRA Form F6180.49A when a new form is created. Once the credit is used, it should be deleted from the form.

If a railroad leases a locomotive to a private industry and it is used entirely within the confines of a plant that is not a part of the general railroad system, the locomotive cannot be credited as out-of-use time because the locomotive is being used. When the railroad has a leased locomotive returned, the railroad must bring it into compliance with all of part 229 before it can be used in general railroad service.

§ 229.41 Protection against personal injury.

Fan openings, exposed gears and pinions, exposed moving parts of mechanisms, pipes carrying hot gases and high-voltage equipment, switches, circuit breakers, contactors, relays, grid resistors, and fuses shall be in non-hazardous locations or equipped with guards to prevent personal injury.

Guidance

The requirements of this section are designed to protect against safety hazards that could cause personal injuries.

§ 229.43 Exhaust and battery gases.

- (a) Products of combustion shall be released entirely outside the cab and other compartments. Exhaust stacks shall be of sufficient height or other means provided to prevent entry of products of combustion into the cab or other compartments under usual operating conditions.

(b) Battery containers shall be vented and batteries kept from gassing excessively.

Guidance

Section (a): The exhaust system of a locomotive should be inspected closely while the diesel engine is running for cracks in the manifolds and expansion bellows, broken or blown out manifold gaskets, and other signs of exhaust gas discharge into the engine compartment, as evidenced by heavy accumulations of soot and residue. The lay shaft should not be operated by inspectors to accelerate the diesel engine to check for exhaust leaks. If there is evidence of an exhaust leak, the railroad should be requested to operate the lay shaft or rev the engine to locate the leak. Instances have been mentioned by some railroads in which inspectors have reported exhaust leaks and railroad inspectors could not find them. Since the advent of the EMD GP-30 and its successors, and the GE U-25-B and its successors, the locomotive diesel engine compartments are pressurized to the extent that any residual fumes in the car body will be scavenged to the atmosphere around the exhaust stack opening in the roof.

§ 229.45 General Conditions.

All systems and components on a locomotive shall be free of conditions that endanger the safety of the crew, locomotive or train. These conditions include: insecure attachment of components, including third rail shoes or beams, traction motors and motor gear cases, and fuel tanks; fuel, oil, water, steam, and other leaks and accumulations of oil on electrical equipment that create a personal injury hazard; improper functioning of components, including slack adjusters, pantograph operating cylinders, circuit breakers, contactors, relays, switches, and fuses; and cracks, breaks, excessive wear and other structural infirmities of components, including quill drives, axles, gears, pinions, pantograph shoes and horns, third rail beams, traction motor gear cases, and fuel tanks.

Guidance

This regulation is basically a compendium of many regulations found in the former part 230. When this regulation was written, the railroads were concerned that the provisions of this regulation created a degree of discretion in interpretation and application by the MP&E inspectors. FRA's position is that its inspectors have always interpreted the regulations in part 230 in a reasonable manner. FRA also believes that, "conditions that endanger the safety of the crew, locomotive, or train" provide the proper and lawful limit to the application of this section.

Conditions described as fuel, oil, water, steam, and other leaks must be qualified by stating that they constitute a personal injury hazard. Insecure attachments of those items such as third rail shoes or beams, traction motors and motor gear cases, and fuel tanks should have some relevancy to safety, or have deteriorated to the point that it is immediately unsafe and could cause an accident. A locomotive should not be cited for conditions described above if they do not constitute a hazard of any type, but are merely technical in nature. However, the railroad should be required to correct the condition and bring the locomotive into compliance. Any safety appliances not covered in part 231, such as steps and handholds that aid in sanding

Federal Railroad Administration

locomotives, safety railings, and ladder treads affording access to the roof of the locomotive are covered by this section. Similarly, if the sander hose or pipe has a hole in it that discharges sand at eye level, the inspector must establish the personal injury hazard under 229.45. The inspector must explain how the blowing would cause the injury (e.g. sand blowing at eye level on locomotive walkway, etc.). inspectors should use this code if or when they find a handle missing or the locking feature defective on locomotive air brake MU end-cocks, since these conditions may affect the operation of the locomotive's brakes.

When a violation is submitted for any of the conditions described in this section, the personal injury hazard should be described to include a full explanation of the condition and how it creates a personal hazard.

§ 229.46 Brakes: General.

The carrier shall know before each trip that the locomotive brakes and devices for regulating all pressures, including but not limited to the automatic and independent brake valves, operate as intended and that the water and oil have been drained from the air brake system.

Guidance

The inspector should observe railroad personnel performing the required air brake test on a locomotive(s).

Inspectors should check that someone, *before the start of the trip*, drained the oil and water from the air brake system. FRA considers the *trip* in "yard operations" to be the start of the shift. The mere presence of water or oil in the brake system in and of itself does not establish a violation under this section. Nor does the fact that there is oil or water in the system following a daily inspection establish a violation. In order to establish a violation, FRA must prove that the water and oil was not drained from the system before the trip (for which the violation is being sought) began. Thus, if oil or water is present, the inspector should discuss why the presence of such could not have occurred while the locomotive was en route on its trip (length of trip vs. amount of oil and water). The mere fact that a daily inspection was performed does not establish a violation under this section. FRA must establish that the oil or water was not drained prior to the commencement of the involved trip.

Most of the road locomotives are equipped with some type of automatic main air reservoir drain valve to drain the water and oil from the air brake system. Usually when the automatic drain valve is cut out or inoperative, water and oil will accumulate in the reservoir. In this case, inspectors should take exception to an inoperative (defective or nullified) automatic drain valve. If the automatic drain valve is found to be inoperative or nullified, but no water or oil is present in the reservoir, a noncomplying condition **does not** exist under this section. Since it is an appurtenance to the locomotive, § 229.7 could be used for enforcement.

§ 229.47 Emergency brake valve.

(a) Except for locomotives with cabs designed for occupancy by only one person, each road locomotive shall be equipped with a brake pipe valve that is accessible to a member of the crew, other than the engineer, from that crew member's position in the cab. On car body type locomotives, a brake pipe valve shall be attached to the wall adjacent to each end exit door. The words "Emergency Brake Valve" shall be legibly stenciled or marked near each brake pipe valve or shall be shown on an adjacent badge plate.

(b) MU and control cab locomotives operated in road service shall be equipped with an emergency brake valve that is accessible to another crew member in the passenger compartment or vestibule. The words "Emergency Brake Valve" shall be legibly stenciled or marked near each valve or shall be shown on an adjacent badge plate.

Guidance

Section (a): The emergency brake valve may be found in various locations on different locomotives. There is no precise location except that it must be readily **accessible** to someone other than the engineer, and on locomotives with enclosed walkways there must be an additional valve adjacent to the rear exit doors. Although the requirement does not address location of the valve within the cab, the required stenciling near each valve must be visible. If a valve is located behind a cab seat where a crew member must fold the seat down in order to activate it, the required stenciling must not be obstructed. The required stenciling must be visible to identify the valve's location.

Section (b): The emergency brake valve must be located in the passenger compartment and must be connected to the brake pipe.

Good enforcement discretion should be used if the "Emergency Brake Valve" designation is found not intact. The condition should be brought to the railroad's attention for correction. The inspector should periodically have the railroad test the emergency valve on the locomotive on a random basis to insure proper operation.

§ 229.49 Main reservoir system.

(a) (1) The main reservoir system of each locomotive shall be equipped with at least one safety valve that shall prevent an accumulation of pressure of more than 15 pounds per square inch above the maximum working air pressure fixed by the chief mechanical officer of the carrier operating the locomotive.

(2) Except for non-equipped MU locomotives built prior to January 1, 1981, each locomotive that has a pneumatically actuated system of power controls shall be equipped with a separate reservoir of air under pressure to be used for operating those power controls. The reservoir shall be provided with means to automatically prevent the loss of pressure in the event of a failure of main air pressure, have storage capacity for not less than three complete operating cycles of control equipment and be located where it is not exposed to damage.

Federal Railroad Administration

(b) A governor shall be provided that stops and starts or unloads and loads the air compressor within 5 pounds per square inch above or below the maximum working air pressure fixed by the carrier.

(c) Each compressor governor used in connection with the automatic air brake system shall be adjusted so that the compressor will start when the main reservoir pressure is not less than 15 pounds per square inch above the maximum brake pipe pressure fixed by the carrier and will not stop the compressor until the reservoir pressure has increased at least 10 pounds.

Guidance

The inspector should periodically have the railroad demonstrate the functioning and setting of the safety valve and compressor governor at locations where periodic inspections are performed.

Union Pacific Railroad (UP) requested and was granted a conditional waiver to permit UP locomotive main reservoir system safety valve to accumulate up to 25 psi above the maximum working air pressure fixed by the chief mechanical officer, the maximum allowed by regulation is 15 psi. This waiver was assigned Docket Number FRA-2005-21179. A copy of the decision letter is available in the MP&E waiver section of this Compliance Manual.

§ 229.51 Aluminum main reservoirs.

(a) Aluminum main reservoirs used on locomotives shall be designed and fabricated as follows:

(1) The heads and shell shall be made of Aluminum Association Alloy No. 5083-0, produced in accordance with American Society of Mechanical Engineers (ASME) Specification SB-209, as defined in the "ASME Boiler and Pressure Vessel Code" (1971 edition), section II, Part B, page 123, with a minimum tensile strength of 40,000 psi (40 ksi).

(2) Each aluminum main reservoir shall be designed and fabricated in accordance with the "ASME Boiler and Pressure Vessel Code," section VIII, Division I (1971 edition), except as otherwise provided in this part.

(3) An aluminum main reservoir shall be constructed to withstand at least five (5) times its maximum working pressure or 800 psi., whichever is greater.

(4) Each aluminum main reservoir shall have at least two inspection openings to permit complete circumferential visual observation of the interior surface. On reservoirs less than 18 inches in diameter, the size of each inspection opening shall be at least that of 1½-inch threaded iron pipe, and on reservoirs 18 or more inches in diameter, the size of each opening shall be at least that of 2-inch threaded iron pipe.

(b) The following publications, which contain the industry standards incorporated by reference in paragraph (a) of this section, may be obtained from the publishers and are also on file in the Office of Railroad Safety of the Federal Railroad Administration, Washington, DC 20590. Sections II and VIII of the “ASME Boiler and Pressure Vessel Code” (1971 edition) are published by the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.

Guidance

Currently, aluminum main air reservoirs are not in use. This section is included in the regulation to provide design guidance. If an inspector finds an aluminum air reservoir, the regional office should be immediately notified and the information forwarded to the MP&E Staff Director.

§ 229.53 Brake gauges.

All mechanical gauges and all devices providing indication of air pressure electronically that are used by the engineer to aid in the control or braking of the train or locomotive shall be located so that they may be conveniently read from the engineer’s usual position during operation of the locomotive. A gauge or device shall not be more than five percent or three pounds per square inch in error, whichever is less.

Guidance

The regulation pertains only to gauges and displays used by the engineer for controlling or braking a train or locomotive pneumatically. All other air gauges located at other locations on a locomotive are not included. Gauges and preset pressure devices on the belt packs used in remote control locomotive operations are subject to this section.

§ 229.55 Piston Travel.

(a) Brake cylinder piston travel shall be sufficient to provide brake shoe clearance when the brakes are released.

(b) When the brakes are applied on a standing locomotive, the brake cylinder piston travel may not exceed 1½ inches less than the total possible piston travel. The total possible piston travel for each locomotive shall be entered on Form FRA F 6180-49A.

(c) The minimum brake cylinder pressure shall be 30 pounds per square inch.

Guidance

Section (b): The requirements are that the piston’s travel not exceed 1½ inches less than the total possible piston travel. This measurement can be found on the locomotive’s blue card, FRA Form F6180-49A. Inspectors should periodically check the 49A card for accurate measurements. On a typical locomotive in service today, the total piston travel for truck-mounted brake cylinders is 8-inches; therefore, the allowable piston travel shall not exceed 6½

Federal Railroad Administration

inches. Excessive piston travel of a minor nature on only one cylinder should not necessarily result in a violation, but the railroad should be requested to repair it. When measuring piston travel on locomotives, the measurement is from the opening of the cylinder to the collar. It is not the grease ring, as is the practice when measuring piston travel on freight cars.

Section (c) is in regards to the minimum locomotive brake cylinder pressure required by the Federal regulations. These regulations were written when cast iron brake shoes were the standard and the brake cylinder relay air valve delivered 100 percent of the control pressure to the brake cylinders. With the advent of the high friction composition brake shoe, various relay valves have been used depending on whether the rigging was designed for cast iron or composition shoes. To best match the stop distance of cast iron, a two-step relay valve is used for composition shoes. One level is used for the automatic brake where speeds are generally above “switching” speeds, and a higher level for the independent brake that is normally used in switching. By tailoring the relay valve to the locomotive, a standard independent brake valve setting can be used universally on a railroad. This setting is usually 45 psi. The resulting brake cylinder pressure may vary from 27 psi (with a 60 percent relay) to 72 psi (with a 160 percent relay). The 60 percent relay valves (J-46 or J-64) are normally found on older locomotives that were converted from cast iron shoes with clasp rigging to composition shoes with clasp rigging. Therefore, FRA considers such locomotives to be in compliance with the regulations. **(MP&E 98-41)**

§ 229.57 Foundation Brake Gear.

A lever, rod, brake beam, hanger, or pin may not be worn through more than 30 percent of its cross-sectional area, cracked, broken, or missing. All pins shall be secured in place with cotters, split keys, or nuts. Brake shoes shall be fastened with a brake shoe key and aligned in relation to the wheel to prevent localized thermal stress in the edge of the rim or the flange.

Guidance

When out-of-line (overriding) brake shoes are discovered, the inspector should try to determine the root cause of the defect (e.g. bushings, hangers, pins, etc.) Also, the wheel should be examined for thermal stress at the edge of the wheel, as evidenced by small thermal cracks, metal flow, or discoloration.

§ 229.59 Leakage.

- (a) Leakage from the main air reservoir and related piping may not exceed an average of 3 pounds per square inch per minute for 3 minutes after the pressure has been reduced to 60 percent of the maximum pressure.
- (b) Brake pipe leakage may not exceed five (5) pounds per square inch per minute.
- (c) With a full service application at maximum brake pipe pressure and with communication to the brake cylinders closed, the brakes shall remain applied at least five (5) minutes.

(d) Leakage from control air reservoir, related piping, and pneumatically operated controls may not exceed an average of three (3) pounds per square inch per minute for three (3) minutes.

Guidance

Section (a): An air leak from the main air reservoir system cannot be considered noncomplying unless it is **in excess of 3** pounds as described in this section. If the inspector believes that the leak is excessive, he/she should have the railroad perform the required test procedure.

Section (b): After an automatic brake pipe reduction of at least 20 psi (not to exceed full service) is made, wait 45–60 seconds, and if the locomotive is equipped with the means for maintaining brake pipe pressure, this feature must be cut out. Next, observe if the brake pipe leakage exceeds 5 psi per minute.

Section (c): Leakage of air observed at a brake cylinder in itself may not be a noncomplying condition. A noncomplying condition would be present if the brakes did not remain applied for 5 minutes as a result of the leak. This can only be determined after communication from the automatic brake valve is cut off at the completion of a full service application. The railroad should perform the required test for the MP&E inspector.

Section (d): This system will only be found on locomotives which use air-operated electric power contactors and/or an air-operated throttle.

§ 229.61 Draft system.

(a) A coupler may not have any of the following conditions:

- (1) A distance between the guard arm and the knuckle nose of more than $5\frac{1}{8}$ inches on standard type couplers (MCB contour 1904) or more than $5 - \frac{5}{16}$ inches on D&E couplers.
- (2) A crack or break in the side wall or pin bearing bosses outside of the shaded areas shown in Figure 1 or in the pulling face of the knuckle.
- (3) A coupler assembly without anti-creep protection.
- (4) Free slack in the coupler or drawbar not absorbed by friction devices or draft gears that exceeds one-half inches.
- (5) A broken or cracked coupler carrier.
- (6) A broken or cracked yoke.
- (7) A broken draft gear.

Federal Railroad Administration

(b) A device shall be provided under the lower end of all drawbar pins and articulated connection pins to prevent the pin from falling out of place in case of breakage.

Guidance

Coupler heights and safety appliances should be examined for compliance with the Safety Appliance Standards, and all deficiencies should be reported under part 231. The coupler heights must be measured on level, tangent track. The standard height for locomotive coupler is identical to freight and passenger car: the standard gauge railroad center of the knuckle shall be a maximum of 34½ inches, and a minimum of 31½ inches, above the top of the rail.

Section (a)(2): The definition of a crack or break must be applied judiciously used when examining a coupler for such noncomplying conditions. If the condition observed is a shrinkage crack or a hot tear (a phenomenon that occurs during the casting process), it does not significantly diminish the strength of the coupler, and thus is not considered to be a crack or noncomplying condition. For additional information on coupler cracks, see the guidance related to draft systems for freight cars contained in Chapter 4, Section 215.123.

Section (a)(3): Most freight-hauling locomotives have a top-operated lock lifter. As long as there is clearance in the operating loop when the knuckle is closed, the anti-creep should be functioning.

Section (a)(4): This pertains to all types of locomotives regardless of the service to which they are put. The lost motion or draft system free slack is that which is not absorbed by the draft gear or similar equipment. The free slack can be determined by manually placing the coupler in draft and buff position, scribing a mark at each position on the side of the coupler horn, and then measuring the distance between the two marks.

§ 229.63 Lateral motion.

(a) Except as provided in paragraph (b), the total uncontrolled lateral motion between the hubs of the wheels and boxes, between boxes and pedestals or both, on any pair of wheels may not exceed one (1) inch on non-powered axles and friction bearing powered axles, or ¾ inch on all other powered axles.

(b) The total uncontrolled lateral motion may not exceed 1 ¼ inches on the center axle of three-axle trucks.

Guidance

The “total uncontrolled lateral motion” referred to in this section means the lateral motion provided for in the design of the parts, plus any additional lateral motion due to wear. The inspector may have to measure several points of an axle assembly to calculate the total clearance.

§ 229.64 Plain bearings.

A plain bearing box shall contain visible free oil and may not be cracked to the extent that it will leak oil.

Guidance

Only plain bearing boxes are referenced in this section, and then only in a very restrictive manner. Any mechanical defect in the friction bearings, as well as any defects found in a roller bearing assembly, shall be reported under Section 229.45, General Conditions. Obvious hazardous conditions found when inspecting either friction or roller bearings not specifically covered by these regulations may be handled by the use of a Special Notice for Repairs, FRA Form F6180.8.

§ 229.65 Spring rigging.

(a) Protective construction or safety hangers shall be provided to prevent spring planks, spring seats or bolsters from dropping to track structure in event of a hanger or spring failure.

(b) An elliptical spring may not have its top (long) leaf broken or any other three leaves broken, except when that spring is part of a nest of three or more springs and none of the other springs in the nest has its top leaf or any other three leaves broken. An outer coil spring or saddle may not be broken. An equalizer, hanger, bolt, gib, or pin may not be cracked or broken. A coil spring may not be fully compressed when the locomotive is at rest.

(c) A shock absorber may not be broken or leaking clearly formed droplets of oil or other fluid.

Guidance

Section (b): This section is restricted in application. Many of the locomotives presently in service using elliptical springs have more than three leaf springs in a nest. A locomotive may have a long leaf broken and up to two other smaller leaves broken, or up to five smaller leaves broken, provided that no other long leaves are broken. The context of the aforementioned guidance applies to elliptical springs that are only part of a nest of three or more. At no time may a locomotive have two (2) long leaves broken.

Also, many locomotives are equipped with rubber/steel laminated pads instead of leaf springs, and where such pads are found to be defective or deteriorated and they create an unsafe condition, they should be reported under Section 229.45.

Only the outer coil spring is addressed in this section. All coil springs in a truck assembly are to be inspected and considered, such as those that are used to support the span bolster on the EMD SD series of locomotives, and must be in compliance with this section. A spring plank resting on or in contact with the safety hanger should be reported.

Federal Railroad Administration

Section (c): “**Clearly formed droplets**” means a **fresh** accumulation of oil (not dirty or dried) that continually and/or slowly forms into beads. If there is evidence of the unit being ineffective, it is considered defective. This applies to shock absorbers and yaw dampers.

§ 229.67 Trucks.

§ 229.69 Side Bearings.

(a) Friction side bearings with springs designed to carry weight may not have more than 25% of the springs in any one nest broken.

(b) Friction side bearings may not be run in contact unless designed to carry weight. Maximum clearance of side bearings may not exceed one-fourth inch on each side or a total of one-half inch on both sides, except where more than two side bearings are used under the same rigid superstructure. The clearance on one pair of side bearings under the same rigid superstructure shall not exceed one-fourth inch on each side or a total of one-half inch on both sides; the other side bearings under the same rigid superstructure may have one-half inch clearance on each side or a total of 1 inch on both sides. These clearances apply where the spread of the side bearings is 50 inches or less; where the spread is greater, the side bearing clearance may only be increased proportionately.

Guidance

Section (b): Side bearings may not run in contact unless they are designed to carry weight. To determine that there is no clearance between a pair of side bearings that appear to be in contact at both sides, the inspector must use a thin feeler gauge to make the determination as to whether clearance exists.

There are two measurements allowed on a locomotive which has two (2) trucks under the same structure. A total not to exceed $\frac{1}{2}$ inch is allowed at the side bearings of one truck and under the same superstructure, a total not to exceed 1 inch is allowed on trucks with more than one pair of side bearings per truck. The superstructure is only that part over the trucks. Inspectors must be cognizant of truck configurations that allow for more than one pair of side bearings on one truck. No exception should be taken if all of the side bearing clearance is to one side and there is no apparent problem with the locomotive. **All side bearing measurements must be taken on tangent, level track.**

§ 229.73 Wheel sets.

(a) The variation in the circumference of wheels on the same axle may not exceed $\frac{1}{4}$ inch (two tape sizes) when applied or turned.

(b) The maximum variation in the diameter between any two wheel sets in a three-powered-axle truck may not exceed $\frac{3}{4}$ inch, except that when shims are used at the journal box springs to compensate for wheel diameter variation, the maximum variation

may not exceed 1¼ inch. The maximum variation in the diameter between any two wheel sets on different trucks on a locomotive that has three-powered-axle trucks may not exceed 1¼ inch. The diameter of a wheel set is the average diameter of the two wheels on an axle.

(c) On standard gauge locomotives, the distance between the inside gauge of the flanges on non-wide flange wheels may not be less than 53 inches or more than 53½ inches. The distance between the inside gauge of the flanges on wide flange wheels may not be less than 53 inches or more than 53¼ inches.

(d) The distance back to back of flanges of wheels mounted on the same axle shall not vary more than ¼ inch.

Guidance

Section (b): This section deals with the problem of mismatched wheels that are identified as (1) wheel slip control, (2) traction motor current unbalance, and (3) axle load variations.

(1) The wheel slip control system brings into play either manual sanding by the engineer or automatic sanding triggered as the response to arrest the wheel slip. In either case, sanding may substantially increase the ratio of lateral to vertical forces creating a derailment possibility.

(2) Traction motor current unbalance results in different current levels between the motors in the truck that affects the traction motor operating temperature, and the distribution of tractive effort.

(3) The axle load variation caused by different wheel sizes affects the adhesion level demand at various axle locations since some axles are called upon to accept more or less of the locomotive's weight than they would with equal wheel sizes. This affects the tracking characteristics of the locomotive. A lightly loaded leading axle of a truck would have a greater tendency to climb the rail in a curve or at track irregularities, while a heavily loaded axle has the same effect on the track structure as a heavier locomotive.

Inspectors are advised that this regulation applies only to three powered axle trucks. Inspectors should employ the witness groove method to determine the wheel diameter. To properly measure the diameter of a locomotive wheel, measure the distance from the top of the reference (witness) groove to the outer edge of the rim, multiply by two, and add 36 inches. A standard steel wheel gage (finger gage) would normally be used for this measurement. Gauge W319 can also be used to determine a wheel's diameter, especially if 44-inch wheels are involved.

§ 229.75 Wheels and tire defects.

Wheels and tires may not have any of the following conditions:

Federal Railroad Administration

- (a) A single flat spot that is $2\frac{1}{2}$ inches or more in length, or two (2) adjoining spots that are each two (2) or more inches in length.
- (b) A gouge or chip in the flange that is more than $1\frac{1}{2}$ inches in length and $\frac{1}{2}$ inch in width.
- (c) A broken rim, if the tread, measured from the flange at a point five-eighths inch above the tread, is less than $3\frac{3}{4}$ inches in width.
- (d) A shelled-out spot $2\frac{1}{2}$ inches or more in length, or two adjoining spots that are each two or more inches in length.
- (e) A seam running lengthwise that is within $3\frac{3}{4}$ inches of the flange.
- (f) A flange worn to a $\frac{7}{8}$ inch thickness or less, gauged at a point $\frac{3}{8}$ inch above the tread.
- (g) A tread worn hollow $\frac{5}{16}$ inch or more on a locomotive in road service or $\frac{3}{8}$ inch or more on a locomotive in switching service.
- (h) A flange height of $1\frac{1}{2}$ inches or more measured from tread to the top of the flange.
- (i) Tires less than $1\frac{1}{2}$ inches thick.
- (j) Rims less than one (1) inch thick on a locomotive in road service or less than $\frac{3}{4}$ inch on a locomotive in yard service.
- (k) A crack or break in the flange, tread, rim, plate, or hub.
- (l) A loose wheel or tire.
- (m) Fusion welding may not be used on tires or steel wheels of locomotives, except for the repair of flat spots and worn flanges on locomotives used exclusively in yard service. A wheel that has been welded is a welded wheel for the life of the wheel.

Guidance

Great care should be exercised when measuring wheels for flat spots and high flanges. The inspector should use appropriate wheel gages and not include a measurement along with a noncomplying condition, unless the wheel defect in question is so severe that an additional monetary penalty can be established, as reflected in the penalty schedule. Additional guidance on how gages are used to measure wheels can be found in the guidance written for § 215.103.

Section (k): A crack in the wheel will require some judgment on the part of the inspectors, especially those who regularly inspect MU locomotive equipment or locomotives used in commuter service. Those cracks that are found in discolored wheels that extend from the tread outward over the edge of the rim or into the flange should be considered as dangerous to the

safety of the wheel and handled for correction with the railroad. If any crack appears to be opened, it should be reported because the wheel has gone into a state of tension, and any further thermal abuse may result in a broken wheel. These cracks are often referred to as thermal cracks, resulting from high speed, short distances, and the heavy braking required in commuter service. The inspector should be aware of such conditions and bring the issue to the specialist's attention for evaluation and monitor the situation as required.

Section (m): At the option of the railroad, welding of the wheels is permitted to make emergency repairs in order to move a road locomotive from an accident site or a location where a defective wheel cannot be replaced. However, any subsequent move can then only be made as required by Section 229.9 (i.e., the locomotive cannot be used in service and can only be moved lite or dead-in-tow). It is also permissible to weld wheels on locomotives used only in yard service. Yard is defined by "yard limits," which are designated by the railroad and are usually found in the current timetable or established by posted signs. Locomotives with welded wheels can only operate on tracks within the designated limits of a yard, and whose movements are governed by Rule 93, of the AAR's Standard Operating Rules. The minimum requirements of Rule 93 are defined in § 218.35.

§ 229.77 Current collectors.

(a) Pantographs shall be so arranged that they can be operated from the engineer's normal position in the cab. Pantographs that automatically rise when released shall have an automatic locking device to secure them in the down position.

(b) Each pantograph operating on an overhead trolley wire shall have a device for locking and grounding it in the lowest position that can be applied and released only from a position where the operator has a clear view of the pantograph and roof without mounting the roof.

Guidance

The pantograph control switches or buttons are usually located on or near the engineer's control panel, and should be operated by railroad personnel only. **Inspectors should be alert when inspecting locomotives and MU locomotives in electrified territory.** They should consider the catenary system and the current-carrying parts of the third-rail system to be energized and dangerous at all times. Inspectors should not get on the roof of any equipment when it is under the catenary system. Extreme care should be exercised with the use and handling of metal gauges and tools around electrical equipment and especially third-rail equipment.

§ 229.79 Third rail shoes.

When locomotives are equipped with both third rail and overhead collectors, third-rail shoes shall be de-energized while in yards and at stations when current collection is exclusively from the overhead conductor.

Guidance

Federal Railroad Administration

Inspectors should be aware that considerable force is exerted on third-rail shoe beams when in operation. Therefore, these beams must be properly secured on brackets, and not split and cracked.

§ 229.85 Doors and cover plates marked “Danger.”

All doors and cover plates guarding high voltage equipment shall be marked “Danger--High Voltage” or with the word “Danger” and the normal voltage carried by the parts so protected.

Guidance

This item should only be reported as a defect if there are no markings to indicate an obvious area of high voltage. If the car body doors into the main generator or alternator generator compartment are marked “Danger-High Voltage” or “Danger,” but the generator itself does not have every cover so marked, especially if the covers are bolted in place, it should not be reported as a defect. Some logic has to be used by the inspector to determine if there is any imminent danger versus a technical defect in the absence of a cover not being marked.

§ 229.89 Jumpers; cable connections.

(a) Jumpers and cable connections between locomotives shall be so located and guarded to provide sufficient vertical clearance. They may not hang with one end free.

(b) Cable and jumper connections between locomotive may not have any of the following conditions:

- (1) Broken or badly chafed insulation.
- (2) Broken plugs, receptacles or terminals.
- (3) Broken or protruding strands of wire.

Guidance

Section (a): Jumper cables with one end hanging loose should not be taken as a violation when the locomotive is found standing unattended and the locomotive is not **in use** or assigned for service. Conversely, if locomotives are observed in use with one end of the jumper cable hanging free, appropriate enforcement action should be taken. This applies to a locomotive standing in a yard or within the confines of a locomotive servicing area.

Inspectors should periodically lift the jumper receptacle lid to ensure that all terminal pins are in suitable condition for service. In addition, the jumper housing should be inspected to ensure that it seals properly and is free of cracks.

§ 229.91 Motors and generators.

A motor or a generator may not have any of the following conditions:

- (a) Be shorted or grounded.
- (b) Throw solder excessively.
- (c) Show evidence of coming apart.
- (d) Have an overheated support bearing.
- (e) Have an excessive accumulation of oil.

Guidance

One of the defects most often reported is accumulation of oil. The key word in the regulation is **excessive**. If the accumulation over the exterior of the motor or generator is not excessive, it should not be reported. Also, if it is an old accumulation as evidenced by debris and dirt, and no fresh oil is found, it should not be reported as a defect.

§ 229.93 Safety cut-off device.

The fuel line shall have a safety cut-off device that –

- (a) Is located adjacent to the fuel supply tank or in another safe location;
- (b) Closes automatically when tripped and can be reset without hazard; and
- (c) Can be hand operated from clearly marked locations, one inside the cab and one on each exterior side of the locomotive.

Guidance

Since the introduction of the EMD GP-30 series locomotives in the 1950's and the GE U-25 series, the fuel safety cut-off devices have been incorporated in the emergency shut down switches. The earlier fuel safety cut-off devices consisted of a mechanical valve manually operated through a cable system from three locations. Resetting this valve is also manual. Safety shut-off devices of this type must be operable from three locations, one in the cab and one on each exterior side of the locomotive. The MP&E inspector is not to operate the safety cut-off device. The inspector should request that the railroad demonstrate the function on random inspections and whenever there is reason to believe the device is inoperable. If the required marking is missing or incomplete, a violation should not be filed, but it should be brought to the attention of the railroad for correction. As a result of an accident involving a runaway UP freight train that derailed at Hayden, California, FRA published a Notice of Safety Bulletin in the Federal Register on January 30, 1997. The notice requires all railroads to inspect locomotives to determine if the emergency MU fuel cut-off switch is located in such a position that it can be

Federal Railroad Administration

inadvertently activated by the engineer. Inadvertent actuation of a switch located at knee level to the engineer is suspected as the cause of the Hayden, California, accident.

During normal inspections, FRA inspectors should carefully examine the locomotive fuel cut-off switch for vulnerability to inadvertent actuation. When a locomotive is found to have such vulnerability, the inspector should work with the railroads to comply with the Notice of Safety Bulletin as quickly as possible. Any disagreements arising over whether a switch is vulnerable, that cannot be resolved at the regional level, should be referred to the MP&E Staff Director. (MP&E 98-60)

§ 229.95 Venting.

§ 229.97 Grounding fuel tanks.

Fuel tanks and related piping shall be electrically grounded.

Guidance

There is no requirement for any type of fuel level gauge at the fuel oil reservoirs. Generally, all locomotives have fuel sight glasses of some type, but they are for the railroad's convenience, as is the automatic fuel shut-off equipment that is used when fueling locomotives.

§ 229.99 Safety hangers.

Drive shafts shall have safety hangers.

Guidance

The drive shaft hangers described in this section deal with a shaft that, if disconnected, could fall to the track structure and cause a derailment. These types of drive shafts are found on locomotives where the motive power uses a mechanical drive system to power the drive axles (e.g. Budd Company RDCs and the French Turbo trains).

§ 229.101 Engines.

- (a) The temperature and pressure alarms, controls and related switches of internal combustion engines shall function properly.
- (b) Whenever an engine has been shut down due to mechanical or other problems, a distinctive warning notice giving reason for the shut-down shall be conspicuously attached near the engine starting control until repairs have been made.
- (c) Wheel slip/slide protection shall be provided on a locomotive with an engine displaying a warning notice whenever required by § 229.115(b).

Guidance

Section (a): The inspector should be alert to safety switches being nullified when inspecting the diesel engine on locomotives. Where actual tampering of the engine protective devices is found, violations should be considered.

§ 229.103 Safe working pressure; factor of safety.

The safe working pressure for each steam generator shall be fixed by the chief mechanical officer of the carrier. The minimum factor of safety shall be four. The fixed safe working pressure shall be indicated on FRA Form F 6180-49A.

§ 229.105 Steam generator number.

An identification number shall be marked on the steam generator's separator and that number entered on FRA Form F 6180-49A.

§ 229.107 Pressure gauge.

(a) Each steam generator shall have an illuminated steam gauge that correctly indicates the pressure. The steam pressure gauge shall be graduated to not less than one and one-half times the allowed working pressure of the steam generator.

(b) Each steam pressure gauge on a steam generator shall have a siphon that prevents steam from entering the gauge. The pipe connection shall directly enter the separator and shall be steam-tight between the separator and the gauge.

§ 229.109 Safety valves.

Every steam generator shall be equipped with at least two safety valves that have a combined capacity to prevent an accumulation of pressure of more than five pounds per square inch above the allowed working pressure. The safety valves shall be independently connected to the separator and located as closely to the separator as possible without discharging inside of the generator compartment. The ends of the safety valve discharge lines shall be located or protected so that discharged steam does not create a hazard.

§ 229.111 Water-flow indicator.

(a) Steam generators shall be equipped with an illuminated visual return water-flow indicator.

(b) Steam generators shall be equipped with an operable test valve or other means of determining whether the steam generator is filled with water. The fill test valve may not discharge steam or hot water into the steam generator compartment.

§ 229.113 Warning notice.

Federal Railroad Administration

Whenever any steam generator has been shut down because of defects, a distinctive warning notice giving reasons for the shut-down shall be conspicuously attached near the steam generator starting controls until the necessary repairs have been made. The locomotive in which the steam generator displaying a warning notice is located may continue in service until the next periodic inspection.

Guidance

The steam generator regulations are not included in their entirety because there are none in service at the present time. The inspector should refer to the current part 229 if a steam generator is found in service in his/her district.

Amtrak and the commuter railroads use electricity to heat the passenger cars, operate air conditioning units, provide train lighting, and for all other ancillary equipment. The power source is usually a generator installed in the diesel-electric locomotive or an inverter in the electric current. Generators could be a stand-alone engine/generator unit located in a car, in an auxiliary car, or in a compartment of the locomotive. This equipment is to be inspected by the FRA inspectors. It is the railroad's responsibility to maintain the equipment in a safe and suitable condition for service and all deficiencies should be reported under § 229.45.

§ 229.115 Slip/slide alarms.

(a) Except for MU locomotives, each locomotive used in road service shall be equipped with a device that provides an audible or visual alarm in the cab of either slipping or sliding wheels on powered axles under power. When two or more locomotives are coupled in multiple or remote control, the wheel slip/slide alarm of each locomotive shall be shown in the cab of the controlling locomotive.

(b) Except as provided in § 229.9, an equipped locomotive may not be dispatched in road service, or continue in road service following a daily inspection, unless the wheel slip/slide protective device of whatever type --

(1) Is functioning for each powered axle under power; and

(2) Would function on each powered axle if it were under power.

(c) Effective January 1, 1981, all new locomotives capable of being used in road service shall be equipped with a device that detects wheel slip/slide for each powered axle when it is under power. The device shall produce an audible or visual alarm in the cab.

Guidance

On most DC-powered traction motors, the slip/slide device is nullified when a traction motor is cut-out. Therefore, movement of a locomotive with a DC traction motor cut-out can only be made under the provisions of § 229.9. GE provided information concerning wheel slip slide and wheel lock protection provided on the GE Dash 8 and Dash 9 locomotive models. These wheel

slip /wheel lock devices function independent of the DC electrical energy provided to power the traction motors. FRA determined that since the wheel slip/slide detection remains fully active, even though one or more of the traction motors are cut-out, it is not a safety related item and is in proper condition and safe to operate without unnecessary peril to life and limb under 49 CFR § 229.7. This condition also meets the requirements for slip/slide alarms under 49 CFR § 229.115. Being consistent with its enforcement guidance and policies relating to wheel slip/slide and wheel lock on alternating current locomotives, FRA takes no exception to the continued use of locomotives with wheel slip/slide alarms described above provided all of the following conditions are met:

1. Locomotives so equipped will not be permitted to operate with defective or cut-out traction motors beyond any periodic inspection required under 49 CFR § 229.23.
2. Any railroad operating such locomotives must clearly identify within the operating cab of the locomotive that the locomotive is using the wheel slip/slide design as described in this letter within the operating cab of the locomotive.

Locomotives operating with AC traction motors have a wheel slip/slide detection system that remains active regardless of whether an inverter and related traction motor is cut-out. With the slip/slide system active, FRA has determined that a cut-out AC traction motor/inverter is not a safety-related item, and does not take exception to the continued use of locomotives with the AC traction motor cut-out, provided the locomotives does not operate with the defective or cut-out traction motor beyond the periodic inspection required under § 229.23. This applies to both GE and EMD locomotives.

Section (a): The wheel slip/slide device must be provided with either an audible or visual alarm in the cab; only one is required. In a multiple-locomotive consist, the wheel slip/slide action that may occur on a trailing locomotive or on a remote-controlled locomotive must activate a device that can be heard or seen in the cab of the controlling locomotive. This also applies to locomotives operating in DPU service.

Section (b): The exclusion to this requirement is included in Section 229.101(b) and (c).

Section (c): Only MU locomotives built prior to January 1, 1981, are excluded from this rule. MU locomotives built after this date must be equipped as required by Section (a). All MU locomotives that have powered wheels equipped with slip/slide protection must maintain and have such equipment in operating condition.

§ 229.117 Speed indicators.

- (a) After December 31, 1980, each locomotive used as a controlling locomotive at speeds in excess of 20 miles per hour shall be equipped with a speed indicator which is --

Federal Railroad Administration

(1) Accurate within ± 3 miles per hour of actual speed at speeds of 10 to 30 miles per hour and accurate within ± 5 miles per hour at speeds above 30 miles per hour; and

(2) Clearly readable from the engineer's normal position under all light conditions.

(b) Each speed indicator required shall be tested as soon as possible after departure by means of speed test sections or equivalent procedures.

Guidance

Section (a): The inspector must recognize that this regulation has several qualifiers: (1) the locomotive must be a controlling locomotive, and (2) it must be on a train that will exceed a speed of 20 mph. These two criteria must be met before enforcement procedures can be instituted. If a locomotive is placed in service in a non-controlling position without a speed indicator or an inoperative speed indicator, the locomotive is in compliance with this section. This section applies to MU locomotives, and when it was promulgated FRA informed the affected commuter lines that they could apply for waivers.

Section (b): If a speed indicator of a controlling locomotive becomes inoperative en route, it may continue in service under the provision of Section 229.9. It does not require the railroad to reduce the train speed to 20 mph or less. If the noncomplying condition can be brought into compliance by shifting the position of the locomotive in the consist, the noncomplying condition should be rectified by doing so at the next forward location. This could be a siding, a wye, or any location where it is physically possible to reposition the locomotive without endangering the safety of employees, locomotives, or trains. **(MP&E 98-50)**

If the inspector can develop a case in which a railroad dispatched a controlling locomotive with a reported defective speed indicator, suitable enforcement action should be taken.

§ 229.119 Cabs, floors, and passageways.

(a) Cab seats shall be securely mounted and braced. Cab doors shall be equipped with a secure and operable latching device.

(b) Cab windows of the lead locomotive shall provide an undistorted view of the right-of-way for the crew from their normal position in the cab. (See also, Safety Glazing Standards, 49 CFR Part 223, 44 FR 77348, Dec. 31, 1979.)

(c) Floors of cabs, passageways, and compartments shall be kept free from oil, water, waste or any obstruction that creates a slipping, tripping or fire hazard. Floors shall be properly treated to provide secure footing.

(d) The cab shall be provided with proper ventilation and with a heating arrangement that maintains a temperature of at least 50 degrees Fahrenheit six (6) inches above the center of each seat in the cab.

(e) Similar locomotives with open end platforms coupled in multiple controls and used in road service shall have a means of safe passage between them; no passageway is required through the nose of car body locomotives. There shall be a continuous barrier across the full width of the end of a locomotive or a continuous barrier between locomotives.

(f) Containers shall be provided for carrying fuses and torpedoes. A single container may be used if it has a partition to separate fuses from torpedoes. Torpedoes shall be kept in a closed metal container.

Guidance

Section (a): Cab seats should be reported as defective only when they are not securely mounted and braced. Wall-mounted seat bracket guideways should have no openings in them that would allow the seat bracket to inadvertently fall out. Hydraulic cab seats should be checked for operation and leaks.

Section (b): Cab window defects can only be reported if they interfere with the crew's undistorted view of the right-of-way from their normal seated position in the cab. This is a performance standard that should be sufficient to require the railroads to properly maintain such things as windshield wipers and defrosters to meet this standard. Defective cab windows for any other reason may either be taken under the glazing regulations found in part 223, or under section 229.45, if broken and sharp edges create a personal injury hazard.

Section (c): Accumulations of oil, water, debris, and other items on passageway, walkways, cab control compartment floors, or engine compartment floors should be of such a nature as to present a **potential hazard and unsafe condition** for any person who **would use them** (e.g., slipping, tripping, or does not provide secure footing). When an inspector discovers these conditions, he/she should also determine the source and take appropriate enforcement action. The regulation does not require that such things as portable ice chests or crew luggage be secured in the cab, but if these items create a personal injury hazard they should be addressed.

Locomotive air compressor compartments are routinely used for the storage of tools and materials for servicing the locomotive and train (e.g., air hoses, jumper cables, wrenches, etc.), thereby requiring train crew members to enter the air compressor compartment to retrieve many of these items. If the floor in the air compressor compartment is cluttered with loose material or is covered with oil, a tripping or slipping hazard exists.

Several railroads are currently installing toolboxes on their locomotives in the doorway leading into the air compressor compartment. The toolbox location is identified and all other doors leading into the air compressor compartment are marked for maintenance personnel only. The railroad believes that by removing the tools from the compartment and denying access to all except maintenance personnel, the slipping hazard has been removed. In addition, maintenance

Federal Railroad Administration

personnel entering the compartment are required to inspect the floor first and then remove any slipping or tripping hazard prior to entry.

In late 1999, an MP&E Technical Resolution Committee (TRC) examined the application of § 229.119(c) relevant to air compressor compartments, in light of the scenario noted above. Based on the discussions and recommendations developed by the TRC, FRA has determined that the presence of oil on the floor of the locomotive air compressor compartment does not constitute a slipping or tripping hazard under § 229.119(c), if **all** of the following conditions are complied with:

1. Train crews are prohibited from entering the air compressor compartment by general order, bulletin order, time table instructions, or other formal instructions.
2. The air compressor compartment doors are stenciled to indicate that train crew members are not to enter the compartments.
3. Tool storage compartments are readily and clearly identified by stencils.
4. Tool storage compartments are self-contained units, arranged and designed so that any tools or materials falling from the storage hooks or racks do not fall onto the floor of air compressor compartment.
5. When a train crew member identifies (without entering the compartment) a slipping hazard in the air compressor compartment, the condition is listed on the inspection report (current or next daily). Identification of such a condition should not be treated as a noncomplying condition under Part 229 if all other conditions contained in this bulletin are otherwise met.
6. When any tools or materials intended for use by the train crew are found on the air compartment floor, the condition is treated as a tripping hazard, a noncomplying condition under § 229.119(c), and corrective action is taken.
7. Railroads should continue to clean the air compressor compartment as necessary in a timely fashion.

FRA inspectors should take appropriate enforcement action, if there is oil on the air compressor compartment floor that creates a slippery condition **and** there is a tool, part, or material inside that may be needed by a train crew member, even though all other conditions noted above have been met (i.e., restricted access, separate tool storage compartment area).

Furthermore, if the locomotive is not properly stenciled, as noted above, or the train crew is unaware of the access restrictions to the air compressor compartment, then any loose material or oil on the air compressor compartment floor that creates a slipping or tripping hazard would constitute noncompliance with § 229.119(c), and appropriate enforcement action should be taken. **(MP&E 00-05)**

Section (e): The regulation does not require that a locomotive connected with another locomotive has to have an open-end platform. It only requires that if the locomotive does not have a continuous barrier, such as a solid handrail, then the passage between the two locomotives must be safe and protected by chains or other devices. Continuous barriers missing should not be reported as a defect if the locomotive is not being **used** and is inspected in a locomotive service facility. Although there are no minimum height restrictions when a chain is used, inspectors should ensure the chain does not present a tripping hazard.

§ 229.121 Locomotive cab noise.

(a) Performance Standards for Locomotives.

(1) When tested for static noise in accordance with paragraph (a)(3) of this section, all locomotives of each design or model that are manufactured after October 29, 2007, shall average less than or equal to 85 dB(A), with an upper 99% confidence limit of 87 dB(A). The railroad may rely on certification from the equipment manufacturer for a production run that this standard is met. The manufacturer may determine the average by testing a representative sample of locomotives or an initial series of locomotives, provided that there are suitable manufacturing quality controls and verification procedures in place to ensure product consistency.

(2) In the maintenance of locomotives that are manufactured in accordance with paragraph (a)(1) of this section, a railroad shall not make any alterations that cause the average sound level for that locomotive design or model to exceed:

(i) 82 dB(A) if the average sound level for a locomotive design or model is less than 82 dB(A); or

(ii) 85 dB(A) if the average sound level for a locomotive design or model is 82 dB(A) to 85 dB(A), inclusive,

(3) The railroad or manufacturer shall follow the static test protocols set forth in appendix H of this part to determine compliance with paragraph (a)(1) of this section; and, to the extent reasonably necessary to evaluate the effect of alterations during maintenance, to determine compliance with paragraph (a)(2) of this section.

(b) Maintenance of Locomotives.

(1) If a railroad receives an excessive noise report, and if the condition giving rise to the noise is not required to be immediately corrected under part 229, the railroad shall maintain a record of the report, and repair or replace the item identified as substantially contributing to the noise:

(i) on or before the next periodic inspection required by § 229.23; or

Federal Railroad Administration

(ii) if the railroad determines that the repair or replacement of the item requires significant shop or material resources that are not readily available, at the time of the next major equipment repair commonly used for the particular type of maintenance needed.

(2) Conditions that may lead a locomotive cab occupant to file an excessive noise report include, but are not limited to: defective cab window seals; defective cab door seals; broken or inoperative windows; deteriorated insulation or insulation that has been removed for other reasons; broken or inoperative doors; and air brakes that vent inside of the cab.

(3) A railroad has an obligation to respond to an excessive noise report that a locomotive cab occupant files. The railroad meets its obligation to respond to an excessive noise report, as set forth in paragraph (b)(1) of this section, if the railroad makes a good faith effort to identify the cause of the reported noise, and where the railroad is successful in determining the cause, if the railroad repairs or replaces the items cause the noise.

(4) Recordkeeping.

(i) A railroad shall maintain a written or electronic record of any excessive noise report, inspection, test, maintenance, replacement, or repair completed pursuant to § 229.121(b) and the date on which that inspection, test, maintenance, replacement, or repair occurred. If a railroad elects to maintain an electronic record, the railroad must satisfy the conditions listed in § 227.121(a)(2)(i) through (v).

(ii) The railroad shall retain these records for 92 days if they are made pursuant to § 229.21, or for one year if they are made pursuant to § 229.23.

(iii) The railroad shall establish an internal, auditable, monitorable system that contains these records.

Guidance

(TBD)

§ 229.123 Pilots, snowplows, end plates.

After January 1, 1981, each lead locomotive shall be equipped with an end plate that extends across both rails, a pilot, or a snowplow. The minimum clearance above the rail of the pilot, snowplow or end plate shall be 3 inches, and the maximum clearance six (6) inches.

Guidance

This section also applies to MU locomotives. Keep in mind, several railroads have been granted conditional waivers that allow the maximum height to be greater than 6 inches for locomotives used in hump yard service. For a locomotive consist, this requirement only applies to the lead locomotive. The measurement should be taken on relatively level track. The inspector should not defect a locomotive for a minimal deviation of the height requirement. The railroad should be told to adjust the end arrangement so that it is in compliance.

§ 229.125 Headlights and auxiliary lights.

(a) Each lead locomotive used in road service shall have a headlight that produces a peak intensity of at least 200,000 candela. If a locomotive or locomotive consist in road service is regularly required to run backward for any portion of its trip other than to pick up a detached portion of its train or to make terminal movements, it shall also have on its rear a headlight that produces at least 200,000 candela. Each headlight shall be arranged to illuminate a person at least 800 feet ahead and in front of the headlight. For purposes of this section, a headlight shall be comprised of either one or two lamps.

(1) If a locomotive is equipped with a single lamp headlight, the single lamp shall produce a peak intensity of at least 200,000 candela. The following meet the standard set forth in this paragraph (a)(1): a single PAR-56, 200 watt, 30-volt lamp; or a lamp of equivalent design and intensity.

(2) If a locomotive is equipped with a dual-lamp headlight, a peak intensity of 200,000 candela shall be produced by the headlight based either on a single lamp capable of individually producing the required peak intensity or on the candela produced by the headlight with both lamps illuminated. If both lamps are needed to produce the required peak intensity, then both lamps in the headlight shall be operational. The following meet the standard set forth in this paragraph (a)(2): a single PAR-56, 200-watt, 30-volt lamp; two operative PAR-56, 350-watt, 75-volt lamps; or a lamp(s) of equivalent design and intensity.

(b) Each locomotive or locomotive consist used in yard service shall have two headlights, one located on the front of the locomotive or locomotive consist and one on its rear. Each headlight shall produce at least 60,000 candela and shall be arranged to illuminate a person at least 300 feet ahead and in front of the headlight.

(c) Headlights shall be provided with a device to dim the light.

(d) Effective December 31, 1997, each lead locomotive operated at a speed greater than 20 miles per hour over one or more public highway-rail crossings shall be equipped with operative auxiliary lights, in addition to the headlight required by paragraph (a) or (b) of this section. A locomotive equipped on March 6, 1996 with auxiliary lights in conformance with § 229.133 shall be deemed to conform to this section until March 6, 2000. All locomotives in compliance with § 229.133(c) shall be deemed to conform to this section. Auxiliary lights shall be composed as follows:

Federal Railroad Administration

(1) Two (2) white auxiliary lights shall be placed at the front of the locomotive to form a triangle with the headlight.

(i) The auxiliary lights shall be at least 36 inches above the top of the rail, except on MU locomotives and control cab locomotives where such placement would compromise the integrity of the car body or be otherwise impractical. Auxiliary lights on such MU locomotives and control cab locomotives shall be at least 24 inches above the top of the rail.

(ii) The auxiliary lights shall be spaced at least 36 inches apart if the vertical distance from the headlight to the horizontal axis of the auxiliary lights is 60 inches or more.

(iii) The auxiliary lights shall be spaced at least 60 inches apart if the vertical distance from the headlight to the horizontal axis of the auxiliary lights is less than 60 inches.

(2) Each auxiliary light shall produce a peak intensity of at least 200,000 candela or shall produce at least 3,000 candela at an angle of 7.5 degrees and 400 candela at an angle of 20 degrees from the centerline of the locomotive when the light is aimed parallel to the tracks. Any of the following meet the standard set forth in this paragraph (d)(2): a PAR-56, 200-watt, 30-volt lamp; a PAR-56, 350-watt, 75-volt lamp; or a lamp of equivalent design and intensity.

(3) The auxiliary lights shall be focused horizontally within 15 degrees of the longitudinal centerline of the locomotive.

(e) Auxiliary lights required by paragraph (d) of this section may be arranged

(1) to burn steadily or

(2) flash on approach to a crossing. If the auxiliary lights are arranged to flash;

(i) they shall flash alternately at a rate of at least 40 flashes per minute and at most 180 flashes per minute,

(ii) the railroad's operating rules shall set a standard procedure for use of flashing lights at public highway-rail grade crossings, and

(iii) the flashing feature may be activated automatically, but shall be capable of manual activation and deactivation by the locomotive engineer.

(f) Auxiliary lights required by paragraph (d) of this section shall be continuously illuminated immediately prior to and during movement of the locomotive, except as provided by railroad operating rules, timetable or special instructions, unless such exception is disapproved by FRA. A railroad may except use of auxiliary lights at a

specific public highway-rail grade crossing by designating that exception in the railroad's operating rules, timetable, or a special order. Any exception from use of auxiliary lights at a specific public grade crossing can be disapproved for a stated cause by FRA's Associate Administrator for Safety or any one of FRA's Regional Administrators, after investigation by FRA and opportunity for response from the railroad.

(g) Movement of locomotives with defective auxiliary lights.

(1) A lead locomotive with only one failed auxiliary light must be repaired or switched to a trailing position before departure from the place where an initial terminal inspection is required for that train.

(2) A locomotive with only one auxiliary light that has failed after departure from an initial terminal, must be repaired not later than the next calendar inspection required by § 229.21.

(3) A lead locomotive with two failed auxiliary lights may only proceed to the next place where repairs can be made. This movement must be consistent with § 229.9.

(h) Any locomotive subject to part 229, that was built before December 31, 1948, and that is not used regularly in commuter or intercity passenger service, shall be considered historic equipment and excepted from the requirements of paragraphs (d) through (h) of this section.

Guidance

The candela rating established in this section corresponds to the intensity level implicitly required under the prior rules in part 230. That rule was more a detailed performance standard that required not only that it illuminate a person 800 feet ahead and in front of the headlight, but that the engineer in the operating compartment possess the visual capacity to see in a clear atmosphere a dark object as large as a man of average size standing erect at least 800 feet ahead and in front of the headlight.

The inspector should also be aware that the qualifier in this section is that only the **lead locomotive** must be equipped with the prescribed headlight. Intermediate locomotives in a consist with inoperative headlights are not to be considered as noncomplying. Also, the requirement for rear headlights on road locomotives has certain conditions. The inspector should take appropriate enforcement action when a headlight is found defective. However, if the locomotive has a light arrangement using two sealed beam headlights, the inspector must ascertain whether they are the 200-watt, 30-volt lamps or if they are the 350-watt, 75-volt lamps. The reason for this is because if the dual light system is using the 200-watt, 30-volt lamps, both lamps would have to be defective before enforcement action can be taken. However, the inspector should take appropriate enforcement action if one of the bulbs is defective on dual-light systems using the 350-watt, 75-volt lamps.

Federal Railroad Administration

There have been instances where some locomotives have had the auxiliary lights (ditch lights) installed in a manner that covers a portion of the uncoupling levers, which serve as the end handhold on a locomotive. If this condition exists, it should be handled for correction.

The following questions and answers are from a previously issued Technical Bulletin that addressed the many inquiries concerning the application, operation, and inspection requirements of auxiliary lights:

1. When does a locomotive have to be equipped with auxiliary lights?

- A. Each lead locomotive that operates over one or more public grade crossings at a speed greater than 20 mph shall be equipped with operative auxiliary lights on the forward end of the locomotive as it approaches a public highway-rail grade crossing.

2. What is a public highway-rail grade crossing as it applies to auxiliary lights?

- A. It is the location where railroad tracks intersect a roadway that is part of the general system of public streets and highways, and is under the jurisdiction of and maintained by a public authority and open to the general traveling public.

3. What are auxiliary lights?

- A. Auxiliary lights are two white lights producing at least 200,000 candela that are located on the front of the locomotive to form a triangle with the locomotive headlight. They must be mounted at least 36 inches above the top of the rail, except on MU locomotives and control cab locomotives where such placement would be impractical. On such MU locomotives and cab control locomotives, the lights shall be mounted at least 24 inches above the top of the rail. Other mounting and focusing requirements are listed in § 229.125(d). There are other arrangements that are “grandfathered” to satisfy auxiliary light requirements.

4. What are the grandfathered arrangements?

- A.
- 1) Oscillating lights may fulfill the requirements of section 229.125(d) for auxiliary lights, provided they meet the “grandfathering” requirement of section 229.133(c)(1), i.e. the oscillating light meets the requirements of section 229.133(b)(4)(A) or (B), and was “ordered for installation on that locomotive prior to January 1, 1996.
 - 2) Note that Part 229.133(b)(4)(A) refers to a traditional mechanically oscillating light (Marrs or Gyra style lights), whereas section 229.133(b)(4)(B) refers to electrically oscillating (alternately flashing) lights “at one location on the front of the locomotive” (not separated as regular auxiliary lights would be) aimed within 5 degrees of the centerline

of the locomotive. If it was installed after January 1, 1996, it does not qualify.

3) Strobe lights that were applied to the locomotive prior to March 6, 1996, will satisfy the auxiliary light requirements until the locomotive is either retired or rebuilt (whichever comes first), but the speed of the locomotive is restricted to 40 mph when used as a lead locomotive.

4) Two white auxiliary lights spaced at least 44 inches apart on at least one axis, and that were installed on the locomotive prior to May 30, 1994, satisfies the auxiliary light requirements until the locomotive is either rebuilt or retired, whichever comes first. *This is the headlight arrangement commonly used in commuter service.*

5. Do auxiliary lights have to work when a calendar-day inspection is performed?

A. Auxiliary lights are treated the same as headlights when calendar-day inspections are performed.

6. When do the auxiliary lights have to be illuminated?

A. Auxiliary lights must remain continuously illuminated immediately prior to and during the movement of the locomotive, except as provided by railroad operating rules, timetables, or special instructions. This not only increases conspicuity at public highway-rail grade crossings, but also addresses private crossings, pedestrians, and roadway workers.

7. Do the lights have to flash on approaching a crossing?

A. The lights may burn steadily or flash (pulse) on approach and while passing over a public highway-rail grade crossing.

8. Are there circumstances where the lights can be legally extinguished?

A. Yes. The regulations permit railroads to designate specific locations where auxiliary lights can be extinguished, as long as these designated locations are identified in either the railroad's operating rules, timetable, or special written instructions. This would typically be at locations where existing operating rules require the headlight to be dimmed, such as: at stations; when passing another train; in yards where switching is performed; or at locations where train operations parallel a public highway and the night vision of motorists would be impaired by the use of auxiliary lights. Any exceptions from the use of auxiliary lights at specific locations are subject to disapproval by FRA's Associate Administrator for Railroad Safety/Chief Safety Officer, or one of FRA's Regional Administrators, after the investigation, and an opportunity for response by the railroad, for a stated good cause.

9. Can a train be dispatched from the initial terminal without auxiliary lights on the lead locomotive?

A. If the lead locomotive is not equipped with auxiliary lights, the train can be dispatched out of an initial terminal, with the understanding that the locomotive cannot operate over any public highway-rail grade crossing at a speed greater than 20 mph. Otherwise, if the lead locomotive is equipped with auxiliary lights, all must be functioning on the end of the locomotive in the forward direction of the train movement.

10. Can the train leave the initial terminal with one light defective on the lead locomotive?

A. No, all auxiliary lights must be working on the lead locomotive in the forward direction of the train movement.

11. What about en route failures?

A. If one light becomes defective en route, the locomotive can continue to operate in the lead at track speed, but the defective light must be repaired no later than the next calendar day. This locomotive could not be used in the lead position out of an initial terminal unless repairs were made. If two lights become defective en route, the locomotive (train) may only proceed to the next location where repairs can be made, and the locomotive is restricted to 20 mph or less over all public highway-rail grade crossings until the lights are functioning.

12. If the mechanism that causes the oscillating light to oscillate is defective, how should this condition be treated?

A. This would be treated as a complete failure of the auxiliary light. It could not be dispatched from an initial terminal as a lead unit, and if the failure occurred en route, it would have to be repaired at the next point where repairs could be made with the locomotive restricted to 20 miles per hour over all public highway-rail grade crossings.

13. Are locomotives that operate in both directions (dual-control) required to be equipped with auxiliary lights on each end of the locomotive?

A. These types of locomotives should be equipped on each end, since they frequently operate as a lead in both directions. However, if a locomotive is equipped with auxiliary lights on only one end, then it could only be dispatched out of an initial terminal as the lead unit, if the equipped end is placed in the forward direction of the train movement. If during the trip this same locomotive made a reverse move as a lead unit, it would be restricted to 20 miles per hour over all public highway-rail grade crossings.

14. When a speed restriction at a public highway-rail grade crossing is required, does this mean the whole train is restricted to 20 miles per hour over the crossing?

A No, just the lead locomotive is restricted to 20 miles per hour over the crossing.

15. Are steam locomotives required to be equipped with auxiliary lights?

A. No. Also, any locomotive built before December 31, 1948, which is not used in commuter or inter-city passenger service, is excepted from auxiliary light requirements. (MP&E 98-3)

§ 229.127 Cab lights.

(a) Each locomotive shall have cab lights which will provide sufficient illumination for the control instruments, meters, and gauges to enable the engine crew to make accurate readings from their normal positions in the cab. These lights shall be located, constructed, and maintained so that light shines only on those parts requiring illumination and does not interfere with the crew's vision of the track and signals. Each controlling locomotive shall also have a conveniently located light that can be readily turned on and off by the persons operating the locomotive and that provides sufficient illumination for them to read train orders and timetables.

(b) Cab passageways and compartments shall have adequate illumination.

Guidance

Section (b): The preamble to this rule states that it was intended to be similar to the former rule, 230.233(b), which includes the qualifier that when employees are required to pass from one cab to another, the platform and passageway between shall be illuminated. There are no passageways on the road-switcher type of locomotives; these are found on the car body type locomotives where people walk inside and illumination is important. Lights that are inside the car body of a road-switcher type locomotive are not to be considered as compartment lights and shall not be taken as a noncomplying condition. Where the criteria for a passageway exist, illumination must be provided and the lights maintained. The same is true for the walkway platforms between locomotives found on road-switchers. A flashlight or other hand-held light does not satisfy the requirements of this rule.

§ 229.129 Locomotive horn.

(a) Each lead locomotive shall be equipped with a locomotive horn that produces a minimum sound level of 96 dB(A) and a maximum sound level of 110 dB(A) at 100 feet forward of the locomotive in its direction of travel. The locomotive horn shall be arranged so that it can be conveniently operated from the engineer's usual position during operation of the locomotive.

(b)

(1) Each locomotive built on or after September 18, 2006 shall be tested in accordance with this section to ensure that the horn installed on such locomotive is in compliance with paragraph (a) of this section. Locomotives built on or after September 18, 2006 may, however, be tested in accordance with an acceptance sampling scheme such that there is a probability of .05 or less of rejecting a lot with a proportion of defectives equal to an AQL of 1% or less, as set forth in 7 CFR part 43.

(2) Each locomotive built before September 18, 2006 shall be tested in accordance with this section before June 24, 2010 to ensure that the horn installed on such locomotive is in compliance with paragraph (a) of this section.

(3) Each remanufactured locomotive, as determined pursuant to § 229.5 of this part, shall be tested in accordance with this section to ensure that the horn installed on such locomotive is in compliance with paragraph (a).

(4)

(i) Except as provided in paragraph (b)(4)(ii) of this section, each locomotive equipped with a replacement locomotive horn shall be tested, in accordance with paragraph (c) of this section, before the next two annual tests required by § 229.27 of this part are completed.

(ii) Locomotives that have already been tested individually or through acceptance sampling, in accordance with paragraphs (b)(1), (b)(2), or (b)(3) of this section, shall not be required to undergo sound level testing when equipped with a replacement locomotive horn, provided the replacement locomotive horn is of the same model as the locomotive horn that was replaced and the mounting location and type of mounting are the same.

(c) Testing of the locomotive horn sound level shall be in accordance with the following requirements:

(1) A properly calibrated sound level meter shall be used that, at a minimum, complies with the requirements of International Electrotechnical Commission (IEC) Standard 61672-1 (2002-05) for a Class 2 instrument.

(2) An acoustic calibrator shall be used that, at a minimum, complies with the requirements of IEC standard 60942 (1997-11) for a Class 2 instrument.

(3) The manufacturer's instructions pertaining to mounting and orienting the microphone; positioning of the observer; and periodic factory recalibration shall be followed.

(4) A microphone windscreen shall be used and tripods or similar microphone mountings shall be used that minimize interference with the sound being measured.

(5) The test site shall be free of large reflective structures, such as barriers, hills, billboards, tractor trailers or other large vehicles, locomotives or rail cars on adjacent tracks, bridges or buildings, within 200 feet to the front and sides of the locomotive. The locomotive shall be positioned on straight, level track.

(6) Measurements shall be taken only when ambient air temperature is between 32 degrees and 104 degrees Fahrenheit inclusively; relative humidity is between 20 percent and 95 percent inclusively; wind velocity is not more than 12 miles per hour and there is no precipitation.

(7) With the exception of cab-mounted or low-mounted horns, the microphone shall be located 100 feet forward of the front knuckle of the locomotive, 15 feet above the top of the rail, at an angle no greater than 20 degrees from the center line of the track, and oriented with respect to the sound source according to the manufacturer's recommendations. For cab-mounted and low-mounted horns, the microphone shall be located 100 feet forward of the front knuckle of the locomotive, four feet above the top of the rail, at an angle no greater than 20 degrees from the center line of the track, and oriented with respect to the sound source according to the manufacturer's recommendations. The observer shall not stand between the microphone and the horn.

(8) Background noise shall be minimal: the sound level at the test site immediately before and after each horn sounding event shall be at least 10 dB(A) below the level measured during the horn sounding.

(9) Measurement procedures. The sound level meter shall be set for A-weighting with slow exponential response and shall be calibrated with the acoustic calibrator immediately before and after compliance tests. Any change in the before and after calibration levels shall be less than 0.5 dB. After the output from the locomotive horn system has reached a stable level, the A-weighted equivalent sound level (slow response) for a 10-second duration (LAeq, 10s) shall be obtained either directly using an integrating-averaging sound level meter, or recorded once per second and calculated indirectly. The arithmetic-average of a series of at least six such 10-second duration readings shall be used to determine compliance. The standard deviation of the readings shall be less than 1.5 dB.

(10) Written reports of locomotive horn testing required by this part shall be made and shall reflect horn type; the date, place, and manner of testing; and sound level measurements. These reports, which shall be signed by the person who performs the test, shall be retained by the railroad, at a location of its choice, until a subsequent locomotive horn test is completed and shall be made available, upon request, to FRA as provided by 49 U.S.C. 20107.

(d) This section does not apply to locomotives of rapid transit operations which are otherwise subject to this part.

Guidance

(TBD)

§ 229.131 Sanders.

Except for MU locomotives, each locomotive shall be equipped with operable sanders that deposit sand on each rail in front of the first power operated wheel set in the direction of movement.

Guidance

The section has two qualifiers, in that **MU locomotives are exempt** and that **each locomotive** in a consist shall have operable sanders that deposit sand **in front of the first power-operated wheel set in the direction of movement**. At a servicing facility where the direction of a locomotive or locomotive consist is unknown, the inspector should require the railroad to have all out-board sanders operational prior to departure. However, if a locomotive is inspected at the head end of the train, only the sanders in the direction of the train movement must be operational. Locomotives used in yard switching service, which normally move in both directions, should have the outboard sanders operational. A hole in the sand delivery pipe is not an inoperative sander. The mere presence of a hole in the sander hose or pipe is not sufficient to establish a violation under section 229.131, without detailed discussion of the hole's impact on the sander's ability to operate. FRA is required to establish that the sander is not depositing sand in front of the wheel. **However, if sand is being discharged at eye level and constitutes a personal injury hazard, it should be reported under section 229.45.**

§ 229.133 Interim locomotive conspicuity measures -- auxiliary external lights.

Guidance

Guidance for this section can be found under **§ 229.125, Headlights and auxiliary lights.**

§ 229.135 Event recorders.

(a) *Duty to equip and record.* Except as provided in paragraphs (c) and (d) of this section, a train operated faster than 30 miles per hour shall have an in-service event recorder, of the type described in paragraph (b) of this section, in the lead locomotive. The presence of the event recorder shall be noted on Form FRA F6180-49A (by writing the make and model of event recorder with which the locomotive is equipped) under the REMARKS section, except that an event recorder designed to allow the locomotive to

assume the lead position only if the recorder is properly functioning is not required to have its presence noted on Form FRA F6180-49A. For the purpose of this section, “train” includes a locomotive or group of locomotives with or without cars. The duty to equip the lead locomotive may be met with an event recorder located elsewhere than the lead locomotive provided that such event recorder monitors and records the required data as though it were located in the lead locomotive. The event recorder shall record the most recent 48 hours of operation of the electrical system of the locomotive on which it is installed.

(b) *Equipment requirements.* Event recorders shall monitor and record data elements required by this paragraph with at least the accuracy required of the indicators displaying any of the required elements to the engineer.

(1) A lead locomotive originally ordered before October 1, 2006, and placed in service before October 1, 2009, including a controlling remote distributed power locomotive, a lead manned helper locomotive, a DMU locomotive, and an MU locomotive, except as provided in paragraphs (c) and (d) of this section, shall have an in-service event recorder that records the following data elements:

- (i) Train speed;
- (ii) Selected direction of motion;
- (iii) Time;
- (iv) Distance;
- (v) Throttle position;
- (vi) Applications and operations of the train automatic air brake;
- (vii) Applications and operations of the independent brake;
- (viii) Applications and operations of the dynamic brake, if so equipped;
and
- (ix) Cab signal aspect(s), if so equipped and in use.

(2) A locomotive originally manufactured before October 1, 2006, and equipped with an event recorder that uses magnetic tape as its recording medium shall have the recorder removed from service on or before October 1, 2009 and replaced with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this Part and that records at least the same number of data elements as the recorder it replaces.

(3) A lead locomotive, a lead manned helper locomotive, and a controlling remotely distributed power locomotive, other than a DMU or MU locomotive, originally ordered on or after October 1, 2006 or placed in service on or after October 1, 2009, shall be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this part. The certified event recorder memory module shall be mounted for its maximum protection. (Although other mounting standards may meet this standard, an event recorder memory module mounted behind and below the top of the collision posts and above the platform level is deemed to be mounted “for its maximum protection.”) The event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the following data elements:

- (i) Train speed;
- (ii) Selected direction of motion;
- (iii) Time;
- (iv) Distance;
- (v) Throttle position;
- (vi) Applications and operations of the train automatic air brake, including emergency applications. The system shall record, or provide a means of determining, that a brake application or release resulted from manipulation of brake controls at the position normally occupied by the locomotive engineer. In the case of a brake application or release that is responsive to a command originating from or executed by an on-board computer (e.g., electronic braking system controller, locomotive electronic control system, or train control computer), the system shall record, or provide a means of determining, the involvement of any such computer;
- (vii) Applications and operations of the independent brake;
- (viii) Applications and operations of the dynamic brake, if so equipped;
- (ix) Cab signal aspect(s), if so equipped and in use;
- (x) End-of-train (EOT) device loss of communication front to rear and rear to front;
- (xi) Electronic controlled pneumatic braking (ECP) message (and loss of such message), if so equipped;

Motive Power and Equipment Compliance Manual

- (xii) EOT armed, emergency brake command, emergency brake application;
- (xiii) Indication of EOT valve failure;
- (xiv) EOT brake pipe pressure (EOT and ECP devices);
- (xv) EOT marker light on/off;
- (xvi) EOT “low battery” status;
- (xvii) Position of on/off switch for headlights on lead locomotive;
- (xviii) Position of on/off switch for auxiliary lights on lead locomotive;
- (xix) Horn control handle activation;
- (xx) Locomotive number;
- (xxi) Locomotive automatic brake valve cut in;
- (xxii) Locomotive position in consist (lead or trail);
- (xxiii) Tractive effort;
- (xxiv) Cruise control on/off, if so equipped and in use; and
- (xxv) Safety-critical train control data routed to the locomotive engineer’s display with which the engineer is required to comply, specifically including text messages conveying mandatory directives, and maximum authorized speed. The format, content, and proposed duration for retention of such data shall be specified in the product safety plan submitted for the train control system under subpart H of part 236 of this chapter, subject to FRA approval under this paragraph. If it can be calibrated against other data required by this part, such train control data may, at the election of the railroad, be retained in a separate certified crashworthy memory module.

(4) A DMU locomotive and an MU locomotive originally ordered on or after October 1, 2006 or placed in service on or after October 1, 2009, shall be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this Part. The certified event recorder memory module shall be mounted for its maximum protection. (Although other mounting standards may meet this standard, an event recorder memory module mounted behind the collision posts and above the

Federal Railroad Administration

platform level is deemed to be mounted “for its maximum protection.”) The event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the following data elements:

- (i) Train speed;
- (ii) Selected direction of motion;
- (iii) Time;
- (iv) Distance;
- (v) Throttle position;
- (vi) Applications and operations of the train automatic air brake, including emergency applications. The system shall record, or provide a means of determining, that a brake application or release resulted from manipulation of brake controls at the position normally occupied by the locomotive engineer. In the case of a brake application or release that is responsive to a command originating from or executed by an on-board computer (e.g., electronic braking system controller, locomotive electronic control system, or train control computer), the system shall record, or provide a means of determining, the involvement of any such computer;
- (vii) Applications and operations of the independent brake, if so equipped;
- (viii) Applications and operations of the dynamic brake, if so equipped;
- (ix) Cab signal aspect(s), if so equipped and in use;
- (x) Emergency brake application(s);
- (xi) Wheel slip/slide alarm activation (with a property-specific minimum duration);
- (xii) Lead locomotive headlight activation switch on/off;
- (xiii) Lead locomotive auxiliary lights activation switch on/off;
- (xiv) Horn control handle activation;
- (xv) Locomotive number;
- (xvi) Locomotive position in consist (lead or trail);

- (xviii) Tractive effort;
- (xix) Brakes apply summary train line;
- (xx) Brakes released summary train line;
- (xxi) Cruise control on/off, if so equipped and used; and
- (xxii) Safety-critical train control data routed to the locomotive engineer's display with which the engineer is required to comply, specifically including text messages conveying mandatory directives, and maximum authorized speed. The format, content, and proposed duration for retention of such data shall be specified in the product safety plan submitted for the train control system under subpart H of part 236 of this chapter, subject to FRA approval under this paragraph. If it can be calibrated against other data required by this part, such train control data may, at the election of the railroad, be retained in a separate certified crashworthy memory module.

(5) A locomotive equipped with an event recorder that is remanufactured, as defined in this part, on or after October 1, 2007, shall be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D to this Part and is capable of recording, at a minimum, the same data as the recorder that was on the locomotive before it was remanufactured.

(6) An event recorder originally manufactured after January 1, 2010, that is installed on any locomotive identified in paragraph (b)(1) of this section shall be an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D to this Part and that is capable of recording, at a minimum, the same data as the event recorder that was previously on the locomotive.

(c) Removal from service. Notwithstanding the duty established in paragraph (a) of this section to equip certain locomotives with an in-service event recorder, a railroad may remove an event recorder from service and, if a railroad knows that an event recorder is not monitoring or recording required data, shall remove the event recorder from service. When a railroad removes an event recorder from service, a qualified person shall record the date that the device was removed from service on Form FRA F6180-49A, under the REMARKS section, unless the event recorder is designed to allow the locomotive to assume the lead position only if the recorder is properly functioning.

(d) Response to defective equipment. Notwithstanding the duty established in paragraph (a) of this section to equip certain locomotives with an in-service event recorder, a locomotive on which the event recorder has been taken out of service as provided in paragraph (c) of this section may remain as the lead locomotive only until the next

Federal Railroad Administration

calendar-day inspection. A locomotive with an inoperative event recorder is not deemed to be in improper condition, unsafe to operate, or a non-complying locomotive under §§ 229.7 and 229.9, and, other than the requirements of Appendix D of this part, the inspection, maintenance, and testing of event recorders are limited to the requirements set forth in §§ 229.25(e) and 229.27(d).

(e) Preserving accident data. If any locomotive equipped with an event recorder, or any other locomotive-mounted recording device or devices designed to record information concerning the functioning of a locomotive or train, is involved in an accident/incident that is required to be reported to FRA under part 225 of this chapter, the railroad that was using the locomotive at the time of the accident shall, to the extent possible, and to the extent consistent with the safety of life and property, preserve the data recorded by each such device for analysis by FRA. This preservation requirement permits the railroad to extract and analyze such data, *provided* the original downloaded data file, or an unanalyzed exact copy of it, shall be retained in secure custody and shall not be utilized for analysis or any other purpose except by direction of FRA or the National Transportation Safety Board. This preservation requirement shall expire one (1) year after the date of the accident unless FRA or the Board notifies the railroad in writing that the data are desired for analysis.

(f) Relationship to other laws. Nothing in this section is intended to alter the legal authority of law enforcement officials investigating potential violation(s) of State criminal law(s), and nothing in this chapter is intended to alter in any way the priority of National Transportation Safety Board investigations under 49 U.S.C. 1131 and 1134, nor the authority of the Secretary of Transportation to investigate railroad accidents under 49 U.S.C. 5121, 5122, 20107, 20111, 20112, 20505, 20702, 20703, and 20902.

(g) Disabling event recorders. Except as provided in paragraph (c) of this section, any individual who willfully disables an event recorder is subject to civil penalty and to disqualification from performing safety-sensitive functions on a railroad as provided in § 218.55 of this chapter, and any individual who tampers with or alters the data recorded by such a device is subject to a civil penalty as provided in appendix B of part 218 of this chapter and to disqualification from performing safety-sensitive functions on a railroad if found unfit for such duties under the procedures in part 209 of this chapter.

Guidance

1. Requires replacement, by October 1, 2009, of each event recorder using magnetic tape as a storage medium with a certified crashworthy ERMM capable of recording at least the same data elements as the recorder it replaces. Any magnetic tape recorder replaced after October 1, 2005, must be replaced with a certified crashworthy event recorder memory module.
2. Requires all new lead locomotives, lead manned helper locomotives, and controlling distributive power locomotives (ordered after October 1, 2006, or placed in service after October 1, 2009) to be equipped with a certified crashworthy ERMM capable of

recording up to 25 data elements for traditional locomotives and 22 data elements for MU and DMU locomotives.

3. Requires all remanufactured locomotives after October 1, 2007, to be equipped with a certified crashworthy ERMM capable of recording at least the same data elements as the event recorder on that locomotive prior to remanufacture.
4. Requires event recorders originally manufactured after January 1, 2010, and installed on a covered locomotive, to be equipped with a certified crashworthy ERMM.
5. Contains specific performance criteria for determining the crashworthiness of an ERMM. These include criteria for fire, impact shock, static crush, fluid immersion, and hydrostatic pressure and contains testing sequence requirements. The criteria are based on existing crashworthiness standards of the IEEE, modified for the locomotive environment.
6. Requires preservation of event recorder data for a period of 1 year for any locomotive involved in an accident or incident required to be reported to FRA under part 225.
7. Provides relief from the periodic inspection requirements for microprocessor-based event recorders with self-monitoring features. Requires inspection of these types of event recorders annually.

§ 229.137 Sanitation, general requirements.

(a) *Sanitation compartment.* Except as provided in paragraph (b) of this section, all lead locomotives in use shall be equipped with a sanitation compartment. Each sanitation compartment shall be:

- (1) Adequately ventilated;
- (2) Equipped with a door that:
 - (i) Closes, and
 - (ii) Possesses a modesty lock by October 4, 2003;
- (3) Equipped with a toilet facility, as defined in this part;
- (4) Equipped with a washing system, as defined in this part, unless the railroad otherwise provides the washing system to employees upon reporting for duty or occupying the cab for duty, or where the locomotive is equipped with a stationary sink that is located outside of the sanitation compartment;
- (5) Equipped with toilet paper in sufficient quantity to meet employee needs, unless the railroad otherwise provides toilet paper to employees upon reporting

Federal Railroad Administration

for duty or occupying the cab for duty; and

(6) Equipped with a trash receptacle, unless the railroad otherwise provides portable trash receptacles to employees upon reporting for duty or occupying the cab for duty.

(b) *Exceptions.* (1) Paragraph (a) of this section shall not apply to:

(i) Locomotives engaged in commuter service or other short-haul passenger service and commuter work trains on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive or elsewhere on the train, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift;

(ii) Locomotives engaged in switching service on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift;

(iii) Locomotives engaged in transfer service on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift;

(iv) Locomotives of Class III railroads engaged in operations other than switching service or transfer service, which are not equipped with a sanitation compartment as of June 3, 2002. Where an unequipped locomotive of a Class III railroad is engaged in operations other than switching or transfer service, employees shall have ready access to railroad-provided sanitation facilities outside of the locomotive that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift, or the railroad shall arrange for en route access to such facilities;

(v) Locomotives of tourist, scenic, historic, or excursion railroad operations, which are otherwise covered by this part because they are not propelled by steam power and operate on the general railroad system of transportation, but on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift; and

(vi) Except as provided in § 229.14 of this part, control cab locomotives designed for passenger occupancy and used in intercity push-pull service that are not equipped with sanitation facilities, where employees have

ready access to railroad-provided sanitation in other passenger cars on the train at frequent intervals during the course of their work shift.

(2) Paragraph (a)(3) of this section shall not apply to:

(i) Locomotives of a Class I railroad which, prior to June 3, 2002, were equipped with a toilet facility in which human waste falls via gravity to a holding tank where it is stored and periodically emptied, which does not conform to the definition of toilet facility set forth in this section. For these locomotives, the requirements of this section pertaining to the type of toilet facilities required shall be effective as these toilets become defective or are replaced with conforming units, whichever occurs first. All other requirements set forth in this section shall apply to these locomotives as of June 3, 2002; and

(ii) With respect to the locomotives of a Class I railroad which, prior to June 3, 2002, were equipped with a sanitation system other than the units addressed by paragraph (b)(2)(i) of this section, that contains and removes human waste by a method that does not conform with the definition of toilet facility as set forth in this section, the requirements of this section pertaining to the type of toilet facilities shall apply on locomotives in use on July 1, 2003. However, the Class I railroad subject to this exception shall not deliver locomotives with such sanitation systems to other railroads for use, in the lead position, during the time between June 3, 2002, and July 1, 2003. All other requirements set forth in this section shall apply to the locomotives of this Class I railroad as of June 3, 2002.

(c) *Defective, unsanitary toilet facility; prohibition in lead position.* Except as provided in paragraphs (c)(1) through (5) of this section, if the railroad determines during the daily inspection required by § 229.21 that a locomotive toilet facility is defective or is unsanitary, or both, the railroad shall not use the locomotive in the lead position. The railroad may continue to use a lead locomotive with a toilet facility that is defective or unsanitary as of the daily inspection only where all of the following conditions are met:

(1) The unsanitary or defective condition is discovered at a location where there are no other suitable locomotives available for use, i.e., where it is not possible to switch another locomotive into the lead position, or the location is not equipped to clean the sanitation compartment if unsanitary or repair the toilet facility if defective;

(2) The locomotive, while non-compliant, did not pass through a location where it could have been cleaned if unsanitary, repaired if defective, or switched with another compliant locomotive, since its last daily inspection required by this part;

(3) Upon reasonable request of a locomotive crewmember operating a locomotive with a defective or unsanitary toilet facility, the railroad arranges for access to a

Federal Railroad Administration

toilet facility outside the locomotive that meets otherwise applicable sanitation standards;

(4) If the sanitation compartment is unsanitary, the sanitation compartment door shall be closed and adequate ventilation shall be provided in the cab so that it is habitable; and

(5) The locomotive shall not continue in service in the lead position beyond a location where the defective or unsanitary condition can be corrected or replaced with another compliant locomotive, or the next daily inspection required by this part, whichever occurs first.

(d) *Defective, unsanitary toilet facility; use in trailing position.* If the railroad determines during the daily inspection required by § 229.21 that a locomotive toilet facility is defective or is unsanitary, or both, the railroad may use the locomotive in trailing position. If the railroad places the locomotive in trailing position, they shall not haul employees in the unit unless the sanitation compartment is made sanitary prior to occupancy. If the toilet facility is defective and the unit becomes occupied, the railroad shall clearly mark the defective toilet facility as unavailable for use.

(e) *Defective, sanitary toilet facility; use in switching, transfer service.* If the railroad determines during the daily inspection required by § 229.21 that a locomotive toilet facility is defective, but sanitary, the railroad may use the locomotive in switching service, as set forth in paragraph (b)(1)(ii) of this section, or in transfer service, as set forth in paragraph (b)(1)(iii) of this section for a period not to exceed 10 days. In this instance, the railroad shall clearly mark the defective toilet facility as unavailable for use. After expiration of the 10-day period, the locomotive shall be repaired or used in the trailing position.

(f) *Lack of toilet paper, washing system, trash receptacle.* If the railroad determines during the daily inspection required by § 229.21 that the lead locomotive is not equipped with toilet paper in sufficient quantity to meet employee needs, or a washing system as required by paragraph (a)(4) of this section, or a trash receptacle as required by paragraph (a)(6) of this section, the locomotive shall be equipped with these items prior to departure.

(g) *Inadequate ventilation.* If the railroad determines during the daily inspection required by § 229.21 that the sanitation compartment of the lead locomotive in use is not adequately ventilated as required by paragraph (a)(1) of this section, the railroad shall repair the ventilation prior to departure, or place the locomotive in trailing position, in switching service as set forth in paragraph (b)(1)(ii) of this section, or in transfer service as set forth in paragraph (b)(1)(iii) of this section.

(h) *Door closure and modesty lock.* If the railroad determines during the daily inspection required by § 229.21 that the sanitation compartment on the lead locomotive is not equipped with a door that closes, as required by paragraph (a)(2)(i) of this section, the

railroad shall repair the door prior to departure, or place the locomotive in trailing position, in switching service as set forth in paragraph (b)(1)(ii) of this section, or in transfer service as set forth in paragraph (b)(1)(iii) of this section. If the railroad determines during the daily inspection required by § 229.21 that the modesty lock required by paragraph (a)(2)(ii) of this section is defective, the modesty lock shall be repaired pursuant to the requirements of § 229.139(e).

(i) *Equipped units; retention and maintenance.* Except where a railroad downgrades a locomotive to service in which it will never be occupied, where a locomotive is equipped with a toilet facility as of [the effective date of the final rule], the railroad shall retain and maintain the toilet facility in the locomotive consistent with the requirements of this part, including locomotives used in switching service pursuant to paragraph (b)(1)(ii) of this section, and in transfer service pursuant to paragraph (b)(1)(iii) of this section.

(j) *Newly manufactured units; in-cab facilities.* All locomotives manufactured after June 3, 2002, except switching units built exclusively for switching service and locomotives built exclusively for commuter service, shall be equipped with a sanitation compartment accessible to cab employees without exiting to the out-of-doors for use. No railroad may use a locomotive built after June 3, 2002, that does not comply with this subsection.

(k) *Potable water.* The railroad shall utilize potable water where the washing system includes the use of water.

§ 229.139 Sanitation, servicing requirements.

(a) The sanitation compartment of each lead locomotive in use shall be sanitary.

(b) All components required by § 229.137(a) for the lead locomotive in use shall be present consistent with the requirements of this part, and shall operate as intended such that:

(1) All mechanical systems shall function;

(2) Water shall be present in sufficient quantity to permit flushing;

(3) For those systems that utilize chemicals for treatment, the chemical (chlorine or other comparable oxidizing agent) used to treat waste must be present; and

(4) No blockage is present that prevents waste from evacuating the bowl.

(c) The sanitation compartment of each occupied locomotive used in switching service pursuant to § 229.137(b)(1)(ii), in transfer service pursuant to § 229.137(b)(1)(iii), or in a trailing position when the locomotive is occupied, shall be sanitary.

(d) Where the railroad uses a locomotive pursuant to § 229.137(e) in switching or transfer service with a defective toilet facility, such use shall not exceed 10 calendar days from the date

Federal Railroad Administration

on which the defective toilet facility became defective. The date on which the toilet facility becomes defective shall be entered on the daily inspection report.

(e) Where it is determined that the modesty lock required by § 229.137(a)(2) is defective, the railroad shall repair the modesty lock on or before the next 92-day inspection required by this part.

Guidance

There are several types of locomotive cab toilet facilities in use today. Micophor, Envirovac Vacuum Systems (EVAC), and Motive Equipment, Inc. (MEI) are a few of the most common types.

The Norfolk Southern Railway and Amtrak primarily use the EVAC systems.

Micophor uses a two-tank system, the only one of its kind. Human waste is deposited in the tank directly below; when flushed, it is passed by way of piping into a chemical (chlorine) holding tank for biological break-down, and then passed out to a drip pipe to atmosphere (right-of-way).

Other manufacturer's toilets use only one tank. The same tank that waste is passed into is used as a holding tank. The flush simply opens a flapper and forces clean water to wash or rinse the bowl and then allows the waste to pass into the tank below where it is biologically (chemically) broken down. If the proper amount of chlorine is used, and the tank is not overfilled to capacity, it is retained until it is sucked out by the railroad maintenance person when it is time for service.

The most common causes for locomotive toilet systems failing, regardless of the manufacturer, is the lack of maintenance by the railroads, vandalism, and paper towels and/or various other types of foreign matter being introduced into the toilet system. Toilet systems are only designed to break down human waste and common toilet paper.

Surveys indicate that any kind of paper towel will clog and foul these toilet systems. By being too thick to be broken down by the chlorine, it clogs the system and makes the filtering system ineffective.

The quality and/or lack of maintenance by the railroads greatly contribute to noncompliance problems. Individual railroads are responsible for maintenance schedules. The frequency of maintenance and servicing really depends on the use of the facility, the number of crewmembers, crew changes, and use by outside parties. Often, servicing personnel are guilty of using the wrong or improper chemicals to break down the bacteria in the toilet systems. Also, if an improper cleaning agent is used to clean the toilet, it can contaminate and render the toilet's chemicals ineffective.

The most common complaints are:

1. Toilet compartment stinks/dirty

2. System toilet tank plugged
3. Toilet does not flush
4. Lack of or no water in holding tank
5. Waste system pipe leaks
6. Water tank leaks
7. Strong chlorine odor in toilet compartment
8. Low voltage ground from tank heating system
9. Full or overflowing tanks (models with holding tanks)
10. Insufficient chlorine in chlorinator
11. Strong chlorine odor in cab (poor or no ventilation)
12. Vent pipe or vent hole plugged
13. Waste holding tank or fresh water holding tank frozen
14. Broken or damaged chlorinator caps and seals
15. Loose chlorine slugs on floor in toilet compartment
16. Toilet does not flush
17. Tampons and/or feminine napkins found in toilet bowls and cannot be broken down in chlorine. This is becoming more of a common problem since the rise of female employees throughout the railroad system.

Section 229.137(c) prohibits a railroad from placing a locomotive with an unsanitary or defective toilet in the lead position. The railroad makes this determination *at the time of the daily inspection* required by § 229.21. In order for FRA to take a violation of § 229.137(c), among other things, FRA must show that the railroad determined at the time of the daily inspection that the locomotive toilet facility was defective and/or unsanitary. Without that showing, FRA will not be able to sustain a violation.

This also applies if FRA wants to take violations under § 229.137(d)–(h). For each of those sections, FRA must show that the railroad made the determination (e.g., lack of toilet paper, inadequate ventilation, or lack of a modesty lock, etc.) at the time of the daily inspection.

As noted in the preamble to the Final Rule, en route failures that occur after the daily inspection impose no burden on the railroad until the next daily inspection is due. According to working group members involved in drafting the rule, the current railroad practice concerning en route toilet failures is to move defective toilets into the trailing position, where it is possible to do so. Please note, however, that the final rule does *not* require such a movement.

Proper Ventilation

Ventilation is a serious problem. Some of the problems found during a field survey are that the vent caps have been pulled off or removed and the vent pipe has been plugged with paper towels.

Federal Railroad Administration

With the toilet in use and no ventilation, the odor will soon migrate into the cab and crew area of the locomotive.

Some railroads simply cut a hole in the nose of the cab and place a vent over it, to avoid outside debris from entering the toilet compartment. This is the basic system using ambient air to circulate. It works best when the toilet compartment door is closed and the locomotive is in motion. However, some railroads have installed a positive pressure ventilation system. This is done by a pipe that runs from the toilet compartment through the cab wall and into the engine room exhaust fan compartment. This system vents even if the locomotive is standing still and the toilet compartment door open. **Note:** This system still works best with the toilet compartment door closed. Some locomotives will not vent while standing still. They only vent with the locomotive in motion, and when the toilet compartment door is kept closed. This is commonly known as negative air flow. However, this is not an exception nor a violation, if the door is open and the locomotive is standing still. If the toilet is operating properly and the door is closed with the locomotive standing still, the cab odor should be minimal and diminish when the locomotive is in motion. There are no specifications as to how a locomotive toilet facility can be or has to be vented. The important thing is that it works. All toilet compartments, regardless of type of locomotive or venting system, work best with the toilet compartment door closed.

Toilet compartment door gaskets (seals) make a difference in ventilation and should be replaced when needed. Although the regulation does not specifically address the door seals or gasket, inspectors should note a defective door seal or gasket and inform the railroad supervisor in charge of locomotive repairs and/or service that the defective condition could lead to an odor problem, which could become a compliance issue.

Toilet Facility Lighting

The sanitation regulations do not specifically address lighting for the toilet compartment. However, because the toilet facility is considered a compartment of the locomotive, the provisions of § 229.127(b) would apply. Therefore, if the lighting is inadequate, missing, or inoperative, then it should be considered as a defect. Surveys have indicated that lighting problems are attributed to either the use of light bulbs with improper wattage or burned out light bulbs. This can also be considered a tripping hazard if the compartment is dark enough or even near black (zero visibility). In the case of many older locomotives, appurtenances have been installed or retrofitted in the nose of the locomotive in such a manner as to impose an obstruction in the way of the toilet, and in some cases can cause accident or injury to the person using the facility.

Modesty Locks

Modesty lock means a latch that can be operated in the normal manner only from within the sanitary compartment that is designed to prevent entry of another person when the sanitary compartment is in use. A modesty lock may be designed to allow deliberate forced entry in the event of an emergency.

Important Note: The modesty lock does not have to be able to be opened from the outside in an emergency. Most modesty locks currently in use consist of a secondary latch, and are generally made of plastic and can easily be broken with moderate force. If the secondary latch is being used as a modesty lock and is broken, then this should be considered a defective modesty lock and handled in accordance with § 229.139 (e).

Acceptable Forms of Sanitation (Personal Hygiene)

There should also be a sufficient quantity of fresh water, either for drinking or for washing or rinsing hands after using the toilet facility.

There are many types of acceptable forms of cleaning and washing solutions for crew members to use for personal hygiene. The most common is crew packs. This package contains waterless hand cleaner, paper towels, a small quantity of toilet paper and a trash bag. These are usually available either when the crew reports for duty or placed in the cab by railroad service employees. Some locomotives may also be equipped with sinks for washing hands. If this is the case, then an ample amount of water must be available for washing and rinsing hands. However, sinks are not mandatory, and even if a sink is in place, it may not be used if crew packs are available.

Subpart D – Design Requirements

§ 229.141 Body structure, MU locomotives.

Guidance

Although this Subpart is not expected to be used by the field inspectors during routine inspection activity, it must be considered when conducting accident investigations, especially when there has been a head-on or rear end collision. Also, event recorder preservation requirements must be observed.

Chapter 9

Steam Locomotive Inspection and Maintenance Standards, Part 230

Introduction

The first Federal statute addressing steam locomotives was the Ash Pan Act passed by Congress on May 30, 1908. The act described how the ash pans were to be attached to the steam boiler, that they were to be maintained in a safe suitable condition for service, and that all operating mechanisms of the ash pans shall be arranged so that they may be safely operated. Prior to the Act, a person had to empty the ash pan by crawling under the locomotive, and if the locomotive moved he was either killed or injured. The Ash Pan Act was repealed by Congress as part of the, “Federal Railroad Safety Authorization Act of 1982” but ash pans are still under Federal regulations and referenced in 49 CFR § 230.69, *Ash Pans*, of the Steam Locomotive Inspection and Maintenance Standards.

On February 17, 1911, Congress passed the Locomotive Inspection Act, bringing all locomotive steam boilers under Federal auspices and laying out the structure of the Bureau of Locomotive Inspection with its attendant administrative and field force personnel of 50 locomotive inspectors and their specific duties. The Bureau was made a part of the Interstate Commerce Commission. The Act held the district inspector responsible for the locomotives housed in his district. On March 4, 1915, the Act was amended to include not only the steam boiler but the entire locomotive and its appurtenances. The steam locomotive regulations are codified under 49 CFR Part 230 Sections 1–199.

The regulations pertaining to steam locomotives were last published in November 1999, under 49 CFR Part 230, when FRA issued a Final Rule on Steam Locomotive Inspection and Maintenance Standards. The rule went into effect on January 18, 2000, however, implementation of the new rule was designed to allow the steam owner/operators to phase in the new requirements over a period of time. The new rule was revised to consider the operating realities of today’s steam locomotive operations which consist primarily of tourist and excursion service. A new inspection scheme was developed subjecting steam locomotives to periodic inspections and tests based on “service days” rather than “calendar days.” The new regulation required all owner/operators of steam locomotives to conduct an engineering survey of the boiler, which must reflect the current condition of the boiler at the time the survey is made. Results of the survey are reported on boiler specification card, FRA Form 4.

A steam locomotive boiler is an external combustion engine in which burning fuel converts water into steam in a horizontal boiler. The steam is directed into that portion of the locomotive called a steam engine where the expansion properties of the steam are allowed to act on both sides of a driver piston to rotate the driving wheels. Most of the steam locomotives in service today have two steam engines, but several railroads have locomotives which have four steam engines. The piston is connected to the drive wheels through a cross head arrangement, main rods and side rods. Control of the speed of the locomotive is accomplished through the throttle mechanism as manipulated by the engineer in the cab. When steam locomotives were the predominant form of tractive power, there were approximately 75,000 in service. The steam

Federal Railroad Administration

locomotive was a labor intensive piece of machinery requiring constant attention and hard work to maintain them in a safe and suitable condition for service.

The most critical area of the steam locomotive is the boiler. Keep in mind that 1 cubic inch of water is converted to 1,600 cubic inches of steam (at atmospheric pressure); and at a pressure of 150 psi, the temperature of saturated steam is 366 degrees. This pressure is attempting to rupture the boiler; and it is the design, maintenance and inspection required by FRA regulations, and good maintenance practices by the owners/operators of steam locomotives, which prevents this from occurring. When steam boilers do rupture, it is of a cataclysmic nature which can move the mass of the boiler off the rail, and in many cases kills the engineer and fireman. These facts are presented so that you are aware that the steam boiler is a pressure vessel which can be extremely dangerous if not properly inspected and maintained.

There are over 100 active steam locomotives operating in the United States under FRA's jurisdiction. The monitoring of the steam locomotives is the responsibility of the FRA inspector that has attended Safety Improvement and Development Division (SIDDD) training addressing Part 230. The FRA inspector should endeavor to inspect each steam locomotive under his/her jurisdiction no less than twice each year, once under hydrostatic pressure, and once when under working steam pressure. Excluding steam locomotives that do not permit access, FRA policy requires inspectors to perform an interior inspection of the boiler proper (steam space), firebox, and smokebox once each year, when possible, and at every 1,472 service day inspection. The FRA inspector is also responsible for maintaining all records and associated reports for each steam locomotive under his/her charge. Each railroad and owner of a steam locomotive, which falls under these Federal regulations, should forward all required reports to the Regional office in which the steam locomotive is housed. The Washington office will not be responsible for maintaining regional steam locomotive files.

FRA no longer considers requests to the Regional Administrators for flue removal extensions. Locomotives are now required to receive a 1,472 service day inspection (49 CFR § 230.17), which includes the boiler survey and new specification card. Any waiver from these requirements would be processed under Part 211 and the FRA Railroad Safety Board.

All waivers under the Locomotive Boiler Inspection Act, previously issued, shall lapse on the date the locomotive comes under new requirements, unless a copy of the grant of waiver is filed for reassessment with FRA's Office of Railroad Safety in Washington, DC, prior to that date. FRA will review the waiver and notify the applicant whether the waiver has been continued.

In regards to the actual boiler inspection, asbestos may be observed at certain points of a steam locomotive used as insulation to prevent thermal loss. As long as the asbestos is not friable (i.e., loose and flaking with fibers floating in the air, which could be inhaled into the lungs, and/or is completely shielded to prevent contact), it is not considered to be hazardous. If the asbestos is friable, the inspector need not expose himself/herself to any danger, but shall inform the railroad or owner of the locomotive that the asbestos must be properly removed or completely sealed and isolated from contact before the requested inspection can be performed. Asbestos fibers are known to be carcinogenic and if carried into the lungs can cause cancer or asbestoses.

Guidance

FRA's SIDD developed and provided training to FRA MP&E inspectors on design and inspection of steam locomotives and the requirements of the Steam Locomotive Inspection and Maintenance Standards. Those inspectors who successfully completed the SIDD training are deemed qualified to inspect steam locomotives for compliance with these regulations.

This correspondence is directly related to those MP&E Inspectors who have successfully completed the Steam Locomotive OJT Standards without formally attending classroom training. It has been determined that holding their qualification in order to inspect steam locomotive rolling equipment for compliance under 49 CFR Part 230 – Steam Locomotive Inspection and Maintenance Standards before formally attending classroom training is not in the best interest of safety.

Effective immediately, MP&E Inspectors who have successfully completed Steam Locomotive OJT may conduct independent inspections for compliance with Part 230. Be aware that the Office of Safety continues to encourage using two qualified Steam Locomotive inspectors when feasible, especially when conducting interior inspections.

Further guidance dictates that any inspector having questions related to steam locomotive inspections covered under 49 CFR Part 230 should immediately contact their specialist or headquarters specialist for guidance.

The National Boiler Inspection Code (NBIC) (Supplement 1, Parts 2 and 3) contains specific rules and special requirements for inspection, repairs, alterations, and storage of steam locomotive boilers. This is a National Standard that railroads, owners, and operators may use during inspection and repair. Inspectors should have a copy of the NBIC with them when conducting steam locomotive inspections, and be familiar with its requirements. Note: The "historical boiler" sections of the NBIC do not apply to steam locomotive boilers under the jurisdiction of the FRA.

Regulation 49 CFR Part 230

Subpart A – General

§ 230.1 Purpose and scope.

§ 230.2 Applicability.

§ 230.3 Implementation.

Guidance

Section (b) Interim flue removal extensions.

Federal Railroad Administration

FRA no longer considers requests for flue removal extensions under the provisions of § 230.10 of the regulations in effect prior to January 18, 2000.

Section (c) Petition for special consideration. Locomotives that have either fully or partially satisfied the requirements of 49 CFR § 230.17 after September 25, 1995, and before January 18, 2000, could request special consideration to be grandfathered under the new requirements, provided the locomotive is in full compliance with 49 CFR § 230.17 by the time the petition is actually filed. The time period to file these petitions expired January 18, 2001, but FRA has considered and the Safety Board has granted waivers to extend the filing date; however, the request must be accompanied by all relevant documentation to be considered (including an FRA Form No. 4, and all records that demonstrate the number of days the locomotive has been in service).

§ 230.4 Penalties.

§ 230.5 Preemptive effect.

§ 230.6 Waivers

Guidance

A person, or operator, may petition for a waiver of any Part 230 requirement. Each petition for waiver must be filed according to Part 211 of this chapter. All steam locomotive waivers, granted prior to January 18, 2000, lapsed on that date; which is the effective date of the current rule. A common practice under the previous Part 230, referred to as a “Flue Removal Extension,” is no longer available. Any request for variance of the regulation must be processed as stated above.

§ 230.7 Responsibility for compliance.

Guidance

This section states that the locomotive owner and/or operator is directly responsible for ensuring that all requirements of the Steam Locomotive Inspection and Maintenance Standards are satisfied and that a locomotive is safe and suitable for service. This part does not relieve the railroad, over which the steam locomotive is operating, from its responsibility that the steam locomotive or tender are in proper condition and safe to operate.

§ 230.8 Definitions.

Guidance

Alteration. Any change to the boiler which affects its pressure retention capability. Rating changes are considered alterations. An alteration could lower or raise the pressure vessels’ ability to retain pressure.

Renewal. Replacement in kind with a newly manufactured or remanufactured (restored to original tolerances) component. Materials shall be suitable for the service intended. A replacement in kind would be considered a repair.

§ 230.12 Movement of non-complying steam locomotives.

Guidance

This section dealing with movement of a noncomplying steam locomotive is similar to the requirements for movement of a defective locomotive found in 49 CFR § 229.9.

Section (a): When a noncomplying condition under Part 230 is found by either the railroad's inspector or an MP&E Inspector, except as provided in paragraphs (b), the railroad may only move the steam locomotive as a lite locomotive or dead locomotive under whatever conditions that the qualified person and the railroad deem suitable for a safe move (except as provided in paragraphs (b)). The steam locomotive may be moved to any location the railroad designates to have it brought into compliance. If the FRA Inspector believes that the movement of the locomotive by the railroad under this section constitutes an immediately unsafe situation, such as a possible derailment, a Special Notice For Repairs (FRA Form F6180.8) may be issued to effectively remove the locomotive from service. In addition to describing the immediate unsafe condition, the inspector must also note that the movement restrictions or lack of (i.e., speed, distance, etc.), as proposed by the railroad, would create an additional unsafe problem. The inspector should never dictate to a railroad the conditions for the movement of any noncomplying locomotive, unless the condition is so deplorable that movement at any speed would create an unsafe condition. In either case, the inspector should consult with regional management prior to making any decision. Any restrictions are the railroad's responsibility.

Section (b) requires that a qualified person determine (i) that it is safe to move the locomotive, and (ii) the maximum speed and other restrictions necessary for safely conducting the movement. Difficulty in the interpretation and enforcement of § 230.12 arises as this section does not provide guidance with respect to the criteria used to "qualify" a person to make the determination required above. Decisions to continue the use of a noncomplying locomotive, in some cases, are being made by persons not qualified to make these decisions. A person qualified to perform a daily inspection may not necessarily possess the qualifications to make the determination that it is safe to move a defective locomotive.

The qualified person must have demonstrated to the owner/operator at a minimum, the knowledge and ability to inspect steam locomotives and provide recommendations regarding the criteria listed in Section (b). This does not imply that the qualified person must possess intimate knowledge of and experience with all of the components and functions of a steam locomotive.

When investigating an issue involving enforcement of 49 CFR § 230.12, inspectors must carefully examine the qualifications of the individual who made the safety recommendations to determine if the owner/operator acted in compliance with the regulations.

Federal Railroad Administration

Section (d) allows for the continued use of a steam locomotive that develops an en route noncomplying condition until the earlier of: (1) the next calendar day inspection, or (2) the nearest forward point where the repairs necessary to bring it into compliance can be made. Use of a locomotive under this provision is permitted only if the requirements of 49 CFR § 230.12(a) are fully met, which means a “noncomplying tag” that is properly filled out must be in the cab of the noncomplying steam locomotive.

Where an MP&E Inspector has knowledge that a railroad permits steam locomotives, which develop en route noncomplying conditions, to continue **in service** past mechanical facilities where repairs can be made, the inspector should investigate to determine that the requirements of Section (a) are being complied with. If the inspector is made aware that a noncomplying locomotive was moved beyond a forward repair location that has previously demonstrated the ability to effect repairs of the noncomplying condition, the inspector must ensure that the subject locomotive would no longer be used as a propelling or lead locomotive.

Section 230.12 allows a railroad to move a noncomplying steam locomotive as a lite or dead locomotive to a more distant repair point of its choice, provided it meets all other requirements of 49 CFR § 230.12, and such action does not endanger the safety of employees, locomotives, or train.

Section 230.12 only permits the movement of a noncomplying locomotive with a Part 230 defect. Nothing in 49 CFR § 230.12 authorizes the movement of a steam locomotive with power brake or safety appliance defects. Such locomotives can only be moved under provisions of 49 U.S.C. § 20303 of the Act and/or the Power Brake Regulations. **(MP&E 98-50)** It is the responsibility of the railroad to ensure that any locomotive moved with a noncomplying defect is in accordance with the applicable law. If there is any doubt, the railroad should contact the FRA. The move may require the railroad to submit for one-time movement authority. (See Chapter 2).

§ 230.13 Daily inspection.

Guidance

Section 230.13(a) is similar to the requirements found in the Locomotive Safety Standards § 229.21, Daily inspection, for each day that the steam locomotive is in service. The purpose of the daily inspection is to ascertain that the locomotive is safe to operate in the service for which it is used, and is in total compliance with Part 230 prior to being placed in service. It is a visual walk-around inspection of the locomotive that provides an opportunity, every day the locomotive is used, to find and correct incipient problems before they lead to an accident or safety incident. An effective locomotive calendar day inspection requires that the individual performing the inspection be alert for telltale signs of any condition or defect that is a potential hazard.

Reference to Appendices A (Inspection Requirements) and B (Diagrams and Drawings) reference items and should not be considered all encompassing. They are only provided as an example and do not relieve the owner/operator from performing a proper inspection.

Motive Power and Equipment Compliance Manual

After a daily inspection is performed, the steam locomotive should be free of any noncomplying conditions before it is offered for service. The locomotive cannot legally be used until all Federal defects are corrected.

If the inspector continues to find recurrent defects or a pattern of noncomplying conditions at a particular location, the inspector should monitor the performance and the results of the daily inspections, as well as question the individuals performing the inspections, to ascertain if the individuals have the knowledge and ability to perform such inspections.

If daily inspection reports reflect noncomplying conditions on a steam locomotive and the inspector finds the conditions were not corrected by the railroad and that the locomotive continues to be used, violations should be submitted. Such violations should be accompanied by all the documentation available, with a complete explanation regarding the railroad operation at the location.

Failure to complete or produce a record or report (in and of itself) is not sufficient evidence to establish that a railroad failed to perform an inspection. It is a “records” violation, unless other evidence (i.e., witness statement, interviews, event recorder downloads, visual observation, etc.) is obtained to establish the failure to conduct the inspection. If the only evidence available merely establishes a failure of a railroad to produce a required inspection report, then the appropriate section to cite for civil penalty is § 230.13(c), for a report not properly executed or retained. Use the “lack of a record and/or report” to **support** the other evidence obtained to establish a “failure to perform an inspection” violation.

Section (a): A daily inspection is required by this section for each day a locomotive is in use. A written report and record are required when the inspection is performed, and documented on FRA Form No. 2. The inspection can be conducted at any time during the calendar day. It can be done just before midnight or just after midnight.

Section (b): Pre-departure inspection requires at the beginning of each day the steam locomotive is used, that an individual competent to do so shall inspect the steam locomotive and its tender and appurtenances to ensure that they are safe and suitable for service, paying special attention to the following items: (1) water glasses and gauge cocks; (2) boiler feedwater delivery systems, such as injectors and feedwater pumps; and (3) air compressors and governors, and the air brake system. While the daily inspection can be performed at the operator’s discretion, the items listed in section (b) must be inspected at the beginning of each day.

§ 230.14 Thirty-one (31) service day inspection.

Guidance

Section (a) The 31 service day inspection must be performed no less than each time the steam locomotive accrues 31 service days. The reference to Appendix A to 49 CFR Part 230, Inspection Requirements, is a tool and should not be considered all encompassing. The lists are only provided as an example and do not relieve the owner/operator from performing a proper inspection.

Federal Railroad Administration

Operators are required to maintain a list of all service days accrued by a locomotive. These lists must be provided to FRA upon request so that service days may be verified. A service day is accrued each day the locomotive boiler has steam pressure above atmospheric pressure, with fire in the firebox; in the case of a fireless steam locomotive, any calendar day that the boiler has steam pressure above atmospheric pressure.

Section (b) allows FRA to request to be present during the 31 service day inspection. Once an agreeable date is reached, the railroad should plan to perform the required tests, and may do so even if FRA is unable to be there. If FRA feels that a particular operator is not performing all required tests or inspections, this is a way to verify.

Section (c) requires that the operator, within 10 days of the 31 day inspection, file a copy of FRA Form No. 1, and provide a copy to FRA's regional office where the locomotive is normally maintained. A sample of FRA Form No. 1 is provided in Appendix C to 49 CFR Part 230.

§ 230.15 Ninety-two (92) service day inspection.

Guidance

The 92 service day inspection is performed at the third 31-service day inspection with additional requirements. The record retention and forwarding requirements remain the same as the 31 service day inspection requirements.

§ 230.16 Annual inspection.

Guidance

(a) General. Annual inspection requirements are calendar driven not service day, even if a steam locomotive has only had 1 service day over the previous 368 service days. It would still require an annual inspection. The annual inspection includes all requirements of the daily inspection, and the 31 and 92 service day inspections found in Appendix A of the rule. At each fifth annual inspection, a flexible staybolt and cap inspection is required in accordance with 49 CFR § 230.41.

(b) FRA notification. The FRA Regional Administrators shall be provided written notice at least 1 month prior to an annual inspection and shall be afforded an opportunity to be present. If the Regional Administrator, or their representative, is unable to make the agreed upon date and a new date cannot be agreed to, the inspection may be performed on the previously scheduled date.

(c) Filing inspection reports. Section (c) requires that the operator, within 10 days of the annual day inspection, file a copy of FRA Form No. 3, and provide a copy to FRA's regional office where the locomotive is normally maintained. A sample of FRA Form No. 3 is provided in Appendix C of the rule.

§ 230.17 One thousand four hundred seventy-two (1,472) service day inspection.

Guidance

(a) General. The 1,472 service day inspection includes all inspection requirements found in Appendix A of the rule for daily, 31 service day, 92 service day, annual, 5th annual, and 1,472 service day inspections. The 1,472 service day or 15-year timeframe begins when the locomotive is placed in service or 1 year from the day the first tube is reinstalled in the boiler, whichever occurs first.

The 1,472 service day inspection requires that all tubes be removed from the locomotive so that the interior of the boiler can be thoroughly cleaned and inspected. Section 230.31(b) allows not removing the superheater flues if they don't interfere with the interior inspection and if NDE testing of the flues shows that they are safe and suitable. The boiler thickness is verified and FRA Form No. 4 is recalculated.

Section (b) requires that the operator, within 30 days of completing the 1,472 service day inspection, file a copy of FRA Form No. 4, and provide a copy to FRA's regional office where the locomotive is normally maintained. A sample of FRA Form No. 4 is provided in Appendix C of the rule. There is no requirement for the owner/operator to provide supporting documentation of boiler survey and measurements used to fill out FRA Form No. 4 and develop the calculations. FRA inspectors, if available, should request the supporting documentation and provide the information to the MP&E Division at Headquarters, along with the form for review.

Recordkeeping Requirements

§ 230.18 Service days.

Guidance

(a) Service day record. The steam locomotive owner and/or operator shall maintain and make available to FRA, upon request, a current copy of the service day record that contains the number of service days the steam locomotive has accrued since the last 31, 92, annual, and 1,472 service day inspections. A service day is accrued each day the locomotive boiler has steam pressure above atmospheric pressure, with fire in the firebox; in the case of a fireless steam locomotive, any calendar day that the boiler has steam pressure above atmospheric pressure.

(b) Service day report. A service day report, FRA Form No. 5, must be submitted January 31 with the Regional Administrator accounting for the days the steam locomotive was in service from January 1 through December 31st of the preceding year, even if the locomotive had no service days.

(c) Retirement where no service day reports filed. If no report is filed, the steam locomotive may be considered retired by FRA, and the locomotive owner/operator may have to complete all 1,472 service day inspection items to return the steam locomotive to service.

§ 230.19 Posting of FRA Form No. 1 and FRA Form No. 3.

Federal Railroad Administration

Guidance

FRA Form Nos. 1 and 3 must be posted under a transparent cover in the cab of an in-service steam locomotive. FRA Form No. 1 will not be required for the first 31 service days following an annual inspection and the posting of an FRA Form No. 3. (See Appendix C of this rule.)

§ 230.20 Alteration and repair report for steam locomotive boilers.

Guidance

(a) Alteration or Repair reports (FRA Form No. 19), detailing the changes to the locomotive, must be filed with the FRA Regional Administrator within 30 days from the date the work was completed, and attached to and maintained with FRA Form No. 4 until such time as a new FRA Form No. 4 (reflecting the alteration) is submitted to the Regional Administrator. Alteration reports shall be filed and maintained for the life of the boiler. (See Appendix C of this rule.) FRA inspectors should be familiar with the boilers in their territory and monitor repairs to ensure that Alteration and Repair reports are submitted when work of this type is performed. Alterations and repairs are frequently performed during off-season nonoperating periods, and inspectors should make an effort to perform occasional spot checks on locomotives in their territory during those periods.

§ 230.21 Steam locomotive number change.

Subpart B-Boilers and Appurtenances

§ 230.23 Responsibility for general construction and safe working pressure.

Guidance

The steam locomotive owner and operator are responsible for the general design and construction of the steam locomotive boilers under their control.

Allowable Stress

§ 230.24 Maximum allowable stress.

Guidance

The maximum allowable stress value on any component of a steam locomotive boiler shall not exceed $\frac{1}{4}$ of the ultimate tensile strength of its material. All steam boilers in service must be designed and built to have a safety factor of at least 4; that is, it must be able to withstand a pressure of at least 4-times the normal working steam pressure

§ 230.27 Maximum shearing strength of rivets.

Guidance

When the rule was published in November 1999, there was a requirement to calculate the maximum shearing strength of rivets, but there was no place to record the figure on FRA Form No. 4. On July 11, 2005, FRA issued a correction to the rule which requires that the maximum shearing strength of rivets calculation be recorded on FRA Form No. 4.

§ 230.28 Higher shearing strength of rivets.

Guidance

A higher shearing strength may be used for rivets when it can be shown through testing that the rivet material used is of such quality as to justify a higher allowable shearing strength.

Inspection and Repair

§ 230.29 Inspection and repair.

Guidance

The term “accepted industry standards” is used in several places throughout the regulation, and refers to established repair practices used by the industry over many years. Each inspector assigned to steam locomotive inspection was provided a CD during their SIDD training that contains a large number of these standards. Accepted industry standards are generally considered less stringent than National Standards. Inspectors should note whether the regulation requires a National Standard or established repair practice for a specific repair, and verify that the railroad is meeting the correct requirement.

Guidance

When the regulation addresses an accepted National Standard for boiler repairs, it is referring to the National Board Inspection Code (NBIC). The regulation does not require that the person be an NBIC stamp holder, only that the repair procedures follow NBIC methodology.

§ 230.30 Lap-joint seam boilers.

Guidance

Upon inspection of a lap-joint, pay close attention to the edges of the seams for grooving or cracking. If a visual indication is observed, request that the locomotive owner/operator use a nondestructive test to verify the finding.

§ 230.31 Flues to be removed.

(a) Inspection of the boiler interior.

Guidance

Federal Railroad Administration

The purpose of the removal of flues is to inspect the entire interior of the boiler and its bracing, not the flues; although the flues should be inspected while removed.

(b) NDE testing.

Guidance

The rule allows that boilers be left in place, if they can be thoroughly cleaned and inspected without removing the superheater flues. The FRA Inspector may require their removal for cause. If left in place, the superheaters must be NDE tested.

§ 230.32 Time and Method of Inspection.

Guidance

(a) Time of inspection.

(b) Method of inspection.

(1) Entire boiler. The 1,472 day inspection is the most comprehensive inspection performed on the boiler, and inspectors should closely monitor the railroads' inspection procedure, and take this opportunity to personally inspect both the interior and exterior for the conditions described in this section.

(2) Boiler interior. FRA inspectors entering the boiler should consider the following:

Steam boilers are recognized as confined spaces. As such the hazards they may contain must be evaluated before entry to ensure that persons entering them will be able to work safely. FRA has a policy in place that defines the circumstances under which FRA employees can enter confined spaces—such as steam boilers—safely. It is not expected that very many, if any, steam boilers will present hazards severe enough to prohibit entry. However, the procedures that are part of the policy must be followed to ensure that it is safe to enter a boiler.

The primary stricture in the policy is the following statement:

“No person shall enter, or order a subordinate to enter any permit-required confined space. Entry into other classes of confined spaces shall be done in accordance with the regulatory requirements, and this policy and procedure.”

The key words here are “permit-required confined space.” MP&E inspectors following the procedures will be able to determine whether or not a boiler is “permit-required” and, if not, make the entry safely. A brief review of some of the key definitions and procedures begins with the definition of confined space:

Confined Space means a space that has all three of the following characteristics:

- It is large enough and so configured that an employee can bodily enter and perform assigned work.
- It has limited or restricted means for entry or exit (for example; tanks, vessels, silos, storage bins, hoppers, vaults, pits, etc.).
- It is not designed for continuous human occupancy.

An **“Entry”** into a confined space is considered to be “breaking the plane” of the opening into the confined space in such a manner that you are exposed to the hazards.

Confined spaces can be classified based on the nature and severity of the safety and health hazards they contain. **Permit-required** spaces contain the most severe hazards, and can’t be controlled or eliminated. **Alternate-procedure** spaces only have atmospheric hazards—“bad air”—that can be controlled by ventilation. **Non-permit** spaces do not contain, but have the potential to contain, any hazard capable of causing death or serious physical harm.

Keep in mind that confined spaces that can be entered without restriction **MUST** be evaluated and found to be free of recognized serious safety hazards (those that can cause serious illness, injury or death), free of atmospheric hazards, and having sufficient oxygen to support the life of the inspector for the time required to be in the space.

FRA procedures use a “Confined Space Evaluation Checklist,” which provides a standard format for the evaluation process. It is to be used by FRA personnel to make the evaluations necessary for deciding whether or not to enter the space. Each Region has a 4 gas atmosphere test instrument for determining the levels of oxygen, carbon monoxide, hydrogen sulfide, and flammable gas/vapor in an atmosphere. Your specialist or Regional Collateral Duty Safety Officer will be able to facilitate getting the instrument and a supply of the checklists.

FRA inspectors shall strictly follow the guidelines below when entering a confined space:

1. Comply with the confined space entry requirements related OSHA’s standards.
2. Two inspectors shall participate consistent with FRA policy.
3. The more experienced (formally certified) inspector takes the lead on all inspections related to Part 230.
4. This guidance does not excuse the trainee from completing all of the task(s) outlined in the OJT Standards. It is understood that a task e.g., Duty 5: Identify Steam Locomotive 1472 Service Day Inspection Requirements; could take longer to complete due to the operating constraints of the railroad.

(3) Boiler exterior. A thorough inspection shall be made of the entire exterior of the boiler while under hydrostatic pressure.

§ 230.33 Welded repairs and alterations.

Guidance

When the regulation addresses an accepted National Standard for boiler repairs, it is referring to NBIC. The regulation does not require that the person be an NBIC- stamp holder, only that the repair procedures follow NBIC methodology. If a railroad proposes to make a welded flush patch repair/alteration, in addition to the railroad submitting their written request to the FRA Regional Administrator, the railroad must provide a copy of the entire package to MP&E Division headquarters, for review prior to granting approval.

§ 230.34 Riveted repairs and alterations.

Guidance

When the regulation addresses an accepted National Standard for boiler repairs, it is referring to NBIC. The regulation does not require that the person be an NBIC stamp holder, only that the repair procedures follow NBIC methodology. If a railroad proposes to make a riveted alteration to an un-stayed portion of a boiler, in addition to the railroad submitting their written request to the FRA Regional Administrator, the railroad must provide a copy of the entire package to MP&E Division headquarters, for review prior to granting approval.

Pressure Testing of Boilers

§ 230.35 Pressure testing.

Guidance

The temperature of the steam locomotive boiler shall be raised to at least 70 degrees Fahrenheit any time hydrostatic pressure is applied to the boiler. This is a new requirement. It is important that the owner/operator conduct an internal inspection of the boiler following any hydrostatic test where the pressure exceeds Maximum Allowable Working Pressure (MAWP). Pay close attention to boiler brace attachment points for loose or damaged fasteners.

§ 230.36 Hydrostatic testing of boilers.

Guidance

A hydrostatic test must be conducted at each 1,472 service day and annual inspection. Other factors trigger a hydrostatic test such as any alteration, flush patch, or riveting to a non-stayed area of the boiler. Whenever a hydrostatic test is required under this Part, the temperature of the boiler shall be between 70 and 120 degrees Fahrenheit. The pressure applied shall be 25% above MAWP.

Note: This section also requires an internal inspection of the boiler anytime a hydrostatic test is applied above MAWP. FRA policy requires FRA inspectors to conduct a physical internal inspection of the boiler, firebox, and smokebox at each annual inspection, provided the boiler is safe to enter as discussed in the guidance above under §230.32

(b)(2). If the boiler, firebox, and smokebox is not entered and inspected, FRA inspectors shall note, "Interior inspection of boiler not made" and show reason on the inspection report using the comment feature.

§ 230.37 Steam test following repairs or alterations.

Staybolts

§ 230.38 Telltale holes.

§ 230.39 Broken staybolts.

(b) Staybolt replacement.

(c) Assessment of broken staybolts.

(d) Prohibited methods of closing telltale holes.

§ 230.40 Time and method of staybolt testing.

(a) Time of hammer testing.

(b) Method of hammer testing.

(a) General.

(b) Drilled flexible staybolts.

(c) Recordkeeping.

(d) Testing at request of FRA inspector.

Steam Gauges

§ 230.42 Location of gauges.

§ 230.43 Gauge siphon.

§ 230.44 Time of testing.

§ 230.45 Method of testing.

§ 230.46 Badge plates.

§ 230.47 Boiler number.

Federal Railroad Administration

Safety Relief Valves

§ 230.48 Number and capacity.

§ 230.49 Setting of safety relief valves.

§ 230.50 Time of testing.

Water Glasses and Gauge Cocks

§ 230.51 Number and location.

§ 230.52 Water glass valves.

§ 230.53 Time of cleaning.

§ 230.54 Testing and maintenance.

§ 230.55 Tubular type water and lubricator glasses and shields.

§ 230.56 Water glass lamps.

Injectors, Feedwater Pumps, and Flue Plugs

§ 230.57 Injectors and feedwater pumps.

§ 230.58 Flue plugs.

Fusible Plugs

§ 230.59 Fusible plugs.

Washing Boilers

§ 230.60 Time of washing.

§ 230.61 Arch tubes, water bar tubes, circulators and thermic siphons.

Steam Pipes

§ 230.62 Dry pipe.

§ 230.63 Smoke box, steam pipes and pressure parts.

Steam Leaks

§ 230.64 Leaks under lagging.

§ 230.65 Steam blocking view of engine crew.

Part 230 Subpart C-Steam Locomotives and Tenders

§ 230.66 Design, construction, and maintenance.

§ 230.67 Responsibility for inspection and repairs.

Speed Indicators

§ 230.68 Speed indicators.

Ash Pans

§ 230.69 Ash pans.

Brake and Signal Equipment

§ 230.70 Safe condition.

§ 230.71 Orifice testing of compressors.

§ 230.72 Testing main reservoirs.

§ 230.73 Air gauges.

§ 230.74 Time of cleaning.

§ 230.75 Stenciling dates of tests and cleaning.

§ 230.76 Piston travel.

§ 230.77 Foundation brake gear.

§ 230.78 Leakage.

§ 230.79 Train signal system.

Cabs, Warning Signals, Sanders and Lights

§ 230.80 Cabs.

§ 230.81 Cab aprons.

Federal Railroad Administration

§ 230.82 Fire doors.

§ 230.83 Cylinder cocks.

§ 230.84 Sanders.

§ 230.85 Audible warning device.

§ 230.86 Required illumination.

§ 230.87 Cab lights.

Throttle and Reversing Gear

§ 230.88 Throttles.

§ 230.89 Reverse gear.

Draw Gear and Draft Systems

§ 230.90 Draw gear between steam locomotive and tender.

Guidance

The draw gear between the first and second tenders on geared locomotives (i.e. Shay, Heisler, Climax, etc.) are required to be maintained in this same manner as conventional steam locomotives and tenders.

§ 230.91 Chafing irons.

§ 230.92 Draw gear and draft systems.

Driving Gear

§ 230.93 Pistons and piston rods.

§ 230.95 Guides.

§ 230.96 Main, side, and valve motion rods.

§ 230.97 Crank pins.

Running Gear

§ 230.98 Driving, trailing, and engine truck axles.

§ 230.99 Tender truck axles.

§ 230.101 Steam locomotive driving journal boxes.

§ 230.102 Tender plain bearing journal boxes.

§ 230.103 Tender roller bearing journal boxes.

§ 230.104 Driving box shoes and wedges.

§ 230.105 Lateral motion.

Trucks, Frames and Equalizing System.

§ 230.106 Steam locomotive frame.

§ 230.107 Tender frame and body.

§ 230.109 Tender trucks.

§ 230.110 Pilots.

§ 230.111 Spring rigging.

Wheels and Tires

§ 230.112 Wheels and tires.

§ 230.113 Wheels and tire defects.

§ 230.114 Wheel centers.

Steam Locomotive Tanks

§ 230.115 Feed water tanks.

§ 230.116 Oil tanks.

Appendix A to Part 230 - Inspection Requirements

Guidance

The lists in this appendix are intended as guidance only. Adherence to this list does not relieve the steam locomotive owner and/or operator of responsibility for either (1) completing the inspection and maintenance requirements described in this part; or (2) ensuring that the steam locomotive, tender, and its parts and appurtenances are safe and suitable for service.

Technical Bulletins Incorporated for Part 230

Federal Railroad Administration

MP&E 98-12 Hydrostatic Testing of Steam Locomotive Boilers

Section 230.17 of 49 CFR requires "Every boiler, before being put into service and at least once every 12 months thereafter, shall be subjected to hydrostatic pressure 25% above the working steam pressure. Section 230.18 of 49 CFR states, "The dome cap and throttle standpipe must be removed at the time of making the hydrostatic test and the interior surface and connections of the boiler examined as thoroughly as conditions permit." In case, the boiler can be entered and thoroughly inspected without removing the throttle standpipe, the inspector may make the inspection by removing the dome cap only, but the variation from the rule must be noted on the margin of the report. "Boiler entered through auxiliary dome" or "throttle standpipe not removed." If the boiler cannot be entered because of its construction, it should be so stated. "Not entered because..."

Section 230.19 of 49 CFR states, "When the test is being made by the railroad company's inspector, an authorized representative of the company, thoroughly familiar with boiler construction, must personally witness the test and thoroughly examine the boiler while under hydrostatic pressure." 49 CFR Section 230.20 requires, "When all necessary repairs have been completed, the boiler shall be fired up and the steam pressure raised to not less than the allowed working pressure, and the boiler and appurtenances carefully examined." All cocks, valves, seams, bolts and rivets must be tight under this pressure and all defects disclosed must be repaired.

Hydrostatic testing is a process whereby a fluid, usually water, is forced into the boiler to determine the constructive soundness of the complete boiler structure to withstand such test pressure. This test can only be performed properly when all air has been purged from the boiler being tested. After all air has been purged from the boiler, the pressure should be slowly increased by use of a suitable water pump or other device that will not introduce air into the boiler during testing. Air in the boiler under test will defeat the principle of hydrostatic testing. Pressures exerted in this manner subjects all internal surfaces and parts of the boiler structure to equal pressure. Also of very significant importance is the matter of safety. Water is practically incompressible and can store extremely little energy. The energy force exerted is furnished by the pump. On the other hand, if air is trapped in the boiler being tested, it will be compressed to the test pressure attained and build up an energy source that can be extremely dangerous and damaging to the boiler being tested should a failure occur. In the event of a structural failure, the trapped air pressure will continue to expend its built-up energy until exhausted. With a true hydrostatic pressure, stopping the pump ends the pressure source.

In almost all boilers of horizontal fire tube type, the highest part of the boiler will be the dome. During the filling of the boiler, preparatory to hydrostatic testing, air should be vented from as near the top of the dome as possible as pressure can be applied more quickly and easily when there is no air present.

The safety valves are either removed and plugs inserted in their places or else they are closed and clamped. An accurate test gauge is applied to the boiler and the pressure must be watched closely to see that the prescribed testing pressure is not exceeded, as it is very easy to strain,

unduly, some part of the boiler. Cold water is not satisfactory for testing, because the boiler plates are cold and contracted to a minimum and leaks could appear. A boiler that is in good condition and tight under steam will usually show numerous leaks when full of cold water under pressure, so that the use of cold water makes the test unnecessarily severe.

After all defects, such as leaky seams and broken staybolts and crown stays have been taken care of, the boiler is fired up and the pressure raised to not less than working pressure so as to determine the permanency of the repair made.

Broken staybolts are more easily detected by hammer testing when the boiler is under a hydraulic test pressure, than when it is not. The reason is that the broken ends may be separated slightly. Whereas, when the boiler is not under pressure the broken ends may be in contact, thus giving a sound like a good staybolt.

Attached is further information concerning problems associated with trapped air in boilers during hydrostatic testing.

WHERE AIR CAN BE TRAPPED

1. If not properly vented or purged during filling of the boiler as described above, air can also be trapped in the superheater system if the locomotive is so equipped, or in the piston valves and cylinders and related piping, if included in the hydrostatic test.
2. If the locomotive is provided with a throttle valve located in the dome and type "A" superheating, and the throttle valve is opened to permit testing of the superheating system during the hydrostatic test, additional air venting procedures will have to be made in order to obtain a true hydrostatic or hydraulic block of water during the test.
3. If the locomotive is provided with a throttle valve located in the outlet side of the superheater header, special precautions are very necessary in order to prevent the trapping of air in the superheater system. Unless it can be known without a doubt that all air has been purged from this system, a true hydrostatic head will not be attainable. It is therefore recommended that a suitable blanking plate and gasket be applied to the entrance to the dry-pipe prior to hydrostatic testing of boilers and vent the boiler, as previously described, from the highest point of the boiler.

As a matter of information to make you aware of hazard of trapped air, the following example is provided, covering a locomotive having a multiple type throttle that is integral with the superheater header:

A locomotive having 1,946 square feet of type E superheating surfaces and having superheater units within 202 superheater flues, or 404 unit tubes, will require approximately 34.15 cubic feet, within the system. This is equivalent to two cylindrical reservoirs 21 inches inside diameter and 85 inches in length, a comparable 34.06 cubic feet. The working pressure in this example locomotive is 245 psi, requiring a hydrostatic test pressure of 25% above working pressure, or 306.25 psi.

Federal Railroad Administration

Whether type "A" or "E" systems are provided, during filling of the boiler water enters the dry pipe near the top of the dome, as possible, then passes into the unit pipes located below and at right angle to the filling water level, and then forces the air from each unit. Type "A" units consist of four pipes, and three return ends. In the type "E" system, a unit may consist of four pipes and three return ends entering two flues, or as many as eight pipes and three return ends entering two flues, or as many as eight pipes and six return ends entering four flues comprising a very complex system of pipes and turns. This is compounded when the type "A" or "E" systems utilize the multiple valve throttle and all air must be purged from the systems through the throttle if it is opened. If the throttle is not opened, all air within the unit system will be compressed by the incoming water and leaks will probably appear.

It is important to know the safe condition of all parts of the locomotive, but other appurtenances should not interfere with a proper hydrostatic test of the boiler.

MP&E 98-9 Steam Locomotive Reports

Each Regional Administrator will retain Steam Locomotive Report Form 1 (Monthly) and Form 3 (Annual) in their regional offices for all steam locomotives headquartered in their Region.

Each year the Regional Director will submit a report which will indicate how many steam locomotives are in their Region, where they are housed, what railroad they operate on, and whether the locomotive is serviceable, stored and which locomotives are operating under a waiver for flues.

Form 4 (Specification Card) and Form 19 (Alteration Report) will be forwarded to RRS-14 and a copy placed in the Regional file.

Chapter 10

Railroad Safety Appliance Standards, Part 231

Introduction

Federal regulations establishing safety appliance standards were issued in 1911 by the Interstate Commerce Commission (ICC), which had created the Division of Safety Appliances. Soon, the ICC issued several “Orders”. These ICC Orders served the same purpose as today’s FRA regulations. In accordance with a statutory directive, the ICC Orders identified the number, dimensions, location, and manner of application of all safety appliances. After the formation of the FRA in 1967, the Railroad Safety Appliance Standards (49 CFR part 231) were issued in 1968, using the ICC Orders as a basis for the rule text. In 1974 and 1976, FRA amended the Railroad Safety Appliance Standards to add two new sections, §§ 231.29 and 231.30. More recently, in 2011, FRA again amended the safety appliance regulations to add two new provisions establishing a special approval process for existing industry standards. Despite these changes, the present-day regulations retain many similarities in substance and form with the original ICC Orders issued beginning in 1911.

The following guidelines and interpretations have been developed to aid Federal and State inspectors conducting inspections for compliance with the Safety Appliance Standards in part 231. It is important that agency interpretations and policies be adhered to by every inspector when conducting these inspections, so that uniformity of compliance activity is achieved. The procedures and guidance provided in both this manual and the General Manual should be observed when assessing the need for appropriate enforcement actions regarding any noncompliance with safety appliance standards. Reports of safety appliance inspections are made on the Motive Power and Equipment Inspection Report, FRA Form **F6180.96**. Violations are to be submitted on the Violation of Safety Appliance Law Report, FRA Form **F6180.29**.

Every rail vehicle (car, locomotive, tender, or similar vehicle) has very specific and defined safety appliance requirements. Inspectors must be knowledgeable of the common types of vehicles and their unique safety appliance arrangements prior to performing part 231 inspections. Inspectors also need to familiarize themselves with the many complexities and requirements of the various vehicles that are categorized as “cars of special construction.” A car of special construction is required to comply with the Railroad Safety Appliance Standards for the car type that it most closely resembles or to the “nearest approximate type” of car. If there are questions about a particular car type, the inspector should contact the Regional Specialist for a definitive classification. For consistency, the Regional Specialists will follow the guidance established by Headquarters.

Strict liability applies when a railroad uses or allows to be used a vehicle with defective safety appliances. If a railroad uses or allows to be used a vehicle that is discovered to have a defective safety appliance and the vehicle is not being moved pursuant to the statutory provisions contained in 49 U.S.C. § 20303 (previously 45 U.S.C. § 13), appropriate enforcement action must be taken. If a railroad is unaware of the existence of a defective condition, it cannot claim to be moving the vehicle for repairs and is subject to civil penalties. Inspectors are expected to

Federal Railroad Administration

use sound judgment, along with the guidance outlined in both the General Manual and Chapter 3 of this manual, when deciding whether the issuance of a violation report is appropriate.

In order to establish a violation, FRA must prove that the vehicle was “in use” or “allowed to be used” with a defective condition. Thus, evidence that the equipment was in use or allowed to be used with a defective safety appliance is always necessary to support a violation. FRA will consider a vehicle in use or allowed to be used as long as the railroad has or should have completed its required inspections and the vehicle is deemed ready for service, even if FRA inspects the vehicle prior to any movement or the actual departure. Defects found at this time are subject to potential civil penalties. Thus, FRA is not required to wait for a car with a defective safety appliance to depart or engage in an actual “haul” in order to assess a violation. If inspectors rely on the above interpretation, the violation report must establish that the railroad had completed all necessary inspections capable of discovering the defective condition. Therefore, evidence must be included in the violation report which establishes the inspector’s basis for this finding. Be as specific as possible. Inspectors should include names, if they are available and the information is helpful in establishing “use”; however, remember to use judgment and discretion in exercising FRA’s enforcement authority. In some situations it may not be the best or appropriate approach to include such information (for example, it would not be appropriate to include a person’s name if doing so would reveal the identity of a complainant in a complaint-based investigation). In many circumstances the best approach is still to establish actual use or movement of the vehicle.

The statutory provisions contained in 49 U.S.C. § 20303 govern the movement of vehicles with defective or insecure safety appliances. This only allows the railroad to move the defective vehicles from the place where the defect is first discovered to the nearest location where the necessary repairs can be made. This movement can either be on the railroad where first discovered or at the option of the connecting railroad, on the line of the connecting railroad if the move is no farther than the location on the line where the defect was first discovered. Thus in order to properly move a car for repairs, the railroad must know the defect exists. There are no tagging requirements for safety appliance defects. At interchange, a railroad can refuse to accept a defective car. Until the receiving railroad accepts the car by moving it or otherwise exercising control over it, it is not liable for civil penalties nor is it required to make any repairs. It should be noted, however, that the delivering railroad remains liable for each defective car it tenders in interchange.

The statutory provision contained in 49 U.S.C. § 20303 is an affirmative defense to be established by the railroad. These seven elements which must be established are:

- The car was properly equipped with safety appliances in the beginning.
- The car became defective while being used by railroad on its line.
- The railroad discovered the defect prior to movement.
- The movement was from the place where the defect was first discovered.

Motive Power and Equipment Compliance Manual

- Repairs could not be made at the location where the defect was first discovered.
- Movement was necessary to make the necessary repairs.
- The car moved only to the nearest available point where the necessary repairs could be made.

The federal regulations on freight power brakes contain guidelines to be considered by FRA inspectors and the railroads in determining what constitutes the nearest location where necessary repairs can be performed. See 49 CFR § 232.15(f). The guidelines are equally applicable to determining such locations for all safety appliance defects. The guidelines must be applied on a case-by-case basis to determine if the railroad acted in good faith in moving defect equipment. The following locations should be considered when applying the guidelines discussed in detail below:

- Locations where a mobile repair truck is used on a regular basis.
- Locations where a mobile repair truck originates or is permanently stationed.
- Locations with an operative repair track or repair shop.
- Locations where the railroad performs mechanical repairs other than safety appliance repairs.

In determining whether a location noted above is capable of making a particular repair the following factors must be considered:

- The accessibility of the location to persons responsible for making repairs.
- The presence of hazardous conditions that affect the ability to safely make repairs of the type needed at the location.
- The nature of the repair necessary to bring the car into compliance.
- The need for railroads to have in place an effective means to ensure the safe and timely repair of equipment.
- The relevant weather conditions at the location that affect accessibility or create hazardous conditions.
- A location need not have the ability to effectuate every type of safety appliance repair in order to be considered a location where some safety appliance repairs can be made.
- A location need not be staffed continuously in order to be considered a location where safety appliance repairs can be performed.

Federal Railroad Administration

- The congestion of work at a location shall not be considered.

In addition to considering the factors noted above, the following factors must be considered in determining whether the location is the nearest location where the necessary repairs can be made:

- Distance to the location. Although this is a key factor it should not be the determining factor. This must be considered in conjunction with all the factors previously noted as well as the following safety considerations.
- The safety of the employees responsible for getting the equipment to or from a particular location.
- The safety hazards involved in moving the equipment in the direction of travel necessary to get it to a particular location.

Inspection Guidance

General Interpretations & Guidance

Although the regulations are precise as to the dimensions, location, and manner of application for the various car types; interpretations and guidance have been developed over the years by FRA to help clarify ambiguities or correct misinterpretations of the regulations. The following written guidance is provided to help the inspector conduct inspections for compliance with the Safety Appliance Standards. There is a matrix available in Appendix C that identifies safety appliance arrangements on the various cars.

(MP&E 98-7) Errors in U.S. Department of Transportation's Safety Appliance Standards Booklet Published 1977

Many inspectors use the September 1977 reprint of the Safety Appliances and Power Brake Requirements (orange) Booklet when conducting safety appliance inspections. Please note there are two textual errors in this book. The first is in the "Note" to § 231.1 on page 9, lines 12 to 23. The correct text should read as follows, with the portions associated with the error underlined:

Note: After December 31, 1976, cars of this type built on or before April 1, 1966, or under construction prior to that date and placed in service before October 1, 1966, must be equipped (as nearly as possible) with the same complement of safety appliances, depending upon type, as specified in § 231.27 for box and other house cars without roof hatches, **or** in § 231.28 for box and other house cars with roof hatches. Cars built after April 1, 1966, or under construction prior thereto and placed in service after October 1, 1966, must be equipped, (depending upon type) as specified in § 231.27 for box and other house cars without roof hatches, **or** in § 231.28 for box and other house cars with roof hatches.

The second textual error involves the omission of two lines after line 12, page 64 in § 231.30(a)(2). The two lines omitted should read as follows:

...1977, seventy percent (70 percent) by October 1, 1978 and all such locomotives by October 1, 1979.

(MP&E 98-13) Interpretation of Sill Step Application, 49 CFR Parts 231.1(d)(2) and 231.27(c)(2)

It has been brought to the Office of Safety's attention that some sill step applications on certain types of cars are being considered by field forces as noncomplying conditions under the Railroad Safety Appliance Standards when in fact, the sill steps are in compliance. To minimize confusion in this area, the following guidelines should be used when considering sill step applications.

49 CFR parts 231.1(d)(2) and 231-27(c)(2) address both, Sill Steps Dimensions and provide the minimum standards for cross-sectional area, material, length and clear depth. The minimum standard for clear depth is 8 inches. *Please note carefully* the words, "clear depth". Clear depth should be understood as meaning a vertical space the width of, and above, the sill step material or strap, and that vertical space shall be clear and unobstructed for 8 inches.

Note how this differs fundamentally from the dimensions requirements for handholds and ladder treads in the Safety Appliance Standards which stipulate, "minimum clearance..., 2 inches" No limiting direction orientation for clear space is provided, therefore clearance of 2 inches is required in all directions or 360 degrees around the handhold or ladder tread.

As in all considerations of safety appliances, whether or not the appliance can be used "safely" must be considered along with the clearances and dimensions.

(MP&E 98-36) Judgment in the Enforcement of the Safety Appliance Standards

In the past, FRA inspectors have taken exception to minimal deviations from the measurements specified in the Safety Appliance Standards on cars that have been in service with the condition for a long period of time without any known incident or casualty. Although these civil penalty citations are valid from a strictly technical and legal point of view; from a common sense point of view, the cars operated safely for years, so these minimal deviations did not materially reduce safety.

Inspectors tend to view the Safety Appliance Standards as requiring the issuance of civil penalty citations if strict adherence to each clearance, size, or placement dimension is not maintained (i.e., either the clearance, placement, or size of each safety appliance is within the exact dimensions required by the regulation, or it is not). Our world has changed and is no longer that simple. The railroad operating environment has drastically changed. Crews are smaller, flat switching is rare and the number of run-through trains is much greater—all decreasing the use of safety appliances. In addition, the limited resources available to both FRA and the railroads require that care be taken to avoid the frivolous use of these resources pursuing minor infractions that do not materially reduce safety.

Federal Railroad Administration

Most of the Safety Appliance Standards were developed nearly 100 years ago in a time when almost all cars were of a standard design. Application of the regulations to these cars was simple and required little, if any, judgment on the part of the inspector. Today most new cars are “Cars of special construction.” See 49 CFR § 231.18. The Safety Appliance Standards for such cars must be determined from the “nearest approximate type” of a standard car. *Id.* As a result, the Safety Appliance Standards cannot be applied directly to these cars without exercising good judgment.

Today, inspectors must exercise this judgment, not just take measurements and file exceptions for minimal deviations. An exception should be taken when the condition of the safety appliance materially reduces safety. For example, a safety appliance with a slight looseness that is still firmly fastened with all of the securing bolts in place, or a safety appliance with a slightly reduced clearance that is still more than adequate for its intended use does not materially reduce safety. However, one court found that a handhold moving as little as ½ inch was not “firmly fastened.” See *Roe v. Port Terminal R.R. Ass’n*, 620 S.W.2d 870 (Tex. App. 1981). Therefore, exactly what materially reduces safety is not always clear—it is a judgment call often dependent on the unique set of conditions governing the operation at the time.

Some general guidance for exercising judgment in the enforcement of the Safety Appliance Standards is as follows:

- Do not take exception to a noncomplying design feature of a type of car that has a long and continuous, safe service history. However, if individual cars of that type or class have another noncomplying condition, an exception may be taken.
- If exertion of a significant force (a force greater than that which would be encountered in the normal use or operation of the appliance) is required to move a safety appliance, exception should generally not be taken.
- On the other hand, if the safety appliance moves easily to the touch, exception certainly should be taken.

Although safety appliances remain an extremely important part of railroad safety and the standards pertaining to these appliances must continue to be enforced, the enforcement of the Standards needs to be determined through the exercise of good judgment so that scarce FRA and railroad resources are not consumed pursuing minor infractions that do not materially reduce safety.

A thorough sample-car inspection—performed in accordance with the procedures described on pages 2-8 through 2-11 of the Motive Power and Equipment Compliance Manual—is the proper time to enforce the Safety Appliance Standards strictly. An excellent sample-car inspection will ensure safety appliance compliance before that type of car is placed in service.

Locomotive Applications and Guidance

Although safety appliances for other than steam locomotives are not specifically addressed in

part 231, with the exception of § 231.29, Road locomotives with corner stairways, and § 231.30, Locomotives used in switching service, non-steam locomotives still are required to have proper safety appliances. It is FRA's position that non-steam locomotives are addressed in the safety appliance standards as "cars of special construction", see § 231.18, which requires that all non-steam locomotives have as nearly as possible the same complement of safety appliances as contained in the categories governing steam locomotives.

(MP&E 98-68) Locomotives Used in Switching Service—Location End Handholds

Questions have been raised regarding the placement of horizontal end handholds relative to the side of the locomotive as referenced in 49 CFR § 231.30(g)(1)(ii).

When the switching step regulation was developed, some handholds were installed by measuring from the side of the locomotive and some from the side of the end plate. The placement of the preponderance of end handholds is measured from the side of the end plate. Electro-Motive and General Electric have been and are presently applying subject handholds in relation to the side of the end plate.

FRA will not take exception if application of horizontal end handhold placement is measured from either the side of the locomotive or side of the end plate.

(MP&E 98-48) Securement of Handrail to the Locomotive Carbody North American Cab Structure

Some locomotives having the wide body North American cab configuration have the upper end of the front vertical handrail not properly secured to the carbody. The Safety Appliance regulation, § 231.30(e)(1)(i) states in part that each vertical handhold " be securely fastened to the locomotive with one-half (½) inch or larger bolts or rivets... "

Some locomotives have the upper end of the front vertical handhold bolted to a bracket that is welded to that section of the carbody that comprises the outside of the front sand reservoir. Although there appears to be adequate strength in the welded bracket, this is not permitted because the regulation specifically requires that the handhold be securely fastened with a bolt or rivet.

However, FRA has permitted welding of some permanent fixtures on locomotives to which safety appliances are mechanically fastened. The welding was made under quality controlled conditions with a full enclosure penetration weld of the fixture to the locomotive, using modern shop welding practices, which provide 100 percent full strength requirements of the joint.

This condition, if found, is not to be taken as a defective condition, but should be brought to the railroad's attention for corrective action.

(MP&E 98-25) Burro Crane Requirements

The following interpretations of the Federal regulations regarding the operation of burro cranes

Federal Railroad Administration

should be used for consistent compliance and enforcement guidelines:

1. Chapter 203 – Safety Appliances, § 20302. General requirements (a)(4), which requires power driving-wheel brakes on locomotives, applies to a Burro Crane being used to pull or push cars on tracks that are part of the general rail system.
2. Railroad Power Brakes and Drawbars, 49 CFR part 232, states that power brakes are not required to be installed on “locomotive cranes” built prior to September 21, 1945. By implication, power brakes are required on all locomotive cranes, including Burro Cranes, built on or after September 21, 1945.
3. Chapter 203 – Safety Appliances, § 20302. General requirements (a)(1)(A), which requires automatic couplers; (a)(1)(B), secure sill steps and hand brakes; and (a)(2), grab irons or handholds; all of which apply to a Burro Crane.
4. If the Burro Crane is used as a road locomotive, § 231.29 of the Safety Appliance Standards, a road locomotive with corner stairways apply.
5. If the Burro Crane is used as a locomotive in switching operations as defined in § 231.30(b)(2), the requirements of § 231.30 of the Safety Appliance Standards apply.
6. Other sections of the Safety Appliance Standards do not appear to apply.
7. Despite the fact that the Burro Crane is excluded from the definition of “locomotive” under § 229.5 of the Locomotive Safety Standards, the Burro Crane is nevertheless subject to the statutory requirements of the Locomotive Inspection Act (in particular, the requirement that it be safe). In the preamble to the final locomotive rule, FRA explicitly recognizes the applicability of the Act by stating that “FRA will continue to implement the basic statutory safety requirements with respect to such work equipment by using the Special Notice for Repair when appropriate.” (45 FR 21093).

(MP&E 98-71) Self-Propelled Vehicles Considered to Be Locomotives (excerpted)

Recently, we have had several inquiries about equipment requirements for self-propelled vehicles used to haul revenue freight on the main line. Self-propelled vehicles are used in a variety of railroad functions. These vehicles include those built by Trackmobile Inc., Shuttle Wagon, Mitchell Equipment Corporation, and Brandt RoadRailer.

....

When a self-propelled vehicle is used to move freight over the railroad, it will be considered a locomotive and must comply with applicable regulations. Even though these vehicles do not resemble a standard locomotive, the purpose for which they are being used requires compliance with 49 CFR parts 223, 229, 231 and 232.

The self-propelled vehicles are unique in construction, appearance, and use. Many of these

Motive Power and Equipment Compliance Manual

vehicles currently being used have already been modified by the manufacturers (as closely as construction would permit) to bring them into compliance with Federal regulations. FRA acknowledges that this equipment has a place in a well-rounded rail transportation system. In an effort to recognize the unique characteristics of these vehicles, FRA inspectors should exercise enforcement discretion and good judgment in analyzing an operation where self-propelled vehicles are used for train movements.

The following specifications should be used by inspectors for enforcement guidance:

....

13. Switching steps as defined in § 231.30.
14. Four horizontal handholds secured to the back and front ends of the vehicle, secured by bolts or other acceptable mechanical fastener. (§ 231.30).
15. Vertical handholds painted in contrasting colors and secured by bolts or other acceptable fasteners. (§ 231.30).
16. Must be equipped with automatic couplers, to prevent the necessity of someone going between the vehicle and car for the purpose of coupling or uncoupling. (§ 231.30).

....

Items deemed to be safety-related, which cannot meet specified requirements, will have to be addressed through the waiver process.

§ 231.15 Steam locomotives used in road service.

The vast majority of, if not all, steam locomotives in use today are used in tourist and excursion road service. The focus of safety appliance inspection on steam locomotives should be directed at whether or not the appliance is structurally sound, securely fastened and located, provides proper clearance, is unobstructed, and is safe to use.

§ 231.15 Specifications common to all steam locomotives.

Steam locomotives with Vanderbilt-type tenders require additional handrails, running boards and handholds that vary from other tenders.

§ 231.16 Steam locomotives used in switching service.

The regulations pertaining to steam locomotives in switching service require footboards. However, inspectors **should not** take exception to steam locomotives that have had the footboards removed. Conversely, many steam locomotive owners/operators have elected not to remove the footboards from their locomotives for historical purposes, but may prohibit railroad personnel from occupying the footboard while the locomotive is moving. In either case, the

Federal Railroad Administration

focus of safety appliance inspection on steam locomotives should be directed at whether or not the appliance is structurally sound, securely fastened and located, provides proper clearance, is unobstructed, and is safe to use.

§ 231.30 Locomotives used in switching service.

Locomotives used in switching service, regardless of built date, must be in full compliance with 49 CFR § 231.30. However, some relaxation of the regulations is allowed with respect to switching step height and width for six-axle locomotives in switching service, built prior to April 1, 1977.

It should be noted that this section specifically allows for the fastening of the switching step to the switching step bracket by weld, provided the weld is at least twice the strength of a bolted attachment. Since this issue can obviously be subjective and open to interpretation, inspectors should exercise discretion. Generally speaking, most welds applied during manufacture are as strong as or stronger than any mechanical fastener made. Welding by the manufacturer is typically performed under controlled circumstances and in accordance with strict Weld Procedure Specification (WPS). The problems associated with welding occur when no WPS exists, as is the case in most railroad locomotive shops. When inspecting switching steps that have been applied by weld, carefully inspect the weld for discontinuities such as incomplete fusion, undercut, overlap, porosity or inclusions. If any of these defects exist in the weld, the integrity of the weld should be questioned.

The outer edge of the bottom switching step must be illuminated on all locomotives built after March 31, 1977. Locomotives built prior to March 31, 1977, may be illuminated, or have the outer edge of the switching step painted a contrasting color. If multiple locomotives (two or more) are used in switching service, only the front switching steps of the leading locomotive and the rear switching steps of the trailing locomotive must be illuminated or painted a contrasting color, depending on built date. Vertical handholds must also be painted a contrasting color. In addition, a minimum of 2½ inches of clearance must be maintained through the entire length of the vertical handhold.

§ 231.29 Road locomotives with corner stairways.

Road locomotives without corner stairways may not be used in switching service after September 30, 1979, except for passenger cars switching service at passenger stations. (*See § 231.30 (a)(3)*)

Freight and Passenger Car Applications and Guidance

Safety Appliance Fasteners (MP&E 98-14)

The Railroad Safety Appliance Standards, 49 CFR part 231, require that safety appliances and their brackets be secured by ½-inch bolts with nuts outside (when possible) and riveted over, or with not less than ½-inch rivets. Additionally, in order to comply with the Safety Appliance Regulations, there must be a deformation of the threads to prevent the fastener from becoming

insecure . This can be accomplished by one of the following methods:

1. Rivet the fastener;
2. Check the threaded portion of the bolt nearest the fastener with a chisel to $\frac{1}{8}$ -inch depth at two locations; or
3. Apply weld to the threaded portion of the threads, so as to deform them.



Figure 1 - A typical two-part mechanical fastener

Additional approved safety appliance securement fasteners are: one-and-two piece rivets (Huck bolt—See **Figure 1**), bolts and nuts, Unilock, Disclock, and Nordlock fasteners when properly applied.

Part 231 is explicit in requiring that handholds be securely fastened. By definition, secure means free from danger or risk of loss; free from fear or doubt; and not likely to fail or give way.

The Federal Railroad Administration's (FRA) longstanding policy concerning the securement of all safety appliances requires that safety appliances or supports for safety appliances must be mechanically fastened. Brackets or supports that are applied to a car structure (other than a tank car tank) solely for the securement of safety appliances are to be mechanically fastened to the car structure.

Many years of railroading experience has shown that welds are not uniform and are subject to failure, despite improvements in welding procedures. Cracks and breaks in welds are difficult to

Federal Railroad Administration

detect during inspections. Therefore, welding is not considered to meet the definition of secure. This is particularly evident at repair facilities, where quality of workmanship is not always assured.

Safety appliances for other than steam locomotives are not addressed in Part 231, with the exception of § 231.29, Road locomotives with corner stairways and § 231.30 Locomotives used in switching service. This does not mean that non-steam locomotives are not required to have proper safety appliances. It is FRA's position that other than steam locomotives must have proper safety appliances and are covered as cars of special construction.

This requires that locomotives other than steam have as nearly as possible the same complement of safety appliances as contained in the categories governing steam locomotives.

However, FRA has not enforced the deformation of threads of bolts used to secure safety appliances on locomotives. These appliances are usually secured by self locking nuts and/or lock washers, and, to our knowledge, have not presented a safety problem.

Exception should only be taken when the safety appliances on other than steam locomotives are insecure or presenting a potential safety hazard to railroad employees. Out-of-service form F6180.8 should only be issued if the safety appliance is defective to the extent it creates an immediate unsafe condition.

(MP&E 98-22) Adjustable Handhold/Ladder Tread

The adjustable handhold/ladder tread is 3/4-inch in diameter. Its length may be adjusted as needed, by the application of a 1/4-inch roll pin into the desired hole. The remaining portion is to be cut off, leaving a smooth surface.

In 1988, the Federal Railroad Administration (FRA) ruled that this adjustable safety appliance meets the specified requirements, if properly applied. However, FRA expressed concern of the possibility of improper application, such as the substitution of the roll pin, improper securement, etc.

If any deficiency is found concerning this safety appliance, such as substitution of the roll pin, improper securement, etc., it should be reported to the regional MP&E Specialist with all pertinent information, including photographs. The Specialist is to promptly advise the MP&E Staff Director.

(MP&E 98-49) Dimensions Applicable to Handles of Uncoupling Levers

In the past, some inspectors have taken exception to the handles of bottom operated uncoupling levers being more than 6 inches from the side of the car.

Section 231.1(k)(2) states in relevant part: (i) Handles of uncoupling levers, except those shown on Plate B or of similar designs, shall be not more than 6 inches from sides of car. (ii) Uncoupling levers of design shown in Plate B and of similar designs shall conform to the

following prescribed limits: (iii) Handles shall be not more than 12, preferably 9, inches from sides of cars. Center lift arms shall be not less than 7 inches long.

The top operated uncoupling lever shown in Plate B is similar in design to bottom operated uncoupling levers and are fundamentally the same, as both are operated in the same manner by an upward lift of the uncoupling lever handle to disengage the coupler lock block.

The reference in § 231.1(k)(2)(i) to uncoupling levers of other than Plate B design requires that the uncoupling lever handle be not more than 6 inches from side of car. This refers primarily to those uncoupling levers which are operated by a downward motion of the uncoupling lever either by hand or foot. This type of uncoupling lever could be operated from the side ladder while the car was in motion.

Therefore, FRA will not take exception to bottom operated uncoupling levers that are similar in design to that shown in Plate B, unless the uncoupling lever handle is more than 12 inches from the side of the car.

Also for your information, the Association of American Railroad's (AAR) Rule 22 for bottom operated uncoupling levers shows the maximum distance of the uncoupling lever handle to be 12 inches from the side of the car.

(MP&E 98-51) Definition of Left and Right — A and B End

The purpose of this bulletin is to provide Railroad Safety Inspectors with the position the Federal Railroad Administration has adopted, as a result of the work of an MP&E Technical Resolution Committee, for determining and reporting the location of noncomplying and/or defective railroad car components. The definition of "left" and "right" is defined in § 231.19:

"Right or Left refers to the side of person when facing end or side of car from ground"

This bulletin further identifies the "A" and "B" end of the car from which the definition will be applied and provides additional guidance for uniformly identifying various components on a car.

The railroad industry's generally established and accepted practice for determining the location of applicable components on rail cars equipped with four, six, or eight wheel trucks is as follows:

- The B end of a car is determined by the location of the hand brake. The end of the car on which the hand brake is located is the B end. The opposite end of the car is known as the A end. On cars equipped with hand brakes on both ends, the "A" and "B" end shall be determined as stencilled.
- When facing the B end of the car, the car is divided into four sections known as BR, BL, AR, and AL. The order of applicable components on the right side of the car shall be known as R1, R2, R3, etc. The order of applicable components on the left side of the car shall be known as L1, L2, L3, etc... See **Figure 2**.

Federal Railroad Administration

- Beginning at the B end of the car, brake beams shall be numbered consecutively, see Figure 3.

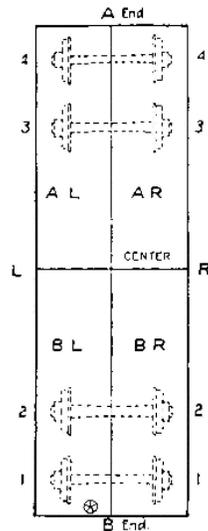


Figure 2 - The definitions of "A" end, "B" end, Left, Right and component order numbers

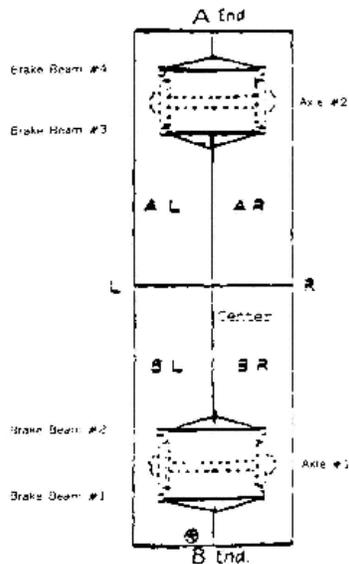


Figure 3 - The definition of brake beam numbering order

The railroad industry's generally established and accepted practice for determining the location of applicable components on articulated and multi-level cars is as follows:

- The “B” end of the car is determined by the location of the hand brake. The end of the car on which the hand brake is located and is stenciled “B end” shall be known as the B end of the car. The end unit opposite the “B” end is the “A” end. The unit adjacent to the B end shall be known as the “C” unit and each additional unit will be stenciled consecutively and alphabetically from the “B” end toward the “A” end. See Figure C. For cars equipped with multiple hand brakes, report the unit location.
- When facing the “B” end of the car, the right side is known as the “R” side and the left side is known as the “L” side. Wheel sets and applicable components will be numbered consecutively from the “B” end to the “A” end, 1 through 9. Applicable components above 9 will be identified alphabetically in reverse order from Z (Z, Y, X, W, etc.) until the last wheel set on the A unit is identified, see **Figure 4**.

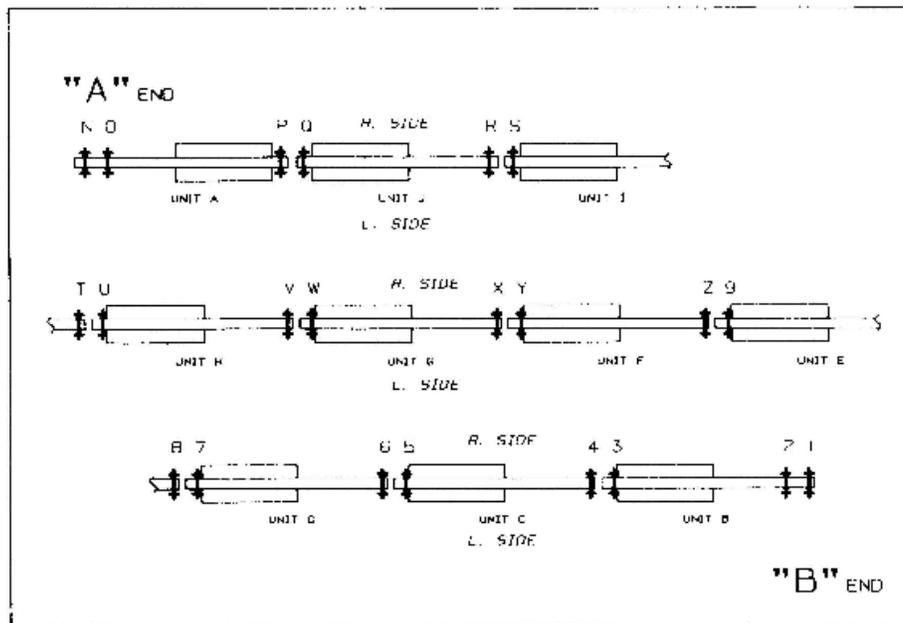


Figure 4 - Definition of the location of applicable components on articulated and multi-level cars

Federal Railroad Administration

- Facing the B end of the car, the articulated connection locations will be lettered beginning with C and will continue consecutively and alphabetically from the B end toward the A end. See **Figure 5**.
- The end truck on the B end will be location B and the end truck on the A end will be location A. Starting with the first truck inboard from the B end, the truck location will be lettered beginning with C and will continue consecutively and alphabetically from the B end toward the A end. See **Figure 5**.

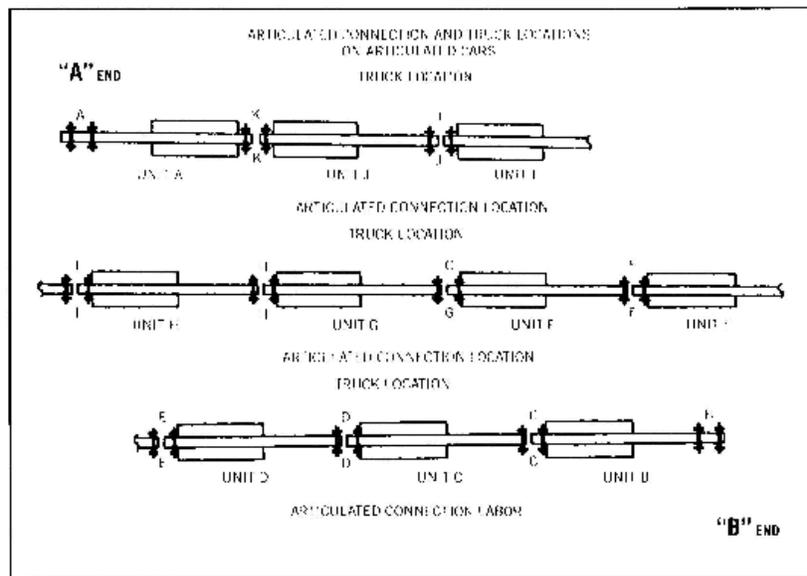


Figure 5 - Definitions of the articulated connection locations and truck locations

- The drawbar connection will be reported as the combination of the locations of the two trucks closest to the drawbar. See **Figure 6**. (i.e. CD, EF, GH, etc.) The end truck on the B end will be location B and the end truck on the A end will be location A. Starting with the first truck inboard from the B end, the truck location will be lettered beginning with C and will continue consecutively and alphabetically from the B end toward the A end. See **Figure 6**.

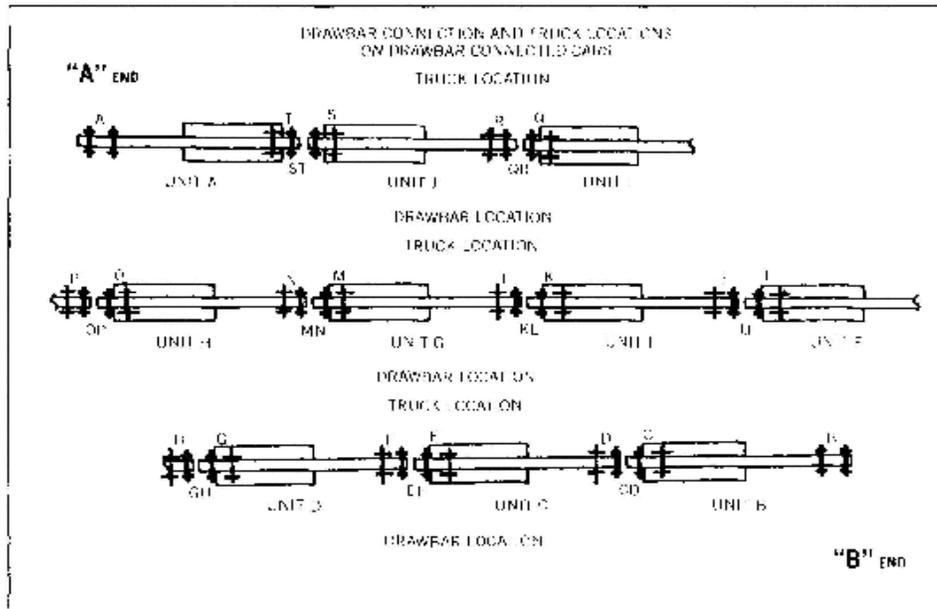


Figure 6 - Definitions of drawbar connection and truck location

The above guidance should be applied when reporting the location of applicable non-complying components under the provisions of part 215, 231, and 232. It can also be applied to passenger cars unless the passenger railroad utilizes some other generally accepted method of identifying the location of passenger car components (e.g. No. 1 end, No. 2 end, etc).

(MP&E 98-18) Aluminum Safety Appliances

In the past, exception has been taken to various cars equipped with aluminum safety appliances: ladder treads, handholds, and sill steps.

FRA's Office of Research and Development has confirmed that the ladder treads, handholds of circular cross-section, 13/16-inch diameter and sill steps, 5/8-inch thick and 2 inches wide, when constructed of 6061-T6 aluminum alloy, exceeds the current Federal Railroad Administration's requirements. Therefore, no exception should be taken to this material.

Hand brakes

(MP&E 98-53) Hand brake Chains

It has been brought to our attention that freight cars of recent construction are being equipped with hand brake chains that are not in compliance with FRA regulations. Hand brake chains are described in the present Safety Appliance Standard Regulation, § 231.27(a)(2)(vi), as follows:

Federal Railroad Administration

All chains shall be not less than nine-sixteenths (9/16) inch BBB coil chain.

The Association of American Railroads (AAR) Manual of Standards S-404-74, 2.1.9, has the following requirements for hand brake chains:

Hand brake power chain shall be 9/16 inch BBB coil chain or meet the minimum specification (working load 5,875 lbs., proof test of 11,750 lbs.) of sufficient length so that the distance from center line of lower attaching rivet hole in housing to center line clevis rivet is 21- 9/16 inches.

It has been determined that both the 3/8 inch alloy chain and the 1/2-inch steel alloy chain currently being used by new car manufacturers exceeds the specifications for the 9/16-inch BBB coil chain.

Therefore, in accordance with 49 CFR § 231.27(a), **exception should not be taken** to hand brake chains that provide the same degree of safety, or a greater degree of safety, as the 9/16-inch BBB coil chain.

The 9/16-inch BBB coil chain is no longer being used by hand brake manufacturers.

(MP&E 98-26) Hand brakes—Articulated Cars

Hand brake performance requirements, as specified in 49 CFR part 231, include the following:

- Must be an efficient design
- Must operate in harmony with the power brake
- Must provide equal or greater total force on the brake shoes as the brake cylinder with 50 psi air pressure
- One hand brake per car.

The AAR is more specific in their requirements in that a minimum braking ratio of 11 percent must be achieved at the brake shoes with a specified force output at the hand brake (equivalent to 125 pounds on the rim of the wheel). Further, the hand brake force must act on one-half of the axles including the “B” end truck. If these requirements cannot be met with a single hand brake, a second hand brake must be applied with appropriate stenciling at each hand brake location.

On some articulated multi-platform cars, it is not feasible to apply the hand brake force to half the axles with one hand brake and a second hand brake has been applied at the opposite end (“A” end) of car.

FRA takes no exception to this practice, if the following conditions are met:

- Stencils must be placed adjacent to each hand brake advising that the car is equipped with two hand brakes.
- Each hand brake shall be so located that it can be safely operated while car is in motion.
- The hand brake force should comply with AAR standards.

(MP&E 98-35) Multi-Unit Articulated Flat Cars–Crossover Platforms

Trailer Train Company’s (TTAX) 5-unit All Purpose Spine Cars are equipped with hand brakes that face outward at each end of the 5-unit consist. The hand brake arrangement is designed so that it can be operated while standing on the sill step or from the ground.

When a 48-foot container is placed on the “A” end unit, the end “crossover” platform is partially covered by the container and has only 10 inches exposed. The “crossover” platforms on these TTAX cars and/or platform extensions on other multi-unit articulated flat cars are not a requirement of the current safety appliance standards. Additionally, they are not used for the proper operation of the hand brakes.

Therefore, FRA will not take exception to these TTAX five-unit All Purpose Spine Cars when loaded on the A and B units with 48-foot containers that partially cover the end “crossover” platforms.

However, FRA requires that safety appliances or supports for safety appliances be mechanically fastened. Brackets that are applied to a car structure other than a tank car, solely for the securement of safety appliances, are to be mechanically fastened to the car structure.

(MP&E 98-5) Standard Level and Low Level Auto Rack Cars

Since the origination of the radial door and its application to auto rack cars, many clearance problems have developed. Because of the nature of these problems, the **vertical** relationship of the side ladders and sill steps has been altered in such a manner that there are variations of misalignment from 5 to 13 inches. The Federal Railroad Administration (FRA) feels that this has created a potential safety hazard and that FRA needs to establish guidelines to implement improvement in this area. FRA and the Car Manufacturers determined that the following dimensions be adopted:

<u>Standard Level Cars</u>	<u>Relationship of Sill Step to Side Ladder</u>
All cars	2-3/16 inch maximum
<u>Low Level Cars</u>	
Built 1978 and prior	5-inch maximum
Built after 1978	4-inch maximum
	<u>Flat Cars</u>

Federal Railroad Administration

(MP&E 98-16) DODX 40000 Series Flat Cars

In the past, inspectors have questioned whether DODX 4000 series flat cars are in compliance with 49 CFR § 231.6(a)(3)(i), which requires that “Each hand brake shall be so located that it can be safely operated while car is in motion.”

These cars are designed to have a 2½ by 8-inch slot in the car floor near each corner. These slots are considered by FRA as “grab holes,” so that the hand brake can be safely operated using this “grab hole” when the car is in motion.

These cars were built primarily to haul M-1 tanks, which are 12 feet wide. The car floor is only 10-feet 8-inches wide. The hand brake is located so that the tanks can be loaded or unloaded.

Also, it has been reported that these cars have a missing bottom rod safety support.

These cars are equipped with Buckeye 6-wheel trucks with truck-mounted brakes. Because of the truck mounted brakes, bottom rods requiring safety supports are found only on the hand brake truck. There are two bottom rods. One is equipped with two safety supports, while the other has only one. The truck, as designed, lacks a bracket or other location to which an effective fourth safety support can be attached. The brake rod in question measures 35 inches between pivot points. The loss of a connecting pin at the unsupported end of the rod would cause the rod to drop a ½-inch over a distance of 7 inches before it encountered the existing safety support. The minimum clearance above the rail would still be more than 2½ inches.

Inspectors should take no exception to cars so equipped.

(MP&E 98-69) Safety Appliance Arrangements on Flat Cars

§ 231.6 specifies the minimum requirements for safety appliances on flat cars. However, over the years, other arrangements have been agreed upon without being incorporated into the standards. Therefore, new and reassigned employees, as well as new car builders, may not be aware of such agreements.

One revised arrangement of horizontal side handholds occurred when the TTAX decided to eliminate the vertical handhold on long bridge plates. This side handhold arrangement follows.

Side Handholds:

- Dimensions: Same as specified for flat cars, except length not less than 18-inches, and diameter not less than 1-inch when legs are extra long.
- Manner of Application: Same as specified for “Box and Other House Cars.”
- Location: One over each sill step on top of rub rail projecting upward, not less than 27 nor more than 34 inches above tread of sill step. Clearance at outer end should

not be more than 8 inches from end of car.

All other safety appliances on piggyback cars should conform to those specified for flat cars. Also, additional handholds provided to facilitate use of hand brakes, including handholds on stub bridge plates, should be retained.

Any flat car that has a low-mounted side hand brake, should be equipped with a second handhold at the hand brake corner 15 to 16 inches above the handhold described previously. The tread of the sill step at this location should be widened to not less than 4 inches and be provided with an anti-skid surface. When possible the length of such sill step should be increased to not less than 14 inches.

The additional handholds and wider sill step to facilitate the use of the low-mounted side hand brake were agreed upon because of the requirement in § 231.6(a)(3)(i), “Each hand brake shall be so located that it can be safely operated while car is in motion.” The inspector should become familiar with these arrangements.

(MP&E 00-07) Safety Appliance Arrangements on Flat Cars with Low-Mounted Side Hand Brakes

Section 231.6 specifies the minimum requirements for safety appliances on flat cars. However, over the years, other alternative safety appliance arrangements have been used by the industry and permitted by FRA in order to accommodate the unique designs of various flat cars. This is particularly true with regard to flat cars equipped with low-mounted side hand brakes. FRA previously issued guidance related to these types of flat cars in Technical Bulletin (TB) **MP&E 98-69**. This bulletin is intended to supplement that previously provided guidance.

Section 231.6(a)(3)(i) requires that “Each hand brake shall be so located that it can be safely operated while car is in motion.” FRA has consistently viewed compliance with this provision as dependent on whether safe operation is possible given the intended location of the hand brake in relation to other safety appliances necessary for its safe operation. As a result, merely providing the handholds explicitly required by § 231.6, does not guarantee that a hand brake can be safely operated. For example, flat cars with low-mounted side hand brakes may need to be equipped with additional safety appliances, over and above those specifically required in § 231.6, in order for the hand brake to be safely operated while the car is in motion.

TB **MP&E 98-69**, incorporating guidance contained in previous FRA technical bulletins dating back to the mid-1970’s, contained guidance regarding one safety appliance arrangement that was acceptable to FRA on flat cars equipped with low-mounted side hand brakes to ensure compliance with the requirement contained in § 231.6(a)(3)(i). In that TB, FRA made clear that it would not take exception to such flat cars if: (i) they were equipped with a second handhold at the hand brake corner 15 to 16 inches above the handhold located over each sill step; (ii) the tread of the sill step at that location was widened to not less than four (4) inches and was provided with an anti-skid surface; and (ii) when possible, the length of such sill step was increased to not less than 14 inches. Such guidance, while not imposing new requirements, provides the industry with certainty about how to comply with the existing requirement at § 231.6(a)(3)(i).

Federal Railroad Administration

Recently, FRA has discovered that the safety appliance arrangements on numerous flat cars with low-mounted side hand brakes are being modified to eliminate the second handhold described above. This handhold is being removed due to the constant damage being sustained by the appliance during the loading and unloading of the flat cars. In order to prevent the continuous damage to these necessary appliances and to ensure the safety of employees while applying the hand brake on these flat cars, FRA believes that additional guidance is needed to provide an alternative to the safety appliance arrangement described in TB **MP&E 98-69**.

Consequently, in addition to the safety appliance arrangement described above, FRA will not take exception to the safety appliance arrangement on any flat car equipped with a low-mounted side hand brake if: (i) the flat car is equipped with a second handhold at the hand brake corner mounted on the end sill not more than 12 inches from the end of the car so as to align with the outer edge of the sill step and not less than 2 inches, nor more than 6 inches, from the side of the car; (ii) the handhold is a minimum of 18 inches in width and not less than 15 inches, nor more than 21 inches, in height; (iii) the tread of the sill step at this location is widened to not less than 4 inches and is provided with an anti-skid surface; and (iv) when possible, the length of such sill step is increased to not less than 14 inches.

As noted above, the guidance contained in TB **MP&E 98-69** remains in effect, and the present guidance merely provides an additional safety appliance arrangement to which FRA will not take exception. Although this TB recognizes two safety appliance arrangements that are acceptable to FRA for meeting the requirement contained in § 231.6(a)(3)(i), with regard to flat cars with low-mounted side hand brakes, there may be other safety appliance arrangements that would also ensure compliance with this requirement on such flat cars. However, merely removing a handhold that followed the guidance of TB **MP&E 98-69** will likely result in a car that does not comply with § 231.6(a)(3)(i).

Covered Hopper Cars

(MP&E 98-23) Covered Hopper Cars – Running Board Extensions

There have been several inquiries concerning running board extensions.

FRA's position is that a running board end extension is not required if the end of the longitudinal running board is at least 6 inches from the vertical plane and the longitudinal running board extends at least the entire length of the roof. In other words, if the longitudinal roof running board does not extend at least the entire length of the roof, a running board extension is required.

Roof Hatch/Walkway Blockage

FRA does not believe open hatch covers on top of cars to be a significant safety issue due to prohibitions of individuals on the top of cars and the ease with which the obstruction can be rectified. If an inspector finds a significant number of instances of open hatch covers, the inspector should contact the Regional Specialist and/or Headquarters, prior to issuing any violations.

Cars of Special Construction

(MP&E 98-17) Bulkhead Flat Cars

Although the Safety Appliance Standards do not specifically address bulkhead flatcars, these cars would be considered a car of special construction. [Section] 231.18 states that cars of special construction must have, as nearly as possible, the same complement of handholds, sill steps, ladders, hand brakes, and running boards that are required for cars of the nearest approximate type.

FRA is of the opinion that this car, with fixed ends above the floor, most closely resembles cars described in § 231.27, “Box and other house cars without roof hatches or placed in service after October 1, 1966.”

Therefore, bulkhead flat cars built or placed in service after October 1, 1966 should comply as nearly as possible with all the requirements of this section.

(MP&E 98-19) “Differential” 100 -Ton Covered Hopper Cars Built by the Thrall Car Manufacturing Company.

On “pressure differential” 100-Ton Covered Hopper Cars, built by the Thrall Car Manufacturing Company, the end platform and end platform handholds are less than 60 inches long because of structural considerations.

Structural justification for the design is to place supports on the flat end sheet, at locations that will prevent over-stressing the sheet when the car is pressurized.

A letter was sent to the Thrall Car Manufacturing Company, General Electric, and Rail Car Services with the following information:

- Concerning the safety appliance arrangement on “Differential” 100-ton covered hopper cars. Specifically, the end platforms and horizontal end platform handholds having a length of less than 60 inches.
- Please be advised that due to the structural design of these cars (curved-sided), FRA will not take exception to the end platforms and horizontal end platform handholds having a length of less than 60 inches. FRA will consider these cars to be of special construction and conform to those requirements, as specified in § 231.18.

Coil Steel Cars

Over the past several years numerous concerns have been raised regarding the classification of Coil Steel Cars under the Safety Appliance Standards contained in 49 CFR part 231. Because

Federal Railroad Administration

Coil Steel Cars do not conform to any of the car types specifically identified in part 231, these cars must be considered **cars of special construction**, pursuant to 49 CFR § 231.18, which states:

Cars of construction not covered specifically in the foregoing sections in this part, relative to handholds, sill steps, ladders, hand brakes and running boards may be considered as of special construction, but shall have, as nearly as possible, the same complement of handholds, sill steps, ladders, hand brakes, and running boards as are required for cars of the nearest approximate type.

Historically, the determination of what type of car specifically identified in part 231 is the “nearest approximate type” to a Coil Steel Car has differed depending on the manufacturer, railroad, and/or FRA personnel involved in making the decision. For the most part, the differing views are the result of the reality that all Coil Steel Cars are not designed or manufactured in an identical fashion. Thus, although this type of car is universally referred to as a “Coil Steel Car,” the cars have unique designs and are constructed differently depending on the manufacturer of the car and/or the date on which the car was built. These variations in the design and construction of Coil Steel Cars have resulted in a number of different interpretations relating to what constitutes the car of “nearest approximate type” under § 231.18.

To date, FRA has generally determined that the nearest approximate type of car, specifically identified in part 231, to a Coil Steel Car is either a flat car or a low-sided gondola car. See 49 CFR §§ 231.6 and 231.5. FRA considers either of these applications to be appropriate and acceptable. Thus, if a Coil Steel Car conforms to the requirements related to either of the above noted car types, then no exception should be taken. When inspecting Coil Steel Cars, FRA inspectors must base their determination of what constitutes the “nearest approximate type” of car under part 231 on previous FRA sample car inspections, if one was performed, and upon the historical application of the regulations to that particular car.

Furthermore, historically, FRA has not taken exception to covers on coil steel cars as to the location and fastening of handholds, railings, or covers that are mixed on a different car than the original design except, if a cover handhold or railing does not have proper clearance, is broken, or is included as part of the hand brake arrangement to support the operation of a hand brake while the car is in motion.

In situations where an FRA Inspector cannot determine the “nearest approximate type” of car, the following procedures shall be applied:

- The inspector should request from the operating railroad the letter issued by FRA, relating to the sample car inspection performed on that series of cars, indicating the sample car inspection “car type” as determined by FRA headquarters. If the car conforms to the requirements related to “car type” indicated by the sample car inspection, then no exception should be taken.
- If the operating railroad cannot produce the above-described document or a sample car inspection was not performed, the “nearest approximate type” of car will be

determined by the FRA inspector and the inspector will document all noncomplying conditions on FRA Form F6180.4a to include photos.

- FRA's Inspector should also request an UMLER or AAR report that indicates the "car type" as determined by the industry from the operating railroad.
- The above-noted information should be sent to the regional MP&E Specialist, who will then submit all of the above information to headquarters with a request for guidance.

Tank Car Applications and Guidance

(MP&E 98-31) Safety Chains on Tank Cars

Operating platforms on tank cars without underframes are addressed in §231.21(j)(3), which states:

(3) *Location.* (i) Operating platform to be of sufficient length to provide access to all operating fittings. Ladder to be located on sides of car at center.

(ii) The safety railing shall enclose the operating platform, manway and fittings used in the loading and unloading of the tank. Railing shall be open only at the ladders where it shall extend in a vertical direction down to, and be securely attached to the platform. Maximum width of opening, twenty-four inches.

Additionally, there are tank cars constructed with top-operating platforms which have end ladders at each end of the tank car, rather than side ladders, in accordance with § 231.18, *Cars of special construction*.

Therefore, openings in the operating platform allowing access to the ladders do not require safety railing (safety chain) enclosure. All other openings of the operating platform require enclosure. See **Figures 7 and 8**.

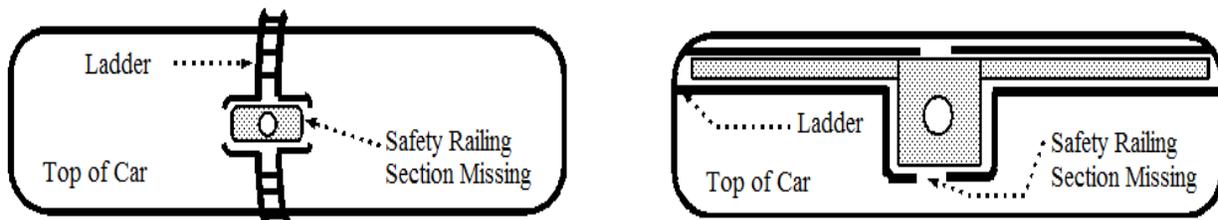


Figure 7 - Noncompliance conditions for tank car operating platform

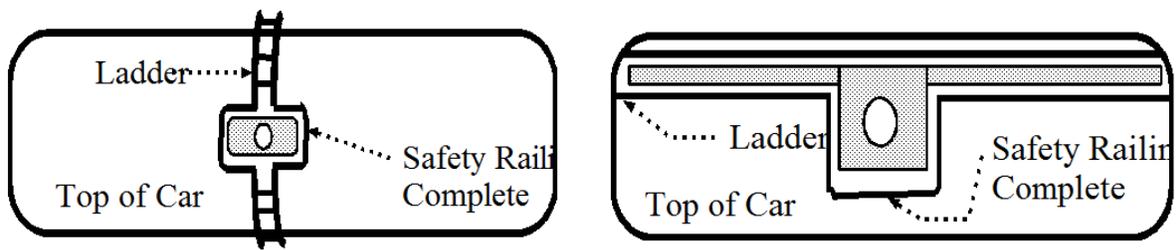


Figure 8 - Compliant railing on tank car operating platform

(MP&E 00-06) Manufacture and Repair of Operating Platforms and Operating Platform Safety Railings On Tank Cars Without Underframes

Section 231.21(j) specifies the minimum requirements for operating platforms on tank cars without underframes. However, many variations in the manufacture and repair of these platforms and the platform safety railings have been in use for a number of years, causing confusion among FRA inspectors and manufacturers as to which methods comply with Federal regulations.

In order to establish consistency within the industry, FRA hosted a committee comprised of representatives from FRA, AAR, Railway Progress Institute, and several major tank car manufacturers. Based on the information provided at the committee meetings and FRA's prior enforcement of the requirements pertaining to operating platforms on these tank cars, this technical bulletin and its attachments provide guidance regarding the various methods of manufacture and repair of operating platforms and operating platform safety railings on these tank cars that are acceptable to FRA.

Section 231.21(j) requires the operating platforms and related safety railings on tank cars without underframes to be "securely attached" or "securely fastened." FRA has a longstanding interpretation of these phrases which requires that the safety appliances be mechanically fastened. See MP&E Technical Bulletin 98-14. However, FRA believes it is necessary and consistent with both safety and FRA's previous enforcement of Part 231 to exercise its enforcement discretion and continue to allow the weldment of certain portions of the safety appliances on these operating platforms. Tank cars have been manufactured for numerous years with operating platforms that have handrails welded to stanchions and stanchions welded to car body brackets. Tank cars built in this manner have operated for decades without creating any known safety hazard. Thus, FRA will not take exception to existing equipment with these types of safety appliance arrangements, but will require mechanical attachment of such appliances on all tank cars with operating platforms built after January 1, 2000, and when repairs are required on equipment built prior to that date. See Exhibit G, Figures 17 and 18.

Similarly, FRA has allowed safety railings on operating platforms to be repaired using weldment under certain controlled conditions. Thus, the guidance contained in this bulletin merely acknowledges repair and fabrication requirements for safety railings on operating platforms that are consistent with existing practices to which FRA has not taken exception in the past. FRA

believes that the fabrication and repair requirements related to handrails, contained in Exhibits A and F, Figures 13 through 16, do not result in a reduction of the structural integrity of the railings. Furthermore, although weldment is permitted at intermediate points in the railing, the railing is mechanically fastened at the end locations where it is attached to the operating platform or stanchion.

FRA will exercise its enforcement discretion and not take exception to the factory weldment of safety appliance brackets at intermediate locations on the grating of operating platforms. See Exhibits A and D, Figures 7 through 9. There are several reasons for this exercise of discretion. The gratings used on operating platforms have been manufactured for years with these intermediate brackets being directly welded to the gratings, and FRA is not aware of any safety hazards arising from this design. Furthermore, due to the high quality of factory welds, a mechanical fastener would add little or no structural strength to the attachment. In addition, this type of weldment will be permitted only on intermediate brackets, where less stress is being placed on the attachment. All platform attachments at end supports will be required to be mechanically fastened. See Exhibits A and C, Figures 6 and 6A. Moreover, the only field repair that will be permitted on intermediate brackets will be replacement of the grating assembly with a factory-made assembly or application of mechanical fasteners. See Exhibits A and D, Figures 7 through 9.

The guidance contained in this bulletin applies only to operating platforms on tank cars without underframes and is not intended to apply to safety appliances at any other location on a car. See Exhibits: A through I.

Exhibit A:

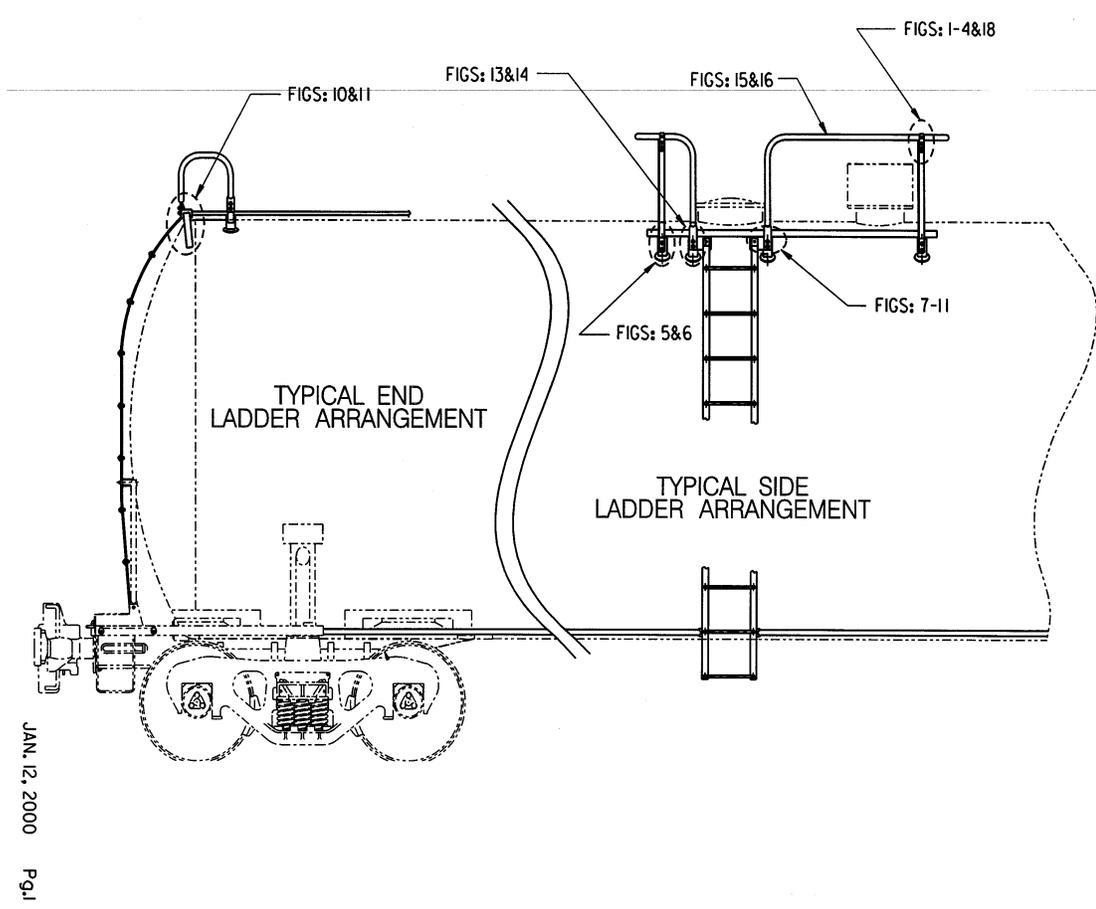


Exhibit B:

STANCHION TO RAILING ATTACHMENT OPTIONS

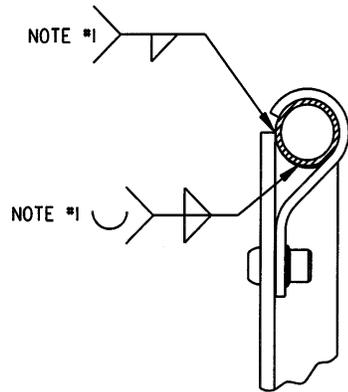


Fig. 1
Fastened Single Clip

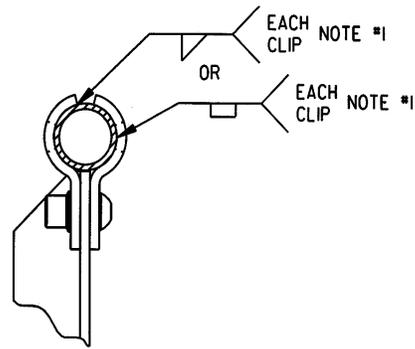


Fig. 2
Fastened Double Clip

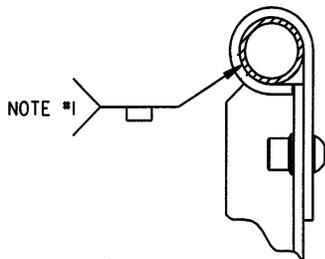


Fig. 3
Fastened Wrap-around Clip

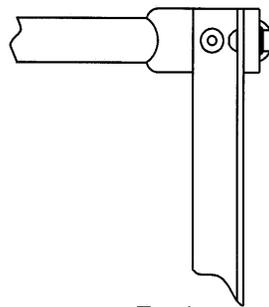


Fig. 4
Fastened

NOTE #1: Welding in addition to Mechanical Fasteners is acceptable at the option of industry. Additional fasteners are acceptable.

Exhibit C:

TYPICAL GRATING ASSEMBLY, WELDING

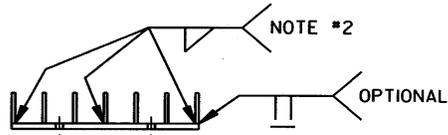
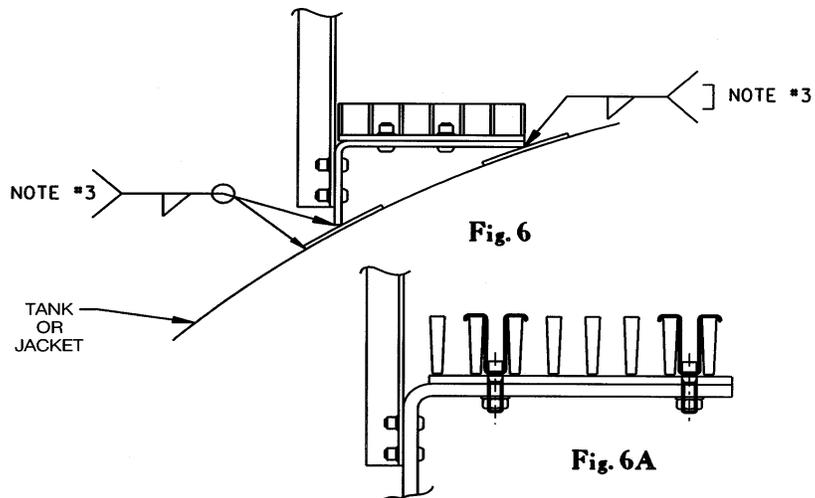


Fig. 5

TYPICAL PLATFORM ATTACHMENT AT END SUPPORTS

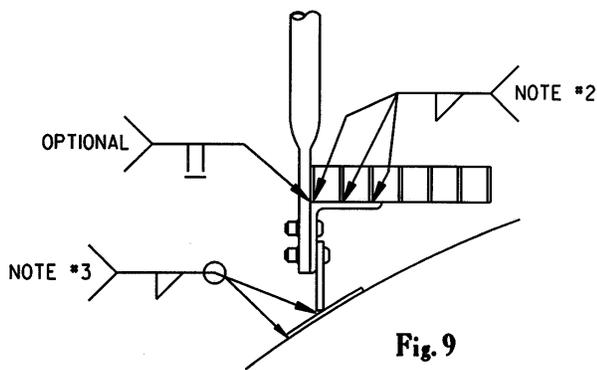
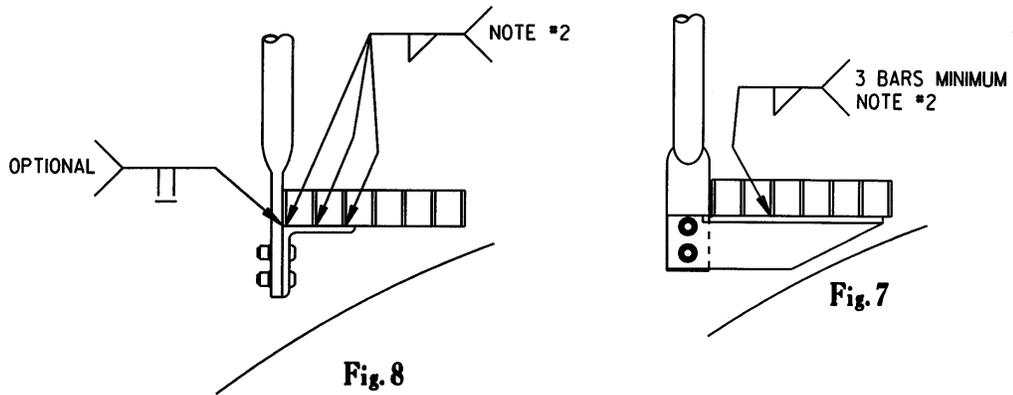


NOTE #2: Factory Welds or Mechanical Fasteners are acceptable securement at these locations. Field repairs require Mechanical Fasteners or Factory Made Assemblies.

NOTE #3: Field welding acceptable at these locations.

Exhibit D:

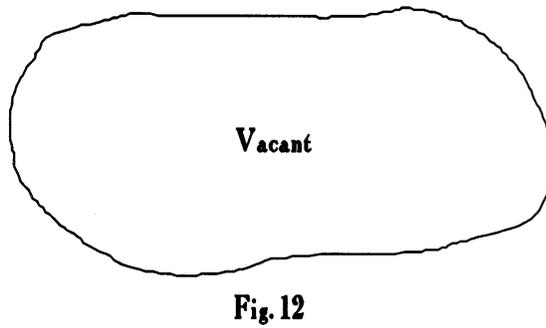
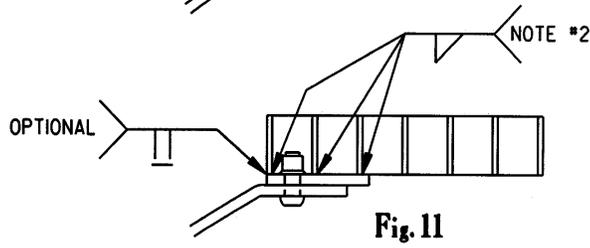
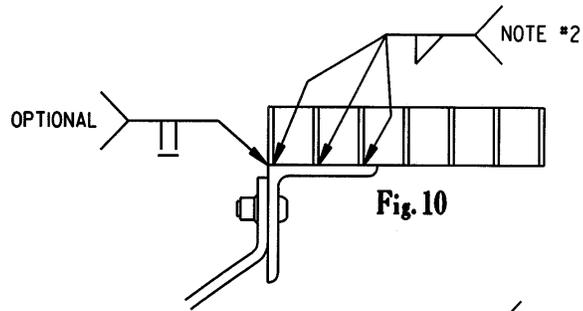
ATTACHMENT TO GRATING AT INTERMEDIATE LOCATIONS



NOTE #2: Factory Welds or Mechanical Fasteners are acceptable securement at these locations. Field repairs require Mechanical Fasteners or Factory Assemblies.

NOTE #3: Field welding acceptable at these locations.

TYPICAL LADDER TO GRATING ATTACHMENT



NOTE #2: Factory Welds or Meshanical Fasteners are acceptable securements at these locations. Field repairs require Mechanical Fasteners or Factory Made Assemblies.

Exhibit F:

FABRICATION AND REPAIR OF PIPE RAILING

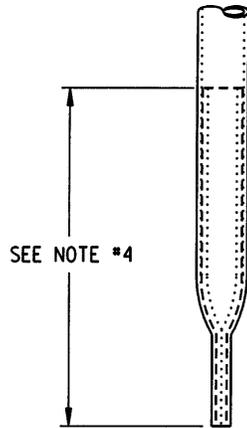


Fig. 13
Typical
Reinforcement Insert
where Flattened

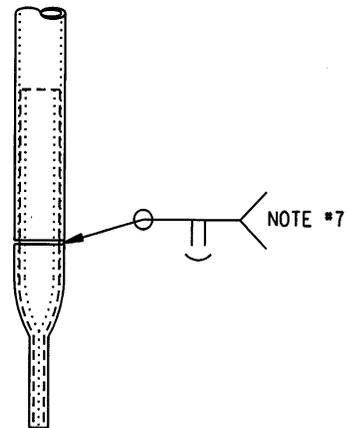


Fig. 14
Typical Repair
See Note 5

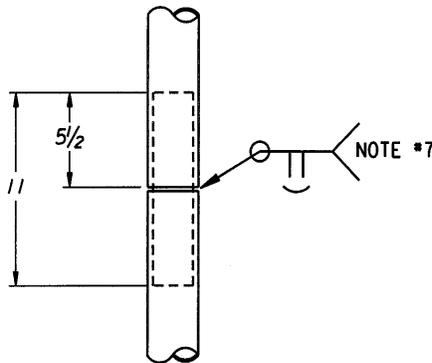


Fig. 15
See Note 6

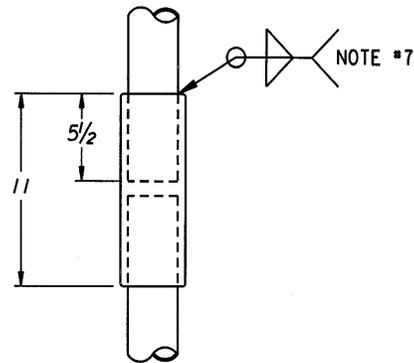


Fig. 16

NOTE #4: When safety railing is 1 1/4 inch pipe and involves flattening, pipe must be reinforced with a steel pipe insert at least 11 inches long or twice the length of the flattened portion, whichever is greater.

NOTE #5: Repair in accordance with AAR Interchange Rule 81 Figure 81, 1999 revision, attached.

NOTE #6: In Accordance with 6/28/96 FRA Letter to UTC and sketch x-6994.

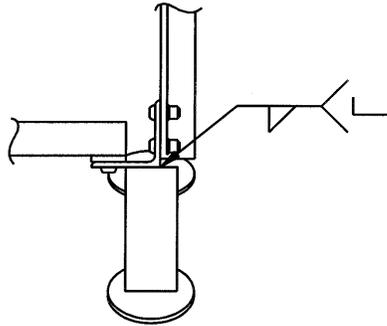
NOTE #7: Break sharp edges

Jan. 12, 2000 Pg. 6

Federal Railroad Administration

Exhibit G:

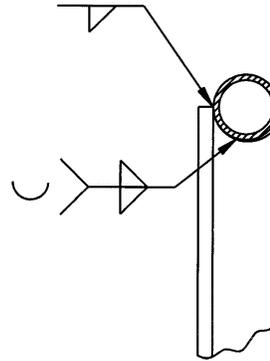
*ATTACHMENTS APPROVED ONLY FOR
EXISTING CARS BUILT PRIOR TO JAN. 01, 2000



Stanchion to Bracket Attachment*

Fig. 17

See Note 8



Railing to Stanchion Attachment
All Welded*

Fig. 18

See Note 9

NOTE *8: Field repairs require mechanical attachment similar to Figure 6.

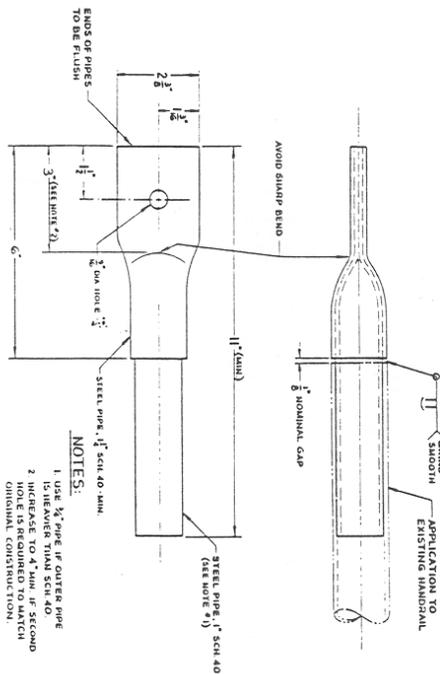
NOTE *9: Field repairs require mechanical fasteners similar to Figures 1 thru 3.

Exhibit H:

RULE 81 – TANK AND TANK CAR REPAIRS

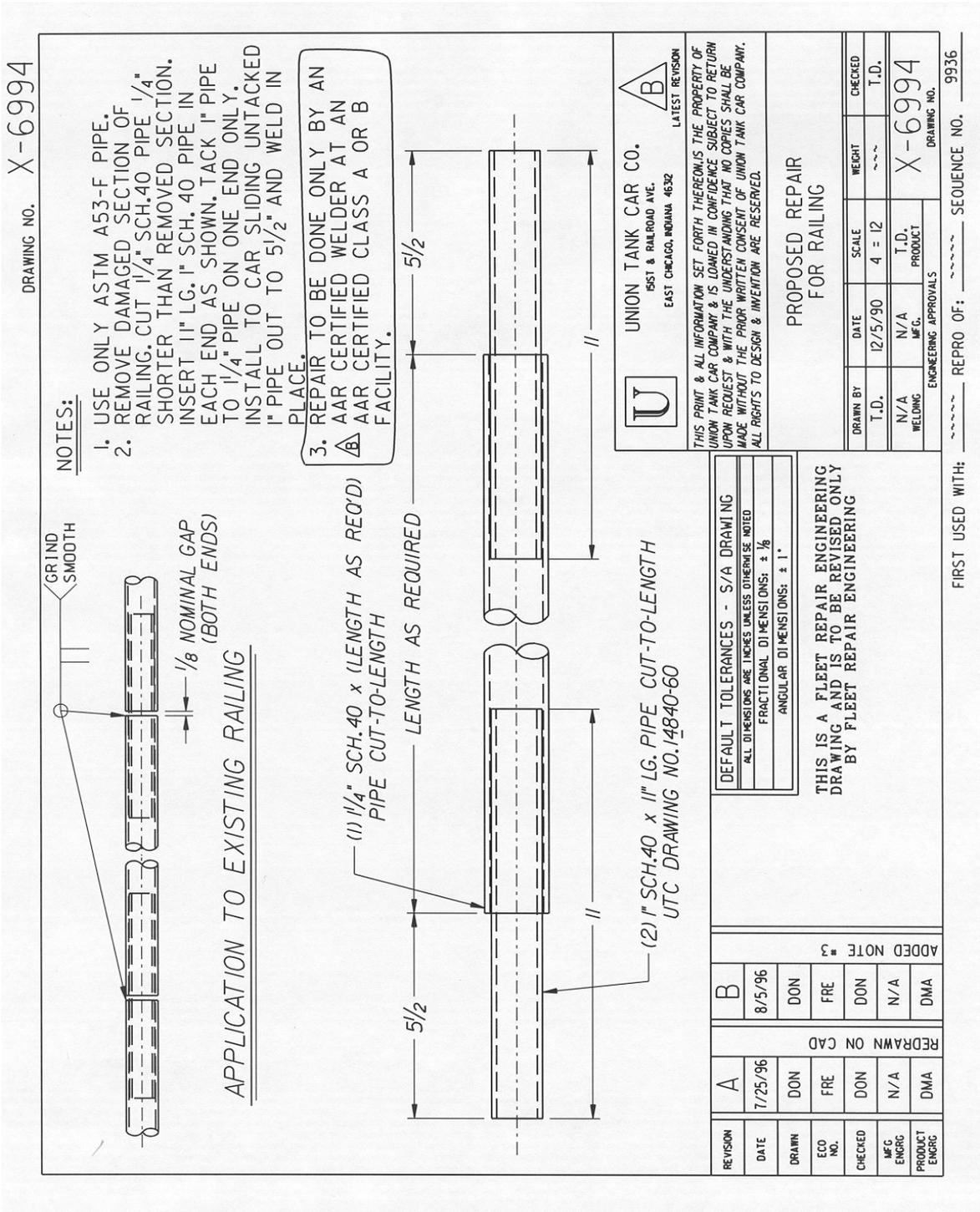
- A. Cause For Repairs
 - 1. As required
- B. Correct Repairs
 - 1. End platform safety railing may be renewed in kind or substituted for each other when used as specified providing steel pipe and solid steel are not intermixed.
 - a. 1 1/4 inch schedule 40 steel pipe.
 - b. 3/4 inch diameter solid steel.
 - 2. When safety railing is 1 1/4 inch pipe and involves flattening, pipe must be reinforced with a steel pipe insert at least 11 inches long or twice the length of the flattened portion, whichever is greater (see Figure A).
 - 3. Tank cars with tanks requiring welded repair, removal of deformations, alteration, conversion or qualification must be processed in a facility that has a current AAR M-1003 Certification per AAR Specification for Quality Assurance, Section J.
- C. Recondition Requirements
 - 1. As required
- D. Welding Requirements
 - 1. Welding is not permitted to tanks of tank cars unless:
 - a. Facility (or an extension thereof) performing welding is certified to M-1002 and M-1003 by the AAR for welded repairs to tanks of welded construction.
 - b. All applicable requirements of the current Hazardous Materials Regulations of the Department of Transportation and Appendix R of AAR Specifications for Tank Cars have been complied with.
 - 2. On tank cars without continuous center sills (stub sill design) welding of cracks in parent metal of the stub sill structural members, or in sill-to-pad welds, is not permitted if any portion of the cracks are within 12 inches of the attachment of the stub sill or in the tank reinforcing pad, except welding which is performed by welders qualified in accord with the latest revision of AAR's Specifications for Tank Cars, and by a M-1002/M-1003 certified facility.
 - 3. Welding is not permitted to the following:
 - a. Tank car end platform safety railings, side railings, or operating platform safety railings, all other handrails/guardrails, except as shown in Figure A, or as provided for in the original approved design.

RULE 81
FIGURE A



- E. General Information
 - 1. For items of repair to tank cars that are common to all cars, see the specific Rule that governs.
 - 2. Painting tanks of tank cars, including underframe and parts, will be reported as outlined in Rule 80.
 - 3. For actual time in repairing and testing tank of tank car, see Rule 75.
 - 4. Cleaning tanks of tank cars, in connection with repairs to tank proper, shall be on actual time basis, per Job Code 4450 of Rule 75.
 - 5. Repairs to tank car head shields and their attachments (excluding hand brake and safety appliance attachments) must be performed only at the direction of the car owner and by an AAR certified shop as shown in Appendix B of Specifications of Tank Cars.
 - 6. Pipe union must not be used in making repairs to handrails of tank cars.
 - 7. Additional charge may be made for accessories such as pipe clamps which require R&R or R in order to make repairs.
 - 8. The application of fabricated tank car handrails/dome safety platform handrails as provided for in the original approved construction shall be reported on a securement basis per Rule 74.

Exhibit I:



Chapter 11

Brake System Safety Standards for Freight & Other Non-Passenger Trains & Equipment; End-of-Train Devices Part 232

Introduction

The Power Brake Regulations were revised and issued January 17, 2001, with an effective date of April 1, 2001. In order to give the railroads and contractors sufficient time to develop and provide the required training to their employees, the implementation date for the majority of the provisions was April 4, 2004.

The following guidelines and interpretations have been developed to aid Federal and State Inspector(s) conducting inspections for compliance with part 232. It is important that agency interpretations and policies be adhered to by every Inspector when conducting these inspections, so that uniformity of compliance activity is achieved. Reports of power brake inspections are made on the Motive Power and Equipment (MP&E) Inspection Report **F6180.96**. Violations are to be submitted on the MP&E Violation Report – **FRA F6180.109**.

Strict liability applies when a railroad uses vehicle (car, locomotive, tender, or similar vehicle) or allows it to be used with a defective power brake condition, and appropriate enforcement action must be taken unless the vehicle has been properly tagged and is being moved to the nearest repair location for the purpose of repair. In order to establish a violation of part 232, FRA must prove that the vehicle was “in use” or “allowed to be used” with a defective condition. Thus, evidence that the equipment was in use or allowed to be used with a defective power brake condition is always necessary to support a violation. Additionally, FRA considers a vehicle “in use” or allowed to be used as long as the railroad has or should have completed its required tests and inspections and the vehicle is deemed ready for service, prior to any movement or the actual departure. Defects found at this time are subject to potential civil penalties. Therefore, the Inspector is not required to wait for a vehicle with a defective power brake to depart or engage in an actual “haul” in order to assess a violation. In accordance with the above “in use” interpretation, the violation report must establish that the railroad had completed or should have completed all necessary inspections capable of discovering the defective condition(s).

Therefore, evidence must be included in the violation report that establishes the Inspector’s basis for this finding. Be as specific as possible. Inspectors should include names of people, if they are available and the information that they provide is helpful in establishing “use”; however, remember to use judgment and discretion in exercising FRA’s enforcement authority. In some situations it may not be the best or appropriate approach to include such information (for example, it would not be appropriate to include a person’s name if doing so would reveal the identity of a complainant in a complaint-based investigation). In many circumstances the best approach is to establish actual use or movement of the equipment.

Federal Railroad Administration

Inspectors are expected to use sound judgment, along with the procedures and guidance provided in both this manual and the General Manual when assessing the need for appropriate enforcement actions regarding any non-compliance with part 232.

In the past, questions were raised concerning the method of compiling air brake inspection data. Therefore, a variety of activity codes and source codes were developed for power brake inspection activities. There are codes that distinguish whether cars are “on-air” or “off-air” when inspections for air brake compliance, part 232, are performed. For the purposes of this discussion, “on-air” means the car has sufficient brake pipe pressure to operate the air brake pistons, and the car is inspected with the brakes applied. This could be either with a full service or an emergency brake application. “Off-air” means the car is inspected without the brakes applied. FRA Inspectors routinely examine cars that are not “on-air” to inspect for the securement of the brake equipment, the position of the retainers, condition of the brake pipe and valves, the operation of angle cocks, etc. Such inspections are included in the car count under the activity code for part 232. However, many functions of the brakes cannot be observed; i.e. piston travel limits, binding or fouling, audible air leaks, etc.

FRA also needed to distinguish between “inbound” and “outbound” extended haul inspections, and there was a need to separate inspection activities of MP&E Inspectors and OP Inspectors. Therefore, to accomplish the above, Inspectors shall use the following activity or source codes for part 232 inspection activities:

<u>Activity Code</u>	<u>Inspection Activity</u>
232	Any car inspected for Part 232 compliance that does not have the brakes applied.
232A	Any car inspected for Part 232 compliance that has the brakes applied by either a service reduction or an emergency application, so that the functionality of the brakes and piston travel limits can be observed.
232T	Anytime a train air brake test is observed.
232E	An inspection of the End-of-Train Device is conducted.
232S	Monitoring a single car or repair track air brake test.
232O	OP Inspectors observing and Initial Terminal brake test in the cab of the locomotive only.
232X	OP Inspectors conducting inspections for securement of freight locomotive equipment.

Source Code

Z

Outbound Extended Haul train inspections.

Inspectors are also reminded that they need to verify the number of cars inspected before entering the number on the inspection report. Do not rely solely upon the representation of railroad personnel or train consist sheets to determine how many cars are inspected. There are several methods Inspectors could use, including counting the cars with hand-held counters, or using the train consist and checking off the cars as they are inspected.

§ 232.3 Applicability

Part 232 generally applies to all freight and other non-passenger train brake systems and equipment. However, subpart E – End-of-train devices, applies to both freight and passenger train operations.

Circus trains are required to comply with part 232. Tourist, scenic, historic or excursion operations that are part of the general railroad system of transportation have to comply with the provisions of part 232 as it existed on May 31, 2001, prior to the effective date of the new regulations. The text of the regulations as they existed on May 31, 2001 is found in Appendix B of the new rule.

Private cars are designed to carry passengers and are generally hauled in both freight and passenger trains. These types of cars may be covered by part 232 as well as the Passenger Equipment Safety Standards in part 238. For example, private cars will be subject to the maintenance and equipment standards applicable to passenger equipment, but will be covered by the inspection requirements contained in this part when hauled in a freight train.

Maintenance of Way (MofW) vehicles must comply with part 232. This includes passenger MofW vehicles as long as they were built on or after September 21, 1945.

§ 232.5 Definitions

This regulation contains an extensive set of definitions that are intended to clarify the meanings of important terms used in the text of the final rule. The text of the definitions was carefully worded to minimize the potential for misinterpretations. However, a few terms have elicited further questions that will be addressed as follows:

Air flow indicator, AFM: As the definition states, the indicator face must display markings from 10 cubic feet per minute (CFM) in increments of 10 CFM or less. It must also display numerals indicating 20, 40, 60 and 80 CFM. If an indicator is marked with numerals of 2, 4, 6, 8, 10, 12, it is not an indicator that can be used to qualify the brake pipe pressure of a train, in lieu of conducting a brake pipe leakage test. It may still be used by the engineer for the purpose of operating a train and it must be tested for accuracy within the prescribed time periods.

Federal Railroad Administration

Brake, effective: Means a brake that is capable of producing its nominally designed retarding force on the train. Inspectors often find instances where only the top or bottom half of a brake shoe is in contact with the wheel and question whether this is an effective brake. FRA conducted studies with the AAR and found that this condition does **not** render a brake ineffective. Therefore it is not, and should not be considered, a defective condition.

Off air: Means not connected to a continuous source of compressed air of at least 60 pounds per square inch (psi). If the automatic brake valve is drawn down below 60 psi, the train would be off air.

Previously tested equipment: Means equipment that has received a Class I brake test and has not been off air for more than 4 hours. If equipment is charged to 60 psi and recharged every 3 hours and 45 minutes, then the equipment would **not** be considered off air.

Qualified Mechanical Inspector (QMI): The only time a QMI is required is for the inspection and testing requirements for extended haul trains found in § 232.213 and ECP per § 232.607(a)(1).

Qualified person: An Inspector should observe the performance and outcome of an individual conducting an inspection or test and ask appropriate questions to determine if an individual is a qualified person. If there are questions concerning the knowledge, skills, or ability of an individual, notify the Regional Specialist for further instructions on how to obtain the training records to determine if the training requirements have been fulfilled. The agency does not want Inspectors requesting training records on individuals. This should be done by the Regional Specialist or Headquarters Specialist.

“Roll-by” inspection: This is only applicable for the “release of brakes” portion of the inspection. It does not constitute an inspection of one side of the train for the purpose of satisfying the requirement of inspecting both sides of the train during a brake inspection.

Switching service: Is defined as the classification of freight cars according to commodity or destination; assembling of cars for train movements; changing the position of cars for purposes of loading, unloading, or weighing; placing of locomotives or cars for repair or storage; or moving of rail equipment in connection with work service **that does not constitute a train movement**. Thus, even if a train is involved in switching, it will require a brake test, if it will engage in a “train movement,” as determined by FRA. The determination of whether the movement of cars is a “train movement” or a “switching movement” is and will be based on the extensive case law developed by various courts of the United States.

FRA’s general rule of thumb as to whether a trip constitutes a **“train movement”** requires 5 or more cars coupled together that are hauled a distance of at least 1 mile without a stop to set off or pick up a car and not moving for the purpose of assembling or disassembling a train. However, FRA may consider movements of less than one 1 mile “train movements” if various circumstances exist. In determining whether a particular movement constitutes a “train movement,” FRA conducts a multi-factor analysis based upon the discussions contained in various court decisions on the subject. See e.g. United States v. Seaboard Air Line R.R. Co., 361

Motive Power and Equipment Compliance Manual

U.S. 78 (1959); Louisville & Jeffersonville Bridge Co. v. United States, 249 U.S. 543 (1919). The following factors are taken into consideration by FRA: the purpose of the movement; the distance traveled without a stop to set out or pick up cars; the number of cars hauled; and the hazards associated with the particular route traveled (e.g., the existence of public or private crossings with or without crossing protection, the steepness of the grade, the existence of curves, any other conditions that minimize the locomotive engineer's sight distance and any other conditions that may create a greater need for power brakes during the movement). The existence of any of these hazards would tend to weigh towards the finding of a "train movement," since these are the types of hazards against which the power brake provisions on the Federal rail safety laws were designed to give protection.

Transfer train: May pick-up and set-out cars while enroute. Any cars picked-up will have to receive at a minimum, a transfer train brake test. However, this does not start a new 20-mile transfer train unless a transfer train brake test is performed on the entire train at that particular location. Yes, a train could travel 100 miles as a transfer train, if a transfer train brake test is performed at every 20-mile segment of the trip.

Unit or Cycle train: Must remain coupled as a consist and continuously operates from location A to location B and back to location A. FRA will not take exception if the train is separated for the purpose of loading/unloading, as long as the cars are not off-air for more than four (4) hours and the consist remains in the original order. A block of cars can be added and removed as long as the cars added are given a Class I brake test before the block of cars are added to the train.

§ 232.9 Responsibility for Compliance

This section contains the "use" or "haul" language as previously discussed. It basically states that any train, railroad car, or locomotive covered by this part will be considered "in use" prior to departure, but after it receives or should have received the necessary tests and inspections required for movement. FRA will not necessarily wait for a piece of equipment with a power brake defect to be hauled before issuing a violation report and recommending a civil penalty. FRA believes that this approach increases FRA's ability to prevent the movement of defective equipment that creates a potential safety hazard to both the public and railroad employees. If Inspectors rely on the "in use" provision, the violation report must establish that the railroad has completed or should have completed all necessary inspections capable of discovering the defective condition(s). Therefore, evidence must be included in the violation report that establishes the Inspector's basis for this finding. Be as specific and thorough as possible. Remember, this is added enforcement flexibility and may not be the best approach in certain situations.

At interchange, a railroad can refuse to accept vehicle with a non-complying condition. In this scenario, if a railroad elects to receive the defective vehicle and the vehicle is not properly tagged, both the offering railroad and the receiving railroad can be held liable.

Paragraph (c) states that any "person" that performs any function or task required by this part will be deemed to have consented to FRA inspection of the person's operation to the extent necessary to ensure that the function or task is being performed in accordance with the

Federal Railroad Administration

requirements of this part. This provision is intended to put railroads, contractors and manufacturers that elect to perform tasks required by this part on notice that they are consenting to FRA's inspection for rail safety purposes of that portion of their operation that is performing the function or task required by this part. In most cases, this function or task involves a contractor's performance of certain required brake inspections or the performance of specified maintenance on cars, such as conducting single car or repair track tests on behalf of a railroad. FRA believes that if a person is going to perform a task required by this part, FRA must have the ability to view the performance of such a task to ensure that it is conducted in compliance with federal regulations. This is supported by 49 U.S.C. § 20107, which requires that FRA be allowed access to a railroad's property at a reasonable time and a reasonable way to conduct inspections. If an Inspector encounters a location that prohibits access on the property to perform an inspection, the Regional Specialist should be immediately notified, who will then contact Headquarters for further instructions.

§ 232.11 Penalties

This section identifies the penalties that may be imposed upon a person, including a railroad or an independent contractor providing goods or services to a railroad, that violates any requirement of this part. While the responsibility for non-complying equipment is usually applied to the hauling railroad, if a contractor is performing one of the required inspections and/or tests, the responsibility can be placed on either the contractor or the railroad, or both. The Inspector should consult with the Regional Specialist to determine where the enforcement action should be directed. The schedule of civil penalties is listed in Appendix A of this rule.

§ 232.15 Movement of Defective Equipment

This section contains the provision regarding the movement of equipment with defective brakes without civil penalty liability.

Paragraph (a) of this section contains various parameters which must exist in order for a railroad to be permitted to haul a piece of equipment with defective brakes for repairs without civil penalty liability. The rule contains language in the provisions that accurately reflect the language contained in the existing statutory provisions pertaining to the movement of equipment with defective brakes.

The statutory provisions contained in 49 U.S.C. § 20303 (previously 45 U.S.C. § 13) govern the movement of equipment with defective or insecure safety appliances, which includes power brakes. This only allows the railroad to move the defective equipment from the place where the defect is first discovered to the **nearest** location where the necessary repairs can be made. This movement can either be on the railroad where the defect is first discovered or on the line of the connecting railroad, only if the connecting railroad has elected to accept the non-complying equipment and the point of repair on the connecting railroad's line, where the equipment will be repaired, is no farther than the point where the repairs could have been made on the line where the equipment was first found to be defective. A railroad can refuse to accept a defective car at interchange. Until the receiving railroad accepts the car by either moving it or otherwise exercising control over it, it is not liable for civil penalties nor is it required to make any repairs.

Motive Power and Equipment Compliance Manual

It should be noted that the delivering railroad remains liable for each defective car it tenders in interchange unless the car is properly tagged.

A car or locomotive with a defective air brake condition cannot be tagged and moved from a location that has the capability to make the necessary repairs. Nor can a car or locomotive with a defective brake condition be tagged and moved in a train that receives a Class I brake test on the **entire** train, irrespective of whether it is at a location where repairs cannot be made.

The statutory provision contained in 49 U.S.C. § 20303 is an affirmative defense to be established by the railroad. There are 7 elements which must be established:

1. The car was properly equipped with power brakes.
2. The car became defective while being used by the railroad on its line.
3. The railroad discovered the defect prior to the movement.
4. The movement was from the place where the defect was first discovered.
5. Repairs could not be made at the location where the defect was first discovered.
6. Movement was necessary to make the necessary repairs
7. The car moved only to the nearest available point where the necessary repairs could be made.

Paragraph (b) of this section contains the specific requirements regarding the tagging of equipment found with defective brake components. The requirements contained in this paragraph are very similar to the tagging requirements contained in part 215, regarding the movement of equipment not in compliance with the Freight Car Safety Standards. This paragraph also permits the use of an automated tracking system in lieu of directly tagging the equipment if the automated system is approved for use by FRA. If and when a procedure is approved, Inspectors will be notified by a Technical Bulletin issued by Headquarters. Any automated tracking system approved for use by FRA must be capable of being reviewed and monitored by FRA at any time (i.e. 24 hours a day, 7 days a week). There must be security features specific to monitoring and tracking defective equipment with which the system is outfitted. There also must be procedures in place in the event the electronic tracking system were to experience a breakdown or malfunction and become unavailable to railroad personnel. As both the statute and the regulation permit the interchange of defective equipment, in specified circumstances, FRA finds it unrealistic to believe that a railroad will not take advantage of this flexibility. Therefore, there would have to be a method on how a foreign railroad that receives equipment at interchange will have knowledge that it is receiving defective equipment without access to the railroad's automated tracking system at the interchange location. Also, how it will handle defective equipment being delivered to it in interchange by another railroad would have to be addressed. There are no regulations establishing tagging requirements for safety appliance defects.

Paragraph (c) restricts the movement of a vehicle with defective brakes for the purpose of unloading or purging, unless it is necessary for the safe repair of the car. Therefore, cars with defective brakes cannot be moved to a location to be loaded or unloaded until the defective condition is corrected, unless the location is the location where the repairs will be made.

Federal Railroad Administration

Paragraph (e) contains the guidelines for train placement. If a freight car or locomotive has inoperative brakes, it cannot be placed as the rear car of a train. This provision would apply to multi-unit articulated equipment if the rear control valve is cut-out. Additionally, there cannot be two or more freight cars consecutively placed in the same train if both cars either have inoperative brakes or are not equipped power brakes. Finally, a multi-unit articulated equipment with a defective brake cannot be placed in a train if more than 2 consecutive individual control valves are cut-out.

Paragraph (f) contains general guidelines that FRA will consider when determining whether a location is one which should be considered a location where brake system repairs must be made. FRA expects a railroad to consider the guidance contained in this paragraph when making its decisions on where equipment containing brake defects will be repaired. The guidance contained in this paragraph is based upon, and consistent with, the voluminous case law which exists that establishes the guiding principles for determining whether a location constitutes a location where the necessary repairs can be made, and whether a location is the nearest location where such repairs can be effectuated. These guidelines are equally applicable to determining such repair locations for all safety appliance defects. The guidelines must be applied on a case-by-case basis to determine if the railroad acted in good faith in moving defective equipment. The following guidelines should be used to determine if a location should be considered a repair location:

- Whether the location has an operative repair track or repair shop.
- Whether the location is a place where the railroad performs mechanical repairs other than safety appliance and/or power brake repairs.
- Whether repair truck(s) are permanently stationed there or whether they come from another location.
- Whether the location is a place where a mobile repair truck is used on a regular basis.

These guidelines provide the outlines for determining what is a repair location, but Inspectors will often need to provide details to support their conclusions. For instance, Inspectors must fully explain trackage availability in the narrative if the location is a place where a mobile repair truck is used. Similarly, if the location is being identified as a mobile repair truck location, they should explain where nearest major facility is in relation to the mobile repair truck location (i.e. repair shop or location where mobile repair truck is permanently stationed or originates). Additionally, they should discuss the type of repair facility, including what types of repairs are made at the location and any other pertinent information.

While FRA acknowledges that not every location where a mobile repair truck is capable of making repairs should be considered a repair location, FRA firmly believes that locations where repair trucks are used in virtually the same manner as a fixed facility should be considered when determining whether the location is capable of making the necessary repairs.

In determining whether a location, noted above, is capable of making a particular repair, the following factors must also be considered:

- The accessibility of the location to persons responsible for making repairs.

Motive Power and Equipment Compliance Manual

- The presence of hazardous conditions that affect the ability to safely make repairs of the type needed at the location.
- The nature of the repair necessary to bring the car into compliance.
- The need for railroads to have in place an effective means to ensure the safe and timely repair of equipment.
- The relevant weather conditions at the location that affect accessibility or create hazardous conditions.
- A location need not have the ability to effectuate every type of safety appliance or power brake repair in order to be considered a location where some safety appliance or power brake repairs can be made.
- A location need not be staffed continuously in order to be considered a location where safety appliance repairs can be performed.
- The congestion of work at a location shall not be considered.

In addition to considering the factors noted above for determining if the location is the nearest location where the necessary repairs can be made, Inspectors must consider distance to the location -- although this is a key factor, it should not be the determining factor. This must be considered in conjunction with all the factors previously noted as well as the following safety considerations:

- The safety of the employees responsible for getting the equipment to or from a particular location; and
- The safety hazards involved in moving the equipment in the direction of travel necessary to get it to a particular location.

Inspectors need to address the items discussed in Paragraph (f) in the written narrative if civil penalties are being pursued.

Paragraph (g) provides a method by which a railroad may designate locations where various brake system repairs will be conducted. See Appendix B of the Compliance Manual for the railroads that have designated locations where brake system repairs will be conducted. This not only provides the railroad name, but the list of locations designated by the railroad.

§ 232.17 Special approval process

This section contains the procedures to be followed when seeking to obtain FRA approval of a pre-revenue service acceptance plan under §232.505 for completely new brake system technologies or major upgrades to existing systems or when seeking approval of an alternative to the test standard incorporated in §§232.305 or 232.307.

§ 232.103 General requirements for all train brake systems

This section contains general requirements that are applicable to all freight and non-passenger train brake systems. This section specifically includes certain basic train brake system practices and procedures that form the foundation for the safe operation of all types of trains.

Federal Railroad Administration

Paragraph (d) requires 100% operative brakes where a Class I brake test is required to be performed. This applies only when the Class I test is performed on the **entire** train. It does not apply at locations where a railroad elects to perform a Class I brake test on cars that are picked-up en route and added to an existing through-train. Therefore, it is permissible to conduct a Class I brake test on cars picked-up en route and move a car with defective brakes from that location under the provisions of §232.15 – *Movement of defective equipment*. Although FRA recognizes that the 100% requirement may be somewhat burdensome for some railroads at certain locations, FRA believes that the number of locations involved is relatively low and should be formally handled on a case-by-case basis through the existing waiver process. Railroads applying for such waivers must be able to establish a true need for the exception and must be willing to provide alternative operating procedures that ensure the safety of the trains being operated from those locations.

Paragraph (g) requires the piston travel limits be indicated by either a stencil, sticker, or badge plate on all cars except for cars equipped with nominal 12-inch stroke (8½ and 10-inch diameter) brake cylinders. **Note:** there are some applications of 12 x 10-inch brake cylinders that have a 5-inch range. For these applications, a stencil, sticker or badge plate would have to convey that information.

Furthermore, pursuant to FRA's conditional approval of a waiver request related to minimum piston travel requirements, see docket number FRA-2004-19402, these cars shall have the empty/load valve tested, if so equipped, as prescribed in AAR Standard S-486-04, Sections 4.6.1 through 4.6.5, anytime a single car test is performed on the car, irrespective of whether the valve has been changed or not. Please note that this test is not required if the car is loaded, since the test can only be performed when the car is empty.

Often there are inquiries concerning the proper method for measuring brake cylinder piston travel on freight cars. In order to achieve consistent compliance, the following procedure will be used to measure piston travel. The actual movement of the piston is the distance that must be measured. To determine this measurement, the longstanding practice of measuring piston travel from the front of the brake cylinder (non-pressure head) to the grease mark on the hollow rod will be used. If a grease mark is not evident, a line scribed on the hollow rod would suffice (see **Figure 1**). If there is confusion as to what the piston travel should be on a particular car, refer to either the badge plate or stenciling located in a conspicuous place near the brake cylinder.

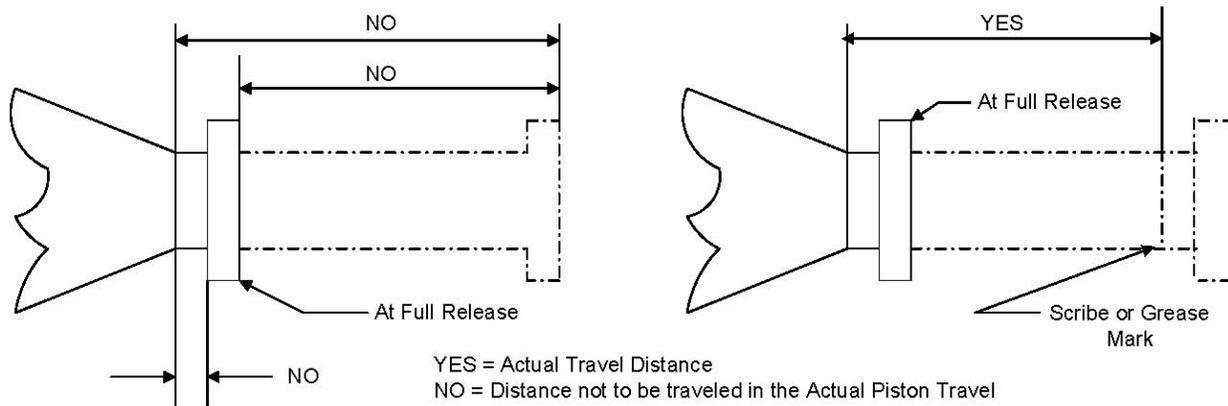


Figure 1: Method of measuring the piston travel

Paragraph (h) requires that all cars placed into service on or after April 1, 2004, be designed so that an Inspector does not have to place himself or herself on, under or between components of the equipment to observe brake application or release. This paragraph also allows railroads the flexibility of using a reliable indicator in place of requiring direct observation of the brake application or piston travel because the designs of some freight car brake systems make direct observation extremely difficult unless the Inspector places himself or herself underneath the equipment. Although the rule permits the use of an indicator for purposes of determining piston travel, the individual inspecting such equipment would be required to inspect all components of the brake system for proper operation.

Paragraph (n) addresses the securement of unattended equipment by means of applying handbrakes, venting brake pipe to zero and leaving the angle cock open on one end of a cut of car(s) and requiring the railroad to develop and implement procedures to verify that the equipment is secure. Unattended equipment is equipment left standing and unmanned in such a manner that the brake system of the equipment cannot be readily controlled by a qualified person. When assessing this situation for compliance, the Inspector should take into account following factors:

- Can a person take corrective action if the equipment should start to roll away?
- Can the individual readily mount the car and apply the handbrake or can the individual safely open an angle cock should the equipment start to roll away?
- Can the individual readily mount the locomotive and either apply the handbrake or operate the brake handles or emergency brake valve to stop the unexpected movement?
- Is the qualified person focused on the situation? For example, if the individual is eating lunch or in the bathroom, full attention is not being given to the equipment. If the individual is in a crew room or talking on the phone, full attention is not being given to the equipment.

Federal Railroad Administration

If an engineer and crew gets off of their train to watch a passing train, and remains in close proximity of their locomotive consist, handbrakes would not have to be applied on the locomotives, as long as someone is close enough to readily mount the locomotive and apply an emergency brake or handbrake, should the locomotives or train start to roll away. If the engineer and crew got off their train and positioned themselves between the passing train and their train, handbrakes would have to be applied, as their train would be considered unattended.

FRA will not take exception to a train crew cutting away from a cut of cars, initiating an emergency brake application on the cut of cars, and then closing the angle cock for the sole purpose of taking the locomotives to the opposite end of the cut of cars to either: (1) couple the locomotives to the cars; or (2) open the angle cock at the other end and leave the angle cock open and vented to atmosphere as required under 49 CFR § 232.103(n)(2). However, if the locomotive cuts away from the cars and closes the angle cock without going “directly” to the other end to either open the angle cock or couple the locomotives to the cars, the railroad would be in violation of 49 CFR § 232.103(n)(2). The emphasis is “**directly**” because even though it may be the train crew’s intent to go “directly” to the opposite end of the cars to take the appropriate action, if a train dispatcher, or whomever, directs the crew to perform another job task before they “directly” go to the opposite end of the cars, a violation is committed. It is only with the understanding that the train crew goes “directly” to the other end of the cars to take the appropriate action that FRA will permit this type of activity.

The term “Yard Limits” as used in the context of this paragraph for the securement of equipment means:

A system of tracks, other than main tracks and sidings, used for classifying cars, making up and inspecting trains, and/or storing cars.

See 49 CFR § 232.7. The securement requirements contained in this rule do not apply to distributed power locomotives when they are placed in a train. However, if locomotives are left in a yard or siding waiting to be used as distributed power and they are unattended, appropriate handbrakes have to be applied.

A locomotive consist is 1 or more locomotives coupled together. They do not have to have the electrical cables connected, nor do they have to have the air hoses coupled. As long as the locomotives are coupled together via the coupler, it is a locomotive consist.

Locomotives located in a locomotive servicing area under the control of mechanical forces do not have to have handbrakes applied while mechanical personnel are preparing them for service. However, once the mechanical people are finished and/or have placed them on “ready tracks” for the train crew or hostler, appropriate handbrakes would have to be applied. Also, train crews have to apply appropriate handbrakes on locomotives they leave in servicing areas, unless mechanical personnel are in place to take immediate control of the locomotives. Anytime mechanical forces are not on duty at a service track location, appropriate handbrakes have to be applied.

In yard environments where there is active switching activity, there must be a sufficient number of cars secured on both ends of a yard track. The unattended, unattached railcars between the secured ends do not have to be secured. In sidings along the right-of-way, cars must be secured to prevent any car, or group of cars, from rolling out of the siding.

Paragraph (n)(1) includes a performance-based requirement that a sufficient number of handbrakes be applied to hold the equipment and that railroads have to develop and implement a process or procedure to verify that the applied handbrakes will sufficiently hold the equipment when the air brakes are released. This requires a railroad to develop appropriate operating rules to verify the sufficiency of the handbrakes applied, which can be tailored to the specific territory and equipment operated by the railroad. This can be as elaborate as the use of a sophisticated matrix or some type of “set calculations” that specify exactly how many handbrakes have to be applied on specific numbers of cars; or it can be as simple as having the engineer release the pneumatic brakes after the handbrakes have been applied, to determine if the equipment is secure. To simply have instructions that state “a sufficient number of handbrakes have to be applied” does not satisfy the intent of the regulation, unless there is the provision that the pneumatic brake has to be released to determine the equipment is secure.

§ 232.105 General requirements for locomotives

This section contains general provisions related to locomotives. It does not include provisions related to the inspection and maintenance of the locomotive braking systems, as these requirements are adequately addressed in Part 229. The exception is the locomotive handbrake or parking brake, which has to be inspected and necessary repairs made as often as service requires, but no less frequently than every 368 days. The date of the last inspection must be entered on Form FRA F6180-49A or suitably stenciled or tagged on the locomotive. Transport Canada’s Cab Form 22, Item 8(a) includes this same information. The information in Item 8(a) of Transport Canada Cab Form 22 satisfies FRA’s requirements.

§ 232.107 Air source requirements

This section contains requirements directed at ensuring that freight brake systems are devoid, to the maximum extent practical, of water and other contaminants which could conceivably deteriorate components of the brake system and, thus, negatively impact the ability of the brake system to function as intended.

Paragraph (a) requires railroads to adopt and comply with a plan to monitor all yard air sources to ensure that the yard air sources operate as intended, are in proper condition, and do not introduce contaminants into the brake system of freight equipment. FRA intends to make clear that the inspections required under this paragraph are to be thorough inspections of the entire yard air source. This inspection would include not only the compressors, but all piping, hoses, valves, and any other component or part of the yard air source to ensure it is in proper condition and operates as intended. This also means that corrective action must be taken on any component that does not operate as intended, such as replacing desiccant in air dryers, and/or tightening pipe connections in the yard to stop air leaks, and replace defective valves and hoses.

Federal Railroad Administration

These inspection requirements apply to any air compressor that is capable of introducing contaminants into the brake pipe of a car or locomotive. Shop compressors, rental compressors and portable air compressors will have to receive the periodic inspections and repairs, along with a written plan and records.

Railroads must maintain records (either electronically or in writing) related to yard air monitoring plans. FRA believes that these records are necessary to ensure that railroads are properly conducting the required inspections and are taking timely and appropriate remedial action when a problem air source is detected.

The monitoring plans apply to any yard air source, either a stationary or portable air compressor, that is used to introduce compressed air into cars and/or locomotives.

While this rule does not contain specific requirements regarding the use of air dryers on either locomotives or yard air sources, it is FRA's position that air dryers must be properly maintained. Therefore, if an Inspector finds an air dryer that is inoperative or has contaminated desiccant, appropriate enforcement action should be taken. For locomotives, §232.105(a) "safe and suitable", should be cited. If the deflection condition is found on a yard air source, the Inspector should review the air monitoring plans and records for compliance.

Paragraph (c) retains the proposed requirement that a railroad adopt and comply with detailed written operating procedures tailored to the equipment and territory of the railroad to promote safe train operations during cold weather situations.

§ 232.109 Dynamic brake requirements

Paragraph (a) requires that a locomotive engineer be informed of the operational status of the dynamic brakes on the locomotives the engineer will be required to operate. This information is to be provided to the locomotive engineer at a train's initial terminal and at other locations where a locomotive engineer first begins operation of a train. While it allows railroads to provide a locomotive engineer with the required information by any means they deem appropriate, the rule is clear that a written or electronic record of the information provided shall be maintained in the cab of the controlling locomotive. This will ensure that relief or other oncoming engineers will have the information that was provided to the previous locomotive engineer. The information required has to inform the engineer of exactly how many units have operating dynamic brakes. This is only required on railroads that use or operate locomotives with dynamic brakes.

Paragraph (b) requires that a locomotive with inoperative dynamic brakes must be repaired within 30 days of being found inoperative or at the locomotive's next periodic inspection, whichever occurs first. If the locomotive is not in a shop that can effectuate the dynamic brake repairs at either the 30-day time period or the locomotive's periodic inspection, the locomotive must be tagged and moved as prescribed in § 232.15, as this is a power brake defect. It cannot be tagged and moved under the provisions of § 229.9. If the locomotive happens to be on a foreign railroad when either the 30-day time period or periodic inspection is due and the movement would require the locomotive to pass several repair locations before it could be

returned to the owning railroad, the foreign railroad must make repairs or ask FRA for permission to move the locomotive past the repair points.

Paragraph (c) contains the requirements related to the tagging of a locomotive found with inoperative dynamic brakes. This should be done when the defective condition is initially identified. Since the locomotive engineer generally discovers this defect, he or she should properly fill out the tag and apply it to the locomotive.

Paragraph (e) contains the provision permitting a railroad to declare a locomotive's dynamic brakes "deactivated" if the following requirements are met: (1) the locomotive is clearly marked with the words "dynamic brake deactivated" in a conspicuous location in the cab of the locomotive; and (2) the railroad has taken appropriate action to ensure that the deactivated locomotive is incapable of utilizing dynamic braking effort to retard or control train speed. It should be noted that FRA intends for this provision to be a permanent application and not used as a solution to circumvent or delay the repair of a defective dynamic brake.

The provisions of § 232.109 are intended to apply to those trains that utilize their dynamic brakes during the train movement. Thus, if the involved run is one on which dynamic brakes are usually employed, then all of the requirements of § 232.109 would apply. Similarly, if the train operation is one where dynamic brakes are not used, then the provisions like §§ 232.109(f) and (g) would not be applicable. Sections 232.109(f) and (g) do not apply to trains used in helper service.

Q: Is it permissible to depart a location where a train originates or a terminal where locomotives can be rearranged, without the controlling unit having dynamic brakes?

A: Yes, but only in two (2) limited circumstances:

1. The locomotive consist is not intended to have dynamic brakes used while in transit (if the run generally requires or usually utilizes dynamic brakes, then this would not apply);
2. The controlling locomotive is capable of controlling the dynamic brakes on trailing units **and** is equipped with either an accelerometer or a dynamic brake indicator.

Q: If a train departs location A with all of the dynamic brakes working and prior to arrival at an intermediate terminal (crew change point), the dynamic brake fails on the lead unit, does the unit have to be swapped or repaired prior to departure from the crew change point?

A: If the unit is equipped as stated above, NO. If not so equipped, then the unit needs to be switched out where it is safe to do so, this may or may not be the crew change point depending on the track availability.

Q: If a train consist that departed an initial terminal with working dynamic brakes and arrives at its destination with defective dynamic brakes, can it depart if there are no other locomotives available?

Federal Railroad Administration

A: Only if the controlling locomotive is capable of controlling the dynamic brakes on trailing units **and** is equipped with either an accelerometer or a dynamic brake indicator. If none of the units had an operative dynamic brake, FRA would still require an accelerometer, if this train operated over a route that required the use of dynamic brakes.

§ 232.111 Train information handling

This section contains the requirements regarding the handling of train information. This information has to be updated whenever a new train crew takes charge of a train. This information is applicable to trains receiving a transfer air brake test and operating as transfer train movement. However, this information would not have to be on a transfer move made within the confines of a yard, as defined in 49 CFR § 232.7.

§ 232.203 Training requirements

This section contains the general training requirements for railroad employees and contractor employees that perform the inspections and test required by this part. Each railroad is responsible for training its employees and maintaining the required records. Likewise, the contractor is responsible for providing appropriate training to its employees and maintaining the required records and information. However, this does not relieve the railroad from potential civil penalties for, e.g., failure to perform a proper Class I brake test, if the employees of a contractor are found not to be qualified to perform the task for which they are assigned responsibility. Both the railroad and the contractor would remain liable for potential civil penalties if the employees used to perform a particular task were not properly trained and qualified in accordance with the training requirements contained in this rule.

For purposes of this section, a “contractor” is defined as a person under contract with a railroad or car owner, or an employee of a person or company under contract with a railroad or a car owner.

The training that an employee is required to receive need only address the specific skills and knowledge related to the tasks that the person will be required to perform under this part. Thus, a railroad or contractor may tailor its training programs to the needs of each of its employees based on the tasks that each of its employees will be required to perform. If an individual never performs a single car test, the railroad would not have to train for this task. If the railroad never performs a Class II brake test, the railroad would not have to train for Class II brake inspections.

Training consists of both classroom and “hands-on” instruction. FRA will accept either the traditional classroom setting with an instructor instructing the students, or an interactive computer-based training (CBT). For the CBT to be accepted, it must be interactive with questions and problem solving activities embedded into the program. It cannot be a computer program that reads information to people or displays text that must be read by the individual without methods to access the individual’s progress. FRA will not accept videos or printed material as the only medium for training. There must be some form of interaction with the

person being trained. Each person must be tested on the knowledge received from such training and the test scores must be documented.

The “hands-on” portion of the training can be a structured, formal exercise monitored by an individual, or structured efficiency tests can be used, provided such testing is properly documented and covers the necessary tasks to ensure retention of the knowledge and skills required to perform the employee’s duties required by this part. Either method must be properly documented.

The rule requires that refresher training be periodically provided at least once every three years. The refresher training has to consist of both classroom and “hands-on” training. FRA does not intend for such training to be as lengthy or as formal as the initial training originally provided, but believes that training should re-emphasize key elements of various tasks and focus on items or task that have been identified as being problematic or of poor quality by the railroad, contractor, or its employees through the periodic assessment of the training program.

FRA believes that in order for a supervisor to properly exercise oversight of an employee’s work, the supervisor must be properly trained and qualified to perform the tasks for which they have oversight responsibilities. Therefore, supervisors have to receive some level of training that has to be documented.

Paragraph (e) requires that each railroad or contractor adopt and comply with a plan to periodically assess the effectiveness of its training program. Although FRA agrees that a formal audit process may not be necessary, FRA continues to believe that railroads and contractors should periodically assess the effectiveness of their training programs. However, rather than require a formal internal audit, FRA believes that periodic assessments may be conducted through a number of different means and each railroad or contractor may have a need to conduct the assessment in a different manner. The use of efficiency tests or periodic review of employee performance could be methods for conducting such reviews. FRA agrees that many railroads, due to their small size, are capable of assessing the quality of the training their employees receive by conducting periodic supervisory spot checks or efficiency tests of their employees’ performance. However, FRA continues to believe that on larger railroads the periodic assessment of a training program should involve all segments of the workforce involved in the training.

§ 232.205 Class I brake test – initial terminal inspection

This section describes the circumstances that mandate the performance of a Class I brake test and outlines the tasks that must be performed when performing this inspection. Basically, a Class I brake test is the functional equivalent to the “initial terminal brake inspection” of the old rule.

A Class I brake test is required at locations where more than one “solid block of cars” is added to or removed from a train. It should be noted that the rule permits both the addition and the removal of a “solid block of cars” at a location without requiring the performance of a Class I brake test on the entire train. However, depending on the make-up of the block of cars, certain inspections will have to be performed on that block of cars at the location where it is added to the

Federal Railroad Administration

train. A railroad can add a single block of cars to a train that is composed of cars from numerous different trains, as long as the railroad assembles the cars into one block and performs a Class I test (or at least a Class II test) on the solid block of cars **before** adding the block to the train. Remember, this chapter of the manual only addresses the brake test requirements. Anytime cars are added to a train, a pre-departure inspection (part 215) must be performed on the cars.

When a through-train arrives at a location and splits into multiple sections, the railroad can only designate one of the sections as being the continuing train. The other sections of the train would require applicable air brake tests, depending on whether they are added as a solid block of cars to another **through-train** and have not been off air for more than four (4) hours, or they are part of a new train. If the railroad adds a locomotive to one of the sections, FRA considers this to be a new train, thereby requiring at a minimum a transfer brake test or a Class I air brake test. If the section added to a train is being made-up at that location, then the cars would have to receive the same test as the train that is being built. This would be the originating point of this type of train.

Paragraph (a)(3) permits trains to remain disconnected from a source of compressed air (“off air”) for four (4) hours without triggering the requirement to perform a Class I brake test. This would permit a railroad to recharge a train before four (4) hours elapse, so the train would retain its on-air status. This could be accomplished by either using a locomotive or yard air.

Paragraph (a)(5) permits trains received in interchange to have a previously tested solid block of cars added to the train without requiring the performance of a Class I brake test. *Previously-tested* means that the cars had to have received a Class I brake test and have not been off air for more than four (4) hours.

Railroads are permitted to remove defective equipment at any location, at any time, without triggering the requirement to perform a Class I brake test on the entire train. This also includes the location where the Class I test is performed. If the inspection reveals a defective car, the regulations do not require that another Class I test be performed after the car is removed from the train.

The rule permits using an end-of-train device (EOT) to verify rear car brake pipe pressure during a Class I brake test, provided the reading of the rear car air pressure is from the controlling or hauling locomotive of the train. Under no circumstances may the rear car brake pipe pressure be read from a remote highway vehicle, another locomotive not attached to the train, or from any other location such as a remote unit installed in an office or shop.

Handheld gauges that are used to verify the rear car brake pipe pressure are required to be accurate. That said, there are no Federal requirements that they be calibrated on a periodic basis. FRA expects a railroad to have some method in place to ensure their accuracy. This applies to all handheld gauges used for any and all brake tests.

At a minimum, the inspector for the railroad must observe both sides of the equipment sometime during the inspection process. FRA continues to believe that both sides of the equipment must be observed sometime after the occurrence of activities that have the likelihood of compromising

the integrity of the brake components of the equipment, such as: hump switching, multiple switching, loading, or unloading.

The rule requires that an adequate inspection of the brake components be conducted on both sides of the equipment sometime during the inspection process. This can occur before the brake pipe is charged and before hoses are connected. Both sides of the equipment do not have to be inspected while the brakes are applied. However, one side of the equipment must be inspected while the brakes are applied and the piston travel on each car must be inspected while the brakes are applied, which could require the individual conducting the inspection to cross the car to observe the piston travel. If an Inspector observes a railroad employee conducting the brake application portion of the inspection, and some of the pistons are mounted on the opposite side of the equipment and no attempt is made to cross over the equipment to observe the piston travel, then appropriate enforcement action (either an exception or violation based on the extent of non-compliance) should be considered for a “partial failure to inspect.” Similarly, if an inspection is being conducted from a vehicle, then the railroad employee should be observed getting out of the vehicle to observe the piston travel on truck mounted brake arrangement unless an indicator is plainly visible from the vehicle.

The presence of numerous power brake defects can be used as proof of a railroad’s failure to perform a required brake test. However, if the only evidence offered to establish a “partial failure to perform” a required inspection is the presence of one (1) car with inoperative brakes, for which a separate recommendation for violation is sought, then it would be **inappropriate** to submit a separate violation for a “partial failure to perform” referencing the involved inspection. Generally, in order to proceed with a violation for both a failure to perform a required inspection and for the underlying defective equipment, FRA would prefer additional direct evidence that some portion of the inspection was not performed (i.e.: actual observation, witness statement), or the presence of numerous non-complying cars. Otherwise, it is FRA’s policy to only assess a civil penalty for either the substantive defects or a failure to perform the required inspection, not both.

Similarly, the regulation requires trains to have 100% operative brakes unless being properly hauled for repairs. Thus, if the only evidence offered to establish less than 100% operative brakes is the presence of 1 or 2 cars with inoperative brakes, for which separate recommendations for violation are sought, then it would be **inappropriate** to submit a separate violation for the train having less than 100% operative brakes. Common sense dictates that if a freight car brake is inoperative or ineffective under § 232.103(f) at the initial terminal, then the involved train would not have 100% operative air brakes at the Class I inspection under § 232.103(d). It is FRA’s policy not to assess multiple violations that are based solely on the same defective condition. However, if a high number of cars are found with inoperative brakes or if a pattern of non-compliance is fully established, then it may be appropriate to pursue separate recommendations for violation on the individual cars as well as the train for having less than 100% operative brakes.

Paragraph (c)(4) permits a retest on a car that has a “no set.” The brakes on a retested car must remain applied until the release is initiated and that the release be initiated no less than three (3) minutes after the application of the brakes. A car can be retested with the use of a suitable

Federal Railroad Administration

device positioned at the car being retested rather than from the head of the consist or from the controlling locomotive, as long as the proper procedures are followed; brake pipe pressure charged and a 20 psi reduction made. An emergency application is not accepted. The practice of gradually opening the angle cock to initiate an application of brakes is not accepted. How many times may a railroad retest a car? As many times as they want, as long as the appropriate brake pipe pressures and reductions are made for each retest.

Paragraph (c)(5) retains the proposed and current requirement that piston travel be adjusted during the performance of a Class I brake test, if it is found outside the nominal limits established for standard 8½-inch and 10-inch diameter brake cylinder or outside the limits established for other types, which will be contained on a stencil, sticker, or badge plate. FRA modified the provision that establishes piston travel limits on cars equipped with 12-inch stroke (eight and one-half 8½ or ten (10) inch diameter) brake cylinders. The new limit is six (6) to nine (9) inches. If piston travel is found to be less than six (6) inches or more than nine (9) inches when conducting the Class I brake test, the piston travel shall be adjusted to nominally 7½ inches. This change is based on a waiver, docket number FRA-2004-19402, which was conditionally granted on August 30, 2005.

A “roll-by” inspection of the brake release is permitted, but it does not constitute an inspection of that side for purposes of inspecting both sides during the inspection. When conducting the “roll-by” inspection, the person on the ground only has to position themselves on one side of the equipment. There must be communication between the person on the ground and the locomotive engineer, so that the engineer can be told to stop the train if there are any problems.

Paragraph (c)(6) states that brake rigging shall be properly secured and shall not bind or foul or otherwise adversely affect the operation of the brake system. All types of brake rigging is subject to wear and/or damage that will cause brake rigging to bind and foul. The hook and eye arrangement is a type of brake rigging that will bind and foul when the components wear and the angularity is changed.

Types of Hook and Eye Brake Rigging:

There are two (2) types of Hook and Eye brake arrangements commonly found on freight equipment, Rigging with a Vertical Body Lever, shown in **Figure 2**; and Rigging without a Vertical Body Lever, see **Figure 3**.

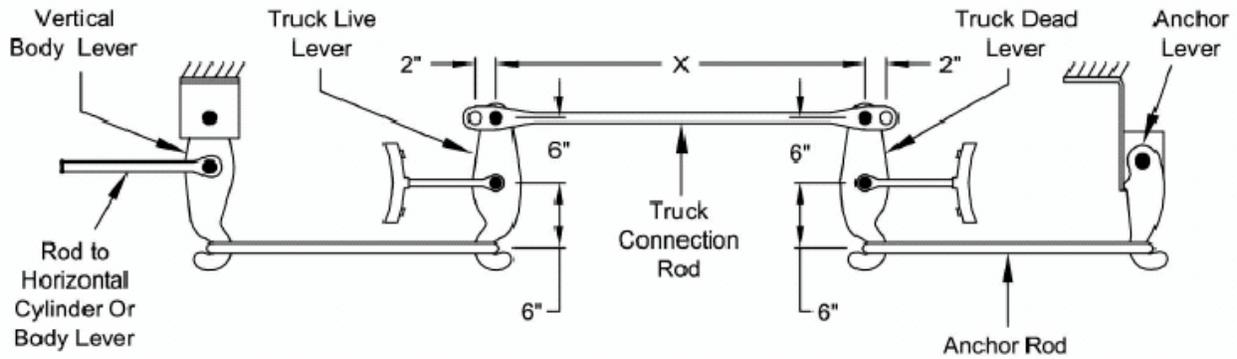


Figure 2: Hook and Eye Brake Arrangement with Vertical Body Lever

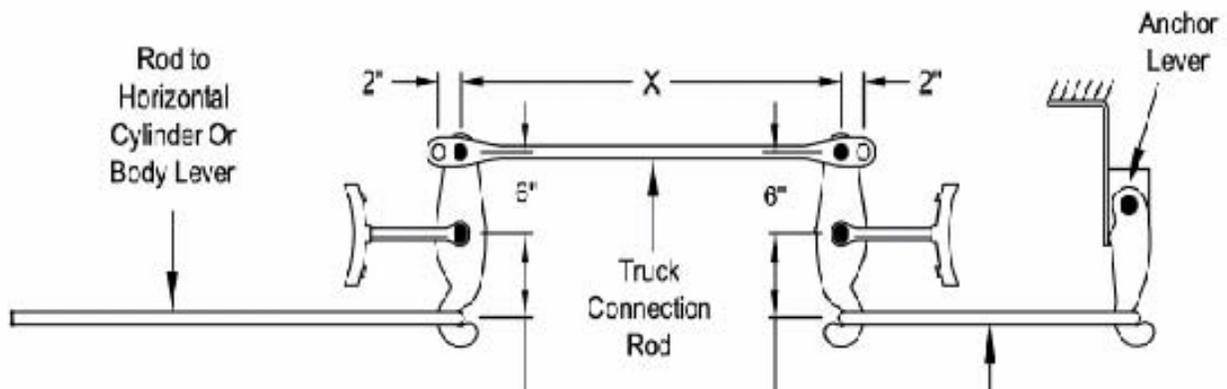


Figure 3: Hook and Eye Brake Arrangement without Vertical Body Lever

Hook and Eye Brake Rigging Fouling Conditions:

Brake rods and levers which “foul” or interfere with brake rigging performance can render a brake system ineffective.

The only real observable indication of serviceability in the field is: Piston Travel, Brake Shoe Wear, and Fouling. Fouling of the brake rigging will reduce brake performance to an unacceptable level. An alert inspector should look for signs of brake shoes ineffective when brakes applied, brake shoe orientation, how close the rigging is to a worn condition, and whether the rigging is fouling or binding.

Hook and Eye Brake Rigging New Car Condition vs. Full-Worn Condition:

A freight car which has been recently built will have brake lever angularity in the Positive (+) condition as shown below in **Figure 4**.

Note that all three (3) levers have Positive (+) angularity.

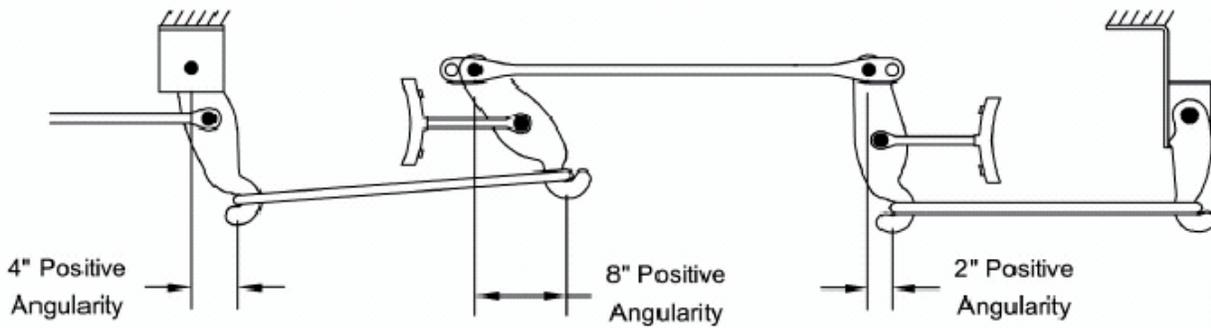


Figure 4: Brake lever angularity in the positive (+) condition

A freight car which has been in service and has a full worn brake rigging condition will have brake levers with a Negative (-) angularity (see **Figure 5**).

Note that all three (3) levers have Negative (-) angularity.

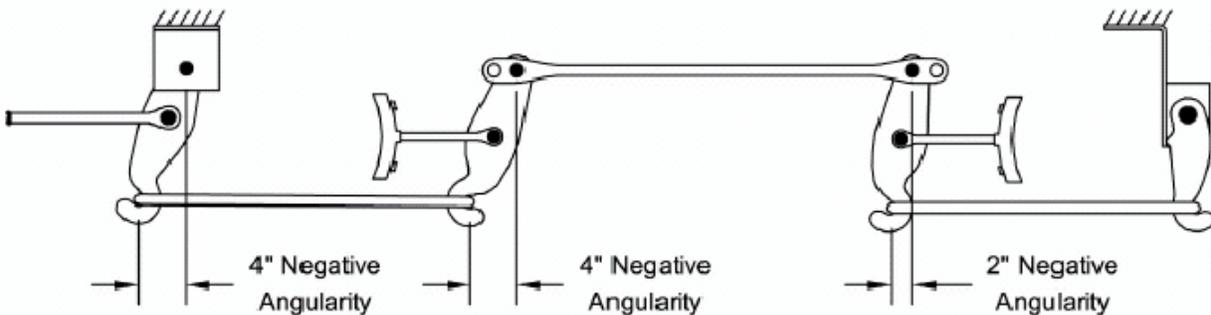


Figure 5: Brake lever angularity in the negative (-) condition

Field Inspection Criteria:

If a freight car has a Hook and Eye brake rigging arrangement, and,

- The brake shoes are serviceable;
- The brake rigging is not binding or fouled;

then the brake rigging is performing as designed and the brakes are in serviceable condition.

If the rigging is binding or fouled, the Inspector should take a violation with the appropriate activity/violation code. If the brake angularity is in the negative condition, the Inspector should note that in the comment section of the inspection report.

Paragraph (d) contains the provision stating that a carman alone will be considered a qualified person if a railroad's collective bargaining agreement (CBA) provides that Carmen are to perform the inspections and tests required by this section. FRA lacks the authority to issue binding interpretations of CBAs, or to settle a dispute between a railroad and its employees as to which group of its employees is to perform what work. FRA intends to make clear, that in order for FRA to proceed with enforcement action under this provision, a decision from a duly authorized body interpreting the relevant agreement, specifically identifying the involved location, and adequately resolving all of the interpretative issues is necessary for FRA to conclude that the work belongs to a particular group of employees. FRA's position has always been that the duly authorized body under the CBA must make a fact specific determination of any and each instance where carmen are not used specifically identifying the involved location and only then would a civil penalty be pursued. Without such a binding decision, FRA cannot make a case that the work belongs to one particular craft of workers.

Paragraph (c)(1)(i)(D) requires that the individual conducting the leakage test must wait 45 to 60 seconds before noting brake pipe leakage, as indicated by the brake pipe gauge in the locomotive, which shall not exceed 5 psi per minute. When FRA Inspectors are observing this test, they need to make sure that the 45 to 60 second window is followed by the person performing the test.

Paragraph (c)(1)(iii) contains the calibration requirements for the air flow indicator. Non-compliance with the required periodic calibration requirements for air flow indicators is an on-going issue. The non-compliance is often the result of either using the wrong test orifice, testing at the wrong brake pipe and/or main reservoir pressure, or simply not performing the calibration test.

Air flow indicators used to conduct air flow method tests are required to be tested and calibrated every 92 days. The following guidance is written for FRA Inspectors to use when observing railroad personnel qualifying air flow indicators:

1. Brake pipe (BP) leakage must be below 2 psi, in order for the air flow indicator to be accurately tested and calibrated.
2. Air Flow Method (AFM) indicators shall be tested and calibrated at 90 psi BP, using the correct calibrated orifice. The calibrated orifice should be marked with the 90 psi BP pressure, serial number, and manufacturer's part number. Verify that the correct calibration orifice is being used to perform the test. Since the manufactures recommend that test orifices should be calibrated annually, inquire about the last calibration date. If it is beyond one year, advise the railroad supervisor in charge that the orifice should be

Federal Railroad Administration

calibrated as recommended by the manufacturer and notify the regional MP&E Specialist.

- Currently, there are two (2) calibration orifice products that are available for testing and calibrating AFM indicators at 90 psi BP. They are: Wabtec's Model #0650756-0090 and Strato's Model # BOC500-20-70.
- There is also a calibrated orifice supplied by Wabco, Model #0650756-0100 which is used for BP pressure set at 100 psi. If this orifice is being used for testing and calibration, the feed valve setting must be set at 100 psi and then verify that BP is being maintained at 100 psi.

NOTE: Strato makes six other calibrated orifices that do not comply with current Federal Regulations. These orifices are designed to be used at temperatures below 20 degree Fahrenheit, which Federal Regulations do not allow.

3. To conduct the test, the correct test orifice must be applied to the BP hose glad hand (preferably the front). The angle cock is then opened to allow BP to exhaust through the orifice.
4. It is very important that BP be maintained at 90 psi (or 100 psi if using the 100 psi test orifice) during the test. Therefore, it may be necessary to adjust the feed valve setting in order to maintain BP at 90 psi. **NOTE:** The railroad should be testing BP pressure it normally uses for train operations.
5. It is also critical that the main reservoir is capable of obtaining a main reservoir (MR) pressure of 130 psi during the test. Ideally, the test reading should be taken at 130 psi MR on the MR pressure rise. It may be necessary to increase engine speed on locomotives that have mechanical driven air compressors, in order to achieve an MR pressure of 130 psi.
6. The air flow indicator must read 60 cubic feet per minute (CFM) and be accurate within ± 3 CFM. On mechanical indicators that is equivalent to the width of the pointer.
7. If the air flow indicator is not accurate within ± 3 CFM, the indicator must be calibrated. The railroad may elect to perform this function on the locomotive or remove the indicator and send it out for calibration.

(MP&E 04-01) When conducting inspections at locations that perform periodic locomotive maintenance, special attention should be given to performance of air flow indicator testing and calibration procedures, as well as the testing and calibration of locomotive air gauges and displays. Inspectors should verify that the tests are properly performed by randomly checking locomotives that are released from the shop after undergoing a periodic maintenance. On the random checks, request that the railroad properly perform a retest, and if the air flow indicator is not in compliance, appropriate enforcement action should be taken. If a location has a high incidence of non-compliance with air flow indicators and/or air gauges, immediately notify the

Motive Power and Equipment Compliance Manual

Regional MP&E Specialist to determine what additional enforcement action(s) should be taken.

Federal Railroad Administration

Paragraph (e) states that when a Class I test is performed on an entire train the engineer shall be notified of the successful test. Most of the time this notification is provided to the engineer in writing, but it can be provided via a hand held radio, a cellular telephone, or communication with a train dispatcher, as long as it is provided to the crew prior to the train's departure and a written or electronic record is created and maintained in the cab of the controlling locomotive until the train either reaches destination or another Class I test is performed on the entire train. If a relieving crew takes charge of a train and the information is not available for the oncoming crew, then a violation of the regulation has occurred. Inspectors should apply appropriate enforcement action based on whether this is a systemic or recurring problem on a case-by-case basis. In order for the railroad to advance the train beyond the point where the information is not available to the oncoming crew, the railroad would have to obtain the correct Class I test information via fax, telephone, etc. and provide that information to the crew, or conduct another Class I brake test and provide the crew with the new Class I information. The rule requires that the identity of the person(s) performing the Class I test be entered on the Class I test information. FRA will accept a full name, the first initial-last name, or an employee ID number to satisfy this requirement. FRA will not accept just initials or "carmen in north yard" or "foreign line" for this requirement. Inspectors should take appropriate enforcement action when this is discovered. Inspectors should also make sure that the crew does not have a computer print-out that indicates the conductor of that crew as the individual making the Class I test, unless that individual performed the test.

The Class I brake test information is relevant only to the Class I test when it is performed on the entire train. The information does not have to be updated as cars are added to or removed from the train while the train is en route. Since the regulation requires the information to remain with the train until it reaches destination or another Class I test is performed on the entire train, the information shall not be altered. If a railroad changes the number of cars on the original slip, Inspectors should take appropriate enforcement action to correct the problem.

§ 232.207 Class IA brake tests--1,000-mile inspection.

For Class IA test locations, the most restrictive car or block of cars in the train will determine the location where this test must be performed. For example, if a train departs point A and travels 500 miles to point B where it picks up a previously tested block of cars en route which has traveled 800 miles since its last Class I brake test and the crew does not perform a Class I brake test when entraining the cars, then the entire train must receive a Class IA brake test within 200 miles from point B even though that location is only 700 miles from point A.

Defective equipment may be moved from or past a location where a Class IA brake test is performed, only if all of the requirements contained in §232.15 have been satisfied. If the location is one meeting the criteria found in §232.15, the car should not be moved until the repairs are completed.

As with the Class I brake test, in order to properly perform a Class IA brake test, both sides of the equipment must be observed sometime during the inspection process. Paragraph (c) contains the provision that requires railroads to designate and maintain a list of locations where Class IA

inspections will be performed. This list shall be made available to FRA upon request. If an Inspector needs this information, then the Regional office must be contacted so that the Regional office can make this request to the railroad in writing.

A railroad cannot just designate a major city, if there are multiple locations in and around the city that can perform the Class IA test. Specific yard locations need to be identified or mile markers. FRA requires that it be notified at least 30 days in advance of any change to the list of Class IA test locations. FRA realizes that there may be occurrences or emergencies, such as derailments, that make it impossible or unsafe for a train to reach a location that the railroad has designated as a Class IA inspection site. Consequently, the rule permits railroads to bypass the 30-day written notification requirement in these instances provided FRA is notified within 24 hours after a designation has been changed. This paragraph also makes clear that failure to perform a Class IA brake test at a designated location will constitute a failure to properly perform the inspection.

§ 232.209 Class II brake tests—intermediate inspection

A Class II brake test is intended to ensure that the brakes on those cars added apply and release and that the added cars do not compromise the integrity of the train's brake system. Therefore, a leakage or air flow test must be performed when the cars are added to the train to ensure the integrity of the train's brake system.

Both sides of the equipment must be observed sometime during the inspection process. The brakes shall apply on each car added to the train and remain applied until a release is initiated and a retest is allowed on those cars found with brakes not applied. It should be noted that, defective equipment may be moved from or past a location where a Class II brake test is performed only if all of the requirements in § 232.15 have been satisfied.

Paragraph (b) also requires that the release of the brakes on those cars added to the train and on the rear car of the train be verified and allows railroads to conduct "roll-by" inspections for this purpose.

Paragraph (c) permits an alternative to the rear car application and release portion of this test. This alternative permits the locomotive engineer to rely on a rear car gauge or end-of-train device to determine that the train's brake pipe pressure is being reduced by at least 5 psi and then restored by at least 5 psi in lieu of direct observation of the rear car application and release.

Paragraph (d) contains the requirements relating to the inspection of cars or blocks of cars added to a train while a train is en route. This paragraph makes clear that if cars are given a Class II brake test when added to a train, then the cars added must receive a Class I brake test at the next forward location where the facilities are available for performing such an inspection.

Paragraph (f) contains the requirements relating to the adding of cars or blocks of cars while a train is en route. This paragraph informs railroads that cars picked up en route that have not been previously tested and kept connected to a source of compressed air are to receive a Class I brake test when added to the train. Alternatively, a railroad may elect to perform only a Class II brake test at the time that a car is added to the train en route, but FRA intends to make clear that when

Federal Railroad Administration

this option is elected, the cars added in this fashion must be given a Class I brake test at the next forward location where facilities are available for providing such attention.

§ 232.211 Class III brake tests–trainline continuity inspection

The purpose of a Class III brake test is to ensure the integrity of the trainline when minor changes in the train consist occurs. Basically, a Class III brake test ensures that the train brake pipe is properly delivering air to the rear of the train. This inspection is designed to be performed whenever the continuity of the brake system is broken or interrupted.

When a car or locomotive is added or removed from a train, the Class III test must be performed as prescribed in paragraph (b), which requires that the test cannot be performed until the BP pressure at the rear of the train is at least 60 psi, as indicated by an accurate gauge or end-of-train device, and a 20-psi brake pipe reduction made.

When the continuity of the brake pipe is broken or interrupted with the train consist otherwise remaining unchanged, it must be determined that BP pressure is being restored to the rear of the train as indicated by a rear car gauge or end-of-train device prior to proceeding. In the absence of a rear car gauge or end-of-train device, a visual application and release of the rear car's brakes can be made **only** if the train consist remains unchanged, which includes cars and locomotives.

§ 232.213 Extended haul trains

Railroads are permitted to designate trains as extended haul trains, which allows such trains to be operated up to 1,500 miles between brake inspections.

The designation of such trains must be in writing to the Associate Administrator for Safety. The designation must include the originating location and destination of the extended haul portion for each train. As trains are added and/or deleted, the railroad must submit the revisions to the Associate Administrator for Safety. Headquarters will provide the updated lists electronically to the regions as they are submitted. Once a train is designated as an extended haul train, it must be operated as an extended haul train until the official list is revised and properly submitted to FRA. Changes cannot be made on a daily basis by a train dispatcher. All changes must be made in writing to the Associate Administrator for Safety as explained above. A railroad cannot make changes through a Regional office.

Extended haul trains are permitted one pick-up and one set-out en route. If more than one pick-up and/or one set-out occur, the Inspector should submit a violation for each occurrence. Also, a Qualified Mechanical Inspector (QMI) must perform the appropriate inspections of all pick-ups and set-outs.

At no time will the FRA penalize a railroad for setting out a defective car during the extended haul train movement. These types of set-outs do not count against the one set-out rule.

At a location where a car(s) is picked-up en route, as long as a QMI has performed the

appropriate inspections of the car, the train crew can add the car to their train and only have to perform a Class III brake test. The QMI does not have to be at the location to simply add the car(s) to the train.

If a train is operating on two extended haul segments, another extended haul outbound inspection must be conducted by a QMI. Cars can be added and/or removed at this location, but it would have to count as one of the permitted pick-ups or set-outs en route. Whether this is done before the inbound/outbound inspection is performed is important as to compliance with the “one” pick-up/one set-out rule.

At the termination point of the extended haul portion of the extended haul run, unless this location is the final destination for the run, a Class I inspection of the train must be performed before the train can continue any further.

§ 232.215 Transfer train brake tests

A "Transfer train" is defined in § 232.5 of this rule as a train that travels between a point of origin and a point of destination, located not more than 20 miles apart. The definition makes clear a transfer train may pick up or deliver freight equipment while en route to its destination.

Cars may be added to a transfer train while the train is en route, provided a transfer train brake test is performed at the location where the cars are added. The train is limited to a total of 20 miles from its point of origin, not from the location where new cars are added.

It is possible to operate a train for a distance of 60 miles on transfer train brake tests, provided a transfer brake test is performed on the entire train at each 20 mile interval.

While the rule permits that transfer test to be conducted when the brake pipe is charged to 60 psi as indicated by a gauge at the rear of the train, with a 15 psi brake pipe reduction, it is permissible to conduct the test at 90 psi brake pipe pressure. However, if 90 psi is used, FRA expects a 20 psi brake pipe reduction be made since the 15 psi allowance was for the lower brake pipe pressure.

Please note that the retest of a car for a brake application during the transfer test should be made using the same brake pipe pressure that is used during the original transfer test. If the transfer test is performed at 60 psi brake pipe pressure, then the retest can be made after the car is charged to 60 psi with a 15 psi reduction. If the transfer test is performed at 90 psi brake pipe pressure, then the retest shall be made at 90 psi with a 20 psi reduction.

§ 232.217 Train brake tests conducted using yard air

When Inspectors encounter a location where the yard air is less than 80 psi, they must ensure the leakage or air flow test is conducted at the proper brake pipe pressure after the locomotives are attached.

While paragraph (d) contains the calibration requirements for yard test devices, it is FRA's intent

Federal Railroad Administration

that only the gauge be tested and calibrated every 92 days. Industry devices such as the “Time-O-Test” and/or individual railroad manufactured devices use a fixed 1/4-inch or 5/16-inch orifice to increase air pressure and a 1/4-inch orifice to reduce brake pipe pressure. FRA does not believe that these orifices need to be calibrated unless there is physical evidence of damage to the device.

§ 232.219 Double heading and helper service

Although the brake system on locomotives are required to be inspected on a daily basis, FRA continues to believe that a visual confirmation of the proper operation of a helper locomotive’s brakes must be made each time the locomotive is added to a train

A helper locomotive found with inoperative or ineffective brakes is to be repaired prior to use or else removed from the train. If it cannot be repaired it must be tagged and taken to the nearest location for repairs.

Paragraph (c) requires a Helper Link device or similar technology be designed with a distinctive alarm to notify the engineer of any loss of communication as well as reset capability in the cab of the locomotive available to the locomotive engineer. Such devices must be tested and recalibrated as necessary according the the manufacturer’s instructions every 365 days.

Subpart D - Periodic Maintenance and Testing Requirements

This subpart provides the periodic brake system maintenance and testing requirements for equipment used in freight and other non-passenger trains.

Inspectors need to periodically monitor the activities of car repair facilities to ensure compliance. Check that the shop is capable of obtaining the single car test dates and that single car test are being performed on cars that have not received a single car test within the past 12 months. Check that handbrakes are being inspected and tested. If the brake shoes do not apply against the wheel when the handbrake is applied, the railroad should take corrective action or appropriate enforcement action should be taken by the Inspector.

Monitor that single car tests are being properly performed on cars that require such tests and that the daily and periodic testing is being performed on the single car test devices.

Paragraph (e) of § 232.303 contains the provisions permitting cars to be moved from a location where necessary repairs are made to a location where a single car or repair track air brake test can be performed, only if it cannot be performed at the same location where the repairs are conducted. FRA disagrees with the assertions of many railroads that air brake repairs should not be required at locations that lack the ability to perform single car or repair track air brake tests. Therefore, Inspectors should not entertain such rhetoric.

Pursuant to 49 CFR § 232.305, a single car test is required to be performed on a car at least once every five years (eight years for new and rebuilt cars) or within the past 12 months if the car is on a repair track. Also, any car that is removed from a train with a defective air brake must

receive a single car test. Inspectors can request the railroad to provide the single car test dates for cars, preferably using the UMLER system. If a railroad cannot provide this information, the Inspector should notify the Regional Specialist, who in turn shall notify Headquarters. Additionally, Inspectors are encouraged to request a test date on each car that is being considered for civil penalty. If a car has not had a single car test within the five year period, another violation should be taken against the car. Inspectors should also periodically run a list of cars that have received attention in a shop or repair track to see if a car has received a single car test within the past 12 months. If not, a violation should be considered.

Section 232.305(b)(1) requires that a single car test be performed on a car that has its brakes cut-out or inoperative when removed from a train. This means that if the car is properly tagged with an inoperative brake and it is set-out of the train, it must have a single car test. If the railroad removes the car from the train with the brakes cut-out (with or without a defect tag) and the Inspector observes this, a single car test would have to be performed on that car. However, if the Inspector finds a car in a yard or siding with the brakes cut-out, the burden of proof is on the Inspector to establish whether the car was set out of a train with the brakes cut-out or some yard crew cut the brakes out as they were switching the car in a yard. The Inspector cannot assume the brakes were cut out when the car was set-out of the train. A defect tag or witness statement would suffice.

Section 232.305(b)(5) identifies the various wheel defects that trigger a single car test on the car. This requirement applies when the railroad removes the wheel from the car for the defective wheel condition. This is especially true for the built-up tread condition, as there are no Federal regulations addressing built-up tread. The “why-made” code on the AAR billing record would have to be used for any enforcement action regarding non-compliance with performing a single car test for a built-up tread condition.

Section 232.305(e) requires a single car test performed on every new or rebuilt car before it is placed in service. Inspectors should periodically monitor this activity at car manufacturing plants.

When a car is on a shop or repair track, the piston travel must be checked. The limits for the piston travel range on cars equipped with 12-inch stroke (eight and one-half (8½) or ten (10) inch diameter) brake cylinders has been changed. The new limit is six (6) to nine (9) inches. If piston travel is found to be less than six (6) inches or more than nine (9) inches when testing the brakes on the shop or repair track, the piston travel shall be adjusted to nominally 7½ inches. This change is based on a waiver, docket number FRA-2004-19402, which was conditionally granted on August 30, 2005. Furthermore, the waiver also requires that these cars shall have the empty/load valve tested, if so equipped, as prescribed in AAR Standard S-486-04, Sections 4.6.1 through 4.6.5, anytime a single car test is performed on the car, irrespective of whether the valve has been changed or not. Please note that this test is not required if the car is loaded, since the test can only be performed when the car is empty.

Inspectors should ensure that railroads are conducting an inspection of the accuracy and operation of any brake indicators on cars so equipped. If the indicator is broken or unreadable, FRA expects corrections to take place while the car is on the shop or repair track.

Federal Railroad Administration

Section 232.309(b) states that mechanical test devices such as pressure gauges, flow meters, orifices, etc., shall be calibrated once every 92 days. Paragraph (d) requires that the test equipment and single car test devices placed in service shall be tagged or labeled with the date its next calibration is due. A tag or label can be affixed to a single car test device and a brake cylinder test gauge, but it is difficult to tag or label a test coupling. If the test coupling is chained or cabled to the single car test device, then it would be considered as a “unit” if the single car test device and test coupling are both calibrated per S-486 by the same facility and the railroad can will also accept a test coupling that has an identifying mark or number (that is unique) inscribed on it that would be the same as a unique number or mark inscribed on the test device, that would make it a “unit” as discussed above. The tag or label on the test device would apply to the entire “unit.”

(MP&E 98-63) Subpart E - End-of-Train Devices

On May 31, 2001, Subpart E, *End-of-Train Devices*, became effective. In order to aid understanding of the inspection and testing requirements of the devices, as well as issues involving en route failures, a modified version of is provided below.

When does the device have to be armed?

The device has to be armed and operable from the time the train departs the point of installation, until the train reaches destination. According to 49 CFR § 232.407(f), if communication cannot be established at the location where the device is installed, the train may move up to one mile from that location at restricted speed, in order to establish communication. If communication is not established within the one-mile movement, the train must be stopped and the device must be either repaired or replaced and communication established before the train can continue, or train orders issued that restricts that train from exceeding 30 mph for the entire trip, provided the train does not traverse any defined heavy grade. If communication is established, the train must be stopped and the appropriate inspection and testing requirements of § 232.409 (a)-(c) must be satisfactorily performed before the train can continue.

What tests have to be performed at the point of installation?

It must be understood that installation includes both the front and rear device. When either of these devices are installed and before the train departs, the following must be performed:

1. It must be determined that the identification code entered into the front unit is identical to the unique code of the rear unit. 49 CFR § 232.409(a).
2. Determine that the quantitative value for brake pipe pressure displayed on the front unit is within 3 pounds per square inch of the reading displayed from either the rear EOT unit or a properly calibrated air gauge at the rear of the train. This reading must be compared after the train is charged. 49 CFR § 232.409(b).
3. A test has to be made to ensure the device is capable of initiating an emergency power

brake application from the rear of the train. 49 CFR § 232.409(c).

What is the test procedure to ensure the device is capable of initiating an emergency power brake application from the rear of the train?

There are currently four acceptable methods of performing this test. The first three methods require attaching the rear-of-train device to the last car of the train, establishing brake pipe pressure, and arming the device.

1. In the first method, the controlling locomotive would transmit an emergency brake application signal with the front unit manual switch causing an emergency application to be initiated from the rear of the train, thereby dumping the whole train into emergency.
2. The second method requires closing the angle cock on the last or second-to-the-last car of the train, and then have the controlling locomotive transmit an emergency brake application signal with the front unit manual switch. Under this method only the last one or two cars of the train will effectuate an emergency brake application.
3. Using the third method, an individual would close the angle cock between the rear-of-train device and the last car. Then have the controlling locomotive transmit an emergency brake application with the front unit manual switch, so that an individual at the rear of the train can determine whether the emergency valve functions properly by either observing the emergency indicator pop out, or observing brake pipe pressure at the rear device go to zero while hearing the exhaust of air from the device.
4. The final acceptable method of inspection is a bench test of the device (front and rear) which would be performed within a reasonable time period prior to the device being armed and placed on the train.

Can anyone perform these tests?

The EOT regulations do not establish a specific requirement concerning who may perform the necessary tests. However, according to § 232.409(c), if anyone other than a crew member performs these tests, the locomotive engineer has to be informed that the test (both front and rear device) was successfully performed. This can be by any means determined by the railroad to be appropriate. However, a written or electronic record of the notification has to be maintained in the cab of the controlling locomotive for the engineer at the point of installation. The notification must include the location, date and time the test was performed, and the name of the individual(s) who performed the test. If one individual tested the front device and another individual tested the rear device, the notification would have to include information for the two separate tests. This written information is not required at subsequent crew change points.

Would these tests apply to a train using a distributive power unit (DPU) at the rear of the train?

No. This type of train is excepted from the two-way EOT requirements, provided the train has a

Federal Railroad Administration

locomotive located at the rear of the train, capable of making an emergency brake application through a command effected by radio telemetry, or by a crew member in radio contact with the lead (controlling) locomotive.

What is a bench test?

The purpose of this particular test is to ensure that the front unit will transmit an emergency brake application signal to the rear device and that the rear device is capable of initiating an emergency brake application from the rear of the train, as required by § 232.405(a). The bench test has to consist of testing both the front and rear units (devices) that will be used on the train. They can be tested independently of each other, as long as the test is performed at the location where the device will be installed on the train.

Testing the rear unit requires applying air pressure to the device and then transmitting an emergency brake application from a front unit using the front unit manual switch. The individual performing the test would determine that the emergency valve functions properly by either observing the emergency indicator pop out or by observing the brake pipe pressure displayed on the gauge on the rear device go to zero and hearing the exhaust of air from the device. The front unit that will be used on the controlling locomotive of a train would be tested by transmitting an emergency brake application from the device using the front unit manual switch, and a rear device would have to successfully receive the signal and activate the emergency air valve.

Both tests must be performed within a reasonable time period prior to the device being armed and placed on the train.

What is a reasonable time period?

A reasonable time period must be determined on a case-by-case basis, based on the factual situation at a specific location, as there are numerous factors that impact the notion of “reasonable.” The following discussion is intended as general guidance for Inspectors to consider in determining whether a bench test at a particular location was conducted within a reasonable time of its installation on a train. This discussion is not intended to create or establish any strict time requirements. The following factors should be considered:

- The environment where the device is tested and stored:
 - Free from weather elements?
 - Free from excessive dust?
 - Free from dirt and grease?
 - Accessible to possible tampering?
- Physical treatment of the device after a successful bench test.
- Railroad’s tracking and monitoring of devices after testing.
- Use of the locomotive after the testing of the front unit.
- Past effectiveness of bench testing procedures at the particular location.

For example, if the devices are tested and stored in a controlled environment, that is free from weather elements, excessive dust, grease, and dirt, then a reasonable amount of time between the testing and installation of the device might be 8 hours or more. Whereas, in circumstances where the devices are haphazardly thrown into a corner of a shop or are placed in the rear of a truck to be bounced around a yard after being tested, then a reasonable amount of time may be one hour or less. Furthermore, the effectiveness of a railroad's bench testing procedures should always be considered in determining what constitutes a reasonable time period. Consequently, Inspectors should provide detailed evidence and fully describe a railroad's bench testing procedures in order to support any determination that the time period between the bench test and installation of a device on a train was not reasonable.

Can devices be bench tested and taken to other locations for application?

No, because § 232.409(c) requires the device shall be tested at the initial terminal or other point of installation. This implies that the device must receive the tests required by the EOT regulation at the location or yard where it will be installed on the train.

What are the testing requirements if locomotive power is changed and a different front unit is used?

At the point of installation, whether it is the front or rear device, all testing requirements apply. If the locomotive power is changed and a new front device is installed on the train, all testing requirements apply. If the front device is replaced with a device from a trailing locomotive, all testing requirements apply since this is a new installation of the front device.

What about the calibration requirements?

In accordance with § 232.409(d), both the front and rear units have to be calibrated for accuracy according to the manufacturer's specifications and procedures at least once every 368 days. The test shall include testing radio frequencies and modulation. The 368 days does not include up to 92 days of shelf-life prior to placing the unit in service. The date of the calibration, the location where the calibration is made, and the name of the person performing the calibration has to be legibly displayed on a weather-resistant sticker or other marking device affixed to the outside of the device (both the front unit and rear unit). It is the railroad's responsibility to account for the shelf-life by either entering an in-service date on the sticker or the number of days of shelf-life on the sticker. If the device is integrated into the computer of the locomotive, the sticker information can be entered on Form FRA F6180-49A. The sticker information must be accessible to both FRA Inspectors and train crew members. Therefore, it cannot be locked in cabinets, out of view.

Are railroads required to keep spare batteries at specific locations?

No, it is within the railroad's discretion to determine when and where batteries will be kept and charged. There are sufficient incentives for railroads to ensure that the batteries are sufficiently

Federal Railroad Administration

charged at all times because of the speed restrictions imposed on trains that develop failures en route; and strict liability for failure of the batteries en route. If an Inspector can determine that a battery failed en route, submission of a violation should be strongly considered.

What actions have to be taken when the device develops a failure en route?

If the device develops a failure en route, the speed of the train is restricted to 30 mph. In addition to observing the 30 mph speed restriction, the train is not permitted to operate over a section of track with an average grade of two percent or greater over a distance of two continuous miles, unless the conditions contained at § 232.407(g) are met.

On some units, front-to-rear failures and rear-to-front failures are displayed. Are both of these failures considered an en route failure?

Since the intent of the rule is to have the capability of initiating an emergency brake application at the rear of the train, only the front-to-rear failure is considered an en route failure. The rear-to-front failure does not affect the ability of the device to initiate the emergency from the rear of the train. If the engineer is unable to determine if the communications failure is front-rear or rear-front, then any communications failure must be considered an en route failure and corrective action must be taken.

Is an intermittent communication failure considered an en route failure?

No, there has to be a continuous loss of communication between the front and rear unit for a period greater than 16 minutes and 30 seconds. However, based on existing designs of the devices currently used, anytime the display indicates a “**comm loss**,” the 16 minutes and 30 seconds have elapsed and the locomotive engineer must comply with the restrictions required for the failure en route requirements.

Can a train proceed over a heavy grade with a defective device?

A train cannot proceed over a heavy grade unless the defective device is replaced with a fully operational device, or one of the following alternative methods is used:

1. An occupied locomotive helper is attached to the rear of the train with the brake pipe connected and tested to ensure brake operation. The helper engineer will initiate and maintain two-way voice radio communication with the engineer on the head end of the train. If communication is lost prior to passing the crest of the grade, the train should be stopped until communication has been restored, if this can be done safely. If communication is lost once the descent has begun, the helper locomotive engineer and the head end engineer will act to stop the train if the train reaches a predetermined rate of speed that indicates a need for emergency braking. The predetermined rate of speed is established by the railroad and should be indicated in the railroad's timetable.
2. An occupied caboose is attached to the end of the train with a tested, functional

brake valve capable of initiating an emergency brake application from the caboose. The occupant of the caboose must establish and maintain radio voice communication with the head end engineer in the same manner as prescribed for the occupied locomotive helper.

3. A radio-controlled locomotive is located at the rear of the train, and is under continuous control of the head end engineer by means of telemetry, and if the radio-controlled locomotive is capable of initiating an emergency brake application from the lead (controlling) locomotive.

Does this mean the train would have to stop on a grade if a failure occurs?

Whenever a failure occurs en route, the train is prohibited from operating over a section of track with an average grade of two percent or greater over a distance of two continuous miles. If the train develops the failure while traversing the grade, § 232.409(g)(2) allows the engineer to safely continue down the grade or to a specific siding, in accordance with the railroad's operating procedures for bringing the train to a stop at the first available location, rather than bring the train to an immediate stop.

If a helper locomotive is used on the head end of a train, does it have to be linked to the two-way EOT?

If a locomotive helper is attached to the front of the train to help the train over a grade, it would not have to be linked to the two-way EOT provided that the locomotive that was originally controlling the train is still armed and capable of initiating an emergency brake command to the rear device and two-way voice radio is initiated and maintained by the helper locomotive engineer with the engineer of the original lead locomotive until the move is completed. If communication is lost, each engineer will immediately act to stop the train if the train reaches a predetermined rate of speed that indicates a need for emergency braking. The predetermined rate of speed is established by the railroad and should be indicated in the railroad's timetable. This only applies to the extent necessary for the helper unit to provide power to get the train over the grade.

If a train were to have problems and stalled in a tunnel where communication is lost, and it took longer than 16 minutes and 30 seconds to correct, could the train move out of the tunnel so that communications could be re-established, or is this a communications failure requiring other corrective measures?

If this incident occurred, the train would be allowed to move out of the tunnel. Once out of the tunnel, if communication is not re-established, the train would have to be brought to an immediate stop. Corrective action for a communication failure would have to be taken.

If a train has to be cut because it has insufficient power to get over a hill, what has to be done with regard to the two-way EOT?

If a train has to be cut because there is insufficient power to pull it over a hill or grade, the device

Federal Railroad Administration

may remain in place on the car at the rear of the train. It does not have to be advanced to the moving section of the train. This only applies to the extent necessary to traverse the grade and only while the train is divided for this procedure.

Can a “Local Train” that is not equipped with a two-way EOT operate above 30 mph?

A local train as defined in § 232.407(a)(3), that does not operate over a section of track with an average grade of 2 percent for 2 continuous miles, can run at authorized track speed without a two-way EOT. In many cases, this could be above 30 mph.

Can a “work train” operate above 30 mph if it is not equipped with a two-way EOT?

A work train as defined in § 232.407(a)(4), that does not operate over a section of track with an average grade of 2 percent for 2 continuous miles, can run at authorized track speed without a two-way EOT. This could be above 30 mph.

Can any train be dispatched without a two-way EOT if it does not exceed 30 mph?

Only if the train will not travel over a heavy grade as defined in § 232.407(a)(1), or is specifically excepted from the requirements found at § 232.407(e).

If a train is equipped with an electronically controlled brake system (ECP), would an EOT be required?

Yes, because the ECP train sets that are currently operating are an overlay system of regular pneumatic brakes. Since these trains can be run in either electronic or regular pneumatic mode, a two-way EOT device would have to be on the rear of the train. If the train is all electronic, the two-way EOT requirements will be covered by the waiver permitting this type of operation.

(MP&E 98-62) Two-Way End-of-Train Device Flowchart

The following flowchart (see **Figure 6**) was developed to provide a better understanding of when a two-way end-of-train device is required. All trains operating over the general railroad system have to comply with this regulation, unless a specific waiver is in effect for a particular operation.

TWO WAY END OF TRAIN
DEVICE REQUIREMENTS

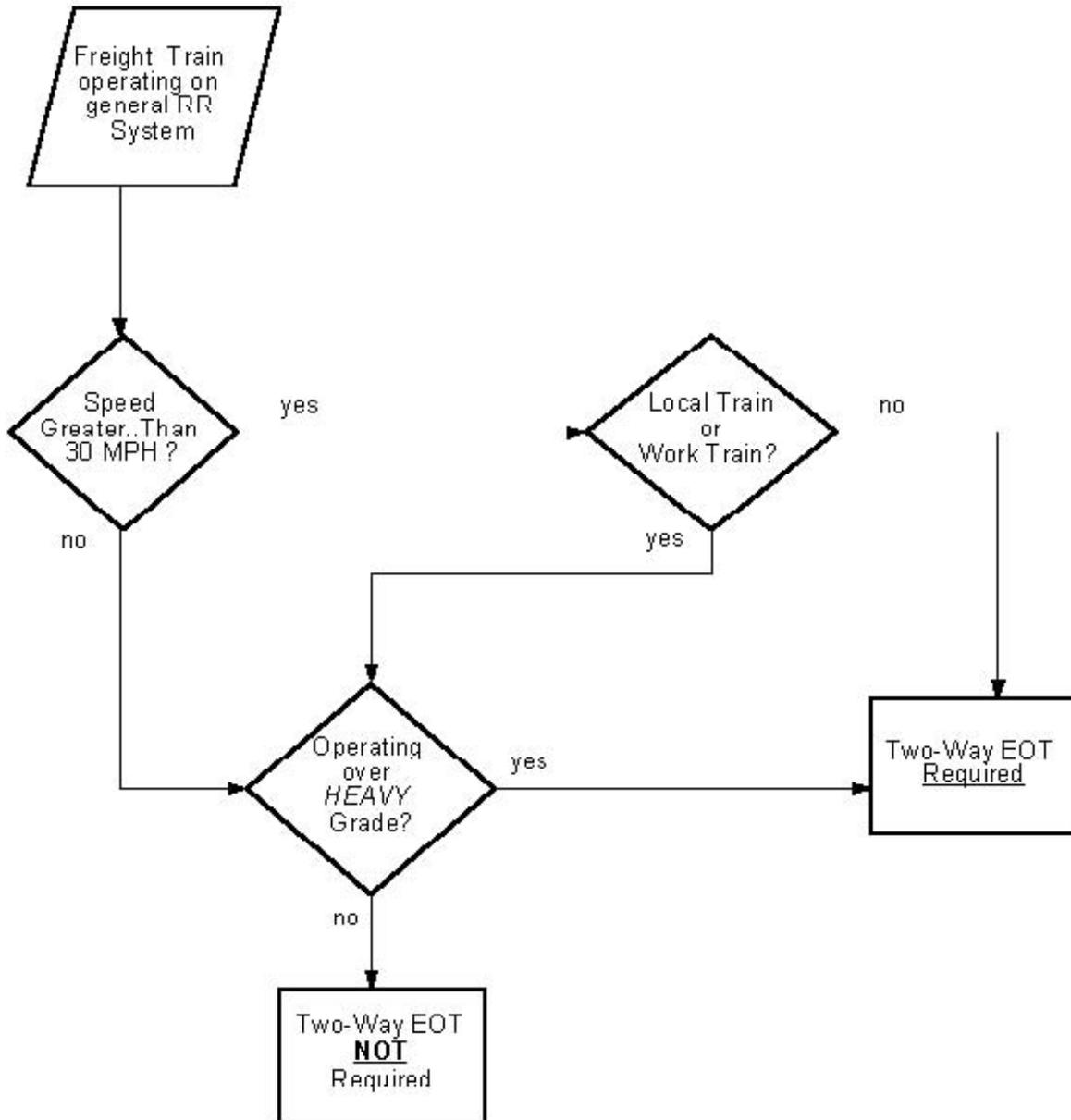


Figure 6: Flow chart to determine two-way end-of-train device requirements

Subpart G—Electrinically Controlled Pneumatic (ECP) Brake Systems

On October 16, 2008, FRA issued the final rule regarding Electronically Controlled Pneumatic (ECP) Brake Systems. See 73 Fed. Reg. 61512–61557. This added subpart G to part 232. The new subpart addresses ECP brake systems on freight trains. This regulation is designed to encourage the safe implementation and use of ECP brake system technologies. It contains specific requirements relating to design, interoperability, training, inspection, testing, handling defective equipment and periodic maintenance related to ECP brake systems.

The ECP brake system radically improves the operation of the automatic air brake by using electrical transmissions to signal the application and release of brakes on each car in a train while still using the force of the brake shoe against the wheel. ECP brakes also greatly simplify the brake system by eliminating multiple pneumatic valves used by conventional brakes and replacing them with a printed circuit board and microprocessor, one electrically operated application valve, and one electrically operated release valve, with feedback of brake cylinder pressure for control.

ECP brake technology requires adding equipment to locomotives and cars that is unique to the operation of ECP brakes. This system still requires a brake pipe to supply compressed air from the locomotive to each car's reservoir in a train. The similarities between conventional and ECP brakes end there. Instead of using reductions and increases of the brake pipe pressure to convey application and release signals to each car in the train, ECP technology uses electronic signals, resulting in a virtually instantaneous application and release of brakes on each car in the entire train. Since the brake pipe pressure no longer serves as the communication medium in ECP brake equipped trains, the brake pipe is constantly supplied, or charged with compressed air from the locomotive regardless of whether the brakes are applied or released. In addition, ECP brake equipped trains offer graduated release, where a partial brake release command provides a partial and proportional brake release

The adopted method of transmission of the application/release signal is via a two-wire cable based system. The electronic components are:

- The Head End Unit (HEU) is the Engineer/ECP system interface that controls the brake application and release signals. On current ECP locomotives, this has been incorporated into the WABTEC and NYAB (see **Figure 7**) electronic locomotive systems and displays (see **Figure 8**).



Figure 7: New York Air Brake stand-alone head end unit



Figure 8: Integrated ECP locomotive display

- The Car Control Identification Device (CCID) (see **Figure 9**) and Car Control Device (CCD) (see **Figure 10**) are the microprocessor-based control units that receive the commands from the locomotive and sends status information and faults back to the locomotive. The CCD is an electronic control device that replaces the conventional pneumatic service and emergency portions during electronic braking functions. The CCD acknowledges and interprets the signals from the HEU and sends a warning signal to the locomotive in the event any component fails to appropriately respond to a braking command. Each CCID has a unique electronic address located in the Car ID Module, which is keyed to the car's reporting mark and number including car type and configuration. The Webtec's CCID and manifold are separate components (see **Figures 9, 10** and **11**). The NYAB's CCID and manifold are a combined unit (see **Figure 12**).



Figure 9: Webtec's Car Control & Identification Device (CCID)



Figure 10: Webtec's Car Control Identification Device CCID (with cover opened)



Figure 11: Webtec's separate manifold



Figure 12: New York Air Brake's combined CCD and manifold

Federal Railroad Administration

- The locomotive power supply (see **Figure 13**) which converts 74 VDC to 230 VDC, or 24 VDC (Used for car sequencing), is used to power the HEU and CCDs. Under AAR standards, the single power supply will supply the necessary current and voltage to at least 160 CCDs and an ECP–EOT.



Figure 13: Locomotive power supply

FRA defines *ECP–EOT device* in 49 CFR § 232.5 as the end-of-train device for ECP brake systems that is physically the last network node in the train, pneumatically and electrically connected at the end of the train to the train line cable operating with an ECP brake system. It shall transmit a status message (EOT Beacon) at least once per second and contain a means of communicating with the HEU, a brake pipe pressure transducer, and a battery that charges off the train line cable (see **Figure 14**).



Figure 14: ECP EOT

Each car is connected to the locomotive via NYAB plug type connectors (see **Figure 15**) and junction boxes. The rear car is also equipped with an ECP-EOT device which is different than a normal pneumatic two-way EOT.

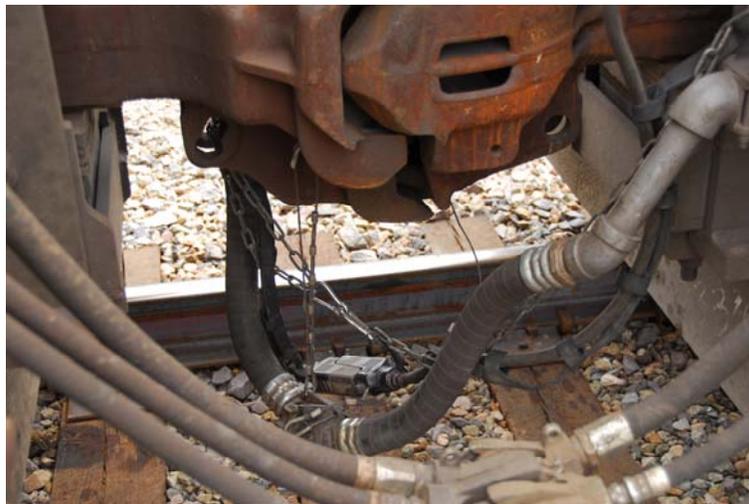


Figure15: Inter-car connectors

1. Located and guarded to provide sufficient vertical clearance.
2. Not cause tripping hazard.
3. Not hang with one end free whenever the equipment is being used in train movements.
4. Not be positioned to interfere with the use of safety appliances.
5. Not have any of the following conditions:
 - Badly chafed or broken insulations

Federal Railroad Administration

- Broken plugs, receptacles, or terminals
- Broken or protruding strands of wire

Prior to October 16, 2008, FRA had conditionally granted a waiver in part, docket number FRA-2006-26435, thereby allowing BNSF Railway and Norfolk Southern Railway to install ECP brake systems on pilot trains to demonstrate the safety and efficiency of the technology in revenue service. Under this waiver, trains equipped with ECP brakes were allowed to travel up to 3,500 miles without undergoing certain routine brake inspections, more than double the distance currently allowed by federal regulations. Now that the final rule has been issued this waiver is no longer in effect.

§ 232.602 Applicability

Subpart G applies to all railroads that operate a freight car or freight train governed by this part and equipped with an ECP brake system. Unless specifically excepted or modified in this section, all of the other requirements contained in this part are applicable to a freight car or freight train equipped with an ECP brake system.

§ 232.605 Training Requirements

Inspection, testing, and maintenance. Paragraph (a) provides that any railroad that operates a freight car or freight train that is equipped with an ECP brake system must adopt and comply with a training, qualification, and designation program for its employees that perform inspections, testing, or maintenance of ECP brake systems. The training program required by this section shall meet the requirements in § 232.203(a), (b), (e), and (f). This paragraph is also applicable to each contractor that performs inspections, testing, or maintenance on freight car or freight trains equipped with ECP brake systems.

Operating rules. Paragraph (b) requires a railroad operating a freight train or freight car equipped with an ECP brake system to amend its operating rules to govern safe train handling procedures related to ECP brake systems and equipment under all operating conditions, which shall be tailored to the specific equipment and territory of the railroad.

Locomotive engineers. Paragraph (c) establishes that a railroad operating a freight train or freight car equipped with an ECP brake system must incorporate safe train handling procedures related to ECP brake systems and equipment into its specific knowledge, skill, and ability criteria under 49 CFR part 240.

§ 232.607 Inspection and testing requirements

Initial terminal. Paragraph (a) establishes that a freight train operating in ECP brake mode shall receive a Class I brake test as described in § 232.205(c) by a qualified mechanical inspector (QMI) and shall receive a pre-departure freight inspection pursuant to part 215 of this chapter by an inspector designated under § 215.11 of this chapter at its point of origin (initial terminal).

Motive Power and Equipment Compliance Manual

Trains en route. Paragraph (b) provides that except for a unit or cycle train, a train operating in ECP brake mode shall not operate a distance that exceeds its destination or 3,500 miles, whichever is less, unless another inspection meeting the requirements of paragraph (a) of this section is performed on the train. A unit or cycle train operating in ECP brake mode shall receive the inspections required in paragraph (a) of this section at least every 3,500 miles.

A freight train operating in ECP brake mode shall receive a Class I brake test as described in § 232.205(c) by a qualified person at a location where the train is off air for a period of more than 24 hours or 80 hours, if the train remains inaccessible to the railroad and in an extended-off-air-facility.

Cars added en route. Each car equipped with an ECP brake system that is added to a train operating in ECP brake mode shall receive a Class I brake test as described in § 232.205(c) by a qualified person, unless all of the following are met:

- The car has received a Class I brake test by a QMI within the last 3,500 miles;
- Information identified in § 232.205(e) relating to the performance of the previously received Class I brake test is provided to the train crew;
- The car has not been off air for more than 24 hours; and
- A visual inspection of the car's brake systems is conducted to ensure that the brake equipment is intact and properly secured. This may be accomplished as part of the inspection required under § 215.13 of this chapter and may be conducted while the car is off air.

Each car and each solid block of cars not equipped with an ECP brake system that is added to a train operating in ECP brake mode shall receive a visual inspection to ensure it is properly placed in the train and safe to operate and shall be moved and tagged in accordance with the provisions contained in § 232.15.

Class III brake tests. A freight train operating in ECP brake mode shall receive a Class III brake test as described in § 232.211(b), (c), and (d) at the location where the configuration of the train is changed, including:

- Where a locomotive or caboose is changed.
- Where a car or solid block of cars is added to the train.
- Where a car or solid block of cars is removed from the train.
- Whenever the continuity of the brake pipe or electrical connections is broken or interrupted with the train consist otherwise remaining unchanged.

Initialization. Paragraph (e) states that the freight train shall be initialized when the following occurs:

- Class I brake test.

Federal Railroad Administration

- Class III brake test.
- When the ECP brake system is powered on.

The initialization process shall, at minimum, be in accordance with AAR Series Standards S-4200 and be performed in the sequential order of the vehicles (freight cars) in the train. Once the ECP brake system is initialized, the train crew must ensure that the total number of cars indicated by the ECP brake system is the same as the total number of cars indicated in the train consist.

Modification to existing brake tests. In lieu of the specific brake pipe service reductions and increases required in subpart C of this part, an electronic signal that provides an equivalent application and release of the brakes shall be used when conducting any required inspection or test on a freight car or freight train equipped with an ECP brake system and operating in ECP brake mode.

In lieu of the specific minimum piston travel ranges contained in § 232.205(c)(5), the piston travel on freight cars equipped with ECP brake systems shall be within the piston travel limits stenciled or marked on the car or badge plate consistent with the manufacturers' recommended limits, if so stenciled or marked.

Exceptions. A freight car or a freight train shall be exempt from the requirements contained in §§ 232.205(a) and (b), 232.207, 232.209, and 232.211(a) when it is equipped with an ECP brake system and operating in ECP brake mode.

§ 232.609 Handling of defective equipment with ECP brake systems.

Paragraph (a) requires ninety-five percent (95%) of the cars in a train operating in ECP brake mode shall have effective and operative brakes prior to use or departure from the train's initial terminal or any location where a Class I brake test is required to be performed on the entire train by a qualified mechanical inspector pursuant to § 232.607.

Paragraph (b) provides that a freight car equipped with an ECP brake system that is known to have arrived with ineffective or inoperative brakes at the location of a train's initial terminal or at a location where a Class I brake test is required under § 232.607(b) shall not depart that location with ineffective or inoperative brakes in a train operating in ECP brake mode unless:

- The location does not have the ability to conduct the necessary repairs;
- The car is hauled only for the purpose of repair to the nearest forward location where the necessary repairs can be performed consistent with the guidance contained in § 232.15(f);
- The car is not being placed for loading or unloading while being moved for repair unless unloading is necessary for the safe repair of the car;
- The car is properly tagged in accordance with §232.15(b).

Pursuant to paragraph (c), a freight car equipped with only conventional pneumatic brakes shall not move in a freight train operating in ECP brake mode unless it would otherwise have effective and operative brakes if it were part of a conventional pneumatic brake equipped train or could be

Motive Power and Equipment Compliance Manual

moved from the location in defective condition under the provisions contained in § 232.15 and is tagged in accordance with § 232.15(b).

A freight train operating in ECP brake mode shall not move if less than 85% of the cars in the train have operative and effective brakes. However, after experiencing a penalty stop for having less than 85% operative and effective brakes, a freight train operating in ECP brake mode may be moved if all of the following are met:

- The train is visually inspected;
- Appropriate measures are taken to ensure that the train is safely operated to the location where necessary repairs or changes to the consist can be made;
- A qualified person determines that it is safe to move the train;
- The train is moved in ECP brake Switch Mode to the nearest forward location where necessary repairs or changes to the consist can be made.

Under paragraph (e), a freight car or locomotive equipped with an ECP brake system that is found with inoperative or ineffective brakes for the first time during the performance of a Class I brake test or while en route may be used or hauled without civil penalty liability under this part to its destination, not to exceed 3,500 miles; provided, all applicable provisions of § 232.609 are met and the defective car or locomotive is hauled in a train operating in ECP brake mode.

A freight car equipped with an ECP brake system that is part of a train operating in ECP brake mode that is found with a defective non-brake safety appliance may be used or hauled without civil penalty under this Part to the nearest forward location where the necessary repairs can be performed consistent with the guidance contained in §232.15(f).

A train operating with conventional pneumatic brakes shall not operate with freight cars equipped with stand-alone ECP brake systems unless:

- The train has at least the minimum percentage of operative brakes required by § 232.609(h) when at an initial terminal or § 232.609(d) when en route; and
- The stand-alone ECP brake equipped cars are:
 - Moved for the purpose of delivery to a railroad receiving the equipment or to a location for placement in a train operating in ECP brake mode or being moved for repair to the nearest available location where the necessary repairs can be made in accordance with §§232.15(a)(7) and (f);
 - Tagged in accordance with § 232.15(b);
 - Placed in the train in accordance with §232.15(e).

Paragraph (h) allows a train equipped and operated with conventional pneumatic brakes to depart an initial terminal with freight cars that are equipped with stand-alone ECP brake systems provided all of the following are met:

Federal Railroad Administration

1. The train has 100% effective and operative brakes on all cars equipped with conventional pneumatic brake systems;
2. The train has at least 95% effective and operative brakes when including the freight cars equipped with stand-alone ECP brake systems;
3. The requirements contained in § 232.609(g) are met.

Tagging of defective equipment. A freight car equipped with an ECP brake system that is found with ineffective or inoperative brakes will be considered electronically tagged under § 232.15(b)(1) and (b)(5) if the car is used or hauled in a train operating in ECP brake mode and the ECP brake system meets the following:

1. The ECP brake system is able to display information in the cab of the lead locomotive regarding the location and identification of the car with defective brakes;
2. The information is stored or downloaded, is secure, and is accessible to FRA and appropriate operating and inspection personnel; and
3. An electronic or written record of the stored or downloaded information is retained and maintained in accordance with § 232.15(b)(3).

§ 232.611 Periodic maintenance

Paragraph (a) requires, in addition to the maintenance requirements contained in § 232.303(b) through (d), a freight car equipped with an ECP brake system shall be inspected before being released from a shop or repair track to ensure the proper and safe condition of the following:

1. ECP brake system wiring and brackets;
2. ECP brake system electrical connections; and
3. Car-mounted ECP brake system components.

Exception. A freight car equipped with a standalone ECP brake system is excepted from the single car test requirements contained in § 232.305(b)(2) and (f).

§ 232.613 End-of-train (EOT) devices

An ECP–EOT shall, at a minimum, serve as the final node on the ECP brake circuit, provide a cable terminal circuit, and monitor, confirm, and report train, brake pipe, and train line cable continuity, cable voltage, brake pipe pressure, and the status of the ECP–EOT device battery charge.

A railroad shall not move or use a freight train equipped with an ECP brake system unless that train is equipped with a functioning ECP–EOT device approved pursuant to paragraph (a) of this section and the railroad complies with paragraph (b) of this section. The ECP–EOT device must be properly connected to the network and to the train line cable at the end of the train.

Exception. A freight train operating in ECP brake mode is excepted from the end-of-train device requirements contained in subpart E of this part, provided that it is equipped with an ECP–EOT device complying with this section.

Note: **MP&E TB 09-02** New Source/Defect Codes for Electronically Controlled Pneumatic Brake Equipment Inspections and New Inspection Report Requirements on Out-Shopped Locomotives and Cars. Inspectors should review the technical bulletin related to ECP Inspection Activity and Out-Shopped Inspection Activity.

Guidance for Appendix B to Part 232 — Part 232 Prior to May 31, 2001 as Clarified Effective April 10, 2002

(MP&E 98-59) Train Brake Inspections

When performing an initial terminal train air brake test under 49 CFR §232.12(c)-(j), an inspection of the train brakes shall be made to determine that the brakes are applied on each car, the piston travel is correct, brake rigging does not bind or foul, and that all brake equipment is properly secured. The 1,000-mile train air brake test under 49 CFR §232.12(b) also requires that the brakes apply on each car in response to a 20-pound service brake pipe pressure reduction and that the brake rigging is properly secured and does not bind or foul. For TMX Truck Mounted Brakes, see Wabtec Indicator at end of this section.

Although the regulation does not specify the physical actions necessary to conduct a proper inspection, a railroad may fulfill the inspection requirement only when its inspectors position themselves in a way that permits the required observations noted above to be made. Obviously, a railroad inspector can visually inspect only what he or she is in a position to see. As the vast majority of all freight cars are equipped with air brake equipment (brake cylinders, brake indicators, brake rigging, etc.) that cannot be observed when inspections are made from only one side of the car, **a proper initial terminal or 1,000-mile train airbrake inspection shall be performed by inspecting both sides of every car in the train.**

The following inspection practice would satisfy the regulations. After cars are assembled, a qualified individual, while connecting the air hoses on one side, performs an inspection of the brake equipment to ensure that brake components are properly secured, the brake rigging is not binding or fouling, and that brake shoes are in proper condition. The brake system is then charged and the air pressure at the rear of the train is checked to ensure it is at the required level. At that point, the brakes are applied and the qualified individual then performs a brake inspection on the other (second) side of the train to ensure that the brake components and rigging are properly secured and do not bind or foul, and that the brake shoes are against the wheel. During this inspection the individual will also check for proper piston travel, crossing over the cars to side one if the piston travel cannot be observed from side two. At the conclusion of this inspection, the brakes are then released and the individual then walks the release of the brakes or observes the brake release as the train rolls by at a low speed. If a roll-by inspection of the brake release is performed, the individual performing the inspection must have some method of

Federal Railroad Administration

communicating with the train crew the results of the inspection. FRA believes that an inspection of the brake components, rigging, and shoes must be conducted on both sides of virtually every car sometime during the inspection process.

A moving utility vehicle may be used in the performance of these inspections. However, these inspections must be made at a speed and in a manner that will permit the qualified person to clearly observe and determine the condition of the air brake equipment and that the piston travel is within limits.

Train air brake tests that are not conducted in compliance with this interpretation shall be considered to be in non-compliance with the regulations. However, as with any regulatory requirement, inspectors should exercise discretion in how §232.12 is enforced so that our limited resources can be focused on matters likely to produce the greatest safety benefit. The general criteria for determining when enforcement action is appropriate, and which action to take, are set forth in 49 CFR Part 209, Appendix A. A railroad's history of compliance with the relevant set of regulations, especially at the specific location involved, must be considered along with the kind and degree of potential safety hazard a condition poses in light of the immediate factual situation. Where compliance with train air brake testing requirements is poor, and improper inspections or no inspections are being performed, the failure to inspect or improper inspection can — along with the physical defects found on the cars—be strong enforcement candidates. Conversely, if a railroad is generally doing a good job in terms of compliance with the train air brake testing requirements at a particular location, the one-time failure to conduct a proper inspection at that point more likely is not a condition that poses a significant safety hazard. Violation reports alleging an improper train air brake test due to the failure to inspect both sides of the train as outlined above must specify precisely how the inspection was improper and include supporting evidence for review (e.g. detailed evidence that the brake equipment on one or more cars in the train—citing the specific component or components—could not be properly observed from only one side of the train).

(MP&E 98-45) Initial Terminal Air Brake Tests at Remote Locations

This technical bulletin provides guidance to Inspectors regarding the performance of initial terminal air brake tests at remote locations. There appears to be some confusion as to what is required when a railroad performs initial terminal brake tests at these remote locations. It has been brought to FRA's attention that some trains at these remote locations, after receiving an initial terminal brake test pursuant to 49 CFR 232.12, are departing locations with cars having inoperative or cut-out air brakes.

The regulation requires 100% operative brakes on trains departing initial terminals. FRA does not believe safety would be advanced by allowing something less than this at these remote locations. Therefore, when initial terminal brake tests are performed at these remote locations FRA expects the requirements contained in 232.12 to be followed. Consequently, if a car is found to have defective or inoperative brakes when the initial test is performed, the car must either be repaired or set-out of the train before the train departs.

(MP&E 99-01) Clarification for Initial Terminal Road Train Air Brake Tests - Section 232.12(d)(1)

Periodically, FRA receives inquiries concerning the amount of brake pipe reduction required when performing an initial terminal brake test. In 1982, FRA issued a technical bulletin (TB) stating FRA's policy. The following information from the earlier TB is still in effect and should clear up any misunderstandings regarding this matter. Inspectors should be governed accordingly.

In recognition of the objectives of the train air brake tests, the pressure-maintaining characteristics of the 26L locomotive air brake equipment, the greater sensitivity of modern control valves on freight cars, and good practice with respect to cutting the brake pipe pressure-maintaining feature out and in, an alternative brake pipe reduction sequence will provide an equally acceptable Initial Terminal Air Brake Test when 26L type equipment is utilized. A single brake pipe reduction of a minimum of 20 pounds, but not to exceed a full service reduction, will produce similar results and may be made in place of the specified sequence required in Section 232.12(d)(1) of a 15-pound reduction followed by an increase to full service.

(MP&E 00-01) Enforcement Guidance for Inspecting and Testing Brakes on Cars while on Shop or Repair Track

The following guidance was developed to alleviate confusion over the testing and repairing requirements of brakes on cars that are repaired on a shop or repair track. Particularly, when a mobile repair vehicle is involved.

49 CFR 232.17(a) contains certain inspection and testing requirements of a car's brake system, when a car is on a "shop" or "repair" track. For example; an application and release of brakes must be performed, piston travel must be inspected and adjusted (if necessary), and certain brake system components must be inspected to ensure they are properly positioned and secured. In addition, such cars must receive periodic attention in accordance with the requirements of the currently effective AAR Code of Rules for cars in interchange. AAR rules require that any car on a shop or repair track receive a repair track air brake test if such attention has not been provided to the car within the previous twelve months.

The current regulation does not define what constitutes a shop or repair track. Although AAR's Field Manual of Interchange Rules contains a definition of shop/repair track, FRA believes that AAR's definition is too narrow and does not adequately delineate what constitutes a repair track for the purposes of §232.17(a). FRA believes the definition fails to adequately consider locations where mobile repair vehicles serve in the same capacity as a fixed repair facility and locations where railroads designate tracks as "expedite" or "light repair" tracks for the purpose of performing minor repairs.

In 1994, FRA provided guidance in Technical Bulletin **MP&E 94-18**, that only light or minor repairs are to be conducted on tracks designated as "expedite" or "light repair" tracks. Currently, FRA does not require railroads to perform air brake related inspections and tests, pursuant to §232.17(a), on cars receiving minor repairs (i.e. straighten safety appliances, replace handholds, replace air hoses, adjust lading, replace coupler knuckle pin, knuckles, etc.), provided the repair work is performed on tracks located outside of a repair shop area. Nor does FRA require the performance of these inspections and tests on a car if a mobile repair vehicle is sent to a remote

Federal Railroad Administration

location to make necessary repairs to the equipment.

However, at locations where a railroad has designated specific tracks to perform repairs on a regular and consistent basis, and when the repairs conducted on those tracks include major repair work (i.e., wheel change, coupler replacement, draft gear repair, repairs requiring an air jack, etc.), FRA considers those tracks to be repair tracks for the purposes of §232.17(a). This includes locations where mobile repair vehicles have replaced a fixed repair facility or serve in the same capacity as a fixed repair facility. FRA believes it is both illogical and inconsistent with the intent and meaning of the existing regulations to exempt tracks at locations where repairs of all types are regularly and consistently performed, from being considered repair tracks merely because they are serviced by a mobile repair vehicle. Furthermore, it would be inconsistent with previous guidance provided by FRA to allow major repair work to be performed on the “expedite” or “light repair” tracks, merely because the repairs are performed by a mobile repair vehicle. It should be stressed that FRA does not intend to prevent a railroad from designating certain tracks for conducting minor repairs and certain tracks for conducting major repairs at the same location.

Consequently, FRA considers the provisions of §232.17(a) applicable to fixed repair facilities and any location where repairs of all types are regularly and consistently performed, regardless of whether a mobile repair vehicle is used to conduct the repairs. FRA does not consider tracks that are designated only for minor repairs to be a repair track pursuant to §232.17(a); provided such track is used only to conduct minor repairs. However, if a major repair is performed on a car located on a track designated for minor repairs, then the car is subject to the provisions of §232.17(a) before it can be placed in service.

(MP&E 98-40) 1000 Mile Interpretation - 49 CFR 232.12(b)

Trains must receive an intermediate inspection at points not more than 1,000 miles apart. It is the carrier’s responsibility to designate the points where the 1,000 mile inspection will be made and provide this information to FRA personnel upon request.

All mileage accumulated from the point of the initial terminal air brake test will count toward the 1,000-mile requirements in Section 232.12(b). It should be noted that mileage accrued in Canada and Mexico will count toward the 1,000-mile requirements. When cars are received in interchange, the receiving railroad is responsible for knowing the distance that all of the cars have travelled since their last inspection.

(MP&E 98-46) Handling of Defective Cars at Intermediate Inspection Locations

The following provides guidance to Inspectors when considering enforcement action for the improper handling of cars found with inoperative or cut-out air brakes at locations where intermediate air brake inspections are performed. FRA is concerned that some railroads are moving cars found with inoperative or cut-out air brakes during intermediate brake inspections from that inspection location, when repairs of those cars could possibly have been made at that location. Therefore, FRA feels that some general guidelines should be provided to Inspectors in the field to aid them in determining whether the location is a place where the repairs could be effectuated.

The statutory provisions contained in 49 USC § 20303 (previously 45 USC Section 13) governs the movement of equipment with defective power brakes. This only allows the railroad to move the defective equipment from the place where the defect is first discovered to the nearest location where the necessary repairs can be made. This movement can either be on the railroad where first discovered or at the option of the connecting railroad, on the line of the connecting railroad if the move is no farther than the location on the line where the defect was first discovered. Thus in order to properly move a car for repairs, the railroad must know the defect exists. Although the new regulations provide for tagging requirements in 2004, there are currently no tagging requirements for power brake defects. At interchange, a railroad can refuse to accept a defective car. Until the receiving railroad accepts the car by moving it or otherwise exercising control over it, it is not liable for civil penalties nor is it required to make any repairs. It should be noted, however, that the delivering railroad remains liable for each defective car it tenders in interchange.

The statutory provision contained in 49 U.S.C. § 20303 is an affirmative defense to be established by the railroad. There are seven elements which must be established:

- The car was properly equipped with power brakes in the beginning.
- The car became defective while being used by railroad on its line.
- The railroad discovered the defect prior to movement.
- The movement was from the place where the defect was first discovered.
- Repairs could not be made at the location where the defect was first discovered.
- Movement was necessary to make the necessary repairs.
- The car moved only to the nearest available point where the necessary repairs could be made.

The final rule on freight power brakes contains guidelines to be considered by FRA Inspectors and railroads in determining what constitutes the nearest location where necessary repairs can be performed. See 49 CFR § 232.15(f). The guidelines are equally applicable to determining such locations for all safety appliance defects. The guidelines must be applied on a case-by-case basis to determine if the railroad acted in good faith in moving defect equipment. The following locations should be considered when applying the guidelines discussed in detail below:

C Locations where a mobile repair truck is used on regular basis; C Locations where a mobile repair truck originates or is permanently stationed; C Locations with an operative repair track or repair shop; and C Locations where railroad performs mechanical repairs other than power brake repairs.

In determining whether a location, noted above, is capable of making a particular repair the following factors must be considered:

- The accessibility of the location to persons responsible for making repairs;
- The presence of hazardous conditions that affect the ability to safely make repairs of the type needed at the location;
- The nature of the repair necessary to bring the car into compliance;
- The need for railroads to have in place an effective means to ensure the safe and timely

Federal Railroad Administration

- repair of equipment;
- The relevant weather conditions at the location that affect accessibility or create hazardous conditions;
- A location need not have the ability to effectuate every type of safety appliance repair in order to be considered a location where some power brake repairs can be made;
- A location need not be staffed continuously in order to be considered a location where power brake repairs can be performed;
- The ability of a railroad to perform a single car test at a location shall not be considered; and
- The congestion of work at a location shall not be considered.

In addition to considering the factors noted above, the following factors must be considered in determining whether the location is the nearest location where the necessary repairs can be made: Distance to the location — Although this is a key factor it should not be the determining factor. This must be considered in conjunction with all the factors previously noted as well as the following safety considerations:

- The safety of the employees responsible for getting the equipment to or from a particular location, and
- The safety hazards involved in moving the equipment in the direction of travel necessary to get it to a particular location. If the location where an intermediate inspection is performed is not a location where the necessary repairs can be made, then the car may be moved for repair. This movement for repair must be made in accordance with 49 U.S.C. § 20303.

§20303. Moving defective and insecure vehicles needing repairs

(a) General — A vehicle that is equipped in compliance with this chapter whose equipment becomes defective or insecure nevertheless may be moved when necessary to make repairs, without a penalty being imposed under section 21302 of this title, from the place at which the defect or insecurity was first discovered to the nearest available place at which the repairs can be made—

(1) on the railroad line on which the defect or insecurity was discovered; or

(2) at the option of a connecting railroad carrier, on the railroad line of the connecting carrier, if not farther than the place of repair described in clause (1) of this section.

(b) USE OF CHAINS INSTEAD OF DRAWBARS — A vehicle in a revenue train or in association with commercially-used vehicles may be moved under this section with chains instead of drawbars only when the vehicle contains livestock or perishable freight.

(c) Liability — The movement of a vehicle under this section is at the risk only of the railroad carrier doing the moving. This section does not relieve a carrier from liability in a proceeding to recover damages for death or injury of a railroad employee arising from movement of a vehicle

with equipment that is defective, insecure, or not maintained in compliance with this chapter.

(MP&E 98-6) Bottom Rod Safety Support

“Bottom rod safety supports” are only required on those cars that have the bottom rod or handbrake bottom rod below the bolster. There are normally three types of bottom rod safety supports in use. The most common is the heavy wire type (Creco) that fits over the brake beam, with underslung loops to cradle the bottom rod should it become disengaged from the rest of the rigging. The handbrake bottom rod used with the brake beam mounted cylinder, generally has a loop or strip attached to each side of the truck bolster. This allows the handbrake to operate freely and acts as a safety guard. There is an older type that can be attached to the spring plank and a newer cable type.

(MP&E 98-8) Air Brake System - Reservoir Connecting Pipes

There have been incidences where Inspectors have detected freight cars in-service that have reservoir connecting pipes incorrectly applied. The auxiliary portion of the reservoir was connected to the emergency portion of the brake valve and the emergency portion of the reservoir was connected to the service portion of the brake valve. Inspectors should be alert to this condition and take appropriate action when detected.

(MP&E 98-11) Testing of Handbrakes on Locomotives Equipped with an Air Release Valve

On some locomotives, the application of the handbrake actuates an air release valve to the brake cylinder on the side of the truck where the handbrake functions. This system is necessary because the brake cylinder body has to be moved by the application of the handbrake and if the piston is extended, the cylinder body cannot be moved. When the release valve is functioning properly, it will relieve the pressure and allow the piston to retract so that the application of the handbrake will force the cylinder body toward the wheel. If the release valve does not function as intended and the handbrake is applied with the piston extended, the locomotive will not have any holding brakes when the air leaks off. FRA has been advised that there have been incidents of roll-away locomotives because of the failure of this release valve. In many cases, employees have applied the handbrake and shut down locomotives, only to discover later that the handbrake was not applied after the air leaked off.

All Inspectors are reminded that they are not to involve themselves in the manipulation of any apparatus that may cause or allow an adverse condition in any way. Testing for the above described condition must be done only by carrier personnel.

(MP&E 98-15) Conditional Use of Air Flow Method For Train Air Brake Qualifications as an Alternative To the Leakage Test For Trains

The following conditions were given to the Association of American Railroads for use of the air flow method (AFM) for train air brake qualifications:

Federal Railroad Administration

1. Each controlling locomotive on a train qualified by the AFM shall be provided with an operational air flow indicator;
2. Participating railroads shall provide an operational end-of-train device (see 49 CFR Section 232.19 - 232.25) on all trains except transfer and yard trains with movements not exceeding 20 miles;
3. The AFM will apply only to trains using locomotives that are equipped with an air flow indicator that conforms with FRA's conditions, AAR specifications and calibration procedures, and 26-L freight locomotive air brake equipment;
4. When the AFM is used for train air brake qualifications, the air brake system shall be charged within 15 psi of the highest locomotive feed valve pressure used by that railroad and air flow shall not exceed 60 cubic feet per minute (CFM);
5. The air flow indicator must be calibrated for accuracy at periodic intervals not to exceed 92 days;
6. The air flow indicator shall be clearly visible and legible in daylight and darkness from the engineer's normal operating position;
7. The air flow indicator gauge shall be clearly and uniformly marked to indicate direct reading of air flow in 10 CFM increments from at least 10 CFM to 80 CFM, with numerals indicating, at a minimum of 20, 40, 60, and 80 CFM for continuous monitoring of the air flow into the brake pipe.
8. The air flow indicator calibration test orifices shall be calibrated at temperatures of not less than 20 degrees Fahrenheit;
9. When a train qualified by the AFM is in operation and experiences an increase in brake pipe air flow and/or an increase in brake pipe gradient and the movable pointer does not return to the limits established in the initial terminal train air brake test within a reasonable time, the train crew shall stop the train for inspection and repair leaks, if detected. If unable to make repairs the crew should arrange to set out defective cars and/or proceed with due caution to the next location where corrective action can be taken;
10. All participating railroads shall provide FRA a list of locations where calibrations will be performed and of locations which will be provided with test orifices. Changed, deleted, or additional locations will be reported to FRA within 92 days; and
11. All personnel involved with the AFM of testing of train's air brake systems and operating such trains must be given training and be aware of and understand the conditions of the waiver.
12. Participating railroads shall provide an operational end-of-train device (see 49 CFR Section 232.19 - 232.25) on all trains except transfer and yard trains with movements not

- exceeding 20 miles;
13. The AFM will apply only to trains using locomotives that are equipped with an air flow indicator that conforms with FRA's conditions, AAR specifications and calibration procedures, and 26-L freight locomotive air brake equipment;
 14. When the AFM is used for train air brake qualifications, the air brake system shall be charged within 15 psi of the highest locomotive feed valve pressure used by that railroad and air flow shall not exceed 60 cubic feet per minute (CFM);
 15. The air flow indicator must be calibrated for accuracy at periodic intervals not to exceed 92 days;
 16. The air flow indicator shall be clearly visible and legible in daylight and darkness from the engineer's normal operating position;
 17. The air flow indicator gauge shall be clearly and uniformly marked to indicate direct reading of air flow in 10 CFM increments from at least 10 CFM to 80 CFM, with numerals indicating, at a minimum of 20, 40, 60, and 80 CFM for continuous monitoring of the air flow into the brake pipe.
 18. The air flow indicator calibration test orifices shall be calibrated at temperatures of not less than 20 degrees Fahrenheit;
 19. When a train qualified by the AFM is in operation and experiences an increase in brake pipe air flow and/or an increase in brake pipe gradient and the movable pointer does not return to the limits established in the initial terminal train air brake test within a reasonable time, the train crew shall stop the train for inspection and repair leaks, if detected. If unable to make repairs the crew should arrange to set out defective cars and/or proceed with due caution to the next location where corrective action can be taken;
 20. All participating railroads shall provide FRA a list of locations where calibrations will be performed and of locations which will be provided with test orifices. Changed, deleted, or additional locations will be reported to FRA within 92 days; and
 21. All personnel involved with the AFM of testing of train's air brake systems and operating such trains must be given training and be aware of and understand the conditions of the waiver.

(MP&E 98-27) Locomotive Handbrakes -Stencil Requirement for Canadian Railroads –

Title 49, CFR, Section 232.10(f)(2) requires that locomotive handbrakes be inspected and repaired as often as service requires with the date suitably stenciled or tagged. Transport Canada's Cab Form 22, Item 8(a) includes this same information. The information in Item 8(a) of Transport Canada Cab Form 22 satisfies FRA's requirement of having "the date suitably stenciled or tagged."

Federal Railroad Administration

(MP&E 98-41) Locomotive Brake Cylinder Pressure

To address questions concerning the minimum locomotive brake cylinder pressure required by the Federal regulations, the following guidance applies.

Section 229.55(c) states:

The minimum brake cylinder pressure shall be 30 pounds per square inch.

Section 232.10(n)(8) states: Air pressure regulating devices must be adjusted for the following pressures: Self-lapping portion for independent air brake (full application pressure) 30-50 pounds. These regulations were written when cast iron brake shoes were the standard and the brake cylinder relay air valve delivered 100 percent of the control pressure to the brake cylinders. With the advent of the high friction composition brake shoe, various relay valves have been used depending on whether the rigging was designed for cast iron or composition shoes. To best match the stop distance of cast iron, a two-step relay valve is used for composition shoes. One level is used for the automatic brake where speeds are generally above “switching” speeds and a higher level for the independent brake which is normally used in switching. By tailoring the relay valve to the locomotive, a standard independent brake valve setting can be used universally on a railroad. This setting is usually 45 psi. The resulting brake cylinder pressure may vary 27 psi (with a 60 percent relay) to 72 psi (with a 160 percent relay). The 60 percent relay valves (J-46 or J-64) are normally found on older locomotives which were converted from cast iron shoes with clasp rigging to composition shoes with clasp rigging. FRA considers such locomotives to be in compliance with the regulations.

(MP&E 98-55) Brake Hoses on Cars Equipped with 15" End-of-Car Cushioning Units

It has been brought to FRA’s attention that some freight cars have undergone modifications that includes the installation of a 15" end-of-car cushioning unit, which if not properly installed and maintained, can develop a crimped brake hose condition. Often when the draft system is converted or improperly maintained, brake hose free play can be reduced, thus causing the brake hose to bind in either full buff or full draft positions.

Inspectors need to be vigilant for signs of brake hose deterioration, especially on cars with modified draft systems. If such conditions are found, immediately report them to the railroad. Also forward these findings to the Regional MP&E Specialist, so data can be collected to determine if a widespread problem exists with a specific series of cars. See FRA Safety Advisory 2008-01 at the end of this section.

(MP&E 98-56) Sloan Model 3050-A and 3200-A Angle Cocks

Sloan Model 3050-A and 3200-A Angle Cocks have caused injuries to several railroad employees. Several railroad employees have experienced personal injury when a Sloan angle cock handle and ball assembly forcefully flew apart, from train line pressure, when turned past the prescribed closed position due to a broken body stop (a.k.a. mechanical stop) for the handle.

FRA contacted the AAR regarding this safety hazard. In response, AAR re-issued instructions

Motive Power and Equipment Compliance Manual

for the proper handling/repairing of Sloan Model 3050-A and 3200-A Angle Cocks
(Maintenance Advisory, (c-8502) MA-27, dated March 14, 1996).

During routine inspections, all field personnel should be alert to the potential safety hazard and verify that all angle cocks have an effective body stop for the handle.

Guidance on truck mounted brakes and indicators

Guidance regarding procedures to follow when truck mounted brakes and indicators shown below are not within the required limits. Example: At Class I, Class IA, yard inspections with brakes applied, repair track, etc...



How to View Piston Travel Indicators
On Cars with TMX Truck Mounted Brakes

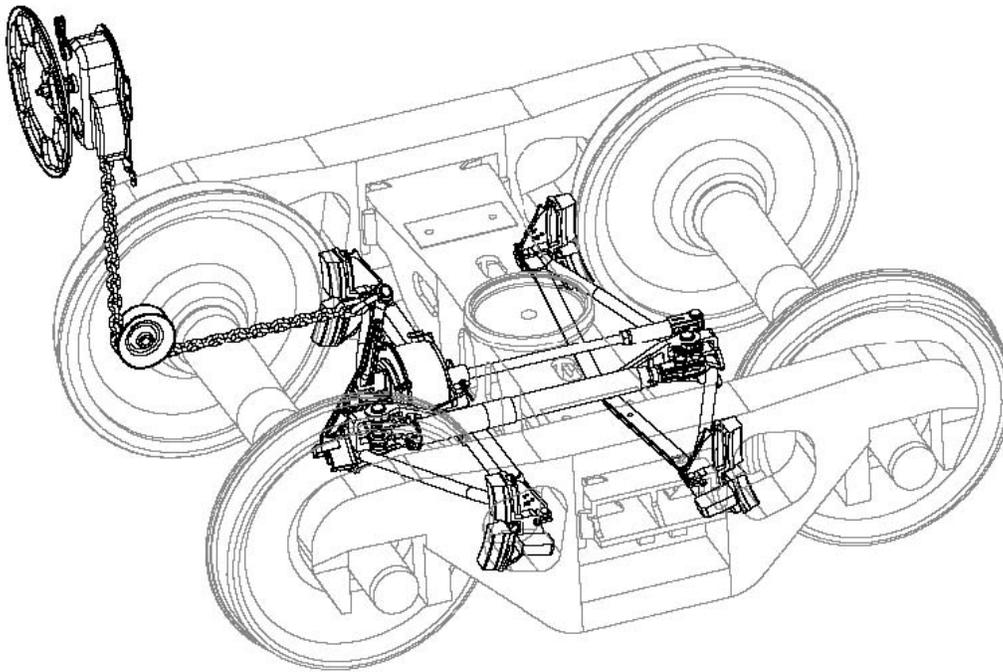


Figure 16: TMX truck mounted brake assembly

TMX Truck Mounted Brake assembly

As you can see in **Figure 16**, the TMX Truck mounted brake assembly is completely independent of the truck bolster and is attached by means of our brake head end paddles into the side frame brake beam guide slots. As you will also see the brake cylinder is mounted to one of the brake beams towards the center of the truck bolster with the hand brake lever, (on trucks

connected to the hand brake), cylinder lever, automatic slack adjuster, and return push rod connected to the transfer lever of the second brake beam.

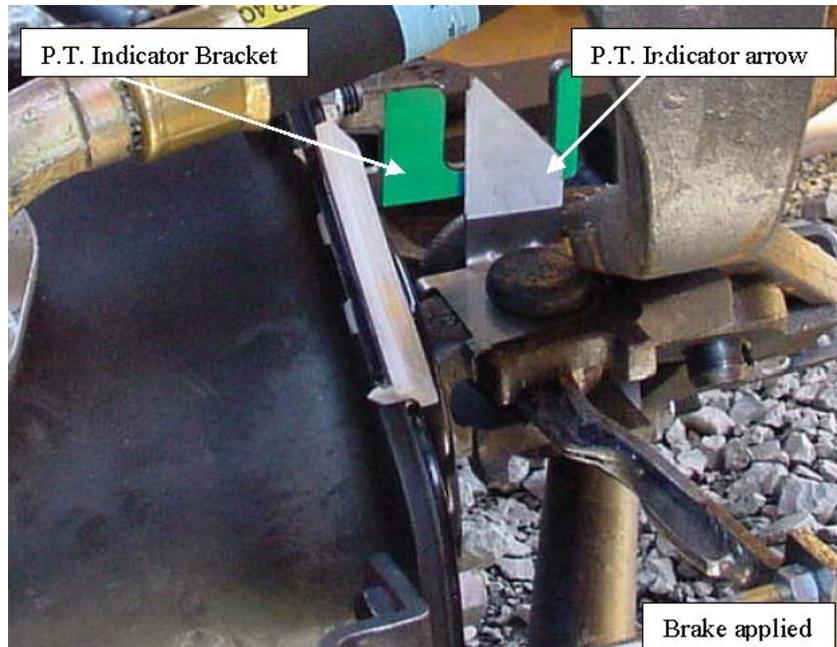


Figure 17: Piston travel indicator arrow is mounted to the piston rod (brake applied)

In **Figure 17** you will see the piston travel indicator arrow mounted to the cylinder piston rod. When brakes are applied this arrow passes in front of a piston indicator bracket attached to the cylinder non pressure head. As the piston extends **Figure 17** illustrates that brakes are applied as indicated by the arrow location between the two vertical edges of the bracket window.

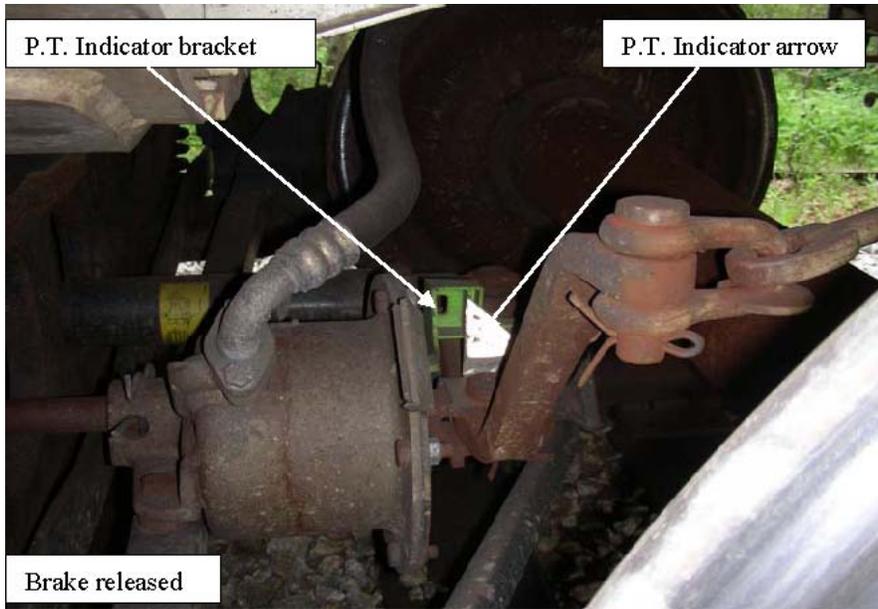


Figure 18: Piston travel indicator arrow (brake is released)

When the brakes are released this arrow will be located out of the bracket window closer to the cylinder as shown in **Figure 18**.

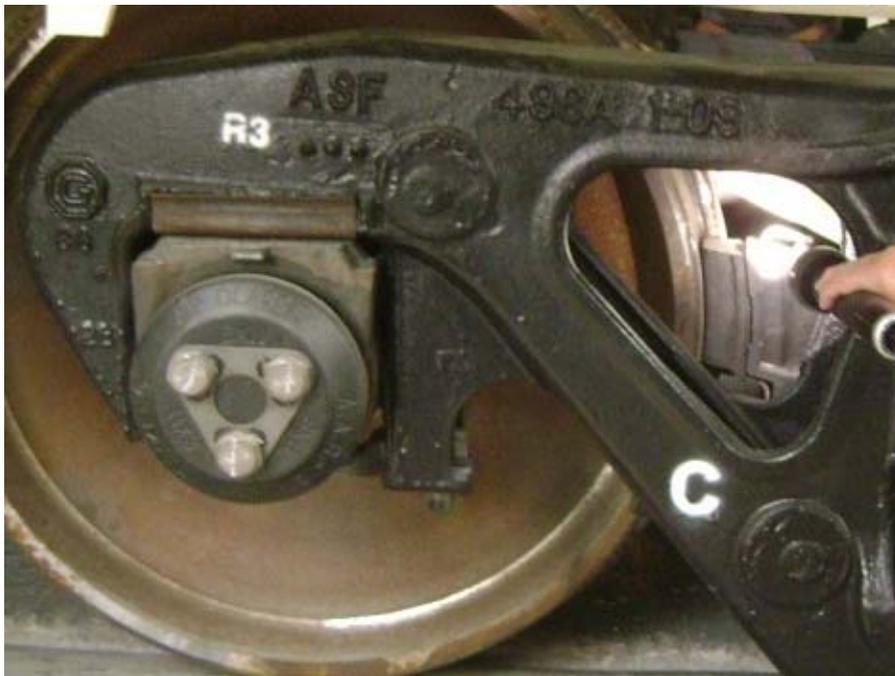


Figure 19: TMX piston travel indicator inspection



Figure 20: TMX piston travel indicator inspection

TMX piston travel indicators can best be observed by looking through the windows next to the spring nest in the side frame of standard AAR three piece trucks just over the brake heads ahead of the cylinder and towards the center of the truck. See **Figure 19** and **Figure 20**.

[Federal Register: April 16, 2008 (Volume 73, Number 74)]

[Notices]

[Page 20741]

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DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

Safety Advisory 2008-01

AGENCY: Federal Railroad Administration (FRA), DOT.

ACTION: Notice of Safety Advisory; damage to intermediate air hose elbow connection on certain freight cars equipped with end-of-car cushion devices.

SUMMARY: FRA's Office of Safety Assurance and Compliance Motive Power and Equipment (MP&E) Division has been notified that certain freight cars equipped with end-of-car cushioning (EOCC) devices may have damage to a 90-degree elbow connected to the trainline angle cock.

FOR FURTHER INFORMATION CONTACT: Tom Blankenship, Mechanical Engineer, MP&E Division (RRS-14); FRA Office of Safety Assurance and Compliance, 1200 New Jersey Avenue, SE., Washington, DC 20590, telephone: (202) 493-6446.

SUPPLEMENTARY INFORMATION: On newly constructed freight cars, the air brake trainline must pass the Association of American Railroads (AAR) Standard S-471, Brake Pipe Restriction Test. This requirement is used to verify the clear and open path of air to adequately operate the train air brake system. The Brake Pipe Restriction Test requires that a 1-inch round nylon ball be transmitted through the trainline under air pressure of 80 psi.

The intermediate air hose arrangement, as shown in Rule 4, Figure 22 of the Field Manual of the AAR Interchange Rules, shows a 90-degree swivel elbow connected to the angle cock. The intermediate air hose (located between the angle cock and the standard air brake hose) has this 90-degree elbow attached to the air hose end of the angle cock. When cars are uncoupled while charged with air, the glad hand on the standard air brake hose can (if not properly restrained) whip back and strike the 90-degree elbow. The violent impact of the glad hand striking this elbow causes the elbow to bend or flatten and subsequently restrict the air flow. This bending or flattening of the 90-degree elbow, if uncorrected, can cause sticking brakes, wheel tread buildup, and diminished capacity of the train air brake system. Freight cars with bent or flattened 90-degree elbows are in violation of Title 49 Code of Federal Regulations (CFR) section 232.205(c)(3), which states in part, "air hoses shall be properly coupled and shall not kink, bind, or foul or be in any other condition that restricts air flow."

FRA has found damage to the intermediate air hose arrangement 90-degree elbow on ATSF 621000-, ATSF 622000-, and BNSF 534000-series cars owned by BNSF Railway (BNSF). BNSF has implemented an aggressive program to address this issue on cars in their ownership by fleet inspection and repair of cars found with damage to the 90-degree elbow.

Additional cars that have been observed with this type of defect include LW 42000-series box cars and TBOX 660000-series box cars.

Recommended Action: Recognizing the need to ensure safety, FRA recommends that railroads and car owners that operate freight cars equipped with EOCC devices having intermediate air hoses with 90-degree elbows subject to the damage described above initiate an inspection and repair program to ensure cars are maintained in accordance with AAR Interchange Rule 4, Figure 22, and that the trainline is not obstructed or restricted.

FRA may modify this Safety Advisory 2008-01, issue additional safety advisories, or take other appropriate action necessary to ensure the highest level of safety on the Nation's railroads.

Issued in Washington, DC, on April 9, 2008.

Jo Strang,

Associate Administrator for Safety.

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Chapter 12

Passenger Equipment Safety Standards Part 238

Introduction

The Federal Railroad Administration added Part 238 containing Passenger Equipment Safety Standards (PESS) on May 12, 1999 (64 FR 25540) and issued responses to petitions for reconsideration through final rules published on July 3, 2000, April 23, 2002, and June 25, 2002 (65 FR 41284, 67 FR 19970, and 67 FR 42892, respectively). On October 19, 2006, FRA published a final rule that addressed various mechanical issues relevant to the manufacture, efficient utilization, and safe operation of passenger equipment and trains that have arisen since the issuance of the PESS rule (71 FR 61836). Additionally, on February 1, 2008, and January 8, 2010, FRA published final rules further amending Part 238 to enhance and add requirements regarding Passenger Train Emergency Systems (PTES) (73 FR 6370) and enhance requirements for the structural strength of the front end of cab cars and multiple-unit locomotives (75 FR 1180), respectively. The original PESS regulation became effective on July 12, 1999. The guidance contained in this section of the compliance manual addresses specific issues or questions raised since the issuance of these rules. For information or guidance of a specific provision not covered in this manual, the preamble discussions contained in the publications noted above should be consulted and reviewed, along with any other related chapters in FRA's compliance manuals (*e.g.*, Chapter 15 of the Operating Practices Manual, which includes guidance regarding the PTES final rule). FRA intends to update this portion of the manual on a regular basis to include any new issues or guidance concerning any of the PESS provisions.

The following provides guidance to be used by Federal and State inspectors when conducting inspections of passenger equipment for compliance with Federal laws and regulations. Although Inspectors have enforcement discretion regarding whether or not to recommend a defect for violation, it is important that agency enforcement policies be adhered to by every inspector when conducting inspections, so that uniformity of enforcement activity is achieved.

The procedures provided in both this manual and FRA's General Manual should be observed when assessing the need for appropriate corrective actions regarding noncompliance with the passenger equipment safety standards. It should be noted that there is significant interplay between the provisions contained in this part and provisions contained in other parts of the Federal regulations. These include: the Locomotive Safety Standards (LSS) in Part 229; the Safety Appliances Standards in Part 231; and the Passenger Train Emergency Preparedness regulations contained in Part 239. When an MP&E Inspector determines that a defect exists on passenger equipment which may not be conducive to safe operation, the inspector must decide if the defect—

- Is a Part 238 defect.
- Should be documented on the F6180.96 - Inspection Report.
- Warrants the issuance of a violation.

- Warrants the issuance of a Special Notice for Repairs under Part 216.
- Should be reported to the railroad as an unsafe condition, not encompassed in the Federal regulations.

The following discussion addresses various issues that have arisen during the implementation of the passenger equipment safety standards and provides guidance on the enforcement of those issues.

Part 238, Subpart A—General

238.3 Applicability.

Guidance

The requirements of Part 238 do not apply to tourist, scenic, historic, or excursion operations even if they operate over the general railroad system. Transportation of passengers to a particular destination is not the principal purpose of a tourist or scenic railway. The requirements also do not apply to circus trains.

238.5 Definitions.

For the complete list of definitions, please refer to the 49 CFR Part 238, § 238.5. The following definitions are the most relevant or more often inquired in this section for purposes of conducting an MP&E inspection:

Actuator means a self-contained brake system component that generates the force to apply the brake shoe or brake pad to the wheel or disc. An actuator typically consists of a cylinder, piston, and piston rod.

The actuator moves as a direct action of the brake piston when applying retarding force or from a load cell that reads brake shoe pressure.

Brake indicator means a device, actuated by brake cylinder pressure, which indicates whether brakes are applied or released.

This device is operated by means other than directly off the piston movement, such as pressure switches located in the brake pipe or low pressure head.

Calendar day means a time period running from one midnight to the next midnight on a given date.

This is the same as a calendar day inspection required in the Railroad Locomotive Safety Standards. One inspection for each day, or part of a day, the equipment is used in service.

Motive Power and Equipment Compliance Manual

Locomotive, MU means rail rolling equipment self-propelled by any power source and intended to provide transportation for members of the general public; however, this term does not include an MU locomotive propelled by steam power unless it is used to haul an intercity or commuter passenger train.

Unlike the definition in the Railroad Locomotive Safety Standards, MU in this rule includes MU passenger locomotives powered by a number of sources.

Passenger car means rail rolling equipment intended to provide transportation for members of the general public and includes a self-propelled car designed to carry passengers, baggage, mail, or express. This term includes a passenger coach, cab car, and an MU locomotive. In the context of articulated equipment, “passenger car” means that segment of the rail rolling equipment located between two trucks. This term does not include a private car.

Passenger car, as defined, includes MU locomotives. Thus, whenever the term “passenger car” is used, then MU locomotives are included unless expressly excluded. MU locomotives, as well as traditional locomotives, remain under the requirements found in Part 229 with the exception of those items in Part 238 not expressly addressed in Part 229, such as deadman pedals or alerter. MU locomotives are required to be inspected by a qualified maintenance person (QMP). Such an inspection may satisfy the requirements for a locomotive daily inspection under Part 229, if it includes all items addressed in that part. However, a locomotive daily inspection under Part 229 will not satisfy the need for the exterior mechanical inspection required by the Passenger Equipment Safety Standards unless it is performed by a QMP and also covers all components and parts addressed in Part 238. If a traditional locomotive receives a daily inspection under Part 229 by an employee other-than a QMP, then those items that are not covered in the Railroad Locomotive Safety Standards (Part 229) but are addressed in the Passenger Equipment Safety standards (Part 238) must be re-inspected by a QMP (ex: dynamic brake, alerter/deadman pedal).

Power car means a rail vehicle that propels a Tier II passenger train or is the lead vehicle in a Tier II passenger train, or both.

Power cars (whether occupied or unoccupied) are considered to be Passenger Equipment and must comply with the inspection, testing, and maintenance (ITM) requirements in § 238.503. FRA review and approval of the railroad’s ITM program is contingent on it meeting or exceeding the requirements of the Locomotive Inspection Act for power cars.

Private Car means rail rolling equipment that is used only for excursion, recreational, or private transportation purposes. A private car is not a passenger car.

Private railroad cars operating in an intercity passenger (e.g., Amtrak, Alaska Railroad) or commuter train are regulated under Part 238 as a type of “passenger equipment” (see paragraph (1)(v) of the definition of this term in § 238.5). Private cars are subject to a number of requirements in Part 238, principally to protect the safety of the passenger trains hauling the private cars and the railroad employees handling the cars. These include requirements for daily (§ 238.303) and periodic (§ 238.307) exterior mechanical inspections, air brake inspections

(§§ 238.309 and 238.311), safety appliances (§ 238.229, referencing Part 231), and suspension system safety (§ 238.227).

Passenger cars (which, by definition, do not include private cars) are subject to numerous, additional requirements, including requirements for daily interior inspections (§ 238.305), interior fittings (§ 238.233), fire safety (§ 238.103), and emergency lighting (§ 238.115). Private cars are not directly subject to fire safety requirements or emergency preparedness requirements in Part 239. Nonetheless, passenger railroads that haul private cars need to consider the possible presence of such private cars when they are developing their fire safety analyses and Part 239 emergency preparedness plans.

FRA notes that Amtrak requires a detailed annual inspection of the private cars it operates (Amtrak Form MAP PC-1), as well as a comprehensive running gear inspection and overhaul of all private cars over 40 years old (Amtrak Form MAP PC-2). FRA considers a completed Amtrak MAP PC-1 to meet the requirements for records of periodic maintenance for private cars required in § 238.307.

If a private car is not being operated in an intercity passenger or commuter train, it is still subject to various requirements, depending on the nature of the railroad operation. For instance, a private car operating in a freight train is subject to the air brake maintenance requirements in Appendix B of Part 232 and the safety appliance standards of Part 231. In addition, private cars are subject to the Safety Glazing Standards of Part 223, unless the cars are “historical” or “antiquated” (i.e., built in 1945 or earlier).

Private Railcars Regulatory Compliance: Q&A

Must private railcars follow the same regulations as other passenger cars in terms of safety? Do the private railcar owners need to report to FRA and does FRA ever inspect their equipment/records?

In general, private railroad cars (or *private cars*) operating in Amtrak or commuter trains are regulated under the Part 238, as *passenger equipment*, which includes *passenger cars* transporting the general public, locomotives, baggage cars, mail cars, and *private cars*. As such, *private cars* are subject to the requirements that apply to all *passenger equipment*, including requirements for daily and periodic exterior mechanical inspections, air brake inspections, safety appliances (sill steps, handholds and handrails), suspension system safety, and wheel inspections--which are all items that if not in compliance with the safety regulations could endanger the safety of the passenger train hauling the private car.

Passenger cars (which do not include *private cars*) are subject to additional requirements, such as a daily interior inspection, interior equipment fastening requirements, fire safety standards, and emergency signage requirements. However, a passenger railroad that regularly hauls private cars needs to consider the possible presence of a private car in their trains when they are developing their fire safety analyses and emergency preparedness plans.

In addition, Amtrak requires a detailed annual inspection of the *private cars* it operates, and a comprehensive running gear inspection and overhaul of all private cars over 40 years old.

In general, if a car is not being operated in Amtrak or commuter train, it is still subject to the air brake maintenance requirements in Part 232 and the safety appliance standards of Part 231 (sill steps, handholds, handrails, uncoupling levers and handbrake and/or statute (Title 49 of the United States Code). It is also subject to the glazing requirements of Part 223, unless it is historic or antiquated (*i.e.*, built before 1945) and used only for excursion, educational, recreational purposes or private transportation purposes (see § 223.3(b)(3)).

Private railcar owners do not have to report railcar maintenance and/or other mechanical-related information to FRA. However, they could be held responsible for a failure to maintain proper records, which is subject to inspection and review by FRA Motive Power and Equipment (MP&E) inspectors. The operating railroads have the primary responsibility for operating compliant equipment in their trains, and that is where FRA's inspectors generally focus their attention. Subsequently, if a railroad has any questions as to compliance, they often follow up with the owners of the equipment so as to avoid liability from FRA, which helps to ensure compliance with FRA regulations.

§ 238.9 Responsibility for compliance.

This section establishes two levels of liability depending on the nature of the defect or inspection for which noncompliance with this part is being alleged. A strict liability standard is applied to non-conformity with any of the safety appliance and power brake provisions of Part 238, including the inspection provision addressing such components. Paragraph (a)(1) makes clear that a railroad may not use, haul, permit to be used or hauled on its line, offer in interchange, or accept in interchange any train or equipment with one or more conditions not in compliance with Part 238's power brake or safety appliance provisions or the involved inspection provisions. A reasonable person standard is applied to all other conditions not in compliance with Part 238, other than the safety appliance and power brake provisions. Paragraph (a)(2) makes clear that for other than safety appliance or power brake defects, a railroad may not use, haul, permit to be used or hauled on its line, offer in interchange, or accept in interchange any train or equipment with one or more conditions not in compliance with Part 238 if the railroad has actual knowledge of the facts giving rise to the violation, or a reasonable person acting in the circumstances and exercising reasonable care would have that knowledge.

Strict liability applies to the use or haul of equipment with defective safety appliances. If a piece of passenger equipment is discovered with a defective safety appliance or power brake and it is not being used or hauled pursuant to the statutory provisions contained in 49 U.S.C. § 20303 and the movement of defective equipment provision of § 238.15, appropriate enforcement action must be taken. If a railroad is unaware of the existence of a defective condition, it cannot be considered to be properly hauling the equipment for repairs under either the statute or § 238.15. Knowledge of the defect need not be established. Inspectors are expected to use sound judgment together with the guidance outlined in the General Manual and Chapter 3 of this manual when deciding whether the issuance of a violation report is appropriate.

Reasonable person liability standard is a somewhat lower standard of liability than the strict liability standard noted above. Under this standard a railroad subject to this part is liable only if it knew, had noticed, or should have known of the existence of either a defective condition on the equipment or the failure to inspect and test the equipment as prescribed in this part. Thus, when seeking a violation of a requirement or provision, other than a safety appliance or power brake requirement, FRA must establish that the railroad had actual knowledge of the condition or a reasonable person exercising reasonable care would have such knowledge. Consequently, a violation report must discuss the inspector's basis for finding that the railroad knew or reasonably should have known of the presence of the defective condition. Inspectors should be as specific as possible when detailing this information.

Paragraph (b) of this section states that in order to establish a violation, FRA must prove that the equipment was "used or hauled" in defective condition. Thus, evidence of an actual "haul" of the defective equipment in a train is always sufficient to support a violation. In addition, this section makes clear that FRA will consider a piece of equipment "in use" and subject to potential civil penalties prior to departure but after a railroad has or should have completed its required inspections and is deemed ready for service. Thus, FRA is not necessarily required to wait for a car with a defective safety appliance or power brake to depart or engage in an actual "haul" in order to assess a violation. If inspectors rely on the above interpretation, the violation report must establish that the railroad had completed all necessary inspections capable of discovering the alleged defective condition. Therefore, evidence must be included in the violation report which establishes the inspector's basis for this finding (be as specific as possible, include names, if available). Note: This is added enforcement flexibility and may not be the appropriate approach in many situations; in many circumstances the best approach is still to establish actual use or movement of the equipment.

Paragraph (c) clarifies FRA's position that the requirements of this part are applicable not only to any railroad subject to the part but also to any person, as defined in §238.5, that performs any function required by Part 238. Although various sections of the regulation address the duties of a railroad, FRA intends that any person who performs any action on behalf of a railroad or any person who performs any action covered by the rule is required to perform that action in the same manner as required of a railroad or be potentially subject to FRA enforcement action.

§ 238.15 Movement of passenger equipment with power brake defects.

Guidance

Paragraph (b) provides that any equipment that is found with a defective air brake during a Class I or IA brake test may only be moved in a non-revenue train (i.e., without passengers) after meeting all additional conditions for the movement of passenger equipment with brakes that became defective en route. That is, the train movement must comply with the applicable operating restrictions in paragraphs (d) and (e) of this section, and the defective equipment must be tagged (or information recorded) pursuant to paragraph (c)(2) of this section. Secondary braking systems, such as dynamic braking, may be continued in service under the conditions found in § 238.303(e)(15)(i) and (ii).

When railroads move equipment with brakes that become defective en route, inspectors should consider more than just the equipment conditions to decide if it is safe to unload passengers at the next station. They should look at the location as to the safety of passengers, overloading equipment, weather, and a number of other concerns. Railroads should not be cited for exercising good judgment to ensure the safety of their passengers.

If the train reaches its final destination and all passengers have detrained, the railroad must then move the equipment for repair while out of service and without passengers. This includes trains that operate to a final destination where the crew would normally change ends and then perform a Class II brake test to operate the equipment towards a repair facility, the return trip must be conducted while out of service and without passengers.

Paragraph (e). – This paragraph places operating restrictions on passenger trains with “completely inoperative” power brakes on the front or rear unit. Coupler mates or similar equipment that are physically joined by a trailer or container operated at the rear of a passenger train that has a braking problem resulting in a truck brake system being cut out does not constitute “completely inoperative” brakes at the rear of the train unless both trucks are cut out.

238.17 Movement of passenger equipment with other than power brake defects.

The off-site QMP could make required determinations when defective running gear is involved and report via radio or telephone without being on the scene.

Part 238, Subpart B—Safety Planning and General Requirements

238.109 Training qualification, and designation program.

Paragraph (a). Beginning on January 1, 2002, each railroad shall have adopted a training, qualification, and designation program for employees and contractors that perform any of the inspections, tests, or maintenance required by this part, and shall have trained such employees and contractors in accordance with the program.

Guidance

If the railroad uses a contractor or another railroad to provide required training the railroad should adopt the training plan being used and keep good records. FRA believes that maintaining good records is the cornerstone of the training requirements.

The tests, inspections, and maintenance required to be performed by a QMP is identified in each section where it is required. An example would be when a person who is QMP-qualified to perform an exterior calendar day mechanical inspection (§ 238.303) finds a wheel with a condemnable defect. After the condition is reported, the car moves to a wheel true machine for repair. While the rule requires that the inspector be a QMP to perform the exterior calendar day mechanical inspection, there is no such requirement for the wheel true operator, and no requirement that a QMP inspect the equipment upon release from the wheel true facility.

Paragraph (b)(8). Require supervisors to complete the program that covers the employees whom they supervise, including refresher training.

Guidance

Supervisors, as discussed in the requirement are first-line supervisors of QMPs, and these supervisors must complete a program that covers the same material as the QMP employees they supervise. This requirement is only for the first-line supervisor.

Paragraph (b)(10). Designate in writing that each employee and contractor has the knowledge and skills necessary to perform the safety-related tasks that are part of his or her job.

Guidance

Employees are not required to carry a card that lists their qualifications, but railroads must maintain a list of its employees' qualifications and be able to provide that information to FRA upon request.

238.119 Rim-stamped straight-plate wheels.

Paragraph (a)(1). Except as provided in paragraph (a)(2) of this section, on or after November 8, 1999, no railroad shall place or continue in service any vehicle, other than a private car, that is equipped with a rim-stamped straight-plate wheel if a brake shoe acts on the tread of the wheel for the purpose of slowing the vehicle.

Guidance

This is only for rim-stamped straight-plate wheels with tread braking, this does not include hub-stamped straight-plate wheels.

Part 238, Subpart D—Inspection, Testing, and Maintenance Requirements for Tier I Passenger Equipment

238.303 Exterior calendar day mechanical inspection of passenger equipment.

Paragraph (a). Except as provided in paragraph (f) of this section, each passenger car and each unpowered vehicle used in a passenger train shall receive an exterior mechanical inspection at least once each calendar day that the equipment is placed in service.

Guidance

The requirement applies to passenger cars. As defined, that includes MU passenger locomotives and all other equipment hauled in a passenger train.

A calendar day inspection (or “daily inspection”) is required for any calendar day the passenger equipment is used in service. A calendar inspection is not governed by the amount of time the

equipment was used. A passenger car that arrives at 12:20 in the morning on any given day would be required to receive a calendar day mechanical inspection on that day.

If a long-haul passenger car receives a daily mechanical inspection and departs, and some time after midnight the car becomes defective and is set out, the railroad would not be responsible to perform a daily inspection for the day that it was used in service and set out, but would have to perform an inspection prior to placing the car into another train or before moving the car for the purpose of repair.

The daily inspection of MU locomotives and control car locomotives performed under the requirements of a locomotive daily inspection (§ 229.21) does not fulfill the requirements for a daily mechanical inspection of passenger equipment unless performed by a QMP qualified for that inspection. Conventional locomotives can be inspected by people the railroad deems qualified (§ 229.21(c)) who are not QMPs with the exception of those items specifically addressed in the Passenger Equipment Safety Standards not covered in the Locomotive Safety Standards, such as dynamic brakes and alerters.

238.305 Interior calendar day mechanical inspection of passenger cars.

Paragraph (c)(5). The words “Emergency Brake Valve” are legibly stenciled or marked near each brake pipe valve or shown on an adjacent badge plate.

Guidance

The required language "Emergency Brake Valve" is preferred, but inspectors should use good judgment when encountering similar verbiage on the stencil or marking, as a large number of these valves are marked “Brake Emergency Use Only.” Inspectors should take no exception to this or other markings that meet the intent.

238.307 Periodic mechanical inspection of passenger cars and unpowered vehicles used in passenger trains.

Paragraph (a). Railroads shall conduct periodic mechanical inspections of all passenger cars and all unpowered vehicles used in a passenger train as required by this section or as warranted and justified by data developed pursuant to paragraph (a)(2) of this section. A periodic inspection conducted under part 229 of this chapter satisfies the requirement of this section with respect to the features inspected.

Guidance

The requirement applies to passenger cars. As defined, that includes control car locomotives and MU passenger locomotives. Those items of inspection that are performed as part of the 92-day, annual, or biannual inspection required as part of the locomotive safety standards are not required to be included in the periodic under the passenger equipment periodic inspection.

Paragraph (b). Each periodic mechanical inspection required by this section shall be performed by a qualified maintenance person.

Guidance

The inspection of the equipment must be performed by a QMP. If a defect has been identified, it must be repaired before the equipment is returned to service. There is no requirement that a QMP make the repairs or re-inspect the equipment when repairs are completed.

Paragraph (c). The periodic mechanical inspection shall specifically include the following interior and exterior mechanical components, which shall be inspected not less frequently than every 184 days. At a minimum, this inspection shall determine that:

Guidance

The 184 day requirement was issued after the 180 day requirement contained in § 239.107(b)(2) and supersedes that requirement.

Paragraph (d). At an interval not to exceed 368 days, the periodic mechanical inspection shall specifically include inspection of the following...

....

(2) The hand or parking brake as well as its parts and connections, to determine that they are in proper condition and operate as intended. The date of the last inspection shall be either entered on Form FRA F 6180-49A, suitably stenciled or tagged on the equipment, or maintained electronically provided FRA has access to the record upon request.

Guidance

(MP&E 07-02) During the drafting of the rule text, the requirements for testing and recording were copied from similar requirements applicable only to locomotives. As a result, the form specified in the rule, Form F 6180.49A (Blue Card), is a locomotive form. However, FRA did not intend to limit use of an onboard record to a Blue Card for keeping test information under this section, especially for equipment that is not a locomotive. Therefore, FRA makes clear that the onboard record may be kept in any manner chosen by the railroad as long as it contains all the required information and is legible. The record does not have to be a Blue Card. Further, railroads may also stencil the information or keep the information electronically, as provided in the section.

238.309 Periodic brake equipment maintenance.

Guidance

Locomotive air dryers.

Locomotive air dryers (“air dryers”) are not specifically addressed by Federal safety laws (*see* 49 CFR Part 229 and 49 U.S.C. § 20103), nor has FRA determined that air dryers are an appurtenance to the locomotive for purposes of 49 CFR § 229.7. Because air dryers are not addressed by Federal safety laws, no violations should be taken for defective air dryers.

In a number of the waivers granted by FRA’s Railroad Safety Board (“Board”) to extend the intervals between brake maintenance (similar to the cleaning, repairing, and testing commonly referred to as COT&S) on both freight (49 CFR § 229.29, Biennial tests) and passenger (49 CFR § 238.309, Periodic brake equipment maintenance), the Board required a functioning air dryer as a condition of the waiver. If a locomotive covered by a waiver that requires a functioning air dryer is beyond the current brake maintenance interval in the regulation, and is found to have a defective air dryer, the locomotive would be noncompliant under 49 CFR § 229.329 or 49 CFR § 238.309 because of the overdue brake maintenance, and not for the defective air dryer. The waivers do not explain how FRA will determine whether an air dryer is defective. Violation reports must explain the basis for the inspector’s determination that the air dryer is defective, and must include a copy of the applicable waiver with the report. As a note, inspectors should not rely only on the air dryer’s color indicator to make the determination.

238.311 Single car test.

Paragraph (b). Each single car test required by this section shall be performed by a qualified maintenance person.

Guidance

As in the previously discussed inspection requirements above (see §§ 238.109 and 238.307), the single car test must be performed by a QMP. It should be noted that, as also discussed above, the regulation does not require associated work, such as removal or replacement of valves, to be performed by a QMP or to be re-inspected by a QMP after repairs have been completed.

Amtrak requested and was granted approval of an alternate standard for performing single car tests of Talgo equipment. This request was assigned docket number FRA-2003-16666.” A copy of the decision letter is available in the section of this compliance manual titled “MP&E Waivers.”.

The American Public Transportation Association (APTA) requested and was granted approval of an alternate standard for performing single car tests of passenger equipment. The approval allows the railroad to use the original APTA Code of Test identified in the Passenger Equipment Safety Standards or the alternate test code dated March 24, 2003, which allows the test to be performed at the pressure at which the brake system is operated. Railroads are free to use either test as needed. This request was assigned docket number FRA-2005-20053,” A copy of the test code is available from APTA at:

<http://www.aptastandards.com/PublishedDocuments/PublishedStandards/PRESS/tabid/85/Default.aspx>.

§ 238.313 Class I brake test.

The requirement to conduct a Class I brake test in paragraph (a) of this section includes all passenger cars that are not self-propelled (so as to exclude MU locomotives and other self-propelled vehicles) and passenger equipment being moved by a passenger railroad, with the exception of equipment being moved in compliance with § 238.15, Movement of passenger equipment with power brake defects. This includes mail trains and passenger equipment without passengers on board that is being moved by a passenger railroad. FRA would consider these cars to be either in revenue service or designed to carry passengers.

Paragraph (a). Each commuter and short-distance intercity passenger train shall receive a Class I brake test once each calendar day that the train is placed or continues in passenger service.

Guidance

If a train is used in service on any given day, regardless of time used, it must receive a Class I brake test. This test can be performed before the service begins or upon completion of service.

Paragraph (d). Each Class I brake test shall be performed by a qualified maintenance person.

Guidance

The Class I brake test must be performed by a QMP qualified for that particular test. The test may use a non-QMP to manipulate the brake valves during the performance of the test.

Paragraph (f)(7). Brake pipe leakage does not exceed 5 pounds per square inch per minute if leakage will affect service performance;

Guidance

Brake pipe leakage may not exceed 5 pounds per square inch per minute, but does not need to be tested unless the leak will affect the operation of the train brakes. Accordingly, any violation reports based on this section must include an explanation of how the leakage will affect service performance of the brakes.

Paragraph (g)(14). If the equipment is provided with a brake indicator, the brake indicator operates as intended; and

Guidance

Most passenger cars and MUs are equipped with indicator lights, but some are equipped with multiple indicators located on each side of the equipment. In such cases, only one set of these indicators per side of car must work to be in compliance.

238.315 Class IA brake test.

Paragraph (a)(1)(iii). The train has not been disconnected from a source of compressed air for more than four hours since the performance of the Class I brake test; and

Guidance

The minimum pressure of ground compressed air to be considered sufficient is 60 psi.

Paragraph (b). A commuter or short-distance intercity passenger train that provides continuing late night service that began prior to midnight may complete its daily operating cycle after midnight without performing another Class I or Class IA brake test. A Class I or Class IA brake test shall be performed on such a train before it starts a new daily operating cycle.

Guidance

Some commuter systems operate service beyond midnight, and the requirement to perform a Class IA prior to the first morning departure was written to make clear that a train is not required to be stopped during its operating cycle in order to receive a Class I or Class IA brake test prior to its first departure of a calendar day. This provision does not, however, relieve a railroad from its responsibility under § 238.313 to perform a Class I brake test on each calendar day that the train is in use—the train operating past midnight must receive a Class I brake test sometime on each of the two days it is in use. . Inspectors should use good judgment when determining if a train requires a Class IA brake test prior to the first morning departure. In contrast to the trains that are not operated through the night (for which the railroad has plenty of time to conduct required tests), the trains that operate throughout the night may only lay up for short periods of time, an hour or two, and requiring a test before the first morning departure may not be practicable.

Paragraph (e). Except as provided in § 238.15(b), a railroad shall not use or haul a passenger train in passenger service from a location where a Class IA brake test has been performed, or was required by this part to have been performed, with less than 100 percent operative brakes.

Guidance

See § 238.315 and the earlier discussion of the conditions for the movement of passenger equipment with power brake defects for repair. Failure to observe any condition for the movement of such equipment will deprive the railroad of the benefit of the movement-for-repair provision and make the railroad and any responsible individuals liable for a civil penalty under this section.

Paragraph (f). A Class IA brake test shall be performed at the air pressure at which the train's air brakes will be operated and shall determine and ensure that:

Guidance

The Class IA brake test does not require trains equipped with electro-pneumatic brakes to have the electro-pneumatic feature tested. This is only required at the Class I test. If the electro-pneumatic feature is defective and is cut out, it is not considered defective until the Class I is performed, and the equipment may be continued in service.

Paragraph (f)(1). Brake pipe leakage does not exceed 5 pounds per square inch per minute if brake pipe leakage will affect service performance;

Guidance

Brake pipe leakage may not exceed 5 pounds per square inch per minute but does not need to be tested unless the leak will affect the operation of the train brakes. Accordingly, any violation reports based on this section must include an explanation of how the leakage will affect service performance of the brakes.

Paragraph (f)(3). For MU locomotives that utilize an electric signal to communicate a service brake application and only a pneumatic signal to propagate an emergency brake application, the emergency brake application functions as intended[;]

Guidance

Railroads are not required to physically test the deadman pedal or other emergency control devices during the Class IA or II brake test with the exception of electric MU equipment that uses an electric signal to communicate a service application and uses only a pneumatic signal for an emergency application; such MU equipment must have the emergency application of its emergency control devices tested to determine that the devices function as intended. Railroads are required to test the deadman pedal or other emergency control devices during the Class IA brake test.

§ 238.317 Class II brake test.

The Class II brake test does not require trains equipped with electro-pneumatic brakes to have the electro-pneumatic feature tested; this is only required at the Class I test. If the electro-pneumatic feature is defective and is cut out, it is not considered defective until the Class I is performed, and the equipment may be continued in service.

Paragraph (a)(5). When an operator first takes charge of the train, except for face-to-face relief.

Guidance

Face-to-face relief would include a QMP, or other persons participating in the Class I brake test, relieving a crewmember, as well as a crew relieving another crew.

Paragraph (d)(1). The brakes on the rear unit of the train apply and release in response to a signal from the engineer's brake valve or controller of the leading or controlling unit, or a gauge

or similar device located at the rear of the train or in the cab of the rear unit indicates that brake pipe pressure changes are properly communicated at the rear of the train;

Guidance

If the railroad places a device at the rear of the train that provides a visual indication of changes in brake pipe pressure, and this indication can be viewed from the front of the train, it fulfills this requirement to test.

Paragraph (d)(2). For MU locomotives that utilize an electric signal to communicate a service brake application and only a pneumatic signal to propagate an emergency brake application, the emergency brake application functions as intended.

Guidance

Railroads are not required to physically test the deadman pedal or other emergency control devices during the Class IA or II brake test with the exception of electric MU equipment that uses an electric signal to communicate a service application and uses only a pneumatic signal for an emergency application; such MU equipment must have the emergency application of its emergency control devices tested to determine that the devices function as intended. Railroads are required to test the deadman pedal or other emergency control devices during the Class IA brake test.

§ 238, Subpart F—Inspection, Testing, and Maintenance Requirements for Tier II Passenger Equipment

§ 238.503 Inspection, testing, and maintenance requirements

Paragraph (d)(3). Trains that miss a scheduled Class I brake test or mechanical inspection due to a delay en route may proceed to the point where the Class I brake test or mechanical inspection was scheduled to be performed.

Guidance

Inspectors need to be very careful in applying this provision. In FRA’s view, a “delay en route” can only occur between terminus points. Boston and Washington would be considered “terminus points,” since at those locations the trains lay-up and are given new train symbols. FRA believes this approach is consistent with the rule’s intent. Thus, if an Acela train is delayed en route it may proceed to either Washington or Boston, but may not be turned if it cannot complete a return trip within the provided time frame.

Chapter 13

Passenger Train Emergency Preparedness, Part 239

(Written guidance is currently being developed and will be published in the near future.)



Chapter 14

Reflectorization of Rail Freight Rolling Stock Part 224

Introduction

The Federal Railroad Administration published the final rule for *Reflectorization of Rail Freight Rolling Stock*, 49 CFR Part 224 on October 28, 2005.

The effective date of the rule as published in the *Federal Register*, Vol. 70, No. 208, is November 28, 2005. The purpose of the rule is to require the application of retroreflective tape material to the sides of freight rolling stock (freight cars and locomotives) to enhance the visibility of trains during times of limited visibility.

Years of research and public involvement have been devoted to the issue of making trains more visible at road crossings especially when visibility is limited due to weather or night time conditions. The rule addresses the need for the reflectorization of rail equipment as well as a description of FRA's research and public outreach efforts aimed at identifying the most effective method for implementing a nationwide Reflectorization program.

The rule provides car owners up to 10 years (see § 224.107, Table 3, for implementation dates) in which to apply retroreflective material to their equipment; and locomotive owners 5 years in which to equip their locomotives. The rule provides guidelines for the characteristics of the material, the dimensions, and the quantity to be applied as well as locations for consistent application.

Guidance

When is retroreflective sheeting required to be applied to freight cars and locomotives constructed after January 26, 2006?

§ 224.107(a)(1)

Freight cars and locomotives constructed after January 26, 2006, must be equipped with retroreflective sheeting before being placed in service.

When is retroreflective sheeting required to be applied to existing freight cars and locomotives that as of October 28, 2005, were not equipped with any retroreflective material?

§ 224.107(a)(2)(i)

Part 224 provides two alternative schedules for the application of the required retroreflective material to railroad equipment already in service at the time of the rule's publication—

Federal Railroad Administration

- (1) As applied to freight cars, first, the “default” schedule of § 224.107(a)(2)(i) requires that retroreflective sheeting be applied to existing cars (1) when the car is repainted or rebuilt; or (2) within nine months (270 calendar days) after the car first undergoes a single car air brake test (SCABT) pursuant to § 232.305. Similarly, as applied to locomotives, the “default” schedule of § 224.107(b)(2)(i) requires conforming retroreflective sheeting to be applied to locomotives not later than nine months after the first biennial inspection pursuant to § 229.29 occurring after November 28, 2005.
- (2) Alternatively, §§ 224.107(a)(2)(ii) and (b)(2)(ii) permit freight cars and locomotives to be reflectorized on a more individualized and flexible schedule, provided certain conditions are met. Specifically, these paragraphs permit freight rolling stock owners (as defined in § 224.5) to opt-out of the default schedule of § 224.107(a)(2)(i) and/or (b)(2)(i) and develop and implement their own schedule for reflectorization, provided the owner (1) files a “Reflectorization Implementation Compliance Report” with FRA; and (2) complies with the implementation schedules in Tables 3 (freight cars) and 4 (locomotives) of the section.

It is important to note that because a fleet owner may elect to opt out of the “default” schedule of the rule and elect to reflectorize its equipment according to its own plan by filing a “Reflectorization Implementation Compliance Report” (Compliance Report), when examining equipment subject to Part 224 and constructed on or before January 26, 2006, to determine whether that equipment is required to be equipped with conforming retroreflective material, an Inspector must first determine if the relevant owner filed a Compliance Report with FRA. Moreover, if the owner filed a Compliance Report, a violation could not be pursued for failing to equip a specific car or locomotive with reflectorization unless it is shown that the percentage of freight cars or locomotives identified in Table 3 and Table 4 of part 224 are not met.

When is retroreflective sheeting required to be applied to existing freight cars and locomotives that as of October 28, 2005, were equipped with at least one square foot of retroreflective sheeting?

§ 224.5

Provided responsible freight rolling stock owner files a “Reflectorization Implementation Compliance Report” with FRA, and the sheeting is not “unqualified retroreflective sheeting” as defined in § 224.5, freight cars and locomotives that as of October 28, 2005 were equipped with at least one square foot of retroreflective sheeting are grandfathered until November 28, 2015.

Where can the retroreflective sheeting be applied?

§ 224.106 Location of retroreflective sheeting.

Generally, retroreflective sheeting shall be applied along the length of each railroad freight car side in the manner provided by a uniform industry standard accepted by the Associate Administrator that provides for distribution of material along the length of each car and as close

as practicable to 42 inches above the top of rail. Diagrams are include in § 224.106 as a guideline for general applications.

If retroreflective sheeting is applied in a vertical pattern, at least one 4x36 inch strip or two 4x18 inch strips, one above the other, shall be applied as close to each end of the car as practicable. Between these two vertical end strips, a minimum of one 4x18 inch strip shall be applied at least every 12 feet, as practicable.

If retroreflective sheeting is applied in a horizontal pattern, at least one 4x36 inch strip, or two 4x18 inch strips, one above or next to the other, shall be applied as close to each end of the car as practicable. Between these end strips, a minimum of one 4x18 inch strip shall be applied at least every 12 feet, as practicable.

Note: these are the general specifications for freight cars. The specifications vary for tank cars, flat cars, cars of special construction and locomotives.

What size of retroreflective sheeting is acceptable?

§ 224.105 Sheeting dimensions and quantity.

The amount of retroreflective sheeting to be applied to each car or locomotive subject to part 224 is dependent on the length of the car or locomotive and the color of the sheeting. For purposes of this part, the length of a railroad freight car or locomotive is measured from endsill to endsill, exclusive of the coupler and draft gear. Table 2 of Subpart B to part 224 provides the minimum quantity requirement for retroreflective sheeting on freight rolling stock.

What color(s) of retroreflective sheeting are acceptable and how will we be able to determine if the product is in compliance?

224.103 Characteristics of retroreflective sheeting.

Retroreflective sheeting applied pursuant to part 224 shall be yellow, fluorescent yellow, or white as specified by the chromacticity coordinates of ASTM International's Standard D 4956-04.¹

The characters "FRA-224", constituting the manufacturer's certification that the retroreflective sheeting conforms to the requirements of paragraphs (a) through (c) of § 224.103, shall appear at least once on the exposed surface of each piece of sheeting in the final application. The characters shall be a minimum of three (3) millimeters high, and shall be permanently stamped, etched, molded or printed within the product and each certification shall be spaced no more than four (4) inches apart.

Are both vertical and horizontal applications in compliance?

¹ The American Association of Railroads Field Manual Rule 66, 2006 Issue, specifies, "yellow only" for applications.

Federal Railroad Administration

On railroad freight cars other than flat cars and tank cars, retroreflective sheeting shall be applied in either a vertical or horizontal pattern along the length of the car sides, with the bottom edge of the sheeting as close as practicable to 42 inches above the top of rail. Retroreflective sheeting shall not be applied below the side sill.

How are the strips to be spaced?

If retroreflective sheeting is applied in a vertical pattern, at least one 4x36 inch strip or two 4x18 inch strips, one above the other, shall be applied as close to each end of the car as possible. Between these two vertical end strips, a minimum of one 4x18 inch strip shall be applied at least every 12 feet, as possible.

If retroreflective sheeting is applied in a horizontal pattern, at least one 4x36 inch strip, or two 4x18 inch strips, one above or next to the other, shall be applied as close to each end of the car as possible. Between these end strips, a minimum of one 4x18 inch strip shall be applied at least every 12 feet, as possible.

Note: these are the general specifications for freight cars. The specifications vary for tank cars, flat cars, cars of special construction and locomotives.

How do I submit a Compliance Report to the FRA?

A Compliance Report may be submitted electronically or by filing a paper copy of completed Form FRA F6180.113 (found in Appendix B to 49 CFR Part 224) with the following:

Creative Information Technology, Incorporated (CITI)
4601 North Fairfax Drive, Suite 1100
Arlington, VA 22203
703-548-3313 Extension 223
POC: Angelica Mamani

Chapter 15

Guidelines for Enforcement of Mechanical Requirements for Rail Grinding Equipment

Introduction

Subsequent to an incident in November 2006, that involved a rail grinder (rail grinding set), and corresponding investigations by the Federal Railroad Administration (FRA), there have been several inquiries about the proper application of regulatory and statutory requirements to the type of equipment involved in the incident. Rail grinding sets are unique and warrant different treatment than self propelled vehicles that are considered locomotives under Federal regulations. The two major U.S. operators of rail grinding trainsets are Loram and Harsco. Major railroads also operate their own rail grinding equipment. Typical configurations for rail grinding trainsets are noted on the next page as (1) locomotive powered grinding trains, and (2) self-powered rail grinding units. The following are guidelines for enforcing the various requirements that apply to the rail grinding sets:

Guidelines for Enforcement of Mechanical Requirements:

- 49 U.S.C. §20701 (Locomotive Inspection Act) - The power unit and the location of the control stand in the rail grinding sets each constitute a locomotive under the statute, but not the regulations.

49 CFR Part 229 (Railroad Locomotive Safety Standards RLSS) does not apply to the rail grinders because the locomotives regulated under Part 229 do not include specialized maintenance equipment. The Locomotive Inspection Act permits FRA to write violations when a “locomotive or tender and its parts and appurtenances are [not] in proper condition and safe to operate.” To determine whether a power unit or the location of the control stand is safe to operate, FRA may use regulatory provisions including those contained in Part 229 as guidelines. FRA inspectors commonly make safety determinations based on observations of equipment and records, as well as industry and regulatory experience. After determining that a power unit or the location of the control stand is unsafe to operate, FRA should cite only the statute, and not the regulation when recommending a violation.

Although Part 229 does not apply to rail grinding sets, the regulation should not be ignored when assessing the safety of the equipment. The safety rationale supporting regulatory requirements, particularly those contained in Part 229 Subpart C, may be relevant to the rail grinding sets, because the equipment is being used in a similar manner. FRA may frame a violation of the statute using facts that would commonly support a violation of the Federal regulations. For example, if FRA discovers a rail grinding set with a 3 inch flat spot on wheel R1 of the power unit, it would be proper for a violation report to state that “the power unit of the rail grinding set is not safe to operate as required by 49 U.S.C. §20701, because “Wheel R1 has a 3 inch flat spot. Running this rail grinding set with a flat spot of this size could lead to a derailment.” This is not a Part

Motive Power and Equipment Compliance Manual

229 violation, but it is a defective condition that makes the power unit or the location of the control stand unsafe to operate. In this example, FRA is using the wheel requirement from 49 CFR § 229.75 to inform its safety assessment of the equipment and describe the violation. Other defective conditions under Part 229 may not make the power unit or the location of the control stand unsafe to operate. For example, it would be very difficult to argue that a defective step light makes the power unit or the location of the control stand unsafe to operate. Ultimately, the FRA inspector is responsible for explaining in the violation report why the defect makes the power unit or the location of the control stand unsafe to operate.

- 49 U.S.C. §20302 (Safety Appliance Act) - The rail grinding sets are a train under the statute, but not the regulations.

The power brake portions of the statute apply to the rail grinding sets, and the specific requirements in 49 CFR Part 232 are not applicable. Section 20302(a)(4) requires that a locomotive be equipped with a power-driving wheel brake and appliances for operating the train-brake system.

50% equipped brake requirement: Section 20302(a)(5) requires that at least 50% of the vehicles in a train be equipped with power brakes and that all the vehicles on an associated train line that are equipped with power brakes shall have their brakes used and operated by the engineer.

100% operative brake requirement: As all of the units in a rail grinding set are equipped with power brakes and are on an associated train line, the statute requires that 100% of the vehicles in the train have operative brakes unless they are being moved for repair under 49 U.S.C. §20303.

Brake inspections: Because the rail grinding sets are subject to Section 20302(a)(5), FRA expects the railroads and operators of this equipment to have an inspection regimen in place that will ensure that the crews operating the equipment are aware of whether the brakes are in compliance with the applicable statutory requirements.

Other safety appliance requirements: Sections 20302(a)(1) and (a)(2) require that vehicles be equipped with efficient hand brakes, sill steps, and other safety appliances that ensure the safety of employees as they mount and dismount equipment. Except for those appliances addressed by 49 CFR Part 231 (see discussion below), FRA should cite only the statute for violations of this type.

- 49 U.S.C. §20303 (Safety Appliance Act) - Section 20303 (which restricts the use and movement of vehicles with defective or inoperative safety appliances) only permits the movement of a vehicle with defective safety appliances to the nearest available place where the necessary repairs can be performed.

Motive Power and Equipment Compliance Manual

If power brakes are discovered defective at a location where repairs are routinely made, repairs are required to be made before the vehicle departs that location. Similarly, if the brakes become defective enroute, the rail grinding set may be moved only for the purpose of repair to the nearest location where the necessary repairs can be made. Guidelines for determining locations where necessary repairs can be performed can be found at 49 CFR § 232.15(f). FRA should cite only the statute for violations of this type.

- 49 CFR Part 231 (Safety Appliance Regulation) - Due to their unique design and purpose, rail grinding sets are considered “cars of special construction” under 49 CFR § 231.18. Therefore, they are required to have (as nearly as possible based on the design limitations of the vehicle) the same complement of handholds, sill steps, ladders, hand brakes, and running boards as required for a car of the nearest approximate type. As with any equipment covered by 49 CFR Part 231, any additional safety appliances on the equipment must comply with the requirements of 49 CFR Part 231.

Guidelines for Enforcement of Roadway Maintenance Machine Requirements:

49 CFR Part 214 (Railroad Workplace Safety) - The rail grinding sets must comply with 49 CFR § 214, Subparts C and D.

Subpart D: “On-Track Roadway Maintenance Machines and Hi-Rail Vehicles” contains various requirements regarding the safety equipment required to be on such machines as well as provisions related to their design and operation. Subpart C: “Roadway Worker Protection” includes training requirements that apply to operators of rail grinding sets. These requirements are intended to prevent accidents and casualties. For convenience, the attached chart "Application of 49 CFR Part 214, Subpart D," summarizes the most significant provisions of 49 CFR Part 214, Subpart D that have been traditionally applied to on-track roadway maintenance machines (RMMS). It is not intended to be all-inclusive. It should be noted that additional or more stringent requirements in the CFR or in the railroad safety statutes may also apply. For example, when the rail grinding sets are moved over the road, 49 U.S.C. §§20302 and 20303 apply. Recommendations of violations against a rail grinding set should be based on the same supporting facts and cite the same pertinent regulatory provisions as other equipment covered by 49 CFR Part 214.

Guidelines for Enforcement of Operating Practices Requirements:

49 CFR Part 240 (Qualification and Certification of Locomotive Engineers) - The rail grinding sets constitute specialized roadway maintenance equipment.

The rail grinding sets, like most specialized maintenance equipment, are unique in both its design and operation. Requiring a certified locomotive engineer (LE) to operate such equipment when it is moved from one work site to another would be operationally restrictive and potentially unsafe since in most instances, an LE certified under Part 240 will not be familiar with the specific operation of specialized maintenance equipment. Safety is better served by permitting an individual familiar with the specific piece of equipment to operate it from one work site to another with the aid of a pilot, where appropriate. Although Federal regulations do not

Federal Railroad Administration

specifically address the territorial qualifications of either the operator or any pilot that may be used when operating specialized maintenance equipment, FRA believes that safe railroading dictates that such individuals should be qualified and familiar with the territory over which the equipment will be operated. FRA strongly recommends and encourages the use of individuals that are qualified on the territory over which the equipment will be operated when such equipment is traveling to and from a work site.

Application of 49 CFR Part 214, Subpart D

(Note: There may be additional or more stringent requirements applicable to this equipment, its owner, and its operator in this or other subparts or parts of the CFR or in the railroad safety statutes, particularly, 49 CFR Part 232 and 49 U.S.C. Sections §§20302 and 20303. This chart is not intended to be all-inclusive and is provided as a helpful summary of the requirements in Subpart D of Part 214 and should be used in conjunction with the regulatory text to determine compliance with this subpart).

Requirement	On-track RMM's - non-highway and light weight greater than 7,500 lbs. and not used exclusively for inspection of track		
	Pre 1/1/91	Existing – Post 1/1/91	New - ordered after 12/26/03 and completed after 9/27/04
Beacon (360-degree warning light)	Not Required*	Not Required*	509 (c) (RMM without fixed roof and less than 17,500 lbs. exempt)
Brake light (or reflective material, or reflective device)	Not Required*	517 (d) - retrofit - brake light or reflective material, or reflective device	509 (d) - brake light
Braking system	Not Required* but see 529	Not Required* but see 529	507 (a)(5)
Change-of-direction alarm	Not Required*	517 (a) - retrofit *If adds safety value	511 (b)
Daily inspection	527 (a)	527 (a)	527 (a)
Fire extinguisher	Not Required*	Not Required*	507 (a)(7)
First aid kit	Not Required*	Not Required*	507 (a)(6)
Flagging equipment	521 (lone, or lead and trailing piece in roadway group if RR rules require flagging equipment)	521 (lone, or lead and trailing piece in roadway group if RR rules require flagging equipment)	521 (lone, or lead and trailing piece in roadway group if RR rules require flagging equipment)

Motive Power and Equipment Compliance Manual

Requirement	On-track RMM's - non-highway and light weight greater than 7,500 lbs. and not used exclusively for inspection of track		
	Pre 1/1/91	Existing – Post 1/1/91	New - ordered after 12/26/03 and completed after 9/27/04
Headlight	513 (c)	513 (c)	509 (a)
Heating and ventilation	Not Required*	517 (b) - retrofit (required if operated at temp. less than 50 deg. and equipped or has been equipped)	505 (g) for RMMS other than 505 (a)(1)-(5), regulators, etc. with enclosed cabs
Horn	513 (b) permanent or portable	513 (b) permanent or portable	511 (a) permanent
Light weight display	Not Required*	517 (c) - retrofit	507 (d)
Operator seat (or position, if standing)	527 (c)(5)	527 (c)(5)	507 (a)(1) except as required under 507(b); operator standing
Record of defective conditions	533 (d)	533 (d)	533 (d)
Rearward viewing devices	Not Required*	Not Required*	509 (e)
Safe and secure position - handholds, handrails, or a secure seat for workers transported on machine; protection from moving parts	513 (a) - retrofit	513 (a) - retrofit	507 (a)(2)
Safe and secure position for riders - identification by stenciling or other written notice (if used)	518	518	518
Safety glass & wipers	Not Required*	517 (e) - retrofit/replace	507 (a)(4)
Secure footing for floors, decks, stairs, and ladders	519	519	519
Speed indicator	Not Required*	Not Required*	507 (c) - more than 32,500 lbs and speed greater than 20 mph
Tag defective item(s)	527 (b)	527 (b)	527 (b)

Federal Railroad Administration

Requirement	On-track RMM's - non-highway and light weight greater than 7,500 lbs. and not used exclusively for inspection of track		
	Pre 1/1/91	Existing – Post 1/1/91	New - ordered after 12/26/03 and completed after 9/27/04
Towing	525	525	525
Work lights	Not Required*	Not Required*	509 (b)
<p>* NOTE on “not required”: If an existing on-track RMM is equipped with a device only required on new equipment, the device should be in proper working condition. If inspectors encounter a broken or inoperable “not required” device, they should write a comment to the railroad describing the defective condition and indicate that a machine with “a condition that inhibits its safe operation” is subject to a good faith challenge, especially where roadway workers working on or near the machine may be relying in part on such a device to alert them to a machine’s presence or proximity. FRA expects that any such inoperable device shall be discussed in the job briefing.</p>			

Chapter 16

Wayside Detector/Train Inspection Guidance

AAR and Class I Railroad Initiatives

To reduce or mitigate the adverse effects of heavy axle loads on track infrastructure, degradation of freight car components and as tools for enhanced train inspections, the railroads have started leveraging the emerging wayside detection technology. Besides addressing the higher or distressed-and-unsafe “stress state” of equipment and track, the railroads intend to achieve, at a minimum, an equivalent or enhanced level of railroad safety by using the wayside detection technology. To achieve this goal, the Advanced Technology Safety Initiative (ATSI) was implemented on October 1, 2004 by the Association of American Railroad’s (AAR’s) Technical Services Working Committee. ATSI is a predictive and proactive maintenance system that uses the best available technology to detect and report potential safety problems and poorly performing equipment before they result in accidents or undue rail damage.

The overall objectives of the railroads are to enhance the quality, efficiency and safety of the train inspection processes through this technology including any assessment of the underlying causal issues. It is believed that a mature wayside detector system can provide remote intervention capabilities by combining facets of this technology that relate to the prevention of incidents, detection of incidents, notification of incidents and recovery from incidents.

Under the auspices of the AAR, the Class I railroads and private car owners have already embarked upon technology driven train inspections. There are a variety of wayside detectors (over 130) already deployed throughout the U.S. and the deployment list is rapidly growing. The initial objective of this undertaking was to reduce the “stress state” of the railroads, that is, to fix or remove from revenue service problematic equipment (poorly performing and defective equipment) before it severely damaged the track infrastructure. That is, the “predictive and proactive maintenance system” of in-service equipment is to identify the component’s deteriorating performance through different levels of degradation to the final level, at which time operations must be interrupted to mitigate the condition. The concept consists of successive “triggers” to indicate progressive degradation and preventive action(s) to be taken.

The wayside detector technologies consist of three general categories: wayside performance detection, machine vision and wayside condition detection. Under the ATSI initiative all of these technologies will eventually feed the Transportation Technology Center Incorporated’s (TTCI’s) Integrated Railway Remote Information Service (InterRIS®) system, which will then feed the “sorted” data into the Equipment Health Monitoring System (EHMS) at the Railinc. Railinc, which is AAR’s IT provider headquartered at Cary, North Carolina, then generates equipment alerts to the car owners through the EHMS.

Federal Railroad Administration

Table 1: Detector Locations by Railroad, City and State

Type	Railroad	City	State
TPD	FAST-TTC	Pueblo	CO
TPD	BNSF	Argyle	IA
TPD	BNSF-Track 1	Argyle	IA
TPD	BNSF-Track 2	Argyle	IA
TPD	BNSF	Victorville	CA
TPD	BNSF	Chriesman	TX
TPD	BNSF	Sandpoint	ID
TPD	BNSF	Joppa	MT
TPD	BNSF-Track 1	Ludlow	CA
TPD	BNSF-Track 2	Ludlow	CA
TPD	BNSF	Trinidad	CO
TPD	BNSF	Flagstaff	AZ
TPD	BNSF	Nonpareil	NB
TPD	BNSF	Pomona	MO
TPD	BNSF	Maupin	OR
TPD	BNSF	St. Croix	WI
TPD	CSXT	Carfax	VA
TPD	FEX	La Piedad	MX
TPD	FXE	Nazareno	MX
TPD	NS	Eggleston	VA
TPD	NS-Track 1	Science Hill	KY
TPD	NS-Track 2	Science Hill	KY
TPD	UP	Evanston	WY
TADS	BNSF	Antioch	NE
TADS	BNSF	Kingman	AZ
TADS	BNSF	Velox	WA
TADS	CP	Arnold	BC
TADS	CSXT	Hague	GA
TADS	NS	Flat Rock	KY
TADS	UP	Martin Bay	NE
WILD	AMTK-Track 2	Edgewood	MD
WILD	AMTK-Track 3	Edgewood	MD
WILD	AMTK-Track 1	Mansfield	MA
WILD	AMTK-Track 2	Mansfield	MA
WILD	BNSF-Track 1	Atherton	MO
WILD	BNSF-Track 2	Atherton	MO
WILD	BNSF-Track 1	Bagdad	CA
WILD	BNSF-Track 2	Bagdad	CA
WILD	BNSF-Track 1	Bingham	NE
WILD	BNSF-Track 1	Bismarck	ND

Type	Railroad	City	State
WILD	BNSF-Track 1	Cochrane	WI
WILD	BNSF-Track 2	Cochrane	WI
WILD	BNSF-Track 1	Kirkland	TX
WILD	BNSF-Track 1	Mesa	WA
WILD	BNSF-Track 1	Peshastin	WA
WILD	BNSF-Track 1	Denver	CO
WILD	BNSF-Track 1	Seymour	MO
WILD	BNSF-Track 1	Wheatland	WY
WILD	BNSF-Track 1	Winton	CA
WILD	CN-Track 1	Aldershot	ON
WILD	CN-Track 2	Aldershot	ON
WILD	CN-Track 3	Aldershot	ON
WILD	CN-Track 1	Moncton	NB
WILD	CN-Track 1	Winnipeg	MB
WILD	CN-Track 1	Arnold	BC
WILD	CN-Track 1	Sainte-Helene de Bagot	QC
WILD	CN-Track 1	Bentonia	MS
WILD	CN-Track 1	Winnipeg	MB
WILD	CN-Track 2	Winnipeg	MB
WILD	CN-Track 1	Cedars	QC
WILD	CN-Track 2	Cedars	QC
WILD	CN-Track 1	Dugald	MB
WILD	CN-Track 1	Dubuque	IA
WILD	CN-Track 1	Neenah	WI
WILD	CN-Track 1	Melville	SK
WILD	CN-Track 1	Jasper	AB
WILD	CN-Track 1	Vinsulla	BC
WILD	CN-Track 1	Hornepayne	ON
WILD	CN-Track 1	Sioux Lookout	ON
WILD	CN-Track 1	Prince George	BC
WILD	CN-Track 1	Nattress	MB
WILD	CN-Track 1	Nechako	BC
WILD	CN-Track 1	Williams Lake	BC
WILD	CN-Track 1	Edmonton	AB
WILD	CN-Track 1	Waukesha	WI
WILD	CN-Track 1	Grand Mere	QC

Motive Power and Equipment Compliance Manual

WILD	CN-Track 1	Stony Plain	AB
Type	Railroad	City	State
WILD	CN-Track 1	Capreol	ON
WILD	CN-Track 1	Uncas	AB
WILD	CN-Track 1	Zephyr	ON
WILD	CN-Track 1	Vinsulla	BC
WILD	CN-Track 1	Winnipeg	MB
WILD	CN-Track 1	Battle Creek	MI
WILD	CN-Track 1	Champaign	IL
WILD	CP-Track 1	Calgary	AB
WILD	CP-Track 1	Toronto	ON
WILD	CP-Track 1	Calgary	AB
WILD	CP-Track 2	Calgary	AB
WILD	CP-Track 1	Minneapolis	MN
WILD	CP-Track 1	Golden	BC
WILD	CP-Track 1	Moose Jaw	SK
WILD	CP-Track 1	Toronto	ON
WILD	CP-Track 1	Moose Jaw	SK
WILD	CP-Track 1	Winnipeg	MB
WILD	CP-Track 1	St. Paul	MN
WILD	CP-Track 1	Montreal	QC
WILD	CP-Track 1	Sudbury	ON
WILD	CP-Track 1	Thunder Bay	ON
WILD	CSX-Track 1	Cartersville	GA
WILD	CSX-Track 1	Grafton	OH
WILD	CSX-Track 2	Grafton	OH
WILD	CSX-Track 1	Johnson City	TN
WILD	CSX-Track 1	Lowell	WV
WILD	CSX-Track 1	Middlesex	NJ
WILD	CSX-Track 1	Pendleton	IN
WILD	CSX-Track 2	Pendleton	IN
WILD	CSX-Track 1	Springfield	PA

WILD	CSX-Track 2	Springfield	PA
Type	Railroad	City	State
WILD	CSX-Track 1	Walthourville	GA
WILD	CSX-Track 1	Self Creek	AL
WILD	FEC-Track 1	Miami	FL
WILD	FXE-Track 1	Corralejo	GT
WILD	FXE-Track 1	Sauz	CH
WILD	NS-Track 1	Knoxville	TN
WILD	NS-Track 1	Marietta	PA
WILD	NS-Track 2	Marietta	PA
WILD	NS-Track 1	Altoona	PA
WILD	NS-Track 2	Altoona	PA
WILD	NS-Track 1	State Line	IA
WILD	NS-Track 1	South Bend	IN
WILD	NS-Track 2	South Bend	IN
WILD	NS-Track 1	Waverly	VA
WILD	NS-Track 2	Waverly	VA
WILD	UP-Track 1	Chamberlin	TX
WILD	UP-Track 1	Donaldson	AR
WILD	UP-Track 1	Elton	LA
WILD	UP-Track 1	Fields	OR
WILD	UP-Track 1	Gothenburg	NE
WILD	UP-Track 2	Gothenburg	NE
WILD	UP-Track 1	Martin Bay	NE
WILD	UP-Track 1	Millican	TX
WILD	UP-Track 1	East Peru	WY
WILD	UP-Track 2	Red Desert	WY
WILD	UP-Track 1	Stuttgart	AZ
WILD	UP-Track 1	Sunset	CA
WILD	UP-Track 1	Westvaco	WY
WILD	UP-Track 1	Wister	CA

InterRIS® is a data warehouse, accessible through the Internet. It is designed to assemble and integrate data from all types of devices that monitor vehicle performance and return

added value to its users by giving quantitative evaluations of rail vehicle performance by enabling planned maintenance and monitoring post maintenance performance to provide quality control checks on the maintenance performed. Railinc located in Cary, North Carolina is the industry's largest and most accurate source for real-time interline rail data. Railinc maintains Industry Reference Files (IRFs) and Umler data. Umler is the

Federal Railroad Administration

electronic resource that contains critical data for North American transportation equipment depicting list of all nationwide fleet by car initials and numbers and specific car data. Railroads, equipment owners, agents, shippers, ports, suppliers, industry consultants, government agencies and car maintenance facilities are all users of Umler.

The first effort under this new initiative is the use of data from Wheel Impact Load Detectors (WILD) to monitor the health of in-service railcar wheels. When a freight car wheel exerts a peak impact load of 90 kips or above as measured by a WILD site, it is not operating effectively, is considered “out of round” and on the path to failure. The program provides a window of opportunity that opens when a wheel reaches a peak impact load of 65 kips. The very first WILD detectors started appearing at Conrail in the early 1990’s to protect against flat wheel impacts on concrete ties. It appears that WILD technology has been quite useful in indicating progressive component degradation using successive wheel impact load thresholds as “alert” levels (see WILD description later).

Future Considerations for Wayside Detectors

FRA encourages the use of new technology when appropriate. FRA’s mission is to promote railroad safety. To carry out this mission, FRA enforces Federal safety standards. The safety standards are tailored to the technology that exists at the time that they are promulgated. Often, new technology can be used in conjunction with existing technology to enhance safety. Railroads are also increasingly using wayside detection technology and their embedded event recorders to assess the cause(s) of train accidents and derailments. This information can also be helpful to FRA during an accident or derailment investigation. The following is a list of common wayside detector features:

- Data-driven tools for railways, vehicle owners, vehicle builders, vehicle maintenance, and component manufacturers,
- Products that monitor performance from wayside,
- Capabilities for the user to make predictive, condition-based rather than reactive vehicle maintenance decisions,
- Automation of communication processes,
- Car owner access to equipment to intervene and effect predictive maintenance strategy,
- Improved maintenance planning and scheduling for proactive management of component life cycle and optimized/ scheduled vehicle repair,
- Automated maintenance inspection for improved reliability of measurements, reduced need for manual inspection, and finding defective car/ truck components,
- Improved safety,
- Improved utilization of car fleet,
- Reduced damage to track and lading,
- Capability to cross reference data and produce more efficient gains,
- Supplements current inspections and adds to network efficiency,
- Networking and management of detector data from all railroads,
- Continuous updates of inspection record of each car for critical running gear performance,

- Interchange data with other railroads/ car owners in advance of car interchange,
- Enhancement of line-points with automated in-coming lineup of workload by defining predictive workload, providing easily viewed and printed workload for in-coming trains/ cars, speeding up normal visual inspections by targeting only problem cars, and extending interval between conventional visual inspections,
- Enhancement of railroad and car-owner “mechanical desk” knowledge of car “health warnings” by using continuous and automated electronic form to spell out symptoms for preventive action, directing maintenance to least disruptive time in the car cycle, using trend analysis to optimize maintenance cycle, and instructing special attention and handling for problem cars, and
- Verification, accountability and ability to audit.

Waiver(s) Issued

Notably, the Union Pacific Railroad (UP) recently applied and was granted relief from single car air brake tests (SCABTs) on empty cars utilizing defect information on irregular wheels and defective bearings gathered by wayside detectors such as WILD, ABD, HBD, HWD, WPM, WPD or TAD. This relief involves empty cars at UP’s North Platte, NE, facility wherein replacement of “non-FRA-condemnable” wheel sets with minor defects that are condemnable under AAR standards is ongoing per UP’s in-train wheel set replacement program as a preventive maintenance tool. A copy of the Safety Board approval letter, dated January 16, 2009, granting this waiver of compliance from Title 49 CFR § 232.305(b)(2) is located in Appendix B. For further details on this waiver, see FRA Docket Number FRA-2007-28454.

Wayside Detector Glossary of Terms

To better understand the nomenclature and “language” of wayside detectors currently used throughout the U.S. a glossary of terms has been provided below:

- **ABD:** Acoustic Bearing Detector. Measures acoustic signatures, indicates bearing defects, and signifies derailment prevention.
- **AISC:** Automated Inspection of System Components.
- **AOA:** Angle of attack of a wheel set is defined as the angle between the track radial line and the center line of the wheel set’s axle. It is a measure of the lateral creepage and lateral loads exerted on the track. It indicates the dynamic behavior and curving performance of the bogie. High value indicates a vehicle with defects and potential for wheel climb derailment.
- **AS AIS:** Automated Safety Appliance Inspection System. Measures dimensions, detects missing appliances and compares standards; and signifies set-out performance.
- **BOJ:** Burnt-off Journal results when a roller bearing overheats and seizes. This condition generally results in missing a portion of the affected axle. The axle journal along with the associated bearing may be discolored and completely separated from the rest of its wheel set.
- **Broken Rail Detection:** Acoustic method or fiber optics or strain gages or track circuit. Signifies derailment prevention from broken rail.

Federal Railroad Administration

- **BSM:** Brake Shoe Module. Measures thickness and missing parts using video machine vision, indicates brake shoe defects, and signifies damage prevention.
- **CAD:** Cracked Axle Detector. Uses laser to generate surface waves along the length of the axle, measures amplitudes of generated waves by air coupled ultrasonic transducers, detects cracks as reflected waves by signature cracks; signifies derailment prevention.
- **CWD:** Cracked Wheel Detector. Uses laser-Air Hybrid Ultrasonic Technique (LAHUT) to create surface and body waves in the wheel which are then recorded using air-coupled ultrasonic transducers. Modification of waves by reflection and refraction at the crack is then detected as a combination of peaks in the frequency domain; signifies derailment prevention.
- **DED:** Dragging Equipment Detector. Signifies damage and derailment prevention.
- **HBD:** Hot Box Detector. Measures temperature change, indicates roller bearing defects, and signifies derailment prevention.
- **HWD:** Hot/Cold Wheel Detectors. Measures wheel temperature, indicates airbrake system defects, and signifies brake performance.
- **IAM:** Inter-axle misalignment is the internal misalignment between the two wheel sets in a bogie, and is measured as the AOA of the leading wheel set minus the AOA of the trailing wheel set. IAM measures the dynamic performance such that a higher value indicates a vehicle with defects.
- **LAD:** Low Air-hose Detector. Measures air-hose height above rail using video machine vision, indicates coupler/air-hose defects, and signifies train stop performance.
- **OILD:** Overload/Imbalance Load Detector. Measures wheel load imbalance using WILD weigh-in-motion, indicates shifted loads, and signifies curving performance and derailment prevention.
- **Rail Flaw Detection:** Laser based ultrasonic NDT. Signifies damage prevention of rails with flaws.
- **TAD:** Trackside Acoustic Detector. Measures acoustic signatures, indicates roller bearing defects, and signifies derailment prevention.
- **TBOGI:** Truck/Bogie Optical Geometry Inspection. Measures geometric faults in the alignment and tracking of bogie wheel sets using laser/optical means, indicates bogie performance deficiencies, and indicates set-out performance.
- **TE:** Tracking error is the lateral distance between the center lines of the axles in the bogie and is defined as the tracking position of the leading wheel set minus the tracking position of the trailing wheel set. A higher value of the TE also represents a degraded dynamic performance of the vehicle.
- **THD:** Truck Hunting Detector. Measures lateral instability in terms of poor lateral dynamic performance, indicates truck and suspension defects, and signifies derailment prevention.
- **TP:** Tracking is defined as the center line of the wheel set compared to the track center line. This is an interim parameter which is used to define the Tracking Error (TE) of a bogie.
- **TPD:** Truck Performance Detector. Measures lateral/vertical wheel loads and angle of attack (AOA), indicates truck and suspension defects based on curving

- performance, and signifies derailment prevention.
- **TS:** Thermal Scan. Using thermal sensors detects heat generated at the interface between the brake shoe and the wheel to determine brake application, is a complement to BSM to assess brake shoe condition, and signifies damage prevention.
 - **WBT:** Warm Bearing Trending. Measures bearing temperature between detectors and identifies excessive trends.
 - **WILD:** Wheel Impact Load Detector. Measures impact loads, indicates wheel tread defects, and signifies damage prevention.
 - **WPM or WPD:** Wheel Profile Module or Wheel Profile Detector. Measures wheel profile dimensions using laser/video scanners, indicates wheel rim/tread shape defects, and signifies set-out performance.
 - **WTT:** Wheel Temperature Trending.

Wayside Detector Treatise

There are three aspects of wayside monitoring of a railway vehicle: 1) its present condition and required maintenance, 2) detection and diagnosis of developing faults, and 3) trending for future performance for preemptive, preventive and proactive maintenance strategies. In this context, the wayside detectors are of two types, reactive systems and predictive systems. Reactive systems detect actual faults on the vehicles. Generally the information from reactive systems is not suited for trending, but is of importance to protect the equipment from further damage due to the fault. Some examples of reactive detector technology are the DED, HBD and HWD. Predictive systems, on the other hand, are capable of measuring, recording and trending the ride performance of the vehicles and also specific components. From the collected information it is possible to analyze the condition of the equipment to predict possible failures and faults that may occur in a near or distant future. This makes it easier to plan the maintenance activity ahead and also to utilize the equipment in a more efficient way. Some examples of predictive detector technology are the ABD, TPD, T/BOGI, THD, TAD, WILD, WPM, WPD, AISC, AS AIS, and BSM.

- **Wheel Impact Load Detector (WILD)**

WILD is an electronic data collection device that measures vertical wheel forces (impacts from damaged wheels as shown in **Figure 1**) on the rail via rail mounted strain gages. It consists of a system of strain gauges placed on the web of the rail, as shown in **Figures 2** and **3**, to measure rail deformation under traffic. It measures impact forces caused by flat, shelled, spalled, out-of-round, built-up-tread and damaged wheels. The high impact forces damage vehicles, cargo, and infrastructure. Preemptive reduction of high impact forces by truing faulty wheels and removing damaged wheels entails benefits due to reduction in derailments, rail fatigue, bearing damage, cold weather rail fractures, car and truck damage, concrete tie cracking and wood tie plate cutting; and increment in wheel tread life and fuel efficiency.



Figure 1: A Damaged Wheel



Figure 2: A Typical Strain Gage Installation on Rail Web over a Crib

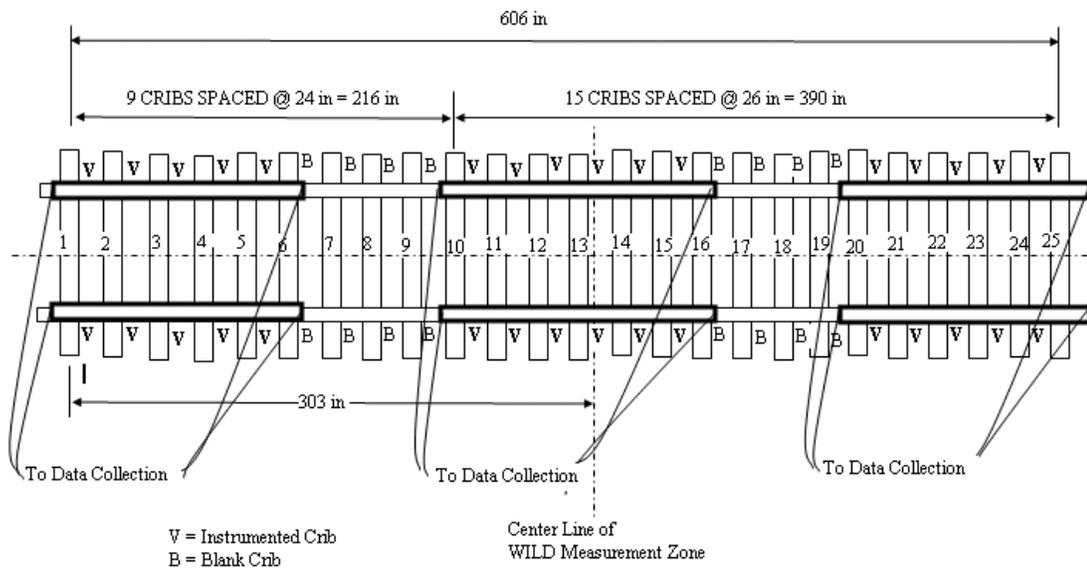


Figure 3: A Typical Layout of WILD Measurement Site

The various features of WILD detectors, **Figure 4**, may include: impact force monitoring, train-vehicle-wheel information, bi-directional traffic, automatic car counting and identification (with valid car library), self-diagnostics, instrumentation layout optimization for fleet wheel diameters, and AAR Rule 41 Standard compliance. The corresponding measurements may include: car IDs, wheel IDs, nominal, peak and dynamic wheel loads, axle loads, train speed and length, tonnage (by train, week and month).

Motive Power and Equipment Compliance Manual

The data collected by the WILD detector network in the U.S., Canada and Mexico resides in the Equipment Health Management System (EHMS), which is the AAR approved reference file maintained by Railinc (www.railinc.com). The various thresholds, per AAR's Field Manual, indicating progressive component degradation are as follows:

- 1) WILD-reading of 65 kips to less than 80 kips for a single wheel indicating an *appropriate* maintenance/ repair attention, termed as the "Window of Opportunity" alert level requiring issuance of *first* Maintenance Advisory from EHMS;
- 2) WILD-reading of 80 kips to less than 90 kips for a single wheel indicating a *warranted* maintenance/ repair attention, termed as the "Opportunistic Repair" alert level requiring issuance of *second* Maintenance Advisory from EHMS;
- 3) WILD-reading of 90 kips to less than 140 kips for a single wheel indicating an *urgent* maintenance/ repair attention, termed as the "AAR Condemnable" alert level requiring issuance of *third* Maintenance Advisory from EHMS; and
- 4) WILD-reading of 140 kips or greater for a single wheel indicating *required* maintenance/ repair, termed as the "Final Alert" level resulting in the issuance of *fourth* Maintenance Advisory from EHMS.

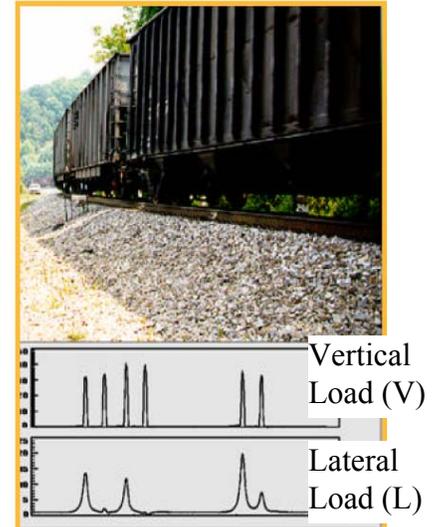


Figure 4: A Typical WILD Deployment on Revenue Track indicating Instrumented Rail over Cribs

- **Truck Performance Detector (TPD)**

TPD detectors monitor the response of car's suspension system along curved track to signal worn or defective component conditions. Conditions detected by TPD are truck warp, poor steering, hollow worn wheels and poor wheel load equalization. Detection of these ailments adds to the security against derailments. TPDs measure wheel/rail forces (vertical and lateral) via strain gauge sensors on the rails in selected reverse curves, **Figure 5**. They also measure the angle of attack (AoA – the angle taken by the axle relative to the direction of motion) of each axle with respect to the rail, which in combination with measured vertical and lateral forces provides information regarding the steering capability of the truck through curves. TPDs identify suspension systems that do not perform optimally in (or after negotiating) curves. Poor performance may result in derailments due to wheel climb, gauge spreading, rail rollover or track panel shift. Poor performance also contributes to wear on rail, special track work, wheel profiles and flanges. By identifying poor performers through performance-based monitoring, preventive maintenance can be performed, reducing derailment risks and

improving the overall safety of rail operations.



Flange Climb → High L/V and AoA;
 Warped Truck → High AoA;
 Track Panel Shift → High NAL (Net Axle Load);
 Rail Roll Over → High TSLV (Truck Side L/V)

Gage Spreading → High L
 Wheel Unloading → Low V
 Track Damage → High V

Figure 5: A Typical TPD Deployment on Revenue “S-Curve” Track Showing Vertical and Lateral Load (Collected) Data, and Indicating the Outcome of Their High Magnitudes

A typical TPD site may consist of an “S” curve arrangement where two curves (typically 4 to 6 degrees) are in the opposite direction relative to each other (i.e., a right-hand and a left-hand curve with a tangent section separating them) as shown in **Figure 6**. This gives the possibility to collect data on the vehicles behavior in both right and left curves as well as in the tangent track.

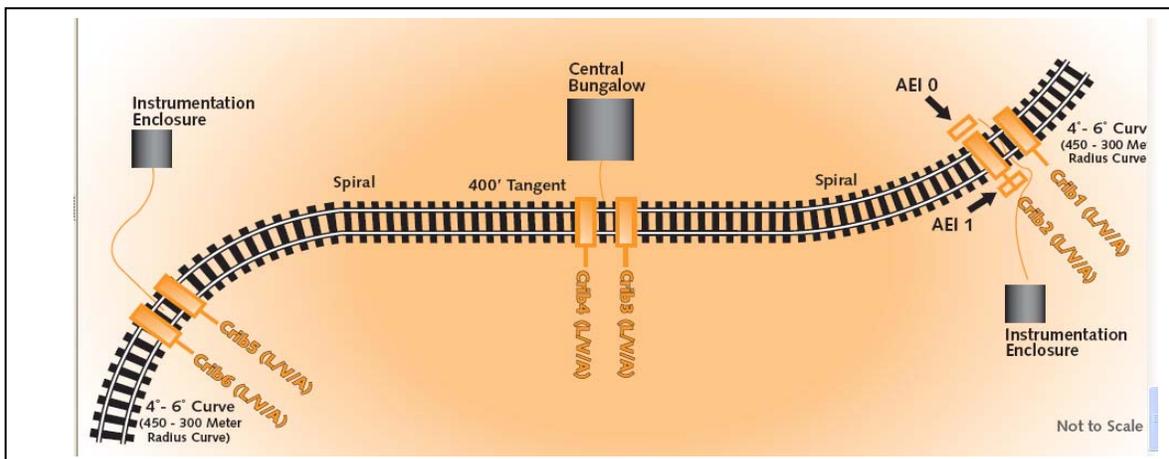


Figure 6: A Schematic Showing the “S-Curved” Track and Location of Instrumented Cribs

TAD wayside detectors monitor bearings by automatically detecting flaws in wheel bearings by evaluating the acoustic signature of the noise (1 kHz and above) created by the flaw, **Figures 7 and 8**, before the bearing becomes hot or seizes in service and results in accidents due to burned-off roller bearings. The most problems in roller bearings occur due to flaws such as cup spalls; cone spalls; spalled, etched, seamed rollers; water etched raceways; and spun or loose cones. Arrested center plate rotation, defective side bearings, and hollow tread wheels add to the roller bearing woes. TADs can detect symptoms of bearing failure at a much earlier stage than hot box detectors (HBDs), and can spot flaws that a visual inspection may not detect. The TAD detectors may find internal roller bearing defects, long before a hotbox detector will detect the problem and so avoid possible derailments with the inevitable consequences of cost, safety, disruption to the network.

TAD wayside detectors use an optimized array of microphones located on each side of the track, **Figure 9**. The microphones are spaced vertically and horizontally. The microphones simultaneously record signals and sensors identify each wheel of the passing train. The acoustic signals are analyzed over a wide range of frequencies. Since roller bearing flaws create noise – they produce an acoustic signature. The data is analyzed to ascertain the presence or absence of these signatures. Trains pass the TAD detector sites at 30 to 50mph.

These detectors are used to mitigate failures, determine high risk bearings and identify severest defects using growler software. AAR has developed Rule 36A.3.c Cause for Removal (AAR Field Manual) for industry. This detection pertains to reducing burn-off derailments. It can be used for customized alarming for the high risk bearings and correlating hot bearings setouts with acoustic alarms.



Figure 7: Damaged Cups and Cones of Bearings

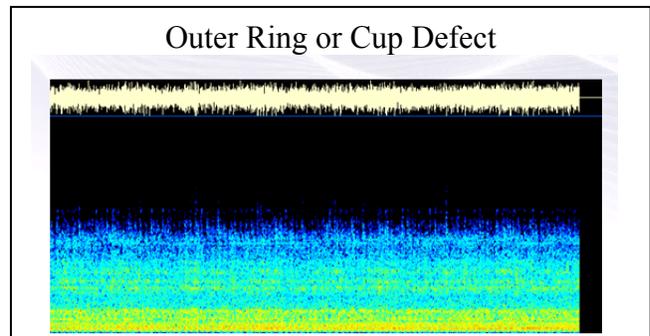
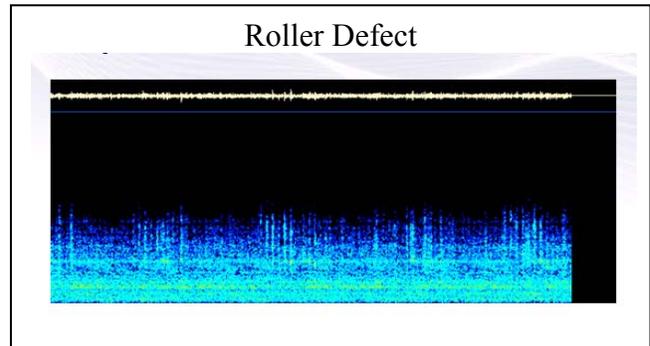
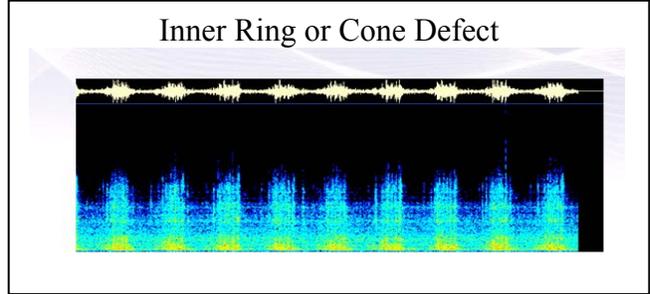


Figure 8: Sound Signatures of Defects



Figure 9: A Typical TAD Site in Revenue Service consisting of Microphone Array, Wheel Sensors and AEI

- **Low Air-Hose Detector (LAD)**

Rail car braking systems depend upon the operational integrity of the coupling hoses that connect air pipes. By design, if a coupling hose fails or becomes otherwise uncoupled, a moving train is put into an emergency braking condition. Unintentional de-coupling can and does occur due to low-lying hoses, **Figure 10**, hitting obstructions in the roadbed. At a minimum, the resulting emergency stop causes delays, but may also damage wheels by creating flat spots and damage lading. The current solutions to this problem incorporate a non-contact, optical sensing approach.

Using infrared light curtains (sensors) to visually inspect each air hose, the Low Air-Hose Detector measures the distance between the top of rail and bottom of each hose, **Figure 11**.



Figure 10: Air Hose State in a Train



Figure 11: A Typical Low Air-Hose

This examination is performed only in the appropriate area between vehicles to minimize the possibility of false alarms. It then identifies the leading and trailing tags nearest each hose that lies below user defined thresholds. The Low Air-Hose Detector integrates AEI tag readers to provide a complete record of offending vehicles, so corrective action can be taken at the most convenient location.

- **Truck Hunting Detector (THD)**

Hunting trucks underneath rail cars can violently oscillate, **Figure 12**, from one rail to the other as they traverse along tangent track, inducing excessive lateral forces that significantly contribute to the rapid wear of rail and rail cars in a relatively short time. In the worst case, such hunting may lead to vertical wheel unloading and wheel climb derailment. Also, this particular type of degraded vehicle performance is a leading cause of damage to delicate lading. At a minimum, hunting trucks cause increased fuel consumption. Unchecked, severe damage to truck components and derailment can result.

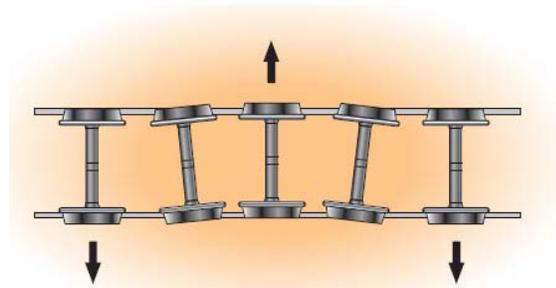


Figure 12: Lateral Displacements of an Axle in Hunting Truck

By measuring the lateral instability that indicates truck and suspension defects, THD wayside detectors, **Figure 13**, can be used to identify inspection and maintenance procedures for bad acting cars to reduce derailments due to flange climb. The hunting data collected by TTCI was used to confirm both the hunting conditions and the condemnable defects. The representative cars at various levels of hunting performance were sent to TTCI for inspection, test, teardown and repair. The teardowns showed that the suspect cars had worn truck components, couplers & coupler carrier plates and door mechanisms. Also, these cars showed signs of either (or both) 1) low truck warp restraint (high/worn wedges/ column wear liners) and 2) low truck/ car body rotational constraint (no constant contact sides bearings (CCSBs), no CCSB preload, melted or damaged CCSBs.) This data consisting of approximately 300 cars/year with a hunting index (HI) ≥ 0.65 and approximately 450 cars/year with a hunting index (HI) ≥ 0.50 in a 12-month period confirmed that a car with either of the above noted hunting indices was condemnable at any time. As such, the car hunting condemnable indices (two HI readings above 0.50 in a twelve month period or a single HI reading above 0.65) were then implemented as new AAR interchange rule on July 1, 2006, and were adopted in the AAR Field Manual Rule 46.

Hunting Truck Detector Measurements:

- Vehicle Hunting Index
- Train Speed
- Vehicle ID and type (with valid car library)

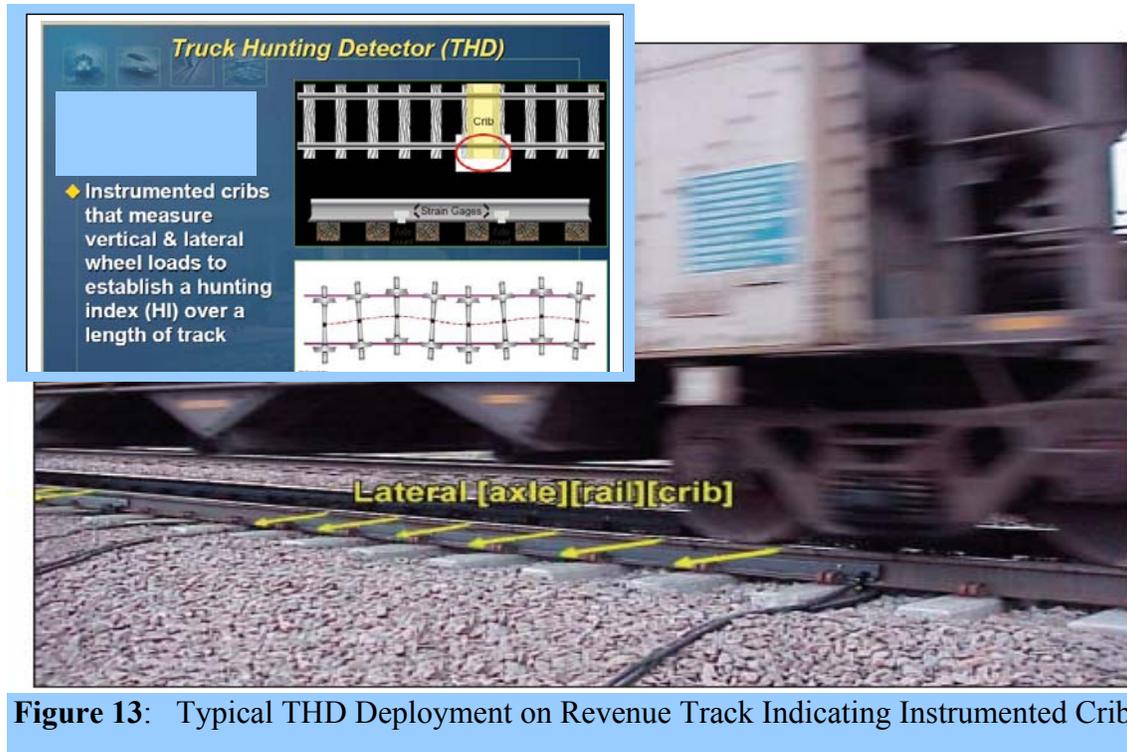


Figure 13: Typical THD Deployment on Revenue Track Indicating Instrumented Cribs

Similar in design to the wayside Wheel Impact Load Detector (WILD), THD wayside detectors can reside at the WILD detector locations. This add-on capability provides measurements of both the array of lateral forces, by the THD, exerted by a hunting truck on a passing train and the simultaneous readings of vertical forces from the WILD. As such the dynamic relationship between vertical and lateral forces is fully accounted to identify those critical instances where the wheel flange and rail gage face geometry may promote flange-climb derailments. These measurements are transformed into the “hunting index” to identify excessive side-to-side motion of bad acting cars.

Some empty or lightly loaded cars are susceptible to truck hunting when operated at speeds over approximately 50 mph. In order to reduce the severity of truck hunting, trucks can be equipped with features such as constant contact side bearings, center plate extension pads, hydraulic snubbers or frame bracing. The restoration of worn truck components also mitigates truck hunting.

- **Hot Box Detector (HBD)**

The function of hot box detectors is to detect overheated journals. Overheated roller

bearings occur when inadequate lubrication or mechanical flaws result in an increase in bearing friction. This phenomenon is called a "hot box" in railway jargon. The bearing temperature can continue to rise and lead to complete failure of the axle, commonly referred to as a "burnt-off journal" (BOJ). A BOJ normally results in the derailment of the car on which it occurs. Should axle failure happen while the train is proceeding at a high speed, the derailment frequently results in multiple cars derailed and/or damaged. A hot box condition on roller bearing-equipped rail cars can elevate quickly and become a BOJ within a few miles.



Figure 14: Typical Location for Scanning a Bearing

The HBD senses radiant infrared heat energy emitted from the bearing as it passes over the detector scanner, **Figures 14** and **15**. The heat energy is converted to an electrical output proportional to the amount of heat and relative to the ambient temperature. Ambient temperature is determined by scanning the bottoms of the rail cars as they pass. Data is then processed to "warm" and "hot" levels. If the amount of energy sensed by the HBD exceeds preset values, then the appropriate action is warranted.

The HBDs are rated to work in ambient temperatures. Severe environmental conditions, such as snow storms and blowing snow conditions, heavy rain and ice, can affect the quality of the scan data. The type of housing used for the roller bearings within the truck assembly can have an impact on the ability of the scanners to sense infrared heat energy.

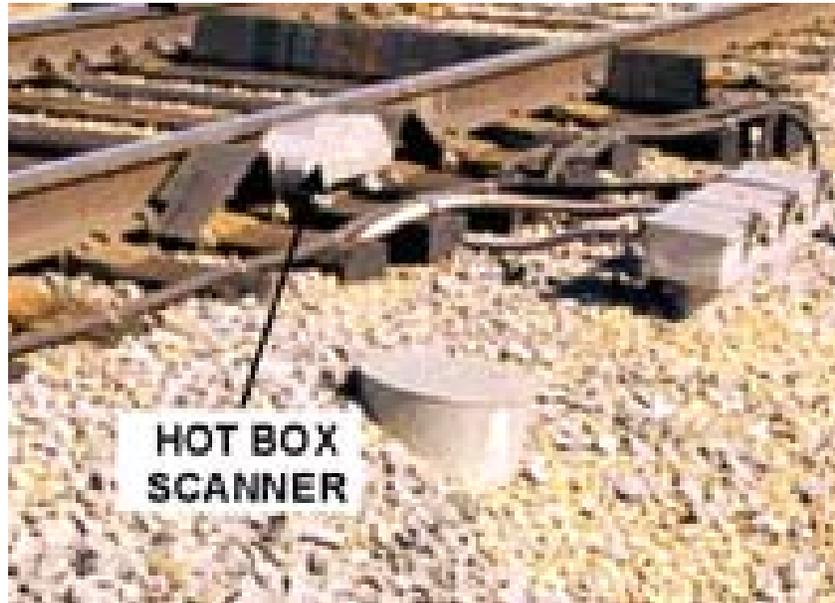


Figure 15: Typical Location of Hot Box Scanner on Field Side of Track

- **Dragging Equipment Detector (DED)**

The dragging equipment detector detects any object hanging under a car or locomotive. The DEDs may be of two different designs; paddle (mechanical) style, **Figure 16**, or impactor (electronic) style, **Figure 17**. The paddle style consists of strike plates, both



Figure 16: Paddle style DED



Figure 17: Impactor style DED showing location of an accelerometer on the underside of the strike plate

inboard and outboard of the rails, attached to a shaft with a cam-operated switch and a return spring. An object striking the paddles in either direction would rotate the shaft, momentarily opening the switch contacts. An open circuit would trigger an alarm. The impactor style is designed to alleviate the problems associated with the paddle style under deep snow conditions and has no moving parts. Stationary strike plates between and outboard of the rails are fitted with accelerometers which detect impact energy. Sufficient impact energy creates an electrical output that generates an alarm.

- **Hot Wheel Detector (HWD)**

The function of hot wheel detector is to detect overheated wheels. Abnormally high temperatures indicate brake pads stuck to wheel treads. This condition causes a significant increase in friction resulting in hot wheels indicating brake problems. The HWD is similar to the HBD in that it senses radiant heat energy using infrared scanner technology. However, the target in this instance is the wheel plate area near the tread, approximately 2 1/2 inches above the rail, **Figure 18**. Some systems use an HWD scanner on both sides of the track, but most use only one scanner on one side of the track. When only one HWD scanner is used, **Figure 19**, to scan wheels on both the near and far rail, it is normally set at an angle to the track. The outboard wheel plate surface of a wheel on the near rail can be scanned, as can the inboard wheel plate surface of a wheel on the far rail. A reference temperature is established by placing a white board on the far side of the track opposite the HWD scanner. The reference board is used as a base value in order to produce semi-absolute wheel plate temperature readings. These readings are then compared to preset alarm thresholds.

If a wheel is cold during brake application, e.g., in a run going down the grade, then its brakes are not working correctly.

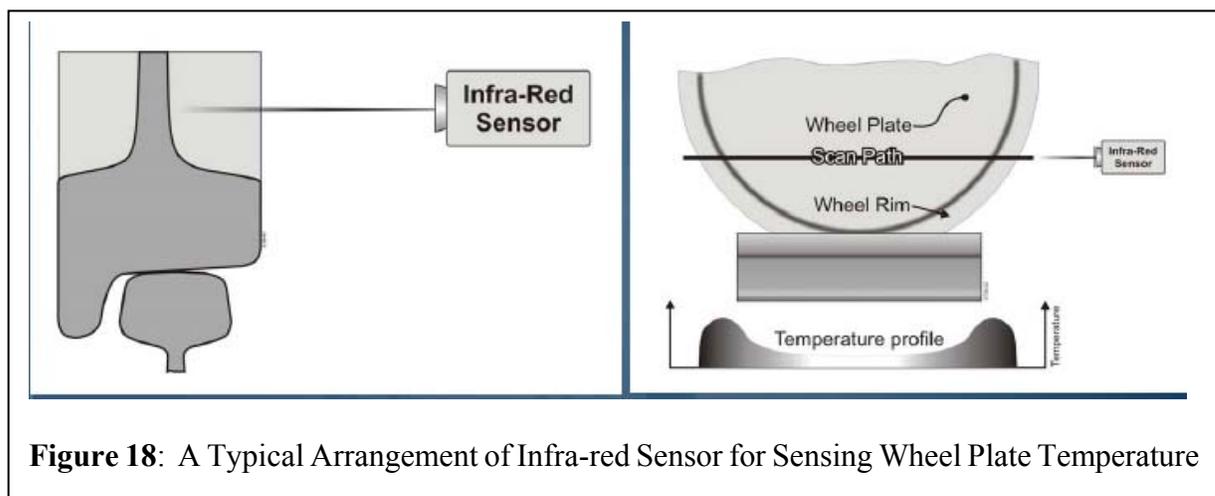


Figure 18: A Typical Arrangement of Infra-red Sensor for Sensing Wheel Plate Temperature



Figure 19: A Super Site on Revenue Track showing HWD, HBD and DED. The HWD has only One Scanner at an Angle to the Track with a White Reference Board on the Far Side.

- **Load Imbalance and Overload Detector (LIOD)**

These detectors are used to reduce derailment conditions and infrastructure damage by measuring vertical loads on all wheels of a car at track speeds; and consequently from these measurements detecting and alarming for overloaded rail cars or imbalanced rail cars, **Figure 20**. Since only vertical wheel loads are of essence for these detectors, **Figure 21**, they lend themselves well as add-on capabilities to the Wheel Impact Load Detectors. However, stand-alone wayside installations of these detectors may sometimes be required. Using statistical analysis of multiple vertical load measurements recorded by the detector, an estimate of the static weight of a rail car is derived to determine if the rail car is overloaded or imbalanced beyond safe operating limits.

These detectors may also provide the weigh-in-motion capability at track speed so that the need to take individual rail cars out of service for weighing is reduced. The corresponding weigh- in-motion measurements may however be affected by defective wheels, and sometimes by hunting trucks or other degraded conditions that reveal themselves in the process. As such the weighing accuracy of these detectors, as compared to the low speed or revenue-scale weigh bridges, is debatable. Their use as alternative weigh-in-motion systems is the prerogative of the railroads, their customers and the AAR.



Figure 20: A Case of Imbalance Loading of car



Figure: 21: Shown LIOD consists of an Angle Iron bolted to Rail at every Tie Location and also anchored with Rail to Ties with Elastic Clips. The Angle Iron is instrumented on Crib Locations to measure Wheel Loads. As shown, the LIOD can be detached and anchored as needed.

•

Wear of the worn wheels on an axle will always be non-symmetrical. Maintenance of trucks then requires that this non-symmetry in wear of profiles of wheel-pairs on axles of the truck be reduced to a minimum. The TBOGI, by monitoring bogie performance on straight track, provides means to access the asymmetric wheel-pair wear of an axle in terms of racking position (TP), inter-axle misalignment (IAM), tracking error (TE), truck rotation and truck shift, **Figure 22**. The TBOGI is a laser-based inspection system manufactured by WID Inc. that scans trains passing at track speed to determine by optical means the geometric faults in the alignment and tracking of bogie wheel sets on straight (tangent) track.

The TBOGI operates on the tangent track eliminating the need for a special track layout. Non-contact laser sensors are installed at a safe distance, **Figure 23**, from passing trains in order not to interfere with any track maintenance work. The measurement method embodied in TBOGI provides a wide dynamic range and yields consistent results. Wide dynamic range allows TBOGI to identify very subtle bogie performance deficiencies while also capturing gross defects. The consistency of data provided by TBOGI allows users to trend the health of rolling stock, thereby enabling the scheduling of maintenance interventions to correct impending defects before an exception is raised or other damage is caused.

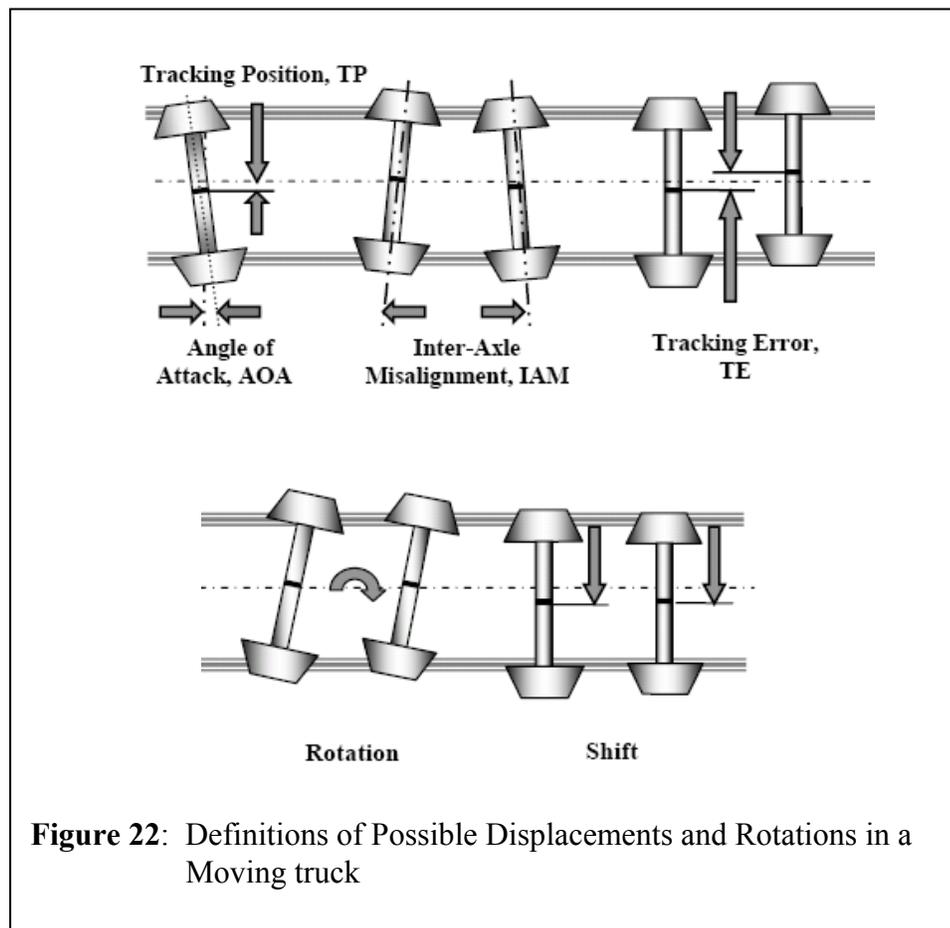
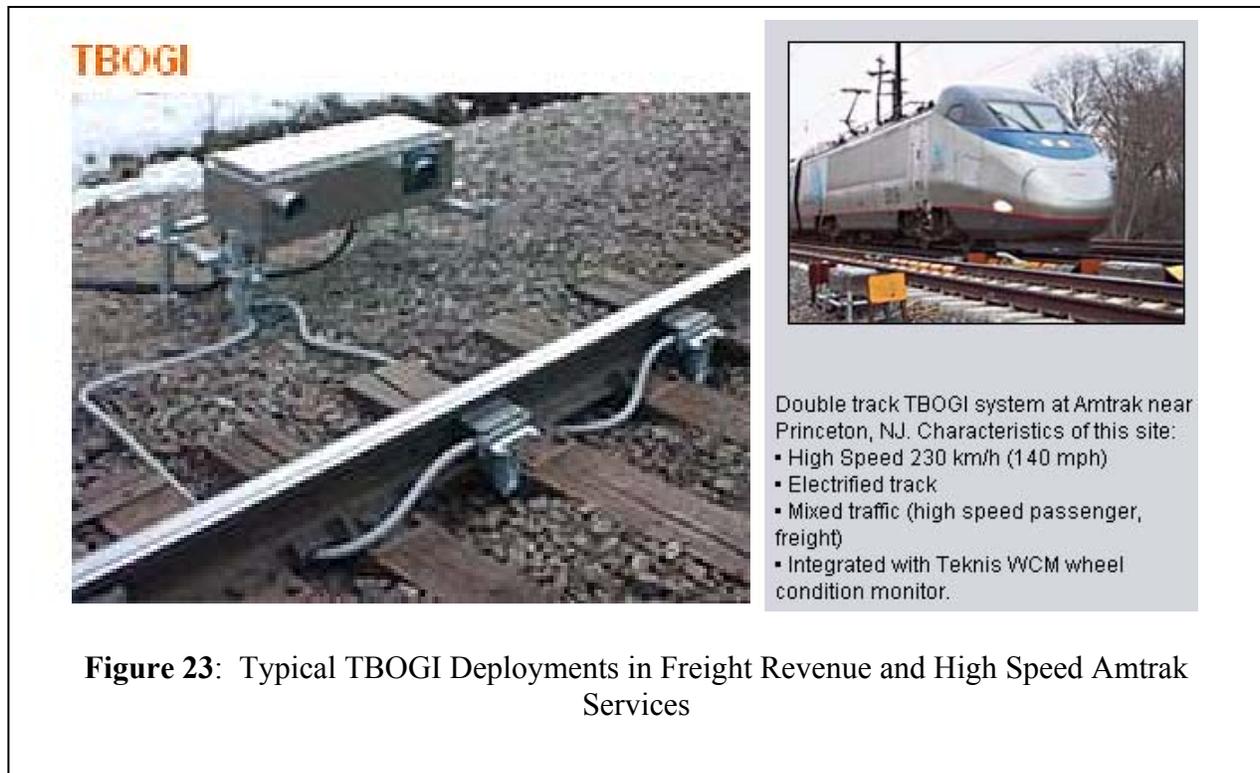


Figure 22: Definitions of Possible Displacements and Rotations in a Moving truck



The features of TBOGI include

- Identifies skewed and “warped” trucks.
- Identifies misaligned trucks.
- Identifies trucks with incorrect wheel set tracking.
- Identifies trucks that wear their wheels asymmetrically (“diagonal wheel wear”) even before severe wear sets in.
- Identifies trucks displaying lateral instability “truck hunting.”
- Non-contact sensors installed at a safe distance from passing trains do not interfere with track maintenance work.
- Installed on tangent track, no need for special track layout.
- Measurements are insensitive to change in weather and rail lubrication conditions.
- Measure at train speed up to 250 km/h.
- Laser based sensor provides high accuracy wheel set angle of attack and tracking position information.

Acting on data produced by the TBOGI can enhance safety, reduce wheel set replacement, prolong truck component life, reduce rail wear, reduce fuel consumption, and optimize maintenance resources.

Federal Railroad Administration

Preliminary Guidance for Interpreting Wayside Detector Data in Derailment Cause Finding / Prevention Related to Car/Equipment Only

The distress to car/equipment arising from operations involving imbalanced loading, overloading, misaligned trucks, increased grade, warped trucks, hollow wheels, out-of-round and flat-spot impacts, curved track, stuck brakes, impacts at bridge approaches, diamonds, switches, and rail joints can be monitored by wayside detection technology according to the three following strategies:

- 1) Wayside condition detections
 - a. Cracked Axle Detector (CAD)
 - b. Cracked Wheel Detector (CWD)
 - c. Thermal Scan (TS)
 - d. Acoustic Bearing Detector (ABD)
 - e. Low Air-hose Detector (LAD)
 - f. Dragging Equipment Detector (DED)
- 2) Wayside performance detections
 - a. Truck Hunting Detector (THD)
 - b. Truck Performance Detector (TPD)
 - c. Wheel Impact Load Detector (WILD)
 - d. Overload/Imbalance Load Detector (OILD)
 - e. Warm Bearing Trending (WBT)
 - f. Wheel Temperature Trending (WTT)
- 3) Wayside machine vision technologies
 - a. Wheel Profile Module (WPM)
 - b. Brake Shoe Module (BSM)
 - c. Automated safety appliance inspection system (ASAIS)
 - d. Automated inspection of system components (AISC)

FRA has no regulations pertaining to the data collected by wayside detectors at present. As such, all that FRA can do is to use this data, along with the railroads, in finding the causes of distress to equipment and infrastructure. To aid in this effort AAR's Field manual provides guidelines on detector calibrations and thresholds on collected data. Some of these thresholds, e.g. for WILD and THD, are also mentioned in prior detector descriptions. As an example, the AAR condemnable alert (WILD - 90 kips to less than 140 kips for single wheel) represents the regular Field Manual Rule 41 condemnable level at any time. The final alert level (WILD - 140 kips and greater for single wheel) represents a wheel having an impact force on the rail so great that it places undue stress on both the wheel and the rail.

Hunting usually occurs on empty cars at speeds greater than 50 mph. Truck hunting detector limits are given in Interchange Rule 46. The responsible party is notified through the EHMS system when a car has a truck with a single THD detector reading (Salient Systems force-based Truck Hunting Index (HI) greater than or equal to 0.20). This is considered the Window of Opportunity when car is in home shop. However, condemnable at any time using THD detector data is defined when either 1) a single HI absolute value reads above 0.65 or 2) two HI absolute values read above 0.50 in a twelve month time period. Rule 46 requires that home shop

disposition be requested from the car owner when a truck exceeds condemning limits detected by a THD wayside detector. Consequent corrective steps require that a) the affected trucks be qualified and/or repaired to AAR Specification M-214, b) condemnable friction wedges be replaced, c) if equipped with constant contact side bearings, resilient or spring elements be replaced, d) roller or block type side bearings be replaced with AAR M-948 approved long travel steel capped constant contact side bearings, and d) side bearing adjustment or component replacement be made per Rule 62. New sections were added to Field Manual Rule 46 addressing truck inspection and repair, and especially side bearing adjustment and repair Rule 62.

AAR Field manual Appendix F addresses WILD and THD detector calibration, validation and data requirements. The truck performance detector (TPD) alert criteria are given in Field Manual Rule 46.

Rules related to the acoustic roller bearing defect detectors (ABD) were added to Field Manual Rule 36. Appendix G covers initial and continuous ABD wayside detector site validation. Field Manual rule states that an ABD wayside detector Level 1 alarm represents a specific minimum amount of bearing damage corresponding to at least one of the following:

- Two square inches or more of spalled area on any one cup or cone running surface,
- One square inch of spalled area on any one cup or cone running surface and ½ square inch or more of spalled area on any one other cup or cone running surface,
- Any orange peel surface (resembling the look and texture of an orange),
- Any roller spall or seam,
- Any loose component indication
 - Cone race backface wear greater than 0.010 inch
 - Indication of spun cone on the corresponding axle journal
 - Oversize cone bore from dynamic growth and evidence of turning on axle journal,
- Two square inches or more of heavy water etched area, with indented surface(s), on cup or cone running surfaces.

If an ABD wayside detector shows a Level 1 alarm on a bearing, the car can be sent to a repair track to perform a hand roll inspection for removal or further inspection. As a rule of thumb, the reasons of hot bearings attributable to various failure progression modes, in descending order of magnitude or significance, are:

- Water etch
- Loose
- Fatigue spalling
- Bearing destroyed
- Wheel defect
- Mechanical
- Adapter
- Lubrication
- Displaced seal
- Application
- Truck related

Federal Railroad Administration

- Manufacturing defect.

Of these above modes, spalling and water etch are detected easily by acoustics. ABD wayside detectors are an evolving technology such that with additional development, some percentage of the other failure modes may also be detectable acoustically.

Appendix A

Instructions for Completing MP&E Violation Reports

Motive Power & Equipment Technical Bulletin MP&E 05-01, Guidelines for Preparing New MP&E Violation Reports – FRA, F6180.109 "Motive Power & Equipment Violation Report Form" which is embedded below under header **Motive Power & Equipment Report Form F 6180.109** is used for violation reports covering 49 CFR Parts 209, 210, 215, 223, 224, 229, 230, 231, 232, 238, 40 CFR Part 201, (Noise Violations, EPA), and Statutory Violations of USC 49 Subtitle V Chapters 203 & 207. MP&E violation recommendations associated with Part 218 and 221 will use Form FRA F6180.67.

Form FRA F 6180.109 and a help guide are components of the RISPC program, and can be accessed from within RISPC or the shortcut icon. The software automatically transfers some of the information from the F 6180.96 Inspection Report over to Form F 6180.109.

Note: A narrative section is still required and shall be inserted in Item 44 (Violation Narrative) of the form. Any attachments such as photographs or other supporting documentation should be included in the F 6180.109 package.

Executive Order – 13589/ Section 5 dated November 9, 2011, Promoting Efficient Spending requires agencies to reduce costs associated with printing and shipping. Hence, inspectors are required to create paperless digital documents of violations for submitting to the regional specialist. This process is intended to provide uniformity in submitting digital violations throughout the FRA. All applications used by MP&E field inspectors, such as Microsoft Word, Microsoft Excel, Photographs, etc. can be converted into a PDF file. This is “built-in” to the application in either the file pull-down menu, printing, or the toolbar. It allows the current document to be converted into a PDF file, which will be saved as the digital violation.

If you have any questions regarding the use of this form or the process by which to complete the digital violation, please contact your Regional Specialist.

The RISPC Program, F6180.96 and Forms F6180.109; F6180.67 Forms

F6180.96 Inspection Report preparation is mandatory for all inspections where a civil penalty action (violation report) is recommended. Inspectors should complete the Remedial Action portion of the inspection report, as soon as the report (railroad copy), is received from the railroad. Federal regulations require railroads to submit notification of Remedial Action to FRA for all violations 30 days after the end of the calendar month in which notice of violation occurred. In this regard, it is recommended that Inspectors update all inspection reports containing violations on a regular basis to help ensure the

Federal Railroad Administration

integrity of FRA's inspection report database. When using the RISPC inspection report program, some of the items will automatically transfer from the F6180.96 inspection report to the F6180.109 and F6180.67 violation report.

Submission of Photographs as Evidence

Photographs can sometimes be very strong evidence in support of a violation. If photographs are included in the violation, the inspector will attach each photograph using a medium which can be converted to a digital attachment (PDF file) and explain what each photograph shows. Photographs which have been altered in any way should not be included as violation evidence. In addition, be certain that the photo clearly depicts the defect and location of the defect(s) in question.

Statements of Witness or Reports of Interview

Unless a violation is substantiated by an Inspector's personal knowledge or by records FRA requires railroads to maintain, the violation report should be accompanied by Statements of Witness report(s) obtained from railroad employees, railroad officials, or other persons who know the circumstances surrounding the non-complying act or condition. It is preferable to use Witness Statements rather than Reports of Interview in violations.

If Reports of Interview must be attached to violation reports, care must be exercised as this could result in unintentional FRA non-compliance with the requirements of Public Law which prohibit disclosure of railroad employees who report railroad safety violations without their written consent. When using Reports of Interview to help ascertain the facts, policy requires the Inspector must:

- Advise the person that the interview is voluntary;
- Advise the person that the interview will be attached to a violation report and submitted to the railroad or company when a penalty demand is issued; and
- Prior to submission, the interview report must be validated by the person being interviewed. This can be accomplished either by mail or hand delivery.

Each Witness Statement or Report of Interview must contain the time, date, full name, title, and mailing address of the person who was interviewed.

Copies of Railroad's Records

When applicable, the violation report must be accompanied by legible copies of the railroad's applicable records, containing information that will provide the FRA's Office of Chief Counsel with substantiating documentation and a clear understanding of the violation of Federal safety regulations.

All supporting documents to the violation must be scanned and included as a PDF file or Master File, which is the complete digital violation package.

Motive Power and Compliance Enforcement Manual

Digital Violation Master File

Use of the mandatory master filename format to name the violation package is as follows and the case type list you will need is included.

File Format:

Region-Case Type-Inspector initials-Violation No.

Example:

R5-FCS-DC-200.pdf

Case Type List

Code	Type
AD	Alcohol and Drug Regulations
AR	Accident Reports Regulations
BW	Bridge Worker Safety Standards
EO	FRA Emergency Order
EP	Railroad Enforcement Procedures
EQ	Engineer Qualification Regulations
FCS	Freight Car Safety Standards
GC	Grade Crossing Signal Safety Regulations
GS	Safety Glazing Standards
HMT	Hazardous Materials Regulations
HS	Hours of Service Laws
HSR	Hours of Service Record Keeping Regulations
LI	Locomotive Safety Standards and Statutes
LIS	Steam Locomotive Safety Standards and Statutes
PEP	Passenger Train Emergency Preparedness Regulations
PEQ	Passenger Equipment Safety Standards
REM	Rear End Marking Device Regulations
ROP	Railroad Operating Practices
ROR	Railroad Operating Rules
RSP	Railroad Communications Regulations
RW	Roadway Worker Protection Regulations
SA	Safety Appliance Statutes and Regulations
SI	Signal Inspection Regulations and Statutes
TH	Train Horn/Quiet Zone
TS	Track Safety Standards

Federal Railroad Administration

List of Exhibits Requirements

1. The exhibits list should not be labelled as an “Attachment List”.
2. The Exhibit List must be a separate document titled “List of Exhibits”.
3. Inspectors MUST NOT place the Exhibit list in the narrative of the Violation Report.
4. List all of your exhibits in order of relevance.

Identification of Exhibits

All documents/pages, including each exhibit that is in your violation package must contain a means of identification (ID). This ID is to be placed in the lower right hand corner of each page of the document.

Note: Inspectors must use the following mandatory identification process.

Inspector Initials – Violation No.

Example: DC-200

Sequence of Master Digital Violation

Inspectors must use the following arrangement when completing the master digital violation.

- Violation Report F6180.109 (not and exhibit)
- List of Exhibits Page with exhibits noted in order of relevance.
- Inspection Report F6180.96 – Railroad Copy
- Other attachments as noted on “List of Exhibits” page in order of relevance.

PDF Violation Package – Bookmarking Documents

Violation packages are required to have bookmarks embedded in the Master File that will identify each exhibit or document separately.

This process can be accomplished using the Adobe program once the violation package Master File is complete.

Violation Package

The entire violation package contains the following:

- TFR – F6180.72x (transmittal form).
- Cover letter regarding extraordinary penalties (if applicable).
- Master violation report file.

Note: Bullets one and two are separate files and do not require digital signature by the inspector.

Motive Power and Compliance Enforcement Manual

Digitally Signing the Completed violation Package

Inspectors are expected to sign the completed violation package with a digital signature. However, the violation package will be accepted with a written signature that is scanned into a PDF document, but FRA would prefer a digital signature.

This process can be accomplished using the Adobe program once the violation package Master File is complete.

Motive Power & Equipment Violation Report Form F 6180.109

Each of the 47 Items and Field descriptions/requirements are outlined in detail.

Item/Field

- 1. Subject:** The program will automatically generate this field when the CFR/USC entry is made in Item #2. Completion of this field is mandatory.
- 2. Violation Of:** Check the appropriate box (e.g., 40 CFR. 49 CFR or Statutory Section). Enter the exact Part, Rule, and Sub-rule for the violation of the CFR. The CFR, Rule, and Sub rule will be automatically generated from the inspection report line item, but may be changed. The CFR and Rule will be checked against the RISPC CFR reference file. Only one line entry is allowed in this field. Completion of this field is mandatory.
- 3. Report No.:** This field is entered for each violation report. Any report number will be accepted as long as it does not create a duplicate report. The report number can only be edited from the start window. It cannot be edited once the violation form is open.
- 4. Related Viol.Rpt.No. (s):** Related violation report numbers should only be entered when multiple violations are issued and related to one another, (e.g., more than one locomotive or car in the same train movement). Completion of this field is optional. It can contain up to 20 characters.
- 5. Inspection Report No.- Report Date:** This field is auto-populated from the F6180.96 Inspection Report. Inspection reports are required for all violations, a violation report may not be prepared unless a corresponding inspection report has been created and present on the hard drive. This is a non-editable field.
- 6. Additional Regulations Violated:** If applicable, enter other sections of the CFR or Statute that the locomotive or car may be in violation of. Since field 2 will only allow for one line of text, this field is the location where additional sections of the CFR may be cited. Locomotives and cars with multiple defective conditions could affect the aggregate amount of civil penalty assessed on a railroad. Completion of this field is optional. It consists of four sub-fields, with 23 characters per sub-filed. If additional space is needed,

Federal Railroad Administration

use the narrative section (Item 44), to detail additional regulations violated. When inspectors create the MP&E Violation Form F6180.109, they may choose to include from the inspection report up to four additional line items in Item #6 for the same locomotive or car.

- 7. Operating Railroad:** This field is auto-populated from the F6180.96 Inspection Report. It may be changed, but it may not be left blank.
- 8. RR Initials:** This field is auto-populated from the F6180.96 Inspection Report. It may be changed, but it may not be left blank.
- 9. Railroad Division:** This field is auto-populated from the F6180.96 Inspection Report. This is a non-editable field.
- 10. Name of Inspector(s):** This field is auto-populated from the F6180.96 Inspection Report. The name of the primary inspector cannot be edited. Clicking and entering the appropriate names directly into the field may enter two additional inspectors' names. Each sub-field can hold up to 25 characters.
- 11. ID Number:** This field is auto-populated from the F6180.96 Inspection Report. This is a non-editable field. Only one inspector ID is necessary for this field.
- 12. Date(s) of Violation:** This field consists of two sub-fields. Completion of the top field is mandatory and is auto-populated from the F6180.96 inspection Report. The default date will be the same date used on the inspection report. However, if it is necessary to change the date, click on the arrow and select the appropriate date from the drop down calendar. The date of the violation may not be later than the inspection report date in item #5. The second sub-field can hold up to 25 characters and should only be used when citing violations for multiple days.
- 13. Time of Violation:** This is the time when the violation occurred based on personal observation, Statement of Witness (signed), or records. Click in the field and enter the appropriate time. This field is limited to 20 characters. Completion of this field is mandatory.
- 14. Inspection point:** This field is auto-populated from the F6180.96 Inspection Report. This is a non-editable field.
- 15. Track No. / Name:** Enter the appropriate track number or track name by clicking and entering the appropriate information. Completion of this field is optional.
- 16. Location of Inspection (City, County & State):** This is the location where the

Motive Power and Compliance Enforcement Manual

inspection was made. This field is auto-populated from the F6180.96 Inspection Report. The default City and/or County and State will be the same City and/or County and State used on the inspection report. For some violations, this location may differ from the location indicated in Item 17, (e.g., inbound train movement violations). The State code will be the two-character abbreviation. This is an editable field. **Note:** For violations based on signed witness statements, this is the location where the witness observed the violation. The location information entered here must be valid.

- 17. Location of Violation (City, County & State):** This is the location where the violation occurred. This field is auto-populated from the F6180.96 Inspection Report. The default City and/or County and State will be the same as Item 16. The State code will be the two-character abbreviation. This is an editable field. **Note:** For violations based on signed witness statements, this is the location where the witness observed the violation. The location information entered here must be valid.
- 18. City, County & State Where Equipment Originated:** Enter the City and/or County and State where the locomotive, car, or train originated. This information may be the same as indicated in Item 16 or 17. The purpose of this field is to identify where the train received its initial terminal inspection and test. Completion of this field is mandatory if the violation is related to defective equipment or if Item 21 is completed. The location information entered here must be valid.
- 19. Location Where Locomotives Are Maintained and Previous Periodic & Daily Inspection Information:** This field consists of three sub-fields. For locomotive violations, enter the City and State where the locomotive is maintained or assigned (if applicable), in the top line or first field. This field is limited to 25 characters of text. The second line requires information pertaining to the previous periodic and daily inspection. Enter the appropriate Date, City, and State for each. The information for this field should be obtained from form F6180.40A and daily record on the locomotive. Previous periodic and daily inspection information is mandatory if the subject of the violation is related to Parts 229 and 230. The dates entered here must not be later than the inspection date. The location information for previous periodic and daily inspections must be valid.
- 20. Line Item:** This field is auto-populated from the F6180.96 Inspection Report. When the violation program is launched, the user is required to choose from the reference table which line item to import from the inspection report. Once this action is complete, pertinent data from the inspection report will auto-populate this field as well as the information required for Items 21, 22, & 23 when applicable. Completion of this field is mandatory.
- 21. Equipment Initials & No.:** This field is auto-populated when applicable from the F6180.96 Inspection Report. This is a non-editable field.

Federal Railroad Administration

- 22. Equipment Description:** This field is auto-populated when applicable from the F6180.96 Inspection Report. This is a non-editable field.
- 23. Train ID:** This field is auto-populated when applicable from the F6180.96 Inspection Report. This is an editable field and must be completed if field 32 is checked yes.
- 24. Type of Service:** Check the appropriate box. Completion of this field is mandatory.
- 25. Name of Defective Component:** Manual entries may be entered directly into the field. Use descriptions from the CFR to identify the defective component whenever possible. Completion of this field is mandatory if fields 21 and 22 are completed. This field is limited to 150 characters of text.
- 26. Location of Defective Component:** Manual entries may be entered directly into field. Enter a description that clearly explains the location of defective component. For example, “Facing side of car to the left” or “Facing end of car to the left”. It is also appropriate to use AAR descriptions to locate a particular appliance on a locomotive or freight car. For example, “Left front bottom switching step, “ or “AR sill step.” Completion of this field is mandatory if fields 21 and 22 are completed.
- 27. Equipment Status:** This field will be completed from a drop-down menu that will contain eight commonly used canned descriptions. Completion of this field is mandatory if field 21 and 22 are completed. This field is limited to 80 characters of text should the inspector need to use other than one of eight canned descriptions.
- 28. Position of Equipment and/or train with Relation to Some Fixed Object at Time of Inspection and/or Violation:** Orientate the equipment or train with a fixed object in the yard or track at the time of violation. For example, BNSF 8888 on main track 200 feet east of the yard office. If unknown indicate “Unknown.” Completion of this field is mandatory. This field is limited to 130 characters of text.
- 29. Defect is:** Check the appropriate box. Completion of this field is mandatory if field 21 and 22 are completed.
- 30. How Long Had Equipment Been At Place of Violation:** Enter the amount of time the equipment in violation of federal Regulations had been at the location identified above. For example, if the equipment observed in violation had just arrived in a train, enter “just arrived.” If the equipment in violation has been there for about two hours from the time of initial observation and then departs in a train enter “Approximately two hours to my knowledge.” Completion of this field is mandatory if fields 21 and 22 are completed.

Motive Power and Compliance Enforcement Manual

- 31. Equipment Marked for Repairs:** Check the appropriate box. This also includes automated tracking. Completion of this field is mandatory if fields 21 and 22 are completed.
- 32. Failure to Perform Air Brake Test:** check the appropriate box. Completion of this field is mandatory.
- 33. Type of Brake Test Required:** Click on the arrow to select the appropriate subject text from the drop down list. The text chosen for this field must be selected from the drop down list, manual entries are not allowed. Completion of this field is mandatory when field 32 is checked "Yes."
- 34. Brakes Overdue for Periodic Attention:** check the appropriate box. Completion of this field is mandatory.
- 35. Brakes overdue for Single Car Test:** Check the appropriate box. Completion of this field is mandatory.
- 36. SCT Device Available:** Check the appropriate box. Completion of this field is mandatory.
- 37. Time:** this field consists of four sub-fields for entering times relating to improper brake test or trains operating with inoperative brakes or has air brakes due for periodic attention. Enter the appropriate times under each of the sub-fields. If the brakes were never applied or released, enter a hyphen (-). Completion of this field is optional, but must be completed when violation is related to improper brake test and/or trains operating with inoperative or has air brakes due for periodic attention. Each sub-field is limited to eight characters of text.
- 38. Trains Consist – Locomotives – Cars – Operative Brakes:** This field consist of six sub-fields for entering information relating to train make-up and percentage of operative brakes. When entering the percentage of operative brakes, be sure to use the appropriate calculations. The calculation methodology differs between passenger and freight operations. Completion of this field is optional, but must be completed when violation is related to improper brake test and/or trains operating with inoperative air brakes. The six sub-fields are limited to the following characters of text, from left to right: 9, 2, 3, 3, 3, & 4.
- 39. State Facts Which Determine Type Of Air Brake Test Required:** Manual entries may be entered directly into the field. Enter an appropriate statement that definitively describes the type of brake test required. For example, in the case of brake(s) cutout, inoperative or failure to perform and Initial Terminal Brake Test, the correct entry would

Federal Railroad Administration

be “Train originally made up at this point.” Completion of this field is mandatory when filed 32 is checked “Yes.” This field will accommodate as much text as desired by user. The preferred typing “font” and size is “Times New Roman” size 12.

40. Description of Use, Movement or Events Constituting Violation: Manual entries may be entered directly into the field. Use descriptions that affirmatively describe observed use or movement of equipment. With the exception of the Glazing and Nose standards, actual movement of equipment is not necessary for the railroad to be in violation of FRA regulations. However, violations citing actual movement will generally make a stronger case for railroad safety. Completion of this field is mandatory. This field will accommodate as much text as desired by user. The preferred typing “font” and size is “Times New Roman” size 12.

41. Describe Repair Facilities: Indicate whether or not repair facilities are available. Provide a detail description of the facilities available. For example, if a location only has wheel trucks available for making repairs provide what type of equipment (tools, compressed air, welding equipment, etc. is available). If a location has a fixed repair facility, provide as many details regarding what type of repairs are made to equipment on a daily basis. If repair facilities are not available indicate “None.” Completion of this field is mandatory. This field will accommodate as much text as desired by user. The preferred typing “font” and size is “Times New Roman” size 12.

Note: If “None” is entered be certain to explain in detail under Violation Narrative why the locomotive, power car, or car (passenger or freight), is in violation of Federal Regulations. The laws and regulations related to safety Appliances require defective safety Appliances to be repaired when found to be defective. However, the law does allow for the movement of defective Safety Appliances to the nearest location where the necessary repairs can be made if repairs cannot be made in a safe and reasonable manner at the location where they are originally found defective. Prevailing case law suggest that neither knowledge of the defect(s) nor convenience mitigates a railroad’s responsibility for compliance with the Safety Appliance Laws and Regulations. The key here is whether or not repairs can be made at the location where the equipment is originally found defective in a safe and reasonable manner. If a wheel truck at a particular location routinely makes repairs of the type needed, then FRA will generally consider that location a location where those repairs can be made. Conversely, FRA does not expect a railroad to conduct repairs at a location that exposes its employees to unnecessary danger or risk of personal injury. Thus, inspectors are reminded to consider these fact and weigh the circumstances carefully when determining “safe and reasonable.”

(For a listing of factors to consider when determining whether a location is one where repairs can be made, see the new Power Brake Regulations at 232.15(f).)

42. Description of Non-compliance: Manual entries may be entered directly into the field.

Motive Power and Compliance Enforcement Manual

This field must contain a detailed narrative description pertaining to the issue in non-compliance. For safety appliance violations, use any of the following three adjectives to describe the defective condition, inoperative, ineffective, or insecure. For example, “Insecure end-handhold account one of two fasteners missing, or “ineffective end-handhold account 14” of its 16” clear length crushed against the car.” Completion of this field is mandatory. This field will accommodate as much text as desired by user. The preferred typing “font” and size is “Times New Roman” size 12.

43. Railroad Response or Remedial Action Taken in Response to Violation: Manual entries may be entered directly into the field. Be certain to describe any agreement or disagreement with respect to findings and notification of violation and note remedial action taken by the railroad. Completion of this field is mandatory. This field will accommodate as much text as desired by user. The preferred typing “font” and size is “Times New Roman” size 12.

44. Violation Narrative: In chronological order, write a thorough description of the violation. This should include factual information that clearly articulates the violation in detail, as well as a summary of defects observed in the train. Describe all circumstances surrounding the violation, such as movement, use or prior inspection by railroad mechanical forces. Use statements such as “I observed” or “This violation is based on personal observation.”

Consider including details that will counter any mitigating factors that railroad attorneys might submit during claims conferences. For example, if the violation is reoccurring and the inspector has had little or no success in achieving compliance with the railroad or individual, it would be extremely important for the inspector to include details about compliance history if not adequately detailed in field 44.

The inspector may quote a portion of the applicable regulation if this will assist the reader’s understanding of the nature of the violation. This field will accommodate as much text as desired by user. The preferred typing “font” and size is “Times New Roman” size 12.

Note: If known, include a brief description of the overall compliance history at location where inspection and/or violation occurred. Enter, in percentages if possible, the overall compliance history for the last year and current year at the location where the violation occurred. It is also acceptable to use narrative descriptions to illustrate situations concerning current and/or past egregious and/or recurrent non-compliance.

45. Date of Report: Enter date the violation report was prepared. Completion of this field is mandatory. This date may not be earlier than the inspection date.

Federal Railroad Administration

- 46. Signature of inspector(s):** At a minimum, the first two copies of the report should bear an original signature of the inspector(s), preferably in blue ink. Inspectors are expected to sign the completed violation package with a digital signature. However, the violation package will be accepted with a written signature that is scanned into a PDF document, but FRA would prefer a digital signature.
- 47. Railroad Notification:** This field has four sub-fields for entering information relating to time, date, person and title of the railroad person notified about this violation. Enter the appropriate information. Completion of this field is mandatory. The notification date may not be earlier than the inspection date.

Digital Violations FAQ

Below are the most commonly asked questions asked of FRA Chief Counsel (RCC) and answers provided.

1. Q. Has FRA's Office of Chief Counsel (RCC) and the Office of Railroad Safety approved this document and the new processes implied herein?

A. Yes.
2. Q. How should I attach supporting documents (exhibits) to violations?

A. *Do not provide a list of supporting exhibits in the body of a violation narrative. Please use a separate sheet titled "List of Exhibits," and list supporting exhibits without numbers or letters. Supporting exhibits should be listed and attached in order of relevance.*
3. Q. Can inspectors reference a specific exhibit in the narrative of the violation even though inspectors were previously instructed **NOT** to put the "List of Exhibits" in the body of the violation itself?

A. *Yes. In fact, RCC strongly requests that inspectors should reference exhibits when it is needed to provide clarity. FRA attorneys will be in a better position to defend the merits of the violation because they will better understand the entire circumstances surrounding the case. Nonetheless, inspectors should be cognizant that if a specific exhibit is referenced in the narrative, and then that same exhibit is removed by RCC, the violation package will likely have to be returned to the inspector for editing.*
4. Q. How should each document in the "List of Exhibits" be named and identified?

Motive Power and Compliance Enforcement Manual

A. In the “List of Exhibits” inspectors should use a name that corresponds to what the exhibit actually is - e.g. Inspection Report, Train Consist, Hours of Service Record, Photo Sheet, etc. For the identifier, each exhibit should use the same identification procedure as the other documents in the violation package. That identifier should be in the lower right hand corner and formatted as: Inspector’s initials-violation number, e.g. PLM-121.

5. Q. Is it necessary to attach an entire train consist, timetable, track chart, etc. when using a voluminous document as an exhibit?

A. No. Only attach the relevant pages such as the cover page and the actual page(s) needed to support the violation. Inspectors should be sure to provide a clear explanation of the relevance the exhibit has to the violation. This explanation should include where and when the inspector obtained the document. This is necessary in the event that the railroad produces conflicting documents.

6. Q. Are there any special considerations I should be aware of when preparing violations associated with complaints?

A. Yes. Nothing in the violation report package should reference the complainant’s name, complaint control number, source code, or the fact that the violation is based on information obtained from a complainant. The only exception is when the violation report is accompanied by a signed witness statement on the approved form. Note: Inspectors should only attach the Railroad Copy of the F6180.96 to the violation report package, not the FRA Copy.

7. Q. Is it necessary to wait for the Remedial Action report to be completed by the railroad prior to submitting the violation package?

A. No, but inspectors should always attempt to resolve remedial action reports in a timely manner.

8. Q. Is the F6180.96 Inspection Report valid without a signature from a railroad official?

A. Yes. An inspection report does not need a railroad official’s signature to be considered valid. However, inspectors should endeavor to obtain the railroad official’s signature acknowledging receipt of the report when practicable, and must always indicate in the violation report the name and title of the railroad official notified of the violation. This signature should be obtained on the Railroad Copy of the F6180.96.

9. Q. Can FRA inspectors accept an e-signature of the railroad official on the F6180.96 Inspection Report? (Like an Adobe e-signature, or similar)

Federal Railroad Administration

A. Yes. Also, a copy of a “read receipt” indicating the railroad official received the report via email is adequate and can be included in the violation package. A “read receipt” can be requested when the FRA inspector sends the railroad official an email with the F6180.96 report attached. The “read receipt” could then be printed out or saved as a PDF file.

10. Q. Regarding Remedial Action of 209.407, can FRA Inspectors accept an e-signature from a railroad official when the railroad sends a “Delayed Report” regarding why their remedial action is delayed.

A. No. Technically, 209.407 requires the delayed report be signed, dated and mailed via first class mail to the FRA inspector within 30 days after the end of the calendar month in which the notification is received.

11. Q. Can FRA inspectors use Adobe’s e-signature in lieu of scanned copies of violation reports and inspection reports that contain original, handwritten signatures?

A. Yes.

12. Q. If I can’t sign my name digitally, will RCC still accept a document that I have signed and then scanned into the violation report?

A. Yes.

13. Q. Should a Form 8 (Special Notice for Repair) be included in the violation report package?

A. Yes, as well as the Form 8A, if available.

14. Q. How do I handle electronic media (wav files, videos, etc.)?

A. RCC will handle on a case-by-case basis (regional management should inquire to RCC for guidance).

15. Q. Is it necessary to create a separate 6180.96 report for each violation cited when there are multiple violations found on a railroad or shipper that day?

A. No. However RCC prefers to see all the defects associated with the violation on one inspection report.

16. Q. Does the violation package have to be bookmarked?

Motive Power and Compliance Enforcement Manual

A. Yes.

17. Q. Is each document in the violation package required to contain a header identifying the document as pertaining to that specific violation?

A. Yes. Use the required format: Inspector's initials-violation number, e.g. PLM-121.

18. Q. What is the difference between the digital violation package master filename and the identification of the documents in the digital violation package?

A. The digital master filename identifies the violation package's master PDF file. The identifier associates each document within the master PDF file with a common name, e.g. PLM-121, preferably in the lower right corner of each page.

19. Q. Are there any documents that should not be included in the violation package's master PDF file?

A. Yes. Both the Transmittal Memo (TFR) and the memorandum addressed to RCC regarding any requested extraordinary penalties are separate documents and should not be included in the violation package's master PDF file.

20. Q. Are there any other resources that I can read to help me improve my violation reports?

A. Yes. Refer to the document in the General Manual entitled "Improvements in Civil Penalty Enforcement Memo – Dated June 18, 2009."

Contact your Regional Specialist if you have additional questions regarding Form F6180.109.

Appendix B

Motive Power & Equipment Waivers

Electronic Locomotive Brakes

The following are waivers that apply to electronic locomotive air brakes, which extend the time periods specified in 49 CFR §§ 229.27(a)(2) and 229.29(a) for cleaning, repairing, replacing, and testing locomotive brake components.

FastBrake–EPIC Electronic Locomotive Brakes

Re: Docket Number FRA-2002-13397 (Formerly H-92-3)

Waiver FRA-2002-13397 (formerly H-92-3) was amended to include Wabtec's next generation of the EPIC product line, the FastBrake electronic air brake system. This conditional waiver extends the time intervals for cleaning, repairing, and testing certain pneumatic air brake components listed in 49 CFR § 229.27(a)(2) and 49 CFR § 229.29(a) to 5 years. Any railroad can use waiver FRA-2002-13397 for locomotives equipped with an EPIC brake system, as long as the waiver is properly identified on the locomotive blue card (Form FRA F6180-49A). Waiver FRA-2002-13397 is subject to the following conditions:

1. WABCO shall furnish FRA a list of all locomotives equipped with the EPIC or FastBrake systems to include: the locomotive manufacturer, the locomotive reporting marks and the date that each locomotive entered service, along with a quarterly update of locomotives that are placed in service with the EPIC or FastBrake systems.
2. WABCO shall submit to FRA a quarterly report listing air brake failures, both pneumatic and electrical, of all locomotives included in this waiver to include: type and date of failure, locomotive reporting marks, cause and resolution, and any parts replaced.
3. All verified failures of pneumatic components shall be promptly reported to FRA prior to disassembly so that WABCO, the railroad, and FRA personnel can jointly witness disassembly of the failed component to determine the cause.
4. FRA's Staff Director for Motive Power and Equipment may select up to 16 locomotives each calendar year for testing. The locomotives selected shall be comprised of locomotives that have been in service for 1, 2, 3, and 4 years with the EPIC or FastBrake system. WABCO shall arrange with the railroads to select a date, time, and location for the test. FRA, WABCO, and railroad personnel will test the locomotive brake system using an FRA approved static locomotive air brake test procedure. If there are no failures, nothing further will be required. If any pneumatic valve fails the test on the locomotive, the failure will be verified on a test rack or on another locomotive. If failure is verified, all pneumatic brake devices will be removed from the locomotive for disassembly and inspection.

Federal Railroad Administration

5. FRA reserves the right to increase the number of locomotives tested as the total of locomotives subject to this waiver increases.
6. The brake pipe vent valves shall be cleaned, repaired, and tested at a minimum of every 368 calendar days.
7. In addition to the current requirements of 49 CFR § 229.27(a)(1), all filtering devices associated with the EPIC or FastBrake system shall be cleaned, repaired, or replaced on a 368 calendar-day interval.
8. The air compressor shall be maintained to perform as intended with emphasis on detection of oil contamination of the main air reservoir.
9. FRA reserves the right to modify or rescind this waiver at any time if failures or conditions so justify, or in the event of noncompliance with any of the conditions of this waiver.

Computer Controlled Brake Locomotive Brakes

Re: Docket Number FRA-2000-7367 (Formerly H 95-3)

The Computer Controlled Brake (CCB) system is manufactured by the New York Air Brake Corporation (NYAB). Any railroad can use waiver FRA-2000-7367 for locomotives equipped with the CCB brake system, as long as the waiver is properly identified on the locomotive blue card (Form FRA F6180- 49A). The existing waiver (FRA-2000-7367) was first granted on September 13, 1996, extending the time interval for cleaning, repairing, and testing pneumatic components of the NYAB CCB-I locomotive air brake system under 49 CFR § 229.27(a)(2) and 49 CFR § 229.29(a) from 736 days to 5 years. On August 20, 1998, the waiver was modified to include NYAB's CCB-II electronic air brake system. On March 11, 2005, FRA modified the existing waiver to include the new CCB-26 electronic air brake system, along with the CCB-I and CCB-II systems, subject to the following conditions:

1. NYAB shall furnish FRA a list of all locomotives operating in the United States equipped with the CCB-I, CCB-II, and CCB-26 brake to include: the locomotive reporting marks, the date that each locomotive entered service, and a quarterly update of locomotives that are placed in service with the CCB brake.
2. FRA reserves the right to have NYAB perform tests and conduct a teardown inspection of any failed pneumatic component of the CCB brake system with FRA personnel witnessing the tests and teardown inspection.
3. At FRA's discretion, NYAB, in conjunction with the railroads, shall perform a functionality test of the CCB brake system on selected locomotives. If any pneumatic valve fails the test on the locomotive, the failure will be verified on a test rack. All pneumatic brake devices will be removed for disassembly and a visual inspection.

Motive Power and Equipment Compliance Manual

4. NYAB shall coordinate with each affected railroad to identify complete CCB sets from the same locomotive for an evaluation of the CCB brake equipment at the 5-year periodic interval, using NYAB Test Plan ABT-3164 or an FRA approved substitute. Every effort should be made to collect original equipment by identifying locomotives in which the CCB sets have had no component replacement during the 5-year service life. If this is not possible, a detailed air brake service report from the railroad must be provided.
5. Test Plan ABT-3164 or an FRA-approved substitute shall be used to test 10 sets of CCB-26 material in a NYAB test facility at the conclusion of 5 years in service. All failures identified in the test shall be put through the NYAB Failure Analysis process to determine the root cause. All components (whether pass or fail) will be torn down and visually inspected with documented photographs of the sub-components. Rubber will be tagged and retained for 1 year in case further analysis is required or requested. FRA reserves the right to have FRA personnel witness the tests and teardown inspections.
6. Reports of each set tested will be summarized and provided to FRA and the appropriate railroad. This report will include the locomotive number, in-service date, history of repairs and field modification (FMI) activities, date any material was removed, and the testing and teardown results. The test reports will also contain all photos, test failures, root cause failure analysis (if required), and an evaluation of the effect of any failures upon the locomotive performance.
7. NYAB shall notify FRA immediately of any significant trends of pneumatic and/or electronic failures (to include software problems), or any new problems that have not been previously identified, which affect the operation of the CCB equipment on any locomotive operating under this waiver.
 - a. FRA reserves the right to increase the number of locomotives tested as the total number of locomotives subject to this waiver increases.
 - b. In addition to the current requirements of 49 CFR § 229.27(a)(1), all filtering devices associated with the CCB brake system shall be cleaned, repaired, or replaced on a 368-calendar day interval.
 - c. The brake pipe vent valve shall be inspected, cleaned, repaired, and tested every 5 years.
 - d. The air compressor shall be maintained to perform as intended with emphasis on detection of oil contamination of main reservoir air.
 - e. FRA reserves the right to modify or rescind this waiver at any time, if failures or conditions warrant, or in the event of noncompliance with any of the conditions of this waiver.

Federal Railroad Administration

CSX Transportation - CCB Test Waiver

Re: Docket Number FRA-1999-6252

CSX Transportation (CSX) was granted a test waiver to prove that the new technology incorporated in the CCB electronic brake system is more reliable and safer in the rail transportation industry with the intent of moving to a performance-based criterion with components replaced or repaired as required. The waiver is applicable to the New York Air Brake Corporation (NYAB) Computer Controlled Brake (CCB) System on CSX locomotives, per the conditions outlined below. The waiver also provides that a committee (Joint CSX/CCB Committee) be created that is comprised of representatives from:

1. FRA
2. CSX
3. Brotherhood of Locomotive Engineers
4. International Association of Machinists and Aerospace Workers
5. NYAB, A Knorr Brake Company
6. General Electric Transportation Systems–Locomotive Division
7. Electro Motive Division (EMD)
8. GE Harris Railway Electronics
9. Rockwell Transportation Electronics
10. Harmon Industries
11. Any other organization or manufacturer involved with the CCB brake system used on locomotives under the test plan.

The waiver is subject to the following conditions:

1. The Joint CSX/CCB Committee is responsible for adopting and establishing a test plan which shall prescribe all testing parameters.
2. All testing procedures and parameters are subject to approval of the FRA test monitor, who shall be appointed by FRA's Associate Administrator for Railroad Safety/Chief Safety Officer.
3. An opportunity to witness all inspections and tests, which are part of the test plan, will be afforded each member of the Joint CSX/CCB Committee. Each member of the Joint CSX/CCB committee shall be provided advance notice of such inspections and tests.
4. CSX will provide FRA and the Joint CSX/CCB Committee with a monthly report of all reported brake failures on all locomotives under the test plan.

5. The FRA test monitor retains the right to modify or suspend any test performed under the test plan.
6. A periodic (92-day) test of the CCB brake system shall be conducted as required by 49 CFR § 229.23, to include a complete functionality test of the locomotive brake system.
7. All brake system filtering devices and dirt collectors shall be replaced annually.
8. FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.

Amtrak Electronic Brake Equipment, used on HHP8 Electric Locomotives

Re: Docket Number FRA-2001-10596

The National Railroad Passenger Corporation (Amtrak) was granted a waiver, FRA 2001-10596, of compliance from certain provisions of the *Railroad Power Brake and Drawbars* regulations, 49 CFR Part 229, regarding the required periodic tests of locomotive brake equipment. This waiver is specific to the electronic brake equipment manufactured by Knorr–New York Air Brake Company (NYAB) and used on Amtrak’s HHP8 electric locomotives. It extends the time interval from 2 years to 5 years on the NYAB electronic brake equipment used on the HHP8 electric locomotives owned by Amtrak with the following conditions:

1. Amtrak shall furnish FRA a list of all locomotives equipped with this type of electronic brake equipment to include: the locomotive reporting marks, the date that each locomotive entered service, and a quarterly update of locomotives that are placed in service with this brake.
2. Amtrak must submit to FRA a quarterly report listing air brake failures, both pneumatic and electrical, of all locomotives under this waiver to include: type and date of failure, locomotive reporting marks, and the cause and resolution of the problem.
3. All verified failures of pneumatic components must be promptly reported to FRA prior to disassembly so that FRA personnel can witness disassembly of the failed component to determine the cause.
4. Amtrak and FRA shall select one locomotive each calendar year for full functional testing, along with the disassembly and inspection of the pneumatic valves. If any pneumatic valve fails the functional test on the locomotive, the failure shall be verified on a test rack or on another locomotive. If the failure is verified, another locomotive will be selected for full functional testing and teardown inspection. If there are no failures, nothing further will be required for that calendar year.
5. FRA reserves the right to increase the number of locomotives tested, as the total number of

Federal Railroad Administration

locomotives subject to this waiver increases.

6. All systems for the discharge or removal of moisture, such as automatic drain valves and air dryers, shall be serviced and maintained to function as intended by the manufacturer.
7. In addition to the current requirements of 49 CFR § 229.27(a)(1), all filtering devices associated with the brake system shall be cleaned, repaired, or replaced on a 368-calendar day interval.
8. The brake pipe vent valve shall be inspected, cleaned, repaired, and tested at a minimum of every 368 calendar days.
9. The air compressor shall be maintained to perform as intended with an emphasis on detection of oil contamination of main reservoir air.
10. Amtrak shall ensure that the correct waiver information is entered on Form F 6180-49A of each locomotive under this waiver.
11. FRA reserves the right to modify or rescind this waiver at any time, if failures or conditions warrant, or in the event of noncompliance with any of the conditions of this waiver. Also, at the conclusion of the 5-year period, FRA reserves the right to extend the waiver if conditions warrant.

Locomotive Brakes

Association of American Railroads - 26-L Type Brake – 1,104 days to 48 Months

Re: Docket Number FRA-2005-21325

The Association of American Railroads (AAR) was granted a waiver to extend the time interval requirements of 49 CFR § 229.27, *Annual Tests*, and 49 CFR § 229.29, *Biennial Tests*, for all locomotives equipped with 26-L type brake systems and air dryers. This waiver applies to any locomotive equipped with a 26-L type brake system and a functioning air dryer, irrespective of ownership or the trackage on which the locomotive is operating. The new time interval is 1,472 calendar days for air brake equipment subject to the clean, repair, and test requirements of 49 CFR §§ 229.27(a)(2) and 229.29(a), with the following conditions:

1. The waiver shall apply only to locomotives equipped with 26-L type brake equipment and a functioning air dryer.
2. Any locomotive operating under this waiver shall have the waiver properly noted on Form FRA F 6180-49A.
3. All air brake filtering devices shall be cleaned or replaced annually.
4. All systems for the discharge or removal of moisture, such as automatic drain valves and air

dryers shall be maintained to function as intended.

5. The air compressor must be maintained to perform as intended with emphasis on detection of oil contamination of the main reservoir air.
6. FRA and AAR shall work together and randomly select two locomotives, annually, for a teardown inspection of the brake equipment, to be witnessed by FRA and invited labor representatives. The number and frequency of this condition may be changed by FRA based on the performance of the brake equipment or the results of the inspections.

Locomotive Recordkeeping

The Government Paperwork Elimination Act (GPEA), Public Law No. 105-277, requires executive agencies to provide “for the option of the electronic maintenance, submission, or disclosure of information, when practicable as a substitute for paper” and “for the use and acceptance of electronic signatures, when practicable.”

Through the waiver process, many railroads have opted to take advantage of the GPEA regarding the paper requirements found in certain provisions of 49 CFR Part 229, Railroad Locomotive Safety Standards. Specifically, the calendar day inspection records and the periodic inspection information required for the locomotive “Blue Card,” Form FRA F6180.49A.

Daily Inspection Electronic Recordkeeping

The following are waivers that allow for the use of electronic signatures and electronic storage of daily locomotive inspection records for specific railroads.

Burlington Northern Santa Fe Railway BNSF

Re: Docket Number FRA-2000-7782

1. The daily inspection record maintained on board the locomotive will be amended to include a place for the person performing the inspection to sign, and a place to indicate if the locomotive was found in noncompliance at the time of the daily inspection.
2. All transportation employees performing daily locomotive inspections will use a secure and unique electronic access code, assigned to them for logging on and off duty and reporting “Hours of Service,” for reporting daily locomotive inspection into the database.
3. Locomotives found defective during the daily inspection will have the block checked on the onboard record that indicates a defective condition; a noncomplying tag will be made; the defective condition reported to the Network Operations Center Mechanical Desk for disposition; and the locomotive will not be used until corrective action is taken.
4. The operations desk will enter the information into the database and will determine how best

Federal Railroad Administration

- to handle the defective locomotive: set out, send a mechanic, or move as a noncomplying locomotive.
5. Crewmembers using the quick tieup provision (Hours of Service) will not be polled on locomotive inspection and review defects entered by operations center.
 6. Mechanical department employees performing daily inspections will be required to fill out the onboard record and will be provided a secure and unique electronic access code for reporting inspections, listing repairs made, or providing additional information to the existing records within the database.
 7. Database records will be maintained for 92 days. Records of repairs made will be added to the database without any change to the original reported information. Database access will be provided through the use of employee ID's and a unique password.
 8. BNSF will protect and prevent tampering with the database by use of a security program. At this time, BNSF uses an IBM program called Resource Access Control Facility (RACF) which allows the user to append the record but not alter the original records. BNSF shall use RACF or an equivalent level of protection to protect database information.
 9. FRA inspectors will be provided all electronic records for specific locomotives (upon request) from BNSF at any computer terminal accessing the program, i.e., transportation and mechanical facilities. BNSF is responsible for maintaining onboard records and database records of daily inspections.
 10. FRA reserves the right to modify or rescind the waiver upon receipt of information pertaining to the safety of rail operations, evidence of electronic database integrity deficiencies, or in the event of noncompliance with any condition of this waiver.

Union Pacific Railway (UP)

Re: Docket Number FRA-2001-11014

1. The daily inspection record maintained onboard the locomotive will be amended to include a place for the person performing the inspection to sign or provide their employee identification number, and a place to indicate if the locomotive was found in noncompliance at the time of the daily inspection.
2. All transportation employees performing daily locomotive inspections will use a secure and unique electronic access code assigned to them for logging on and off duty, and reporting hours of service (HOS) for reporting daily locomotive inspections into the database.
3. Locomotives found with FRA non-complying conditions during a daily inspection will have the block on the onboard record indicating a defective condition checked. Unless the person performing the inspection can correct the condition, a record of the repairs must be made. If the condition cannot be corrected, a non-complying tag must be made,

Motive Power and Equipment Compliance Manual

the defective condition reported electronically, and the locomotive will not be used until corrective action is taken. If the non-complying locomotive is moved from the point at which the condition was discovered, then it must be moved in compliance with 49 CFR Section 229.9, *Movement of non-complying locomotives*, and must be reported to the Harriman Dispatch Center (HDC) prior to movement.

4. The HDC mechanical desk will enter the information into the database and determine how best to handle the non-complying locomotive (i.e., to set out, send a mechanic, or move as a non-complying locomotive). The crewmember will report the locomotive inspection at tie-up, if HOS does not apply.
5. Crewmembers using the quick tie-up provision will not be polled on locomotive inspection or review of the defects entered by the operations center.
6. Mechanical department employees performing daily inspections will be required to fill out the onboard record and will be provided with a secure and unique electronic access code for reporting inspections, listing repairs, or providing additional information to the existing records within the database.
7. Database records will be maintained for 92 days. Records of repairs will be made to the database without any change to the original reported information. Database access will be secured and the employees inputting the data will be identified.
8. UP will 1) protect and prevent tampering with the database by the use of a security program, 2) allow the user to append the records but not alter the original records, and 3) use an electronic security program to protect database information.
9. FRA inspectors will be provided all electronic records for specific locomotives (upon request from UP at any locomotive mechanical facility) and these records must also be made available, upon request, at local transportation department facilities. UP is responsible for maintaining onboard records and database records of daily inspections.
10. This waiver expires 5 years from the date of this letter. At the conclusion of the 5-year period, FRA reserves the right to extend the waiver if conditions warrant and UP has made a written request for an extension to FRA's Office of Safety Assurance and Compliance at least 6 months prior to the expiration date.

FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations, evidence of electronic database integrity deficiencies, or in the event of noncompliance with any of the conditions of this waiver.

Norfolk Southern Corporation (NS)

Re: Docket Number FRA-2005-22822

Federal Railroad Administration

1. The daily inspection record maintained onboard the locomotive will be amended to include a place for the person performing the inspection to sign or provide their employee identification number, and a place to indicate if the locomotive was found in noncompliance at the time of the daily inspection.
2. All transportation employees performing daily locomotive inspections will use a secure and unique electronic access code, assigned to them for logging on and off duty and reporting "Hours of Service," for reporting daily locomotive inspection into the database.
3. Locomotives found defective during the daily inspection will be reported to the Mechanical Operations Center (MOC) for disposition.
4. The MOC will enter the information into the database and will determine how best to handle the defective locomotive; set out, send a mechanic, or move as a noncomplying locomotive.
5. Crewmembers using the quick tieup provision (Hours of Service) will not be polled on locomotive inspection and review defects entered by MOC.
6. Mechanical department employees performing daily inspections will be required to fill-out the onboard record and will be provided a secure and unique electronic access code for reporting inspections, listing repairs made, or providing additional information to the existing records within the database.
7. Database records will be maintained for 92 days. Records of repairs made will be added to the database by the person performing the repair and without any change to the original reported information. Database access will be provided through the use of employee IDs and a unique password.
8. NS will protect and prevent tampering with the database by use of a security program to protect database information.
9. FRA inspectors will be provided all electronic records for specific locomotives upon request from NS at any mechanical department computer terminal.
10. NS is responsible for maintaining onboard records and database records of daily inspections.
11. This waiver shall be identified in block number 19 of the Form FRA F6180.49A (locomotive blue card) and explanatory information regarding the scope and content of the waiver shall be included under "Remarks."
12. FRA reserves the right to modify or rescind the waiver upon receipt of information pertaining to the safety of rail operations, evidence of electronic database integrity deficiencies, or in the event of noncompliance with any condition of this waiver.

Electronic Recordkeeping—Form FRA F6180.49A (Blue Card) Burlington Northern Santa Fe Railway (BNSF)

Motive Power and Equipment Compliance Manual

Re: Docket Number FRA-2003-16440 (See similar conditions below)

Canadian National Railway (CN)

Re: Docket Number FRA-2004-18960 (See similar conditions below) Limited to locomotives owned or leased by CN, Grand Trunk Western Railroad(GTW), Duluth, Winnipeg& Pacific Railway (DWP), Wisconsin Central LTD (WC), Bessemer and Lake Erie Railroad (BL&E), Duluth, Missabe and Iron Range Railway (DM&IR), and British Columbia Railway (BC) maintained by those railroads in their facilities.)

Union Pacific Railway (UP)

Re: Docket Number FRA-2004-17308 (See similar conditions below)

The above railroads have been granted waivers from certain provisions of 49 CFR Part 229, Railroad Locomotive Safety Standards, which permit the railroads to maintain and store electronically, the periodic inspection information required for the Blue Card (Form FRA F6180.49A). Employees who perform periodic, annual, and biannual inspections are permitted to record the inspection information electronically. These waivers also allow the railroad to store the information in an electronic database. Locomotives will still be required to have either a Form FRA F6180.49A or a computer-generated form in place on the locomotive. The following conditions apply to these waivers:

1. The railroads are authorized to use a computer-generated form instead of a standard Form FRA F6180.49A. This form must contain all the required information, including identifying this waiver. The printed name of the person performing inspections will satisfy the requirement for a signature.
2. The railroad will maintain an electronic database to identify those units that require periodic inspection before continuing in service.
3. Employees and supervisors required to make entries on Form FRA F6180.49A will be provided with a secure and unique electronic access code for reporting and certifying inspections and repair records.
4. The railroads will provide employees inspection packages, including all required tests and procedures needed to perform required inspection and tests. If provided electronically, a means for the person performing inspections to indicate completion shall be provided by an assigned unique electronic access code.
5. Inspection packages will include defects and repairs made to the locomotive over the previous 92 days.
6. FRA inspectors will be provided computer-generated copies of Form FRA F6180.49A upon request at any of the railroads' locomotive facilities using the electronic reporting covered by this waiver.

Electronically Controlled Pneumatic (ECP) Brake Requirements for BNSF and NS

Federal Railroad Administration

Re: Docket Number FRA-2006-26435

A waiver was granted to BNSF and NS in order to begin equipping and operating pilot trains using ECP brakes instead of conventional pneumatic brake systems, subject to the following conditions:

1. This waiver shall apply only to BNSF and NS trains equipped and operating with ECP brake systems.
2. The ECP brake system shall, at a minimum, meet all of the current AAR standards contained in the *AAR Manual of Standards and Recommended Practices* related to ECP brake systems.
3. A train operating in ECP brake mode shall receive a Class I brake test (as described in 49 CFR § 232.205(c)) by a qualified mechanical inspector (QMI), and shall receive a pre-departure freight car inspection (pursuant to the requirements specified in 49 CFR Part 215) by an inspector designated under 49 CFR § 215.11 at the initial terminal where the train is originally assembled or where a unit or cycle train Class I brake test is required.
4. Trains operating in ECP brake mode shall not operate at a distance that exceeds its destination or 3,500 miles, whichever is less, without receiving another Class I brake inspection and another Part 215 inspection, as outlined in Condition 3.
5. A unit or cycle train operating in ECP brake mode shall receive a Class I brake inspection and Part 215 inspection at least every 3,500 miles, as outlined in Condition 3.
6. The distance that any car in a train has traveled since receiving a Class I brake test by a QMI will determine the distance that the train has traveled.
7. A train operating in ECP brake mode shall receive a Class I brake test as described in § 232.205(c) by a qualified person at a location where the train is off air for a period of more than 24 hours.
8. Each car equipped with an ECP brake system that is added to a train operating in ECP brake mode shall receive a Class I brake test as described in 49 CFR § 232.205(c) by a qualified person, unless all of the following are met:
 - a. The car has received a Class I brake test by a QMI within the last 3,500 miles.
 - b. Information identified in 49 CFR § 232.205(e) relating to the performance of the previous Class I brake test is provided to the train crew.
 - c. The car has not been off air for more than 24 hours.
 - d. A visual inspection of the car's brake systems is conducted to ensure that the brake equipment is intact and properly secured. This may be accomplished as part of the inspection required under 49 CFR § 215.13 and may be conducted while the car is off air.

9. An ECP brake-equipped train that receives a Class I brake test by a QMI is not required to receive any Class IA brake tests.
10. A train operating in ECP brake mode shall receive a Class III brake test as described in 49 CFR §§ 232.211(b), (c), and (d), at the location where the configuration of the train is changed or whenever the continuity of the brake pipe or electrical connection is broken or interrupted, with the train consist otherwise remaining unchanged.
11. In lieu of the specific brake pipe service reductions required throughout 49 CFR Part 232, an electronic signal that provides an equivalent application and release of the brakes shall be used when conducting any required inspection or test on a freight car or train operating in the ECP brake mode.
12. In lieu of the specific piston travel ranges specified throughout 49 CFR 232, the piston travel on freight cars equipped with ECP brake systems shall be within the piston travel limits stenciled or marked on the car or badge plate consistent with the manufacturers' recommended limits. However, at no time shall piston travel on a standard 12-inch stroke piston exceed 9 inches when conducting a Class I brake inspection as outlined in Condition 3.
13. When conducting the Class I brake test as outlined in Condition 3, the composition type brake shoe must have at least 2-inch thickness, including the lining and backing plate.
14. A freight car or a freight train shall be exempted from the requirements contained in 49 CFR §§ 232.205(a) and (b), 232.207, 232.209, 232.211(a), and 232.505 when it is equipped with an ECP brake system and operating in ECP brake mode.
15. Handling of defective equipment with ECP brake systems.
 - a. Ninety-five percent of the cars in an ECP brake-equipped train operating in ECP brake mode shall be effective and operative prior to use or departure from the train's initial terminal or any location where a Class I brake test is required to be performed on the entire train by a QMI.
 - b. A freight car or locomotive equipped with an ECP brake system that is found with inoperative or ineffective brakes for the first time during the performance of a Class I brake test or while en route, may be used or hauled without civil penalty liability under this part to its destination (not to exceed 3,500 miles); provided all applicable provisions of this section are met and the defective car or locomotive is hauled in a train operating in ECP brake mode.
 - c. A freight car equipped with an ECP brake system that is known to have arrived with ineffective or inoperative brakes at the location of a train's initial terminal or at a location where a unit or cycle train Class I brake test is required, shall not depart that location with ineffective or inoperative brakes in a train operating in ECP brake

Federal Railroad Administration

mode unless the location does not have the ability to conduct the necessary repairs. If the location does not have the ability to conduct the necessary repairs, the car must be properly tagged in accordance with 49 CFR § 232.15(b), and can only be hauled for the purpose of repair to the nearest forward location where the necessary repairs can be performed.

- d. A train operating in ECP brake mode shall not operate with less than 85 percent of the cars in the train with operative brakes, unless it is operating in switch mode for the purpose of moving to the nearest forward location where necessary repairs or changes to the consist can be made.
 - e. A freight car equipped with an ECP brake system that is part of a train operating in ECP brake mode that is found with a defective non-brake safety appliance may be used or hauled without civil penalty to the nearest forward location where the necessary repairs can be performed consistent with the guidance contained in 49 CFR § 232.15(f).
 - f. A train operating with conventional pneumatic brakes shall not operate with freight cars equipped with standalone ECP brake systems, unless the train has 100-percent effective and operative brakes on all cars equipped with conventional pneumatic brakes and at least 95-percent effective and operative brakes when including the freight cars equipped with standalone ECP brake systems; or when cars are picked up en route, there shall be a minimum of 85-percent operative brakes for the entire train when including the standalone ECP brake-equipped cars.
16. A freight car equipped with an ECP brake system that is found with ineffective or inoperative brakes will be considered electronically tagged under 49 CFR §§ 232.15(b)(1) and (b)(5), if the car is used or hauled in a train operating in ECP brake mode and the ECP brake system is able to display the location and identification of the car with defective brakes. The railroad shall develop a method acceptable to FRA to capture and secure the appropriate information so that it is accessible to FRA and appropriate railroad mechanical personnel, as well as satisfy the requirements of 49 CFR § 232.15(b)(3).
17. Each railroad shall submit to FRA's Associate Administrator for Railroad Safety/Chief Safety Officer a list of locations on its system, and an updated list of locations where ECP brake system repairs will be performed each time a location is added or subtracted to its system.
18. In addition to the maintenance requirements contained in 49 CFR §§ 232.303(b) through (d), a freight car equipped with an ECP brake system shall be inspected before being released from a shop or repair track to ensure the proper and safe condition of the following:
- a. ECP brake system wiring and brackets.
 - b. ECP brake system electrical connections.
 - c. Electrical grounds and impedance.

- d. Car mounted ECP brake system components.
19. Using procedures developed by the brake manufacturer, a single car air brake test shall be performed on a freight car equipped with an ECP brake system before being placed into revenue service for the first time using the ECP brake system.
 20. Trains operating in ECP brake mode are exempt from the two-way end-of-train device requirements contained in Subpart E of 49 CFR Part 232.
 21. Prior to operating a freight train in ECP brake mode, the ECP brake system's end-of-train (ECP-EOT) device must be connected to the brake pipe and trainline cable at the end of the train operating with an ECP brake system. The ECP-EOT must be connected to the network and must be transmitting status messages to the head end unit (HEU) before the trainline power can be energized continuously. The ECP-EOT shall continually report brake pipe pressure and trainline voltage to the HEU.
 22. Each railroad shall develop and implement a training program for personnel that operate or perform inspection, testing, or maintenance on a freight car and/or freight train equipped with an ECP brake system. The training shall meet all of the requirements specified in 49 CFR §§ 232.203(a), (b), (e), and (f), and 49 CFR Part 240.
 23. Each railroad shall amend its operating rules to govern safe train handling procedures related to ECP brake systems and equipment under all operating conditions, which shall be tailored to the specific equipment and territory of the railroad.
 24. Prior to operating a train under authority of this waiver, the railroads shall provide notice to the FRA in the same manner provided for extended haul trains pursuant to 49 CFR § 232.213(a)(1).
 25. This waiver is effective for a 5-year period from the date of this letter or until a final rule is implemented for trains equipped with ECP brake systems. At the conclusion of the 5-year period, FRA reserves the right to extend the waiver if conditions warrant and BNSF/NS make a written request for an extension to FRA's Office of Safety Assurance and Compliance within 6 months of the expiration date.

Blue Signal

Two-way end-of-train (EOT) telemetry devices—Removal and replacement of batteries by train and yard crewmembers, and utility employees for BNSF

Re: Docket Number FRA-2001-10660

BNSF was granted relief from certain provisions of 49 CFR Part 218, *Railroad Operating Practices*, regarding blue signal protection of workers. Specifically, the waiver permits train and yard crewmembers and utility employees, to remove and replace batteries in two-way EOT telemetry devices while the EOT is in place on the rear of the train for which the individual has

Federal Railroad Administration

been assigned; without establishing any blue signal protection. Waiver FRA 2001-10660 has been reissued on April 5, 2007, with the following conditions:

1. This approval applies only to BNSF train and yard crewmembers and utility employees.
2. Battery change-outs can be performed on EOT devices by train and yard crewmembers and utility employees only on railroad rolling equipment that they have been called to operate (or been assigned to as “utility employees”).
3. If the function of changing out the EOT device batteries requires the use of tools, then establishing blue signal protection specified by 49 CFR Part 218 is required.
4. BNSF shall immediately report any accident involving this procedure to the FRA Office of Safety Assurance and Compliance.
5. This waiver extension is effective for a period of 5 years from the date of this letter. FRA may extend the waiver if conditions warrant and BNSF provides the FRA Office of Safety Assurance and Compliance with a written request for an extension within 6 months of the expiration date.
6. FRA reserves the right to modify or rescind this waiver upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with the conditions specified.

Two-Way End-of-Train Device (EOT)

TrainLink II ATX end-of-train telemetry (TrainLink II) with power supplied by an Air Generator

Re: Docket Number FRA-2001-9270

Wabtec Railway Electronics (Wabtec) was granted relief from the requirements of 49 CFR § 232.407(f)(2), which requires:

The rear unit batteries shall be sufficiently charged at the initial terminal or other point where the device is installed and throughout the train’s trip to ensure that the end-of-train-device will remain operative until the train reaches its destination.

The waiver provides relief from certain provisions of Title 49 Code of Federal Regulations (CFR) Part 232, *Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment*, regarding End-of-Train Devices. Specifically, the waiver provides conditional relief from Section 232.407(f)(2), which requires that the rear unit batteries be sufficiently charged at the initial terminal or other point where the device is installed and throughout the train's trip to ensure that the end-of-train-device will remain operative until the train reaches its destination.

Motive Power and Equipment Compliance Manual

Based on the satisfactory performance of the TrainLink II- ATX end-of-train telemetry unit, (TrainLink II), FRA hereby extends the waiver subject to the same conditions as the original waiver as follows:

1. This waiver only applies to the TrainLink II - ATX end-of-train telemetry unit, (TrainLink II) manufactured by Wabtec;
2. Railroads using these devices shall ensure that all personnel (including contractors) responsible for the application, removal, testing, maintenance, and/or operation of the TrainLink II, shall be adequately trained to perform the applicable job functions;
3. The TrainLink II shall be installed and operating with power supplied by the air generator during the performance of all required air brake inspections and tests on trains equipped with this device;
4. When a TrainLink II is used to replace an existing end-of-train-device on a train, an air brake leakage test shall be satisfactorily performed on the train with the TrainLink II operating and powered by the air generator;
5. If there is any indication that the backup battery is dead or has a low charge condition at the time of installation, the device shall be considered defective and can not be used until the battery is changed or fully charged;
6. Railroads using the TrainLink II shall perform recommended maintenance according to Wabtec's procedures, specifications, and time intervals with particular emphasis on the air filter;
7. The device shall meet or exceed all Association of American Railroads (AAR) standards and specifications regarding the two-way end-of-train device and shall be compatible with other devices that meet the AAR standards and specifications;
8. The TrainLink II device battery shall provide a minimum of 12 hours of continuous power to operate the device in the event the air generator stops functioning;
9. With the exception of Section 232.403(g)(2), use of TrainLink II devices remain subject to the provisions of 49 CFR Part 232, including but not limited to:
 - a. all inspection, testing, operating, and training requirements specified in 49 CFR Part 232; and
 - b. all en route failure restrictions specified in 49 CFR Part 232;
10. Wabtec shall provide FRA with an annual report summarizing the performance of the product and any recurring or catastrophic problems associated with the device. The report shall also include any modifications to the product, as well as the number of units provided to the railroads;

Federal Railroad Administration

11. Wabtec shall provide a copy of this approval letter to each railroad supplied with the TrainLink II device. Use of this equipment by any railroad is not permitted until such railroad provides to FRA's Associate Administrator for Safety a written confirmation that the railroad agrees to abide by the conditions established in this letter; and
12. This waiver is effective for a 5-year period from the date of this letter. At the conclusion of the 5-year period, FRA reserves the right to extend the waiver if conditions warrant and Wabtec has made a written request for an extension to FRA's Office of Safety Assurance and Compliance, within 6 months of the expiration date.

Re: Docket Number FRA-2006-25794

FRA conditionally approved Quantum's petition for relief from the requirements of 49 CFR 232.403(g)(2), subject to the conditions listed below:

1. This waiver applies only to EOT devices manufactured by Quantum and described in the "Design Review Verification/Validation" section of Quantum's August 15, 2006, waiver petition document. Quantum EOT devices installed in the railroad operating environment shall be of the same type and model of components used in the samples tested and referenced in Quantum's August 15, 2006, waiver petition document.
2. Railroads utilizing Quantum EOT devices shall ensure that all personnel (including contractors) responsible for installing, removing, testing, maintaining, and using the devices, are adequately trained in the operation of the device.
3. Quantum EOT devices shall be installed and operating, with power supplied by the air-driven alternator, during the performance of all required air brake inspections and tests of trains equipped with this device.
4. If at the time of installation, there is any indication that the batteries are dead or have a low charge condition, the Quantum EOT device shall be considered defective and may not be used until corrective action is taken (e.g. the batteries are charged or replaced).
5. Quantum EOT devices shall meet or exceed all Association of American Railroad (AAR) EOT device communication standards.
6. Each Quantum EOT device equipped with two batteries shall provide a minimum of 12 hours of continuous power to operate the device in the event the air-driven alternator stops functioning.
7. With the exception of 49 CFR 232.403(g)(2), Quantum EOT devices remain subject to all other provisions of 49 CFR Part 232, including, but not limited to:
 - a. All inspection, testing, operating, and training requirements specified in 49 CFR Part 232 and Part 221; and
 - b. All en route failure restrictions specified in 49 CFR Part 232 and Part 221.

8. Quantum shall provide FRA with an annual report summarizing the performance of its EOT devices equipped with the type of batteries described in the petition. The report shall include the number of units provided to railroads, modifications made to the devices, and any recurring or catastrophic problems associated with the devices.
9. FRA reserves the right to independently test any Quantum EOT device and to withdraw the approval of this waiver at any time if its performance in the railroad operating environment fails to substantiate the submitted test results.
10. The waiver is effective for a period of 5 years from the date of this letter. FRA may extend the waiver if favorable conditions warrant, and if Quantum submits a written request for an extension. Such request for an extension should be filed with FRA's, Office of Safety Assurance and Compliance at least 6 months prior to the expiration date of this waiver.
11. FRA reserves the right to modify or rescind this waiver upon receipt of information pertaining to the safety of railroad operations or in the event of noncompliance with the conditions specified.

Addendum to Waiver FRA-2006-25794:

FRA and state inspectors are advised that Quantum Engineering, Inc., is presently part of Invensys, Inc., and that devices waived under FRA-2006-25794 may appear with either Quantum or Invensys identification labels.

TrainLink II - Calibration Requirements for Units Equipped with the Wabtec Railway Electronics (WRE) Digitally Synthesized Radio

Re: Docket Number FRA-2004-18895

Wabtec Railway Electronics (Wabtec) was granted relief from the requirements of 49 CFR § 232.407(f)(2), which requires the telemetry equipment to be tested for accuracy and calibrated, if necessary, at least every 368 days; and requires that the date and location of the last calibration or test, as well as the name of the person performing the calibration or test, be legibly displayed on a weather-resistant sticker or other marking device affixed to the outside of both the front and the rear unit.

FRA reviewed the petition and conditionally approved the request, with the following conditions:

1. This waiver applies only to Wabtec TrainLink II Head of Train Devices (HTD) and EOTs that were produced since March 4, 2002, and all existing TrainLink units that have been upgraded with the new WRE digitally synthesized radio.
2. A weather-resistant sticker shall be attached to each unit, identifying that the unit is equipped with the new WRE digital radio and is covered by this waiver. Wabtec shall control the application of these stickers to the units and ensure that the stickers are not arbitrarily distributed to the railroads for railroad employees to apply to the units.
3. Wabtec shall immediately provide written notification to FRA's Office of Safety Assurance

Federal Railroad Administration

and Compliance of any unusual occurrences with the performance of these devices.

American Short Line Regional Railroad Association (ASLRRRA) - Restrictions on Heavy Grade Operation Without Two-Way EOT

Re: Docket Number PB-97-12

Based on ASLRRRA's request for reconsideration, the results of additional analyses and data furnished by Volpe, and in consideration of economic impacts on small entities, the FRA Railroad Safety Board conditionally approved petition PB-97-12 to permit trains to operate in heavy grade territories without a two-way EOT, only under the following restrictions and conditions:

1. Only railroads that have fewer than 400,000 annual employee work hours qualify for this waiver.
2. This waiver is limited to trains operating with a maximum of 200 trailing tons per locomotive axle. [trailing tons means the total tonnage (cars and lading) behind all locomotives providing power].
3. Each locomotive axle used to calculate the trailing tonnage shall have an operative air brake.
4. Each railroad desiring to operate under the terms of this waiver shall provide written notification to the Director, Office of Safety Assurance and Compliance. The notification shall include the maximum grade and specific location(s) where relief is requested. A written description of the operating rules for the proposed operation shall also be included. The railroad may proceed upon acknowledgment by the Director of receipt of notification.
5. Any train operation over a section of track with an average grade greater than 4 percent shall be equipped with a functional two-way EOT device.
6. The values in the following table shall be used for the purposes of this waiver only. The allowable trailing tons per locomotive axle are determined by the speed and the percentage of grade. Neither the speed nor the grade can exceed the allowable trailing tonnage per locomotive axle. The percentage of grade is the average from the top of the mountain to the base of the mountain. Speeds listed in the table are maximum speeds allowed for grade and trailing tonnage combinations. However, railroads should set the speed limit in accordance with operating conditions at the location for which the waiver is applied, with particular attention to avoiding the 10–25 mile per hour range on jointed-track that may cause or accentuate harmonic roll of loaded cars.

ASLRRRA Waiver PB-97-12 - Relief From Two-Way End-of-Train Requirements

Trailing tons per locomotive axle	10 mph	15 mph	20 mph	25 mph
up to 75	4.0 percent grade	4.0 percent grade	4.0 percent grade	4.0 percent grade
76–100	3.5 percent grade	3.5 percent grade	3.5 percent grade	3.5 percent grade
101–125	3.0 percent grade	3.0 percent grade	3.0 percent grade	2.5 percent grade

Motive Power and Equipment Compliance Manual

126–150	2.5 percent grade	2.5 percent grade	2.5 percent grade	2.5 percent grade
151–175	2.0 percent grade	2.0 percent grade	2.0 percent grade	2.0 percent grade
176–200 maximum	2.0 percent grade	2.0 percent grade	2.0 percent grade	1.0 percent grade

7. If the train is equipped with dynamic brakes, the engineer shall determine the condition of the dynamic brakes prior to descending a grade, and such brakes shall be used to supplement the braking effort as required to control the train.
8. Grade/curvature and other local conditions may require the setting of retainers as specified by individual railroad operating rules.
9. If there is an incident where trainline blockage or loss of train brakes occurs, the wheels and brake system of the locomotives and cars shall be inspected after the train is safely brought to a complete stop, and a report made immediately to the FRA regional office.
10. The conditions of this waiver apply to all operations applicable to two-way EOT operations.
11. FRA reserves the right to deny a railroad inclusion to this waiver if conditions so justify.
12. FRA reserves the right to modify or rescind this waiver (as to all or individual railroads) at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.

Passenger Equipment Safety Standards

Passenger Brakes

Re: Docket Number FRA-2003-15340

The American Association of Private Railroad Car Owners, Inc. (AAPRCO) was granted a conditional waiver from 49 CFR § 238.231(m)(2), which specifies that:

Up to two cars may be operated in direct release mode when the rest of the cars in the train are operated in graduated release mode, provided that the cars operated in direct release mode are hauled at the rear of the train consist.

This waiver modifies the requirements to read as, “Up to two cars may be operated in direct release mode when the rest of the cars in the train are operated in graduated release mode.” thereby, eliminating the placement restrictions of the direct release cars to the rear of the train.

This waiver applies to passenger train operations that are subject to 49 CFR Part 238, with the following conditions:

1. The maximum number of cars that may be operated in direct release mode, when the rest of

Federal Railroad Administration

- the cars in the train are operated in graduated release mode, is two.
2. The hauling railroad is responsible for the safe placement of these cars in the trains, to include the right of refusal.
 3. The locomotive engineer shall be notified in writing of the location of these cars in the train, along with any operating restrictions.
 4. The hauling railroad is responsible for providing the locomotive engineer with adequate training on operating trains in graduated-release mode that include cars operating in the direct-release mode.

Highway Rail Vehicles such as RoadRailer7, RailRunner7, Etc.

An approved waiver is required for the operation of this type of equipment because the equipment does not comply with 49 CFR Part 231, which specifies the number, location, and dimensional specifications for handholds, ladders, sill steps, uncoupling levers, and hand brakes; and 49 CFR § 232.2, which regulates drawbar height. The following waivers have been granted to specific railroads:

Burlington Northern Santa Fe Railway Company - (BNSF)

Re: Docket Number FRA-1999-5895

Standard RoadRailer7 Operations

1. This approval applies only to BNSF RoadRailer equipment operation.
2. Interchange will only be permitted with a railroad that has a comparable approval to operate RoadRailer equipment.
3. RoadRailer units shall only be operated in trains consisting exclusively of RoadRailer units and locomotives, unless conditions shown below are complied with.
4. Trains consisting exclusively of RoadRailer equipment shall be limited to a maximum trailing tonnage of 4,800 tons (equivalent to 125 Mark V RoadRailer units or 200 PupRailers).
5. At no time shall the train length exceed the equivalent of 125 Mark V RoadRailer units.
6. An adapter unit (CouplerMate bogie) must be used between the hauling locomotive and the first RoadRailer unit in the train; the first RoadRailer behind the adapter unit must not be empty.
7. Each adapter unit (CouplerMate bogie) shall be equipped with a toolbox containing appropriate instructions, job aids, and the necessary tools and equipment required to address

Motive Power and Equipment Compliance Manual

- problems that may be encountered en route by the train crew.
8. Trains will only be permitted to pickup or set-out RoadRailer units at locations specifically designed to perform these functions with mechanical personnel that are trained and on duty for the purpose of assembly and disassembly of RoadRailer units, unless a defective condition develops en route that would require a RoadRailer unit to be set out of the train.
 9. Hazardous materials are permitted to be hauled in RoadRailer units provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR § 172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) placarding provisions of 49 CFR Subpart F of Part 172 shall apply during rail movements; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal (IM) portable tanks handling hazardous materials are not permitted in this service.
 10. Each RoadRailer adapter unit (CouplerMate bogie) that does not have safety appliances that are compliant with current Federal regulations (with the exception of the hand brake), must be stenciled on each side, in clearly legible letters not less than 6 inches high, "NO SAFETY APPLIANCES" and "DO NOT RIDE," at a location that is visible to a person walking at track level beside the unit.
 11. BNSF shall have instructions that prohibit anyone from riding RoadRailer equipment, unless it is an adapter unit (CouplerMate7 bogie) specifically designed to be ridden and is not stenciled as required in Condition 10. Strict enforcement of this rule is required.
 12. New terminal facilities for RoadRailer equipment shall, to the extent feasible, be designed to limit the frequency and length of reverse movements. Reverse movements of RoadRailer equipment, with personnel riding CouplerMates equipped with compliant safety appliances, shall not exceed 10 mph.
 13. Whenever a shoving move of RoadRailer equipment is required, the movement shall be protected by either an individual riding an adapter unit (CouplerMate bogie) specifically designed to be ridden; or by an individual walking with the movement, and the speed of the move shall not exceed that of the individual walking.
 14. Maximum speed of a RoadRailer train is 60 mph, unless: (1) the RoadRailer units are equipped with AAR-1B narrow flange profile (1:40 taper) and maintained in that condition, whereby the maximum speed shall be 70 mph; or (2) the entire consist is made up of ReeferRailer units, whereby the maximum speed shall be 70 mph. In addition, BNSF shall consider the recommendations cited in FRA's safety analysis of October 18, 2000 (page 9), and in FRA form of actions taken.
 15. Piston travel at initial terminal shall be 1¼–3½ inches.
 16. The air brake shall be considered ineffective at 3e inches.
 17. BNSF shall ensure that all personnel (including contractors) responsible for assembly,

Federal Railroad Administration

inspection, testing, maintenance, and operation of RoadRailer equipment have been trained and qualified to perform those duties prior to undertaking them, including the instructions in the approval pertinent to their duties. Training for railroad operating and mechanical personnel who may encounter the equipment, shall specifically include training necessary to provide for their personal safety when working on or in proximity to the equipment. Supervisors shall also possess the knowledge and skills required of employees subject to their direct supervision. Effective coincident with compliance dates established for revisions to 49 CFR Part 232 (see 66 FR 4101; January 17, 2001), all personnel required to receive training subject to this approval shall have their qualifications for duties (related to RoadRailer equipment) documented in the same manner provided in that part.

18. BNSF shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RoadRailer equipment.
19. BNSF supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad's written procedures, applicable Standards and Recommended Practices of the AAR, current AAR Interchange Rules, and all applicable Federal regulatory requirements.
20. BNSF shall immediately report any accident involving this equipment to FRA's Office of Safety Assurance and Compliance in Washington, DC.
21. FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.

RoadRailer 7 Mixed Train Operations

All the approvals for Standard RoadRailer Operations (items 1–21 above) will apply for mixed train consists, except as follows:

22. For the purpose of this approval, a "mixed train" shall consist of a solid block of RoadRailers coupled to the rear of conventional freight equipment, including multi-platform intermodal, autorack cars, and other freight cars meeting Association of American Railroads standards for interchange service.¹
23. RoadRailer equipment must be placed in a solid block at the rear of a mixed train. RoadRailer equipment must be placed behind any manned helper locomotives. Remote or manned locomotives (DPU units) may be placed immediately ahead of RoadRailer equipment or further up in the train towards the front.
24. Train makeup rules must be published in the BNSF's current timetable and other special

¹ The term "mixed train" is used in lieu of the term "commingled trains" which was used in BNSF's petition.

- instructions. BNSF's computer-based information system must also be modified to flag noncompliant train makeup combinations and assure that information is furnished to applicable train crews before train departure. BNSF System Train Makeup Instructions and Subdivision Train Makeup Instructions also apply to mixed trains with RoadRailer equipment. When these instructions specify trailing tonnage limits, RoadRailer tonnage will be included. Train makeup instructions for trains with remote distributive power unit (DPU) or manned helper locomotives will also be included.
25. RoadRailer equipment totaling more than 3,000 tons must not be coupled to an empty long car (80 feet or longer and excluding multi-platform cars) or an empty TTOX car (single platform, single axle, BNSF Car Code QA) or a TTFX car with any empty platform (four platform, single axle, BNSF Car Code QDE). The BNSF computer-based Train Profile indicates 80-foot or longer cars in the train with the letter "L."
 26. The following is a general approval for mixed train operations: Freight trains containing a maximum of 80 cars by car count that have less than 5 cars equipped with EOC cushioning, may be placed ahead of RoadRailer equipment provided the entire train does not exceed a total length of 7,500 feet including locomotives, and the RoadRailer equipment does not exceed a maximum of 1,000 tons. The BNSF Train Profile indicates EOC cushion equipped cars in the train with the letter "E."
 27. The following is a specific approval for intermodal trains which primarily contain multi-platform doublestack/spine equipment which have very little slack. For intermodal trains containing doublestack and spine equipment with less than 5 other cars equipped with EOC cushioning, any combination of this equipment may be placed ahead of RoadRailer equipment, provided the entire train does not exceed a total length of 8,500 feet including locomotives and RoadRailer equipment does not exceed a maximum of 3,500 tons. Any RoadRailer weighing less than 28 tons must be placed in the rear 1,500 tons of the train. Doublestack equipment may include multi-platform articulated (BNSF Car Kind Codes QY, QV) and solid drawbar equipment (codes QW, QX, QT) and stand alone single platform equipment (code QU). Spine cars are multi-platform articulated equipment (codes QC, QO, Q5, QE, QM). This exception does not apply to westbound and eastbound trains on the Raton and Glorieta Subdivisions.
 28. The following is a specific approval for trains with primarily EOC cushioned equipment (such as autorack and trailer on flatcar (TOFC)/container on flatcar (COFC) trains). For intermodal trains containing five or more cars equipped with EOC cushioning, any total combination of all cars in the train up to a maximum of 40 cars by car count may be placed ahead of RoadRailers provided the entire train does not exceed a total length of 5,500 feet including locomotives, and RoadRailer equipment does not exceed a maximum of 500 tons. Twin flats (BNSF Car Kind Codes QB, QD, QL) are considered two of these types of cars. RoadRailers must not be placed behind more than a total of 40 cars equipped with EOC cushioning, such as autorack and/or TOFC/COFC cars due to the potential slack action with EOC equipment.
 29. BNSF must provide an annual written report to FRA's Office of Safety Assurance and

Federal Railroad Administration

Compliance concerning the mixed train operations which identifies any incident, equipment modifications, operational difficulties, and/or any related failed equipment.

30. Under the program of training set forth in Condition 17 above, BNSF's operating and mechanical personnel must receive explicit training on RoadRailer mixed train makeup instructions pertinent to this waiver.

Canadian National Illinois Central Railroad (CN/IC)

Re: Docket Number FRA-2000-8089

1. This waiver applies only to CN/IC RoadRailer⁷ equipment operation.
2. Interchange will only be permitted with a railroad that has a comparable waiver to operate RoadRailer equipment.
3. RoadRailer equipment shall not be commingled with conventional railroad rolling equipment. RoadRailer units shall only be operated in trains consisting exclusively of RoadRailer units and locomotives.
4. RoadRailer Trains shall be limited to a maximum trailing tonnage of 4,800 tons (equivalent to 125 Mark V RoadRailer units or 200 PupRailers).
5. At no time shall the train length exceed the equivalent of 125 Mark V RoadRailer units.
6. An adapter unit (CouplerMate bogie) must be used between the hauling locomotive and the first RoadRailer unit in the train.
7. Each adapter unit (CouplerMate bogie) shall be equipped with a toolbox containing appropriate instructions, job aids, and the necessary tools and equipment required to address problems that may be encountered en route by the train crew.
8. Trains will only be permitted to pickup or set-out RoadRailer units at locations specifically designed to perform these functions with mechanical personnel that are trained and on duty for the purpose of assembly and disassembly of RoadRailer units, unless a defective condition develops en route that would require a RoadRailer unit to be set out of the train.
9. Hazardous materials are permitted to be hauled in RoadRailer units, provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR § 172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) placarding provisions of 49 CFR Subpart F of Part 172 shall apply during rail movements; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal (IM) portable tanks handling hazardous materials are not permitted in this service.
10. Each RoadRailer adapter unit (CouplerMate bogie) that does not have safety appliances that are compliant with current Federal regulations (with the exception of the hand brake), must

Motive Power and Equipment Compliance Manual

be stenciled on each side, in clearly legible letters not less than 6 inches high, “NO SAFETY APPLIANCES” and “DO NOT RIDE,” at a location that is visible to a person walking at track level beside the unit.

11. CN/IC shall have instructions that prohibit anyone from riding RoadRailer equipment, unless it is an adapter unit (CouplerMate bogie) specifically designed to be ridden and is not stenciled as required in Condition 10. Strict enforcement of this rule is required.
12. New terminal facilities for RoadRailer equipment shall, to the extent feasible, be designed to limit the frequency and length of reverse movements. Reverse movements of RoadRailer equipment, with personnel riding CouplerMates equipped with compliant safety appliances, shall not exceed 10 mph.
13. Whenever a shoving move of RoadRailer equipment is required, the movement shall be protected by either an individual riding an adapter unit (CouplerMate bogie) specifically designed to be ridden; or by an individual walking with the movement, and the speed of the move shall not exceed that of the individual walking.
14. Maximum speed of a RoadRailer train is 60 mph, unless the RoadRailer units are equipped with AAR-1B narrow flange profile (1:40 taper) and maintained in that condition, whereby the maximum speed shall be 70 mph.
15. Piston travel at initial terminal shall be 1¼–3½ inches.
16. The air brake shall be considered ineffective at 3e inches.
17. CN/IC shall ensure that all personnel (including contractors) responsible for assembly, inspection, testing, maintenance, and operation of RoadRailer equipment have been trained and qualified to perform those duties prior to undertaking them, including instruction in the provisions of this waiver pertinent to their duties. Training for railroad operating and mechanical personnel who may encounter the equipment, shall specifically include training necessary to provide for their personal safety when working on or in proximity to the equipment. Supervisors shall also possess the knowledge and skills required of employees subject to their direct supervision. Effective coincident with compliance dates established for revisions to 49 CFR Part 232 (see 66 FR 4101; January 17, 2001), all personnel required to receive training subject to this condition shall have their qualifications for duties (related to RoadRailer equipment) documented in the same manner provided in that part.
18. CN/IC shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RoadRailer equipment.
19. CN/IC supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad’s written

Federal Railroad Administration

procedures, applicable Standards and Recommended Practices of the AAR, current AAR Interchange Rules and all applicable Federal regulatory requirements.

- 20. CN/IC shall immediately report any accident involving this equipment to FRA’s Office of Safety Assurance and Compliance in Washington, DC.
- 21. FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.

Norfolk Southern Corporation - (NS)

Re: Docket Number FRA-2002-11896

- 1. This approval applies only to NS RoadRailer7 equipment operation.
- 2. Interchange will only be permitted with a railroad that has a comparable waiver to operate RoadRailer equipment.
- 3. RoadRailer equipment shall not be commingled with conventional railroad rolling equipment. RoadRailer units shall only be operated in trains consisting exclusively of RoadRailer units and locomotives.
- 4. RoadRailer trains shall be limited to a maximum trailing tonnage as specified in the following tables.

Table 1 B Allowable Total Trailing Tonnage Behind RoadRailers Weighing 28 Tons or More for Various Curve-Compensated Grades and Maximum Curvature

Curvature	2	4	6	8	10
Grade					
+/-2.2	5200	5200	5200	5100	4400
+/-2.1	5200	5200	5200	5200	4600
+/-2.0	5200	5200	5200	5200	4800
+/-1.9	5200	5200	5200	5200	5100

Note: All grades less than +/-1.9 are 5,200 trailing tons

Table 2 B Allowable Total Trailing Tonnage Behind RoadRailers Weighing 18–27 Tons for Various Curve-Compensated Grades and Maximum Curvature

Curvature	2	4	6	8	10
Grade					

Motive Power and Equipment Compliance Manual

+/-2.2	5200	4600	4000	3300	3000
+/-2.1	5200	4800	4200	3500	3100
+/-2.0	5200	5000	4400	3600	3300
+/-1.9	5200	5200	4600	3800	3400
+/-1.8	5200	5200	4900	4000	3600
+/-1.7	5200	5200	5200	4300	3800
+/-1.6	5200	5200	5200	4600	4100
+/-1.5	5200	5200	5200	4900	4400
+/-1.4	5200	5200	5200	5200	4700
+/-1.3	5200	5200	5200	5200	5000

Note: All grades less than +/-1.3 are 5,200 trailing tons

Table 3 B Allowable Total Trailing Tonnage Behind RoadRailers Weighing Less than 18 Tons (Essentially Empty) for Various Curve Compensated Grades and Maximum Curvature

Curvature	2	4	6	8	10
Grade					
+/-2.2	4300	3700	3000	2600	2400
+/-2.1	4500	3900	3100	2800	2500
+/-2.0	4800	4100	3300	2900	2600
+/-1.9	5000	4300	3400	3000	2700
+/-1.8	5200	4500	3600	3200	2900
+/-1.7	5200	4800	3800	3400	3100
+/-1.6	5200	5100	4100	3600	3300
+/-1.5	5200	5200	4400	3900	3500
+/-1.4	5200	5200	4700	4200	3700
+/-1.3	5200	5200	5000	4500	4000
+/-1.2	5200	5200	5200	4900	4400
+/-1.1	5200	5200	5200	5200	4800

Federal Railroad Administration

Note: All grades less than +/-1.1 are 5,200 trailing tons

5. At no time shall the train length exceed the equivalent of 150 Mark V RoadRailer7 units.
6. An adapter unit (CouplerMate bogie) must be used between the hauling locomotive and the first RoadRailer7 unit in the train. The first RoadRailer7 unit that is placed on the CouplerMate bogie must be loaded to a minimum of 28 tons (total weight of lading, trailer empty weight, and first intermediate bogie) whenever the weight of the train exceeds 1,500 trailing tons.
7. Each adapter unit (CouplerMate bogie) shall be equipped with a toolbox containing appropriate instructions, job aids, and the necessary tools and equipment required to address problems that may be encountered en route by the train crew.
8. Trains will only be permitted to pickup or set-out RoadRailer7 units at locations specifically designed to perform these functions with mechanical personnel that are trained and on duty for the purpose of assembly and disassembly of RoadRailer7 units, unless a defective condition develops en route that would require a RoadRailer unit to be set out of the train.
9. Hazardous materials are permitted to be hauled in RoadRailer7 units provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR § 172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) placarding provisions of 49 CFR Subpart F of Part 172 shall apply during rail movements; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal (IM) portable tanks handling hazardous materials are not permitted in this service.
10. Each RoadRailer7 adapter unit (CouplerMate bogie) that does not have safety appliances that are compliant with current Federal regulations (with the exception of the hand brake), must be stenciled on each side, in clearly legible letters not less than 6 inches high, "NO SAFETY APPLIANCES" and "DO NOT RIDE," at a location that is visible to a person walking at track level beside the unit.
11. NS shall have instructions that prohibit anyone from riding RoadRailer7 equipment, unless it is an adapter unit (CouplerMate bogie) specifically designed to be ridden and is not stenciled as required in Condition 10. Strict enforcement of this rule is required.
12. New terminal facilities for RoadRailer7 equipment shall, to the extent feasible, be designed to limit the frequency and length of reverse movements. Reverse movements of RoadRailer7 equipment, with personnel riding CouplerMates equipped with compliant safety appliances, shall not exceed 10 mph.
13. Whenever a shoving move of RoadRailer7 equipment is required, the movement shall be protected by either an individual riding an adapter unit (CouplerMate bogie) specifically designed to be ridden; or by an individual walking with the movement, and the speed of the move shall not exceed that of the individual walking.

14. Maximum speed of a RoadRailer7 train is 60 mph, unless the RoadRailer7 units are equipped with AAR-1B narrow flange profile (1:40 taper) and maintained in that condition, whereby the maximum speed shall be 70 mph.
15. Piston travel at initial terminal shall be 1¼–3½ inches.
16. The air brake shall be considered ineffective at 3e inches.
17. NS shall ensure that all personnel (including contractors) responsible for assembly, inspection, testing, maintenance, and operation of RoadRailer7 equipment have been trained and qualified to perform those duties prior to undertaking them, including instruction in the provisions of this waiver pertinent to their duties. Training for railroad operating and mechanical personnel who may encounter the equipment, shall specifically include training necessary to provide for their personal safety when working on or in proximity to the equipment. Supervisors shall also possess the knowledge and skills required of employees subject to their direct supervision. Effective coincident with compliance dates established for revisions to 49 CFR Part 232 (see 66 FR 4101; January 17, 2001), all personnel required to receive training subject to this condition shall have their qualifications for duties (related to RoadRailer equipment) documented in the same manner provided in that part.
18. NS shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RoadRailer7 equipment.
19. NS supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad's written procedures, applicable Standards and Recommended Practices of the AAR, current AAR Interchange Rules, and all applicable Federal regulatory requirements.
20. When planned train makeup is determined for a train scheduled to operate over a given corridor, a "manifest" of planned units specifying number and order of units and their individual weights is generated.
21. Using the manifest and working down from the planned head of the consist, identify and locate:
 - a. Unit closest to the head of the train that is less than 18 tons.
 - (1) After locating closest to the head of the train that is less than 18 tons, add up trailing tonnage on all following units.
 - (2) Compare total trailing tonnage of these units to allowable trailing tonnage restrictions by corridor as specified in Table 3.
 - (3) If total trailing tonnage is in excess of allowable limits, remove unit(s) that are less than 18 tons and recalculate until reaching acceptable tonnage restriction for corridor or reduce trailing tonnage from rear of train until corridor limit is reached.

Federal Railroad Administration

- b. Unit closest to the head of the train that is 18–27 tons.
 - (1) After locating closest to the head of the train that is 18–27 tons, add up trailing tonnage on all following units.
 - (2) Compare total trailing tonnage of these units to allowable trailing tonnage restrictions by corridor as specified in Table 2.
 - (3) If total trailing tonnage is in excess of allowable limits, remove unit(s) that are 18–27 tons and recalculate until reaching acceptable restriction for corridor or reduce trailing tonnage from rear of train until corridor limit is reached.
 - c. Compare total trailing tonnage of planned train to Table 1 and ensure that total trailing tonnage is within limits for the corridor as specified in Table 1.
22. Restrictive factors (i.e., trailing tonnage, etc.) shall be identified on the train consist. A hard copy of the train consist shall be provided to the train crew.
23. Monitoring and Compliance.
- a. All departed train consists shall be monitored for compliance by Triple Crown and NS.
 - b. Details of all departed consists and identified restrictive factors shall be maintained on hand at Triple Crown headquarters.
 - c. Triple Crown shall pursue development of computer-generated edits and electronically stored consists detailing all restrictive factors regarding trailing tonnage.
24. Within 60 days of the date of this letter, NS shall submit to FRA the following:
- a. Final bulletins/special instructions as published to Triple Crown and other personnel involved in the movements, including clear explanation of methods to be used to determine the weight of the trailers.
 - b. Timetable for development and deployment of electronic system to monitor compliance/flag noncompliance with tonnage restrictions.
25. NS shall immediately report any accident involving this equipment to FRA’s Office of Safety Assurance and Compliance in Washington, DC.
26. FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.

Re: Docket Number SA-87-4 and PB-87-5

1. This waiver applies only to CSX RoadRailer⁷ equipment operation.
2. Interchange will only be permitted with a railroad that has a comparable waiver to operate RoadRailer equipment.
3. RoadRailer equipment shall not be commingled with conventional railroad rolling equipment. RoadRailer units shall only be operated in trains consisting exclusively of RoadRailer units and locomotives.
4. RoadRailer Trains shall be limited to a maximum trailing tonnage of 4,800 tons (equivalent to 125 Mark V RoadRailer⁷ units or 200 PupRailers).
5. At no time shall the train length exceed the equivalent of 125 Mark V RoadRailer units.
6. An adapter unit (CouplerMate bogie) must be used between the hauling locomotive and the first RoadRailer unit in the train.
7. Each adapter unit (CouplerMate bogie) shall be equipped with a toolbox containing appropriate instructions, job aids, and the necessary tools and equipment required to address problems that may be encountered en route by the train crew.
8. Trains will only be permitted to pickup or set-out RoadRailer units at locations specifically designed to perform these functions with mechanical personnel that are trained and on duty for the purpose of assembly and disassembly of RoadRailer units, unless a defective condition develops en route that would require a RoadRailer unit to be set out of the train.
9. Hazardous materials are permitted to be hauled in RoadRailer units provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR § 172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) placarding provisions of 49 CFR Subpart F of Part 172 shall apply during rail movements; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal (IM) portable tanks handling hazardous materials are not permitted in this service.
10. Each RoadRailer adapter unit (CouplerMate bogie) that does not have safety appliances that are compliant with current Federal regulations (with the exception of the hand brake), must be stenciled on each side, in clearly legible letters not less than 6 inches high, "NO SAFETY APPLIANCES" and "DO NOT RIDE," at a location that is visible to a person walking at track level beside the unit.
11. CSX shall have instructions that prohibit anyone from riding RoadRailer equipment, unless it is an adapter unit (CouplerMate bogie) specifically designed to be ridden and is not stenciled as required in Condition 10. Strict enforcement of this rule is required.
12. New terminal facilities for RoadRailer equipment shall, to the extent feasible, be designed to limit the frequency and length of reverse movements. Reverse movements of RoadRailer

Federal Railroad Administration

- equipment, with personnel riding CouplerMates equipped with compliant safety appliances, shall not exceed 10 mph.
13. Whenever a shoving move of RoadRailer equipment is required, the movement shall be protected by either an individual riding an adapter unit (CouplerMate bogie) specifically designed to be ridden; or by an individual walking with the movement, and the speed of the move shall not exceed that of the individual walking.
 14. Maximum speed of a RoadRailer train is 60 mph, unless the RoadRailer units are equipped with AAR-1B narrow flange profile (1:40 taper), and maintained in that condition, whereby the maximum speed shall be 70 mph.
 15. Piston travel at initial terminal shall be 13–32 inches.
 16. The air brake shall be considered ineffective at 3e inches.
 17. CSX shall ensure that all personnel (including contractors) responsible for assembly, inspection, testing, maintenance, and operation of RoadRailer equipment have been trained and qualified to perform those duties prior to undertaking them, including instruction in the provisions of this waiver pertinent to their duties. Training for railroad operating and mechanical personnel who may encounter the equipment, shall specifically include training necessary to provide for their personal safety when working on or in proximity to the equipment. Supervisors shall also possess the knowledge and skills required of employees subject to their direct supervision. Effective coincident with compliance dates established for revisions to 49 CFR Part 232 (see 66 FR 4101; January 17, 2001), all personnel required to receive training subject to this condition shall have their qualifications for duties (related to RoadRailer equipment) documented in the same manner provided in that part.
 18. CSX shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RoadRailer equipment.
 19. CSX supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad's written procedures, applicable Standards and Recommended Practices of the AAR, current AAR Interchange Rules, and all applicable Federal regulatory requirements.
 20. CSX shall immediately report any accident involving this equipment to FRA's Office of Safety Assurance and Compliance in Washington, DC.
 21. FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.

The Texas Mexican Railway Company (TM)

Re: Docket Number FRA-2000-7040

Motive Power and Equipment Compliance Manual

1. This waiver applies only to RoadRailer⁷ equipment operating on the TM Railroad.
2. Interchange will only be permitted with a railroad that has a comparable waiver to operate RoadRailer equipment.
3. RoadRailer equipment shall not be commingled with conventional railroad rolling equipment. RoadRailer units shall only be operated in trains consisting exclusively of RoadRailer units and locomotives.
4. RoadRailer Trains shall be limited to a maximum trailing tonnage of 4,800 tons (equivalent to 125 Mark V RoadRailer units or 200 PupRailers).
5. At no time shall the train length exceed the equivalent of 125 Mark V RoadRailer units.
6. An adapter unit (CouplerMate bogie) must be used between the hauling locomotive and the first RoadRailer unit in the train.
7. Each adapter unit (CouplerMate bogie) shall be equipped with a toolbox containing appropriate instruction booklets, operating manuals, job aids, spare parts and the necessary tools required to address problems that may be encountered en route.
8. Trains will not be permitted to pickup or set-out units en route, unless a defective condition demands the removal of a unit.
9. Hazardous materials are permitted to be hauled in RoadRailer units, provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR §172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) placarding provisions of 49 CFR Subpart F of Part 172 shall apply during rail movements; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal (IM) portable tanks handling hazardous materials are not permitted in this service.
10. Each RoadRailer unit must be stenciled on each side, in clearly legible letters not less than 6 inches high, "NO SAFETY APPLIANCES" and "DO NOT RIDE," at a location that is visible to a person walking at track level beside the unit.
11. TM shall have instructions that prohibit anyone from riding RoadRailer equipment, with strict enforcement of this rule.
12. Terminal facilities used in connection with assembly and disassembly of RoadRailer[®] trains shall be designed so that it is not necessary to make reverse movements to enter or depart from those facilities. The only reverse movements of the units would be limited to those needed to accomplish actual coupling of the units and those required as a consequence of some emergency situation.
13. Shoving RoadRailer equipment should be avoided whenever possible. However, if a shoving move is required, the movement shall be protected by an individual walking with the movement, and the speed of the move shall not exceed that of the individual walking.

Federal Railroad Administration

14. Maximum speed of a RoadRailer train shall not exceed 60 mph.
15. Piston travel at initial terminal shall be 13–32 inches.
16. The air brake shall be considered ineffective with a piston travel of 3e inches or more.
17. TM shall provide adequate training for all operating and mechanical personnel responsible for operating the equipment and performing mechanical inspections, tests, and repairs. The training curriculum shall specifically address all applicable Federal regulatory requirements, as well as the railroad's operating rules, en route failure procedures, and applicable maintenance standards established by the Association of American Railroads (AAR) Interchange Rules. The training shall also cover any active FRA Safety Advisories regarding RoadRailer Safety (SA-99-03 and SA-99-03A); National Highway Traffic Safety Administration (NHTSA Recall Number 00V-025 and 00V-344); Manufacturer's Service Bulletins (Wabash National SB2000-01 thru SB2000-06); and any AAR Advisories that may be issued. The training shall consist of both classroom and hands-on instruction modules designed to impart the knowledge and skills necessary for the performance of the employee's duties. Each individual shall pass a written or oral examination, along with a hands-on demonstration of knowledge and skills necessary for handling RoadRailer equipment. Supervisors shall also possess the knowledge and skills necessary in the operation and maintenance of RoadRailer equipment.
18. TM shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RoadRailer equipment.
19. TM supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad's written procedures, applicable Standards and Recommended Practices of the AAR, current AAR Interchange Rules, and all applicable Federal regulatory requirements.
20. TM shall immediately report any accident involving this equipment to FRA's Office of Safety Assurance and Compliance in Washington, DC.
21. FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.

As clarification in light of comments in the docket of this proceeding, it is intended that the training requirements specified in Condition 17 shall include apprising employees on how to avoid risk potentially associated with operating, inspecting, and repairing such equipment by (1) following appropriate procedures, (2) avoiding unnecessarily placing themselves under or between units, and (3) ensuring that equipment is properly secured when it is necessary to do so.

Safety Appliances

Norfolk Southern Corporation (NS)

Re: Docket Number FRA-2008-0029

On August 29, 2008, the FRA Railroad Safety Board (Board) reviewed the petition, field investigation and technical staff findings and determined that granting the requested relief was in the public interest and consistent with railroad safety. Accordingly, the Board granted the requested relief, subject to the following conditions:

1. This waiver applies to all NS-owned flatcars operated solely in rail train service within the NS rail system.
2. The uncoupling levers may be removed from both ends of flatcars subject to this waiver, except cars at each end of a rail train consist must be equipped with an uncoupling lever at the end of the car to which other equipment may couple. At each location where an uncoupling lever is removed, a car shall have the appropriate Association of American Railroads (AAR) approved coupler blocked and pinned, and locked to prevent the coupler from unintentionally uncoupling.
3. At each location where an uncoupling lever is removed, a car shall be stenciled with the words, "CONTACT MECHANICAL DEPARTMENT TO COUPLE/UNCOUPLE," in letters of contrasting color to the car and at least 2 inches high.
4. Uncoupling shall be performed under blue flag protection and only by designated mechanical personnel at maintenance or shop locations where such personnel can safely get between the equipment to unlock and unblock the coupler. Prior to uncoupling any car subject to this waiver, the uncoupling lever of that car shall be reattached.
5. NS shall develop and implement appropriate procedures to ensure the safe coupling and uncoupling of cars (subject to this waiver) in accordance with the conditions set forth in this letter. Such procedures shall be published in the appropriate NS rules and instructions applicable to train crews, maintenance-of-way forces, and mechanical personnel.
6. NS shall develop and implement appropriate maintenance procedures for mechanical forces to maintain the couplers on all cars subject to this waiver. A maintenance record pertaining to the maintenance of the couplers on all cars subject to this waiver shall be maintained by NS at mechanical force locations where records are maintained. Such records shall be made available for FRA review upon request.
7. NS must report immediately to FRA's Office of Safety Assurance and Compliance any accident/incident and/or injury attributable to the removal of the uncoupling levers on the cars subject to this waiver.
8. NS shall notify FRA prior to any change of operation of any car subject to this waiver.

Federal Railroad Administration

9. This waiver expires 5 years from the date of this letter. At the conclusion of the 5-year period, FRA reserves the right to extend the waiver if conditions warrant and NS has made a written request for an extension to FRA's Office of Safety Assurance and Compliance not less than 6 months prior to the expiration date.

CSX Transportation – (CSX)

Re: Docket Number FRA-2008-0039

CSX seeks to remove the uncoupling levers from this equipment when moving both loaded and empty cars in rail train service.²

On August 29, 2008, the FRA Railroad Safety Board (Board) reviewed the petition, field investigation and technical staff findings and determined that granting the requested relief was in the public interest and consistent with railroad safety. Accordingly, the Board granted the requested relief, subject to the following conditions:

1. This waiver applies to all CSX-owned flatcars operated solely in rail train service within the CSX rail system.
2. The uncoupling levers may be removed from both ends of flatcars subject to this waiver, except cars at each end of a rail train consist must be equipped with an uncoupling lever at the end of the car to which other equipment may couple. At each location where an uncoupling lever is removed, a car shall have the appropriate Association of American Railroads (AAR) approved coupler blocked and pinned, and locked to prevent the coupler from unintentionally uncoupling.
3. At each location where an uncoupling lever is removed, a car shall be stenciled with the words, "CONTACT MECHANICAL DEPARTMENT TO COUPLE/UNCOUPLE," in letters of contrasting color to the car and at least 2 inches high.
4. Uncoupling shall be performed under blue flag protection and only by designated mechanical personnel at maintenance or shop locations where such personnel can safely get between the equipment to unlock and unblock the coupler. Prior to uncoupling any car subject to this waiver, the uncoupling lever of that car shall be reattached.
5. CSX shall develop and implement appropriate procedures to ensure the safe coupling and uncoupling of cars subject to this waiver in accordance with the conditions set forth in this letter. Such procedures shall be published in the appropriate CSX rules and instructions applicable to train crews, maintenance-of-way forces, and mechanical personnel.

² In its petition, CSX states that since the removal of uncoupling levers "is acceptable on the loaded trains, it is our request to extend that acceptance to the empty trains as well since these cars remain in unit train service for rail service only." FRA notes that other than as specifically provided below, the removal of uncoupling levers from any railroad freight car, whether loaded or empty, violates Federal law.

Motive Power and Equipment Compliance Manual

6. CSX shall develop and implement appropriate maintenance procedures for mechanical forces to maintain the couplers on all cars subject to this waiver. A maintenance record pertaining to the maintenance of the couplers on all cars subject to this waiver shall be maintained by CSX at mechanical force locations where records are maintained. Such records shall be made available for FRA review upon request.
7. CSX must report immediately to FRA's Office of Safety Assurance and Compliance any accident/incident and/or injury attributable to the removal of the uncoupling levers on the cars subject to this waiver.
8. CSX shall notify FRA prior to any change of operation of any car subject to this waiver.
9. This waiver expires 5 years from the date of this letter. At the conclusion of the 5-year period, FRA reserves the right to extend the waiver if conditions warrant and CSX has made a written request for an extension to FRA's Office of Safety Assurance and Compliance not less than 6 months prior to the expiration date.

Twin Cities & Western Railroad Company – (TCWR)

Re: Docket Number FRA-2008-0154

FRA's Railroad Safety Board (Board) has carefully reviewed TCWR's request, the results of FRA's own field investigation, the findings of its technical personnel, and comments submitted to the docket, and finds that granting the requested relief is in the public interest and consistent with railroad safety. Accordingly, the Board is granting TCWR's requested relief subject to the following conditions:

1. This waiver applies only to RailMate equipment operated by TCWR.
2. Interchange of RailMate equipment is permitted only with railroads that have comparable waivers to operate RailMate equipment.
3. RailMate will operate at the end of mixed freight trains, including trailer-on-flatcar/container-on-flatcar trains, or as a dedicated consist of RailMate units.
4. RailMate will be limited to a maximum trailing tonnage of 1,875 tons (50 loaded units). The bidirectional transition car will be appropriately equipped with cushioning to limit drawbar forces equal to or less than the longitudinal design load.
5. At no time shall the train length exceed 125 RailMate units.
6. A bidirectional transition unit must be used between the hauling locomotive or the last freight car and the first RailMate unit in the train.

Federal Railroad Administration

7. Each bidirectional transition unit shall be equipped with a toolbox containing appropriate instructions, job aids, and necessary tools and equipment required to address problems that may be encountered en route by the train crew.
8. Trains shall only be permitted to pickup or set out RailMate units at locations: (1) that are specifically designed to perform these functions, and (2) where there are mechanical personnel that are trained and on duty for the purpose of assembling and disassembling RailMate trains. This condition does not apply where a defective condition develops en route that would require a RailMate unit to be set out of a train.
9. Hazardous materials are permitted to be hauled in RailMate trains provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR § 172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) placarding provisions of 49 CFR Part 172, Subpart F shall apply during rail movements; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal portable tanks containing hazardous materials are not permitted in this service.
10. Each RailMate bogie that does not have safety appliances that are compliant with Federal regulations shall be stenciled on each side in clearly legible letters not less than 6 inches high, "NO SAFETY APPLIANCES" and "DO NOT RIDE," at a location that is visible to a person walking at track level beside the unit.
11. TCWR shall issue instructions prohibiting anyone from riding RailMate equipment, unless it is a bidirectional unit specifically designed to be ridden and it is not stenciled as required in Condition 10. Strict enforcement of this rule is required.
12. New terminal facilities for RailMate equipment shall, to the extent feasible, be designed to limit the frequency and length of shove movements. Shove movements of RailMate equipment, with personnel riding a RailMate bidirectional transition unit equipped with compliant safety appliances shall not exceed 10 mph.
13. Whenever a shoving move of RailMate equipment is required, the movement shall be protected by either: (1) an individual riding a RailMate bidirectional transition unit specifically designed to be ridden; or (2) an individual walking with the movement, with the speed of the move not to exceed that of the individual walking.
14. Maximum speed of RailMate train is 60 mph.
15. Piston travel at initial terminal shall be 2 +/- ¼ inches.
16. The air brake shall be considered ineffective at ¾ inches of piston travel.
17. TCWR shall ensure that all personnel (including contractors) responsible for assembly, inspection, maintenance, and operation of RailMate equipment have been trained and qualified to perform those duties prior to undertaking them, including instruction in the provisions of this waiver pertinent to their duties. Training for railroad operating and

Motive Power and Equipment Compliance Manual

mechanical personnel who may encounter the equipment shall specifically include training necessary to provide for their personal safety (including Blue Flag Rule) when working on or in proximity to the equipment. Supervisors shall also possess the knowledge and skills required of employees subject to their direct supervision. All personnel required to receive training subject to this condition shall have their qualifications for duties (related to RailMate equipment) documented in the same manner provided for in 49 CFR Part 232. Signed and dated copies of all training provided to personnel in accordance with this condition shall be kept on file at each RailMate operating terminal.

18. TCWR shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RailMate equipment.
19. TCWR supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad's written procedures, applicable standards, and recommended practices of the Association of American Railroads (AAR) interchange rules, and all applicable Federal regulatory requirements.
20. TCWR shall immediately report equipment and/or component failures and any accident, incident, or injury involving RailMate equipment to FRA's Office of Safety Assurance and Compliance in Washington, DC.

Escanaba & Lake Superior Railroad Company – (ELS)

Re: Docket Number FRA-2008-0155

FRA's Railroad Safety Board (Board) has carefully reviewed ELS's request, the results of FRA's own field investigation, the findings of its technical personnel, and comments submitted to the docket, and finds that granting the requested relief is in the public interest and consistent with railroad safety. Accordingly, the Board is granting ELS's requested relief subject to the following conditions:

1. This waiver applies only to RailMate equipment operated by ELS.
2. Interchange of RailMate equipment is permitted only with railroads that have comparable waivers to operate RailMate equipment.
3. RailMate will operate at the end of mixed freight trains, including trailer-on-flatcar/container-on-flatcar trains, or as a dedicated consist of RailMate units.
4. RailMate will be limited to a maximum trailing tonnage of 1,875 tons (50 loaded units). The bidirectional transition unit will be appropriately equipped with cushioning to limit drawbar forces equal to or less than the longitudinal design load.
5. At no time shall the train length exceed the equivalent of 125 RailMate units.

Federal Railroad Administration

6. A bidirectional transition unit must be used between the hauling locomotive or the last freight car and the first RailMate unit in the train.
7. Each bidirectional transition unit shall be equipped with a toolbox containing appropriate instructions, job aids, and necessary tools and equipment required to address problems that may be encountered en route by the train crew.
8. Trains shall only be permitted to pickup or set out RailMate units at locations: (1) that are specifically designed to perform these functions, and (2) where there are mechanical personnel that are trained and on duty for the purpose of assembling and disassembling RailMate trains. This condition does not apply where a defective condition develops en route that would require a RailMate unit to be set out of a train.
9. Hazardous materials are permitted to be hauled in RailMate trains provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR § 172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) during rail movements, the shipment shall comply with the placarding provisions of 49 CFR Part 172, Subpart F; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal portable tanks containing hazardous materials are not permitted in this service.
10. Each RailMate bogie that does not have safety appliances that are compliant with Federal regulations shall be stenciled on each side, in clearly legible letters not less than 6 inches high, "NO SAFETY APPLIANCES" and "DO NOT RIDE," at a location that is visible to a person walking at track level beside the unit.
11. ELS shall issue instructions prohibiting anyone from riding RailMate equipment, unless it is a bidirectional unit specifically designed to be ridden and it is not stenciled as required in Condition 10. Strict enforcement of this rule is required.
12. New terminal facilities for RailMate equipment shall, to the extent feasible, be designed to limit the frequency and length of shove movements. Shove movements of RailMate equipment, with personnel riding a RailMate bidirectional transition unit equipped with compliant safety appliances, shall not exceed 10 mph.
13. Whenever a shoving move of RailMate equipment is required, the movement shall be protected by either: (1) an individual riding a RailMate bidirectional transition unit specifically designed to be ridden; or (2) an individual walking with the movement, with the speed of the move not to exceed that of the individual walking.
14. Maximum speed of RailMate train is 60 mph.
15. Piston travel at initial terminal shall be 2 +/- ¼ inches.
16. The air brake shall be considered ineffective at ¾ inches of piston travel.

17. ELS shall ensure that all personnel (including contractors) responsible for assembly, inspection, maintenance, and operation of RailMate equipment have been trained and qualified to perform those duties prior to undertaking them, including instruction in the provisions of this waiver pertinent to their duties. Training for railroad operating and mechanical personnel who may encounter the equipment shall specifically include training necessary to provide for their personal safety (including Blue Flag Rule) when working on or in proximity to the equipment. Supervisors shall also possess the knowledge and skills required of employees subject to their direct supervision. All personnel required to receive training subject to this condition shall have their qualifications for duties related to RailMate equipment documented in the same manner provided for in 49 CFR Part 232. Signed and dated copies of all training provided to personnel in accordance with this condition shall be kept on file at each RailMate operating terminal.
18. ELS shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RailMate equipment.
19. ELS supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad's written procedures, applicable standards, and recommended practices of the Association of American Railroads (AAR) interchange rules, and all applicable Federal regulatory requirements.
20. ELS shall immediately report equipment and/or component failures and any accident, incident, or injury involving RailMate equipment to FRA's Office of Safety Assurance and Compliance in Washington, DC.

Canadian Pacific Railway – (CP)

Re: Docket Number FRA-2008-0163

FRA's Railroad Safety Board (Board) has carefully reviewed CP's request, the results of FRA's own field investigation, the findings of its technical personnel, and comments submitted to the docket, and finds that granting the requested relief is in the public interest and consistent with railroad safety. Accordingly, the Board is granting CP's requested relief subject to the following conditions:

1. This waiver applies only to RailMate equipment operated by CP.
2. Interchange of RailMate equipment is permitted only with railroads that have comparable waivers to operate RailMate equipment.
3. RailMate will operate at the end of mixed freight trains, including trailer-on-flatcar/container-on-flatcar trains, or as a dedicated consist of RailMate units.

Federal Railroad Administration

4. RailMate will be limited to a maximum trailing tonnage of 1,875 tons (50 loaded units). The bidirectional transition car will be appropriately equipped with cushioning to limit drawbar forces equal to or less than the longitudinal design load.
5. At no time shall the train length exceed 125 RailMate units.
6. A bidirectional transition unit must be used between the hauling locomotive or the last freight car and the first RailMate unit in the train.
7. Each bidirectional transition unit shall be equipped with a toolbox containing appropriate instructions, job aids, and necessary tools and equipment required to address problems that may be encountered en route by the train crew.
8. Trains shall only be permitted to pickup or set out RailMate units at locations: (1) that are specifically designed to perform these functions, and (2) where there are mechanical personnel that are trained and on duty for the purpose of assembling and disassembling RailMate trains. This condition does not apply where a defective condition develops en route that would require a RailMate unit to be set out of a train.
9. Hazardous materials are permitted to be hauled in RailMate trains provided: (1) the particular commodities are limited to those listed in Table 2 of 49 CFR § 172.504; (2) the shipment complies with other relevant provisions of the hazardous materials regulations; (3) during rail movements, the shipment shall comply with the placarding provisions of 49 CFR Part 172, Subpart F; and (4) cargo tanks, multi-unit tank car tanks, portable tanks, and intermodal portable tanks containing hazardous materials are not permitted in this service.
10. Each RailMate bogie that does not have safety appliances that are compliant with Federal regulations shall be stenciled on each side, in clearly legible letters not less than 6 inches high, "NO SAFETY APPLIANCES" and "DO NOT RIDE," at a location that is visible to a person walking at track level beside the unit.
11. CP shall issue instructions prohibiting anyone from riding RailMate equipment, unless it is a bidirectional unit specifically designed to be ridden and it is not stenciled as required in Condition 10. Strict enforcement of this rule is required.
12. New terminal facilities for RailMate equipment shall, to the extent feasible, be designed to limit the frequency and length of shove movements. Shove movements of RailMate equipment, with personnel riding a RailMate bidirectional transition unit equipped with compliant safety appliances, shall not exceed 10 mph.
13. Whenever a shoving move of RailMate equipment is required, the movement shall be protected by either: (1) an individual riding a RailMate bidirectional transition unit specifically designed to be ridden; or (2) an individual walking with the movement, with the speed of the move not to exceed that of the individual walking.
14. Maximum speed of RailMate train is 60 mph.

Motive Power and Equipment Compliance Manual

15. Piston travel at initial terminal shall be 2 +/- ¼ inches.
16. The air brake shall be considered ineffective at 3¼ inches of piston travel.
17. CP shall ensure that all personnel (including contractors) responsible for assembly, inspection, maintenance, and operation of RailMate equipment have been trained and qualified to perform those duties prior to undertaking them, including instruction in the provisions of this waiver pertinent to their duties. Training for railroad operating and mechanical personnel, who may encounter the equipment, shall specifically include training necessary to provide for their personal safety (including Blue Flag Rule) when working on or in proximity to the equipment. Supervisors shall also possess the knowledge and skills required of employees subject to their direct supervision. All personnel required to receive training subject to this condition shall have their qualifications for duties related to RailMate equipment documented in the same manner provided for in 49 CFR Part 232. Signed and dated copies of all training provided to personnel in accordance with this condition shall be kept on file at each RailMate operating terminal.
18. CP shall maintain adequate records to demonstrate the current qualification status of all personnel assigned to operate, inspect, test, and maintain RailMate equipment.
19. CP supervisors or their representatives shall exercise oversight to ensure that all tasks and maintenance/repair practices are performed in accordance with the railroad's written procedures, applicable standards, and recommended practices of the Association of American Railroads (AAR) interchange rules, and all applicable Federal regulatory requirements.
20. CP shall immediately report equipment and/or component failures and any accident, incident, or injury involving RailMate equipment to FRA's Office of Safety Assurance and Compliance in Washington, DC.
21. FRA reserves the right to modify or rescind this waiver at any time upon receipt of information pertaining to the safety of rail operations or in the event of noncompliance with any of the conditions of this waiver.
22. This waiver is granted for a 5-year period from the date of this letter. FRA reserves the right to extend this waiver if conditions warrant and CP has made a written request for an extension to FRA's Office of Safety Assurance and Compliance at least 6 months prior to the expiration date.

Appendix C

Illustrative Locomotive Plates

Plate S - 1

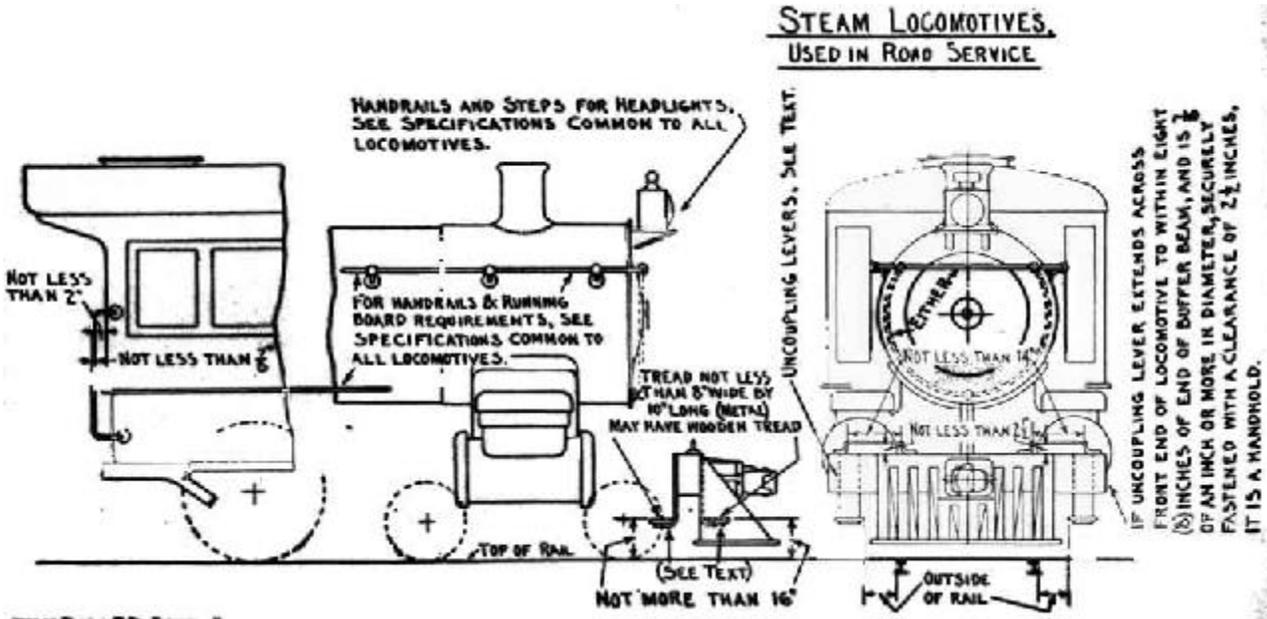


Plate S - 2

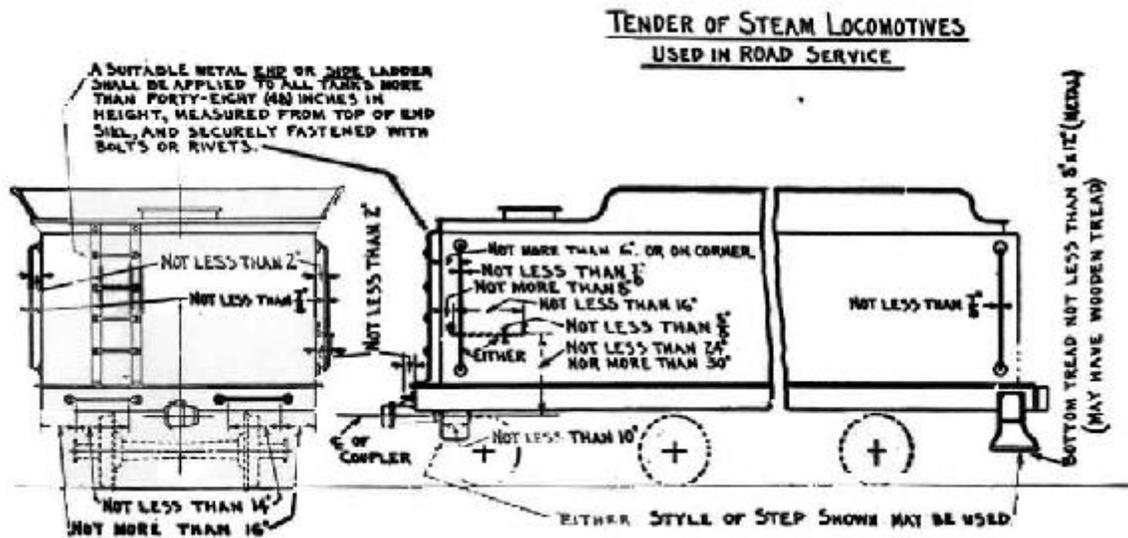


Plate S - 3

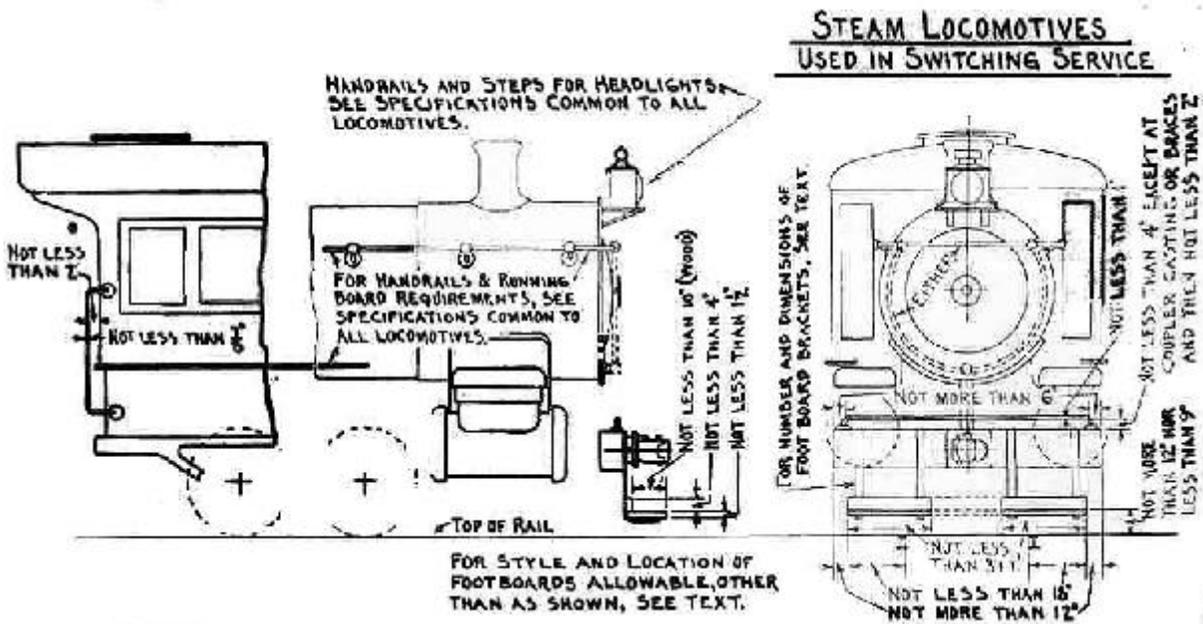


Plate S - 4

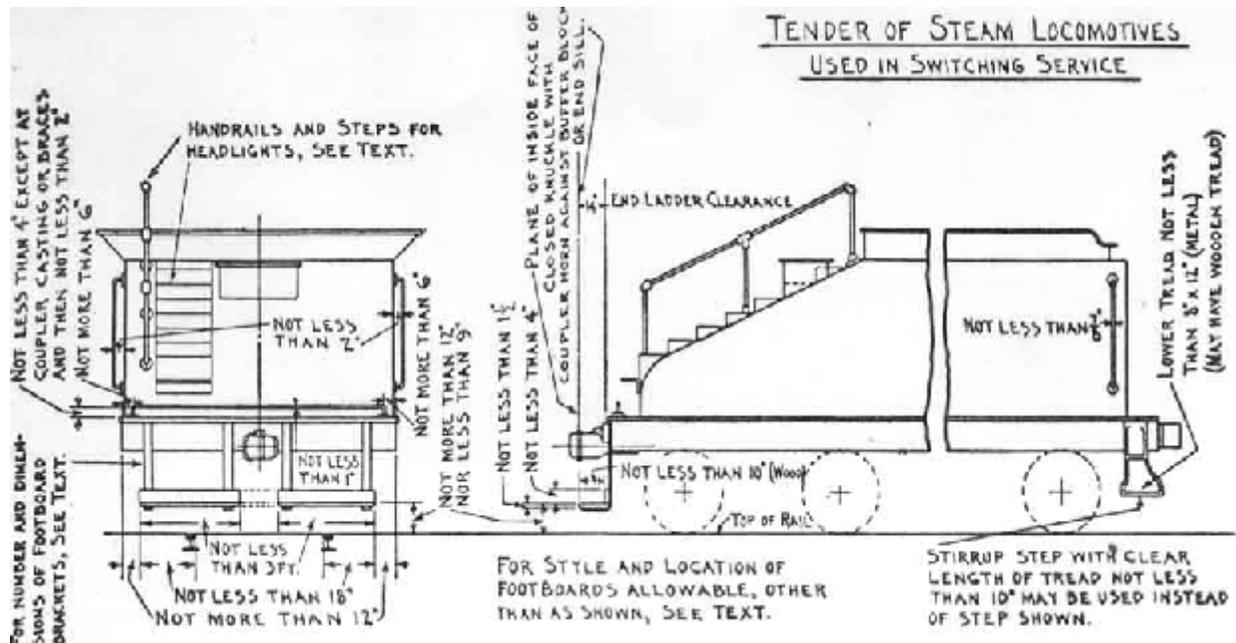
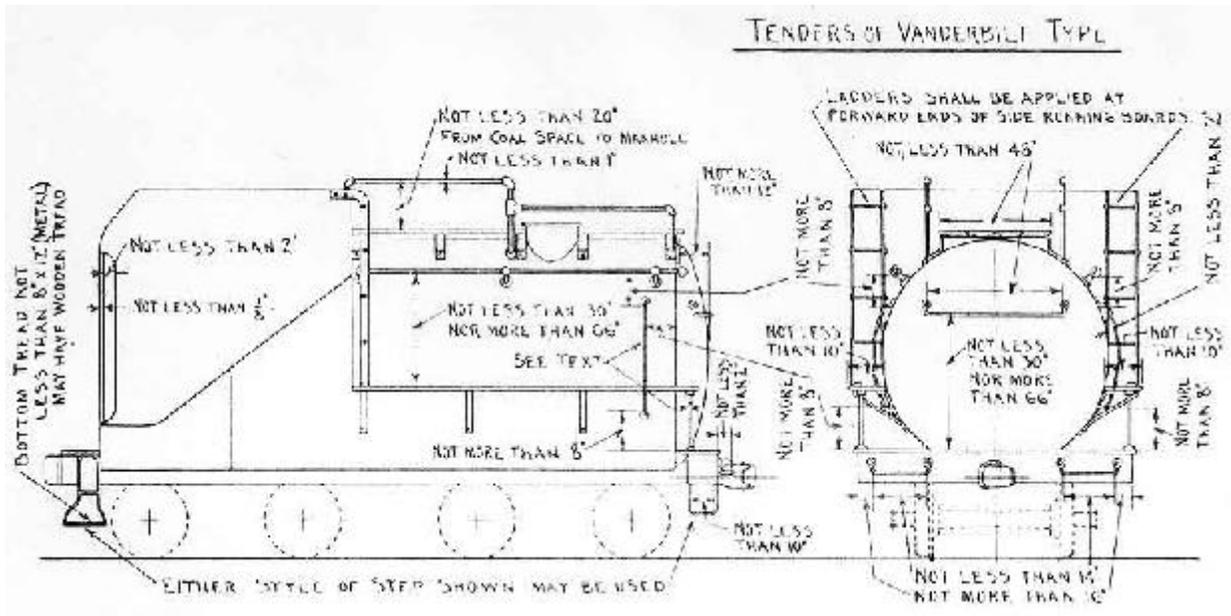


Plate S - 5



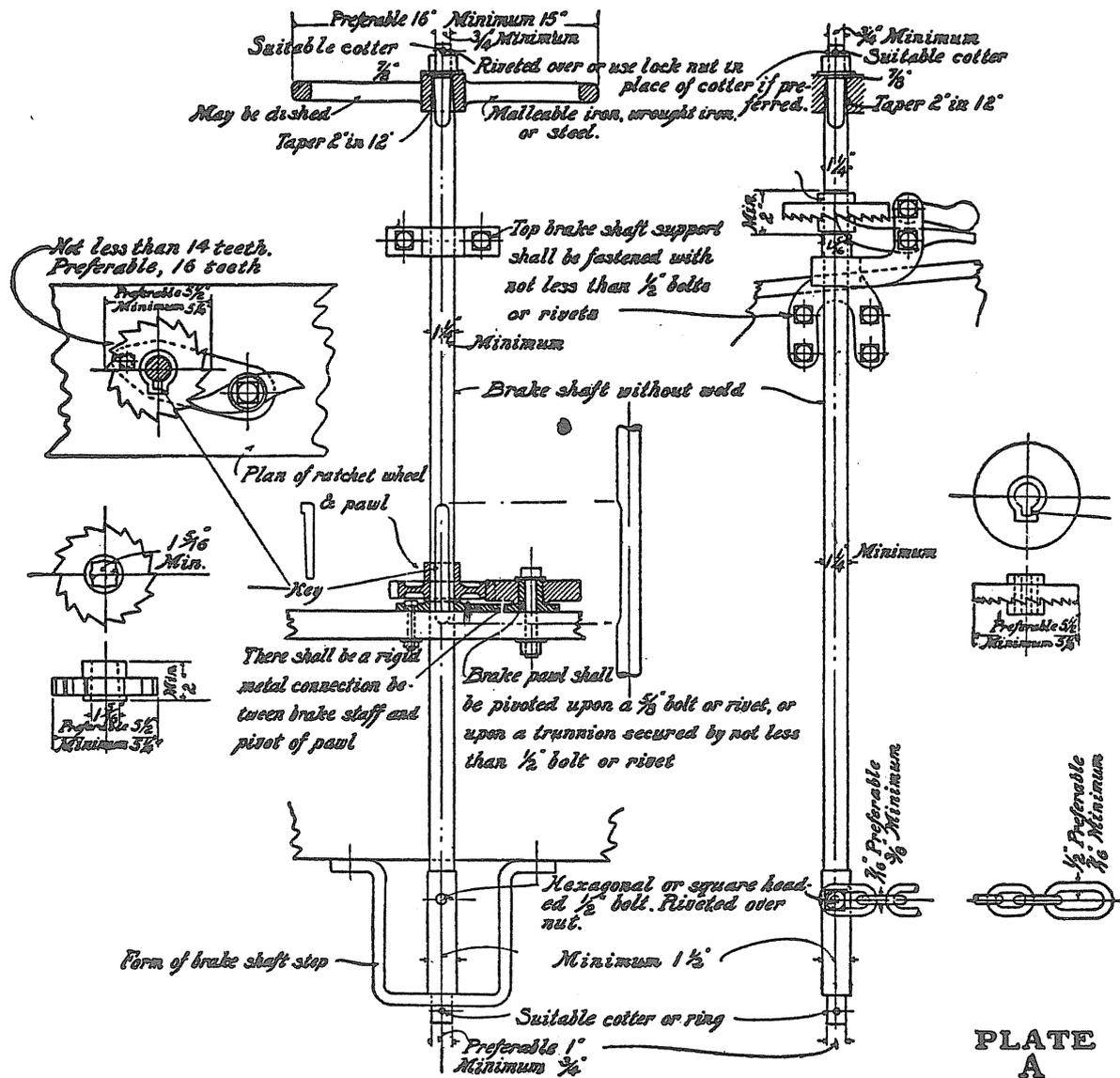
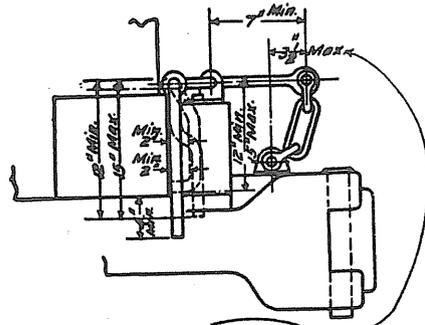


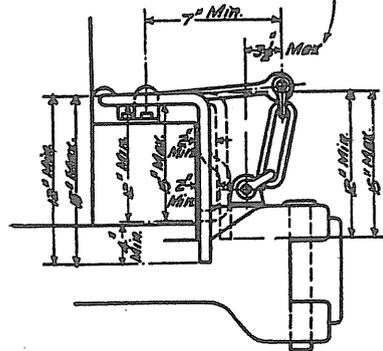
PLATE
A

[Any efficient arrangement of ratchet-wheel and pawl may be used.]

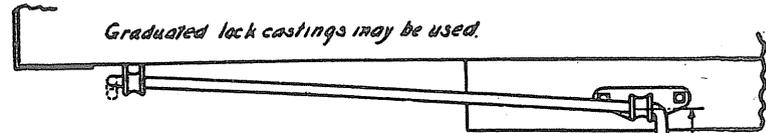


This dimension to be taken when horn of coupler is against buffer block or end sill, and, if slotted bracket is used, when rod is in extreme forward position in bracket.

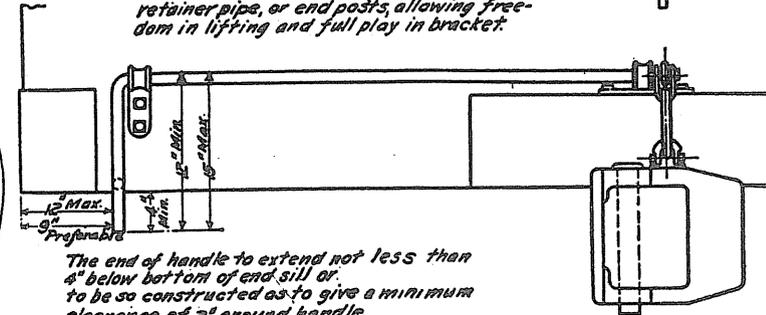
Application to concealed endsill cars.



Application to outside endsill cars.

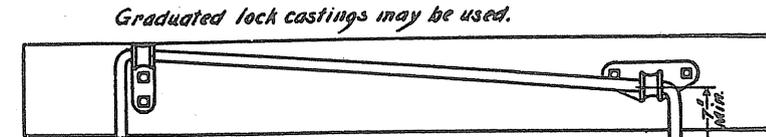


Graduated lock castings may be used.

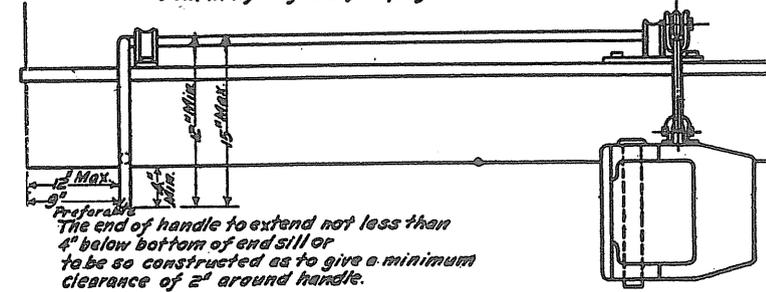


When necessary the rod should be bent or otherwise arranged to clear brake staff, retainer pipe, or end posts, allowing freedom in lifting and full play in bracket.

The end of handle to extend not less than 4" below bottom of end sill or to be so constructed as to give a minimum clearance of 2" around handle.



Graduated lock castings may be used.



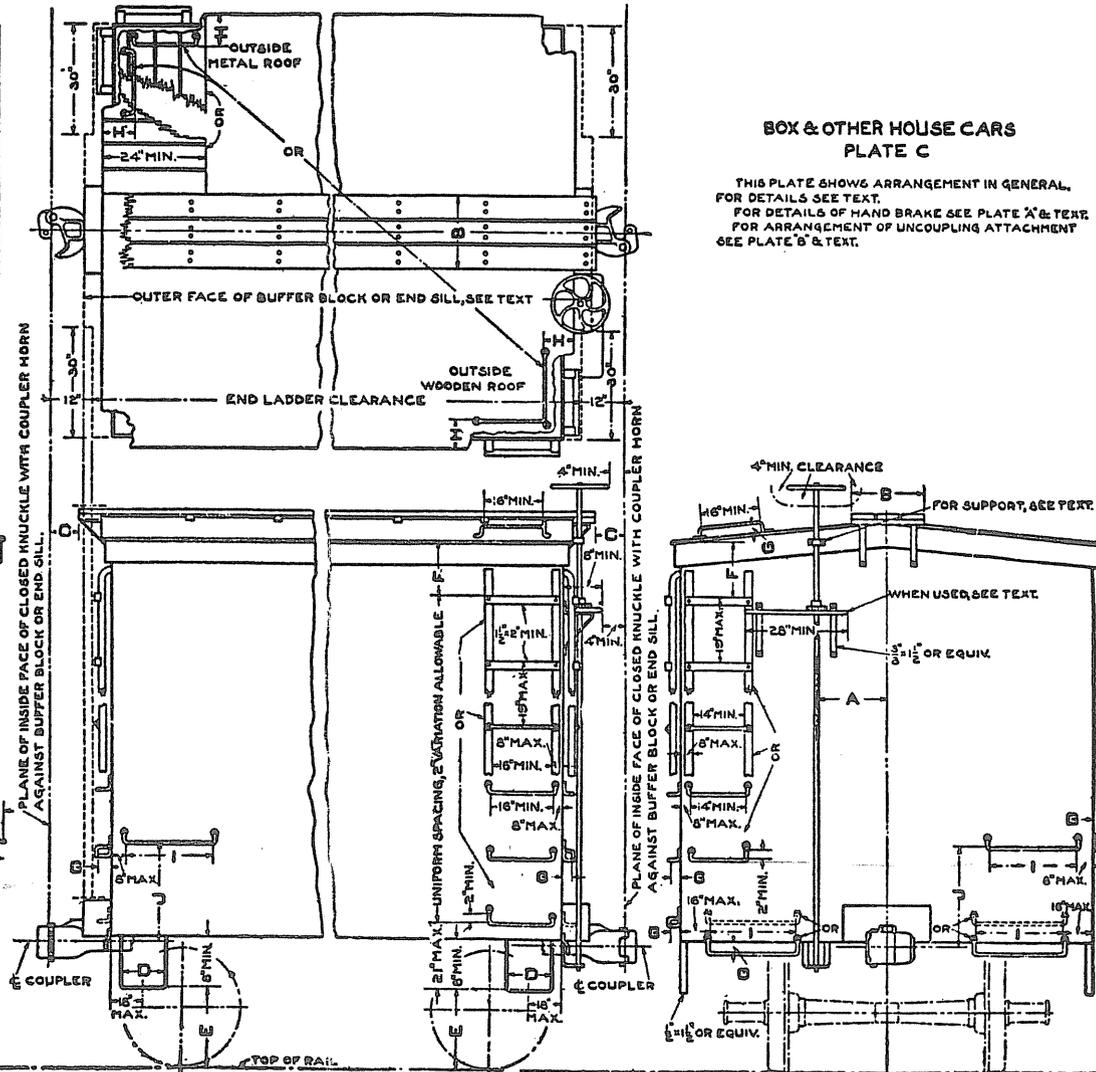
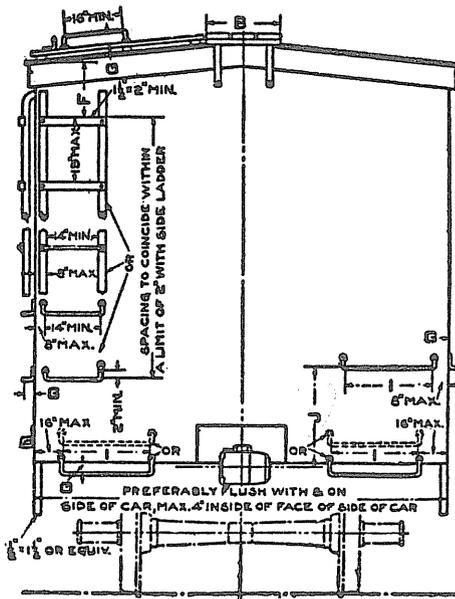
When necessary the rod should be bent or otherwise arranged to clear brake staff, retainer pipe, or end posts, allowing freedom in lifting and full play in bracket.

The end of handle to extend not less than 4" below bottom of end sill or to be so constructed as to give a minimum clearance of 2" around handle.

APPLIANCE		DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
BRAKE SHAFT	A	22"	22"	17"	
RUNNING BOARD (WIDTH)	B	20"	16"	16"	
" (CLEARANCE)	C	10"	6"	6"	
GILL STEPS (LENGTH OF TREAD)	D	12"	10"	10"	
" (HEIGHT ABOVE RAIL)	E	22"	24"	18"	
LADDERS (SPACING FROM ROOF)	F	21"	18"	18"	
" & HANDHOLDS (CLEARANCE)	G	21"	18"	18"	
ROOF HANDHOLDS (FROM EDGE OF ROOF)	H	24"	18"	18"	
HOR. SIDE & END HANDHOLDS (LENGTH)	I	24"	18"	18"	
" (HEIGHT)	J	30"	24"	24"	

Ⓐ ADDITIONAL GILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 Ⓑ HORIZONTAL END HANDHOLDS: WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.

ALL BOLTS & RIVETS 1/2" MIN. DIA.
 BOLTS 3/8" DIA. MAY BE USED FOR WOODEN TREADS WHICH ARE GAINED INTO STILES.
 ALL IRON OR STEEL LADDER TREADS & HANDHOLDS 1/2" MIN. DIA.
 MINIMUM CLEARANCE OF ALL LADDER TREADS & HANDHOLDS 2" PREFERABLY 2 1/2".



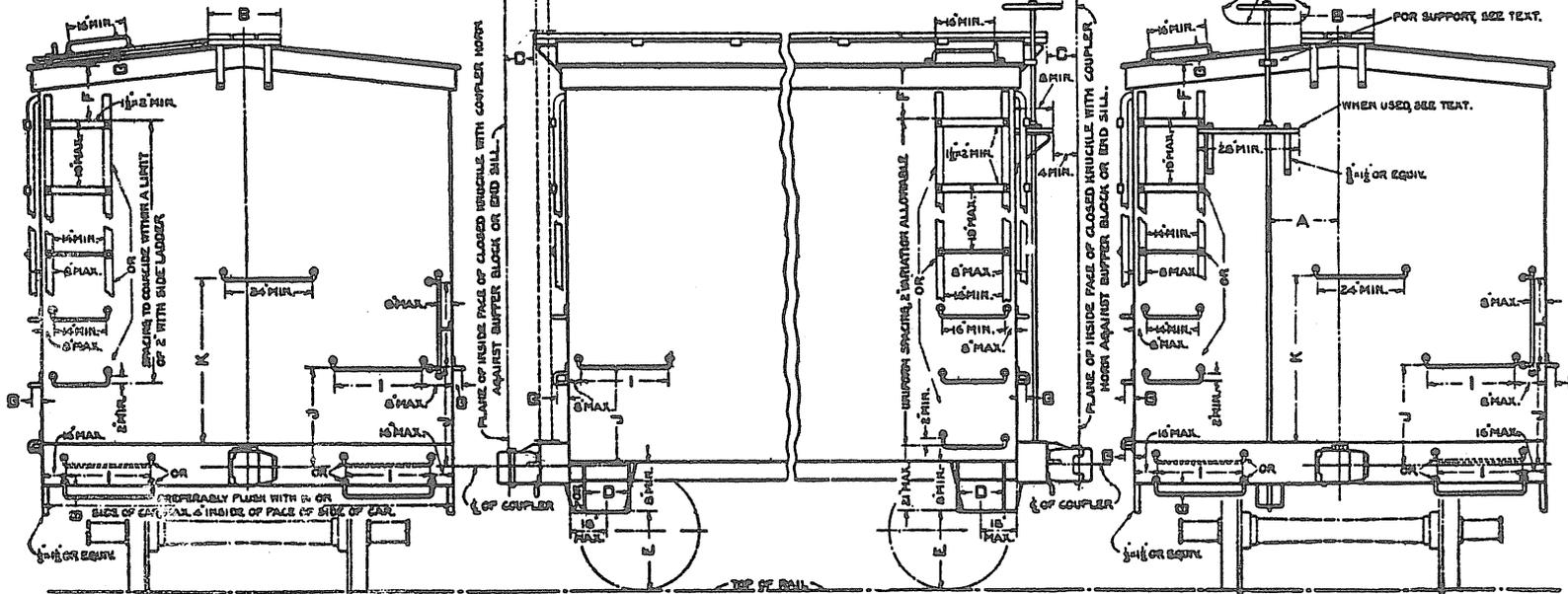
BOX & OTHER HOUSE CARS PLATE C

THIS PLATE SHOWS ARRANGEMENT IN GENERAL.
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE A & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT SEE PLATE B & TEXT.

APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
BRAKE SHAFT	A	—	22	17
RUNNING BOARD (WIDTH)	B	20	—	18
(CLEARANCE)	C	—	10	6
SILL STEPS (LENGTH OF TREAD)	D	12	—	10
(HEIGHT ABOVE RAIL)	E	22	—	24
LADDERS (SPACING FROM ROOF)	F	—	18	12
& HANDHOLDS (CLEARANCE)	G	2 1/2	—	2
ROOF HANDHOLDS (FROM EDGE OF ROOF)	H	—	18	8
HOR. SIDE & END HANDHOLDS (LENGTH)	I	—	24	18
& VERT. SIDE & END HANDHOLDS (HEIGHT)	J	—	30	24
ADDITIONAL HOR. END HANDHOLDS	K	—	30	20
VERTICAL END HANDHOLDS (LENGTH)	L	—	24	18

ⓐ ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ⓑ HORIZONTAL END HANDHOLDS: WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED

ALL BOLTS & RIVETS 1/2 MIN. DIA.
 BOLTS 3/8 DIA. MAY BE USED FOR WOODER TREADS WHICH ARE GAINED INTO STILES.
 ALL IRON OR STEEL LADDER TREADS & HANDHOLDS 1/2 MIN. DIA.
 MIN. CLEARANCE OF ALL LADDER TREADS & HANDHOLDS 2" PREFERABLY 2 1/2"



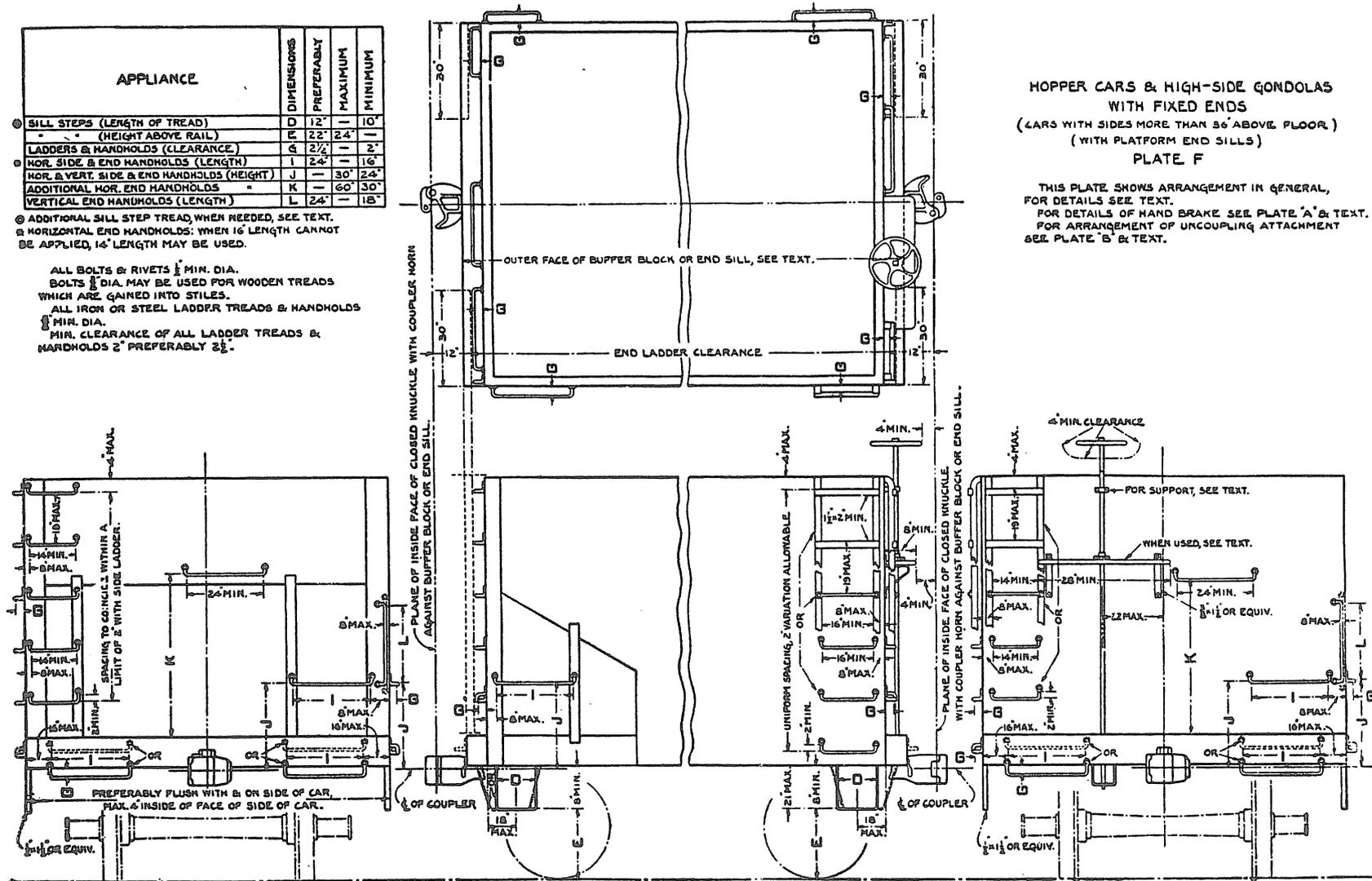
APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
① SILL STEPS (LENGTH OF TREAD)	D	12"	—	10"
" " (HEIGHT ABOVE RAIL)	E	22"	24"	—
LADDERS & HANDHOLDS (CLEARANCE)	G	2 1/2"	—	2"
② HOR. SIDE & END HANDHOLDS (LENGTH)	I	24"	—	16"
HOR. & VERT. SIDE & END HANDHOLDS (HEIGHT)	J	—	30"	24"
ADDITIONAL HOR. END HANDHOLDS	K	—	60"	30"
VERTICAL END HANDHOLDS (LENGTH)	L	24"	—	18"

③ ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ④ HORIZONTAL END HANDHOLDS: WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.

ALL BOLTS & RIVETS 1/2" MIN. DIA.
 BOLTS 3/8" DIA. MAY BE USED FOR WOODEN TREADS WHICH ARE GAINED INTO STILES.
 ALL IRON OR STEEL LADDER TREADS & HANDHOLDS 1/2" MIN. DIA.
 MIN. CLEARANCE OF ALL LADDER TREADS & HANDHOLDS 2" PREFERABLY 2 1/2".

HOPPER CARS & HIGH-SIDE GONDOLAS WITH FIXED ENDS
 (CARS WITH SIDES MORE THAN 36" ABOVE FLOOR)
 (WITH PLATFORM END SILLS)
 PLATE F

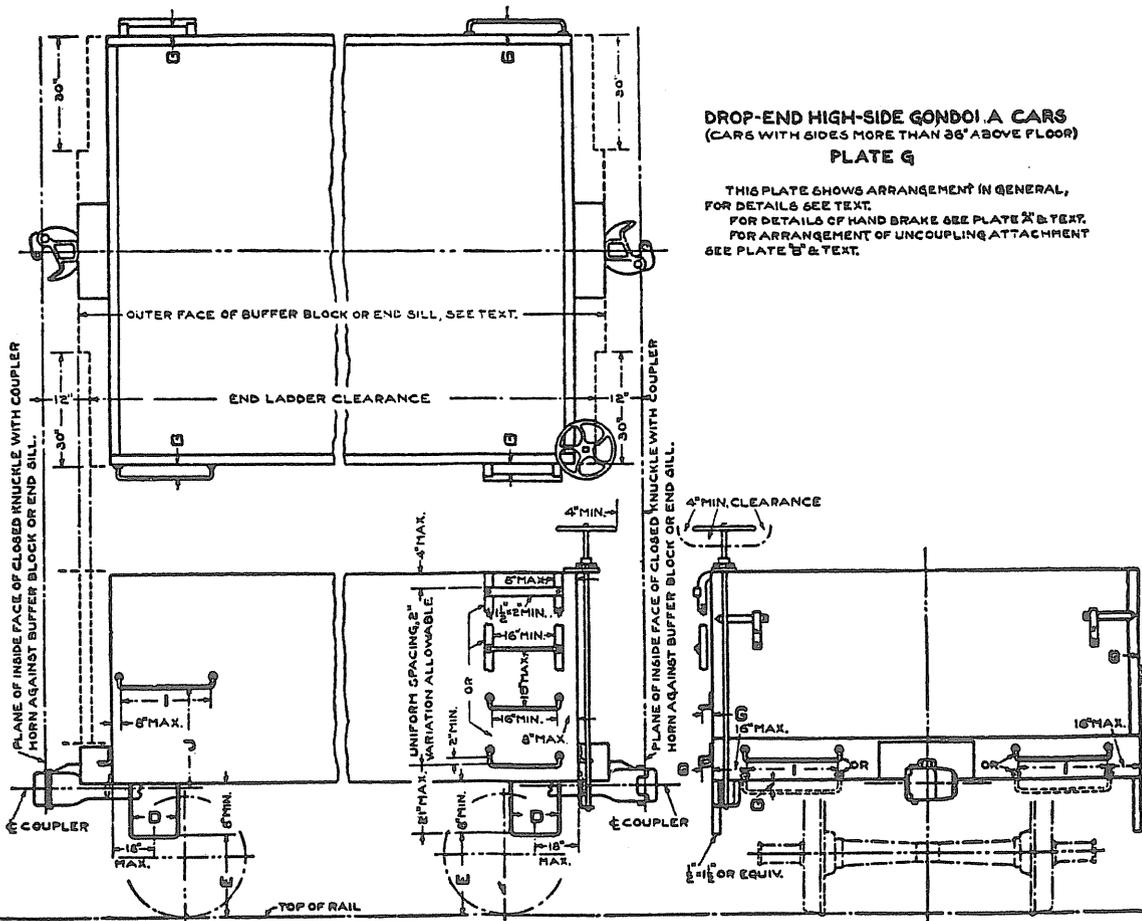
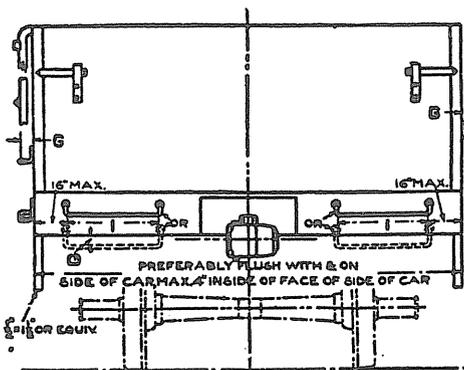
THIS PLATE SHOWS ARRANGEMENT IN GENERAL, FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE 'A' & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT SEE PLATE 'B' & TEXT.



APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
① GILL STEPS (LENGTH OF TREAD)	D	12"	-	10"
" " (HEIGHT ABOVE RAIL)	E	22"	24"	-
LADDERS & HANDHOLDS (CLEARANCE)	G	24"	-	22"
HOR. SIDE & END HANDHOLDS (LENGTH)	I	24"	-	18"
" " (HEIGHT)	J	30"	24"	-

② ADDITIONAL GILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ③ HORIZONTAL END HANDHOLDS WHEN 18" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.

ALL BOLTS & RIVETS $\frac{1}{2}$ " MIN. DIA.
 BOLTS $\frac{3}{8}$ " DIA. MAY BE USED FOR WOODEN TREADS WHICH ARE GAINED INTO STILES.
 ALL IRON OR STEEL LADDER TREADS & HANDHOLDS $\frac{1}{2}$ " MIN. DIA.
 MINIMUM CLEARANCE OF ALL LADDER TREADS & HANDHOLDS 2" PREFERABLY 2 $\frac{1}{2}$ ".



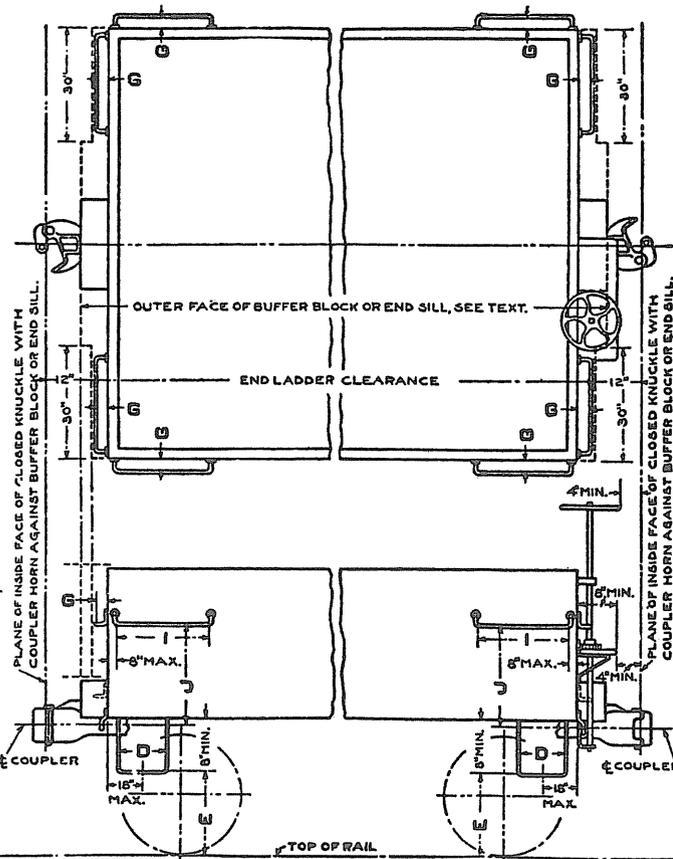
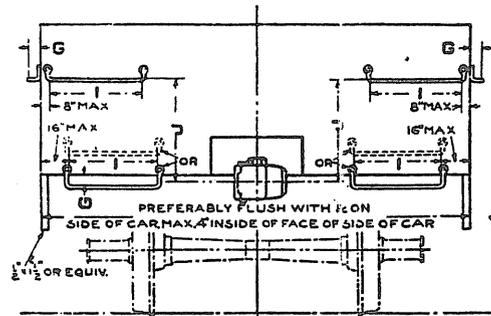
DROP-END HIGH-SIDE GONDOLA CARS
 (CARS WITH SIDES MORE THAN 26' ABOVE FLOOR)
PLATE G

THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE F & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
 SEE PLATE E & TEXT.

APPLIANCE	DIMENSIONS	PREFERABLY	
		MAXIMUM	MINIMUM
① SILL STEPS (LENGTH OF TREAD)	D	12"	10"
" (HEIGHT ABOVE RAIL)	E	22"	24"
HANDHOLDS (CLEARANCE)	A	21"	18"
② WGR. SIDE & END HANDHOLDS (LENGTH)	I	24"	16"
" (HEIGHT)	J	30"	24"

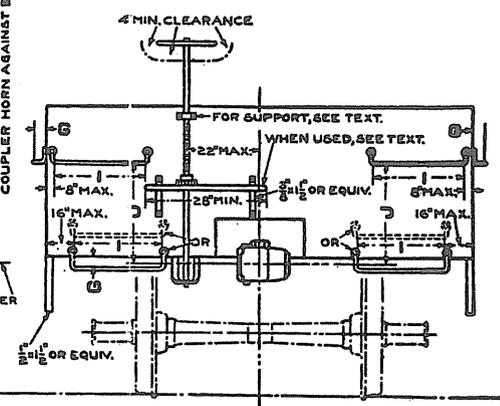
③ ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ④ HORIZONTAL END HANDHOLDS: WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.
 ⑤ IF CAR CONSTRUCTION WILL PERMIT, SEE TEXT.

ALL BOLTS & RIVETS $\frac{1}{2}$ " MIN. DIA.
 ALL IRON OR STEEL HANDHOLDS $\frac{1}{2}$ " MIN. DIA.
 MINIMUM CLEARANCE OF ALL HANDHOLDS 2" PREFERABLY 2 $\frac{1}{2}$ ".



FIXED-END LOW-SIDE GONDOLA & LOW-SIDE HOPPER CARS
 (CARS WITH SIDES 36" OR LESS ABOVE FLOOR)
 - PLATE I

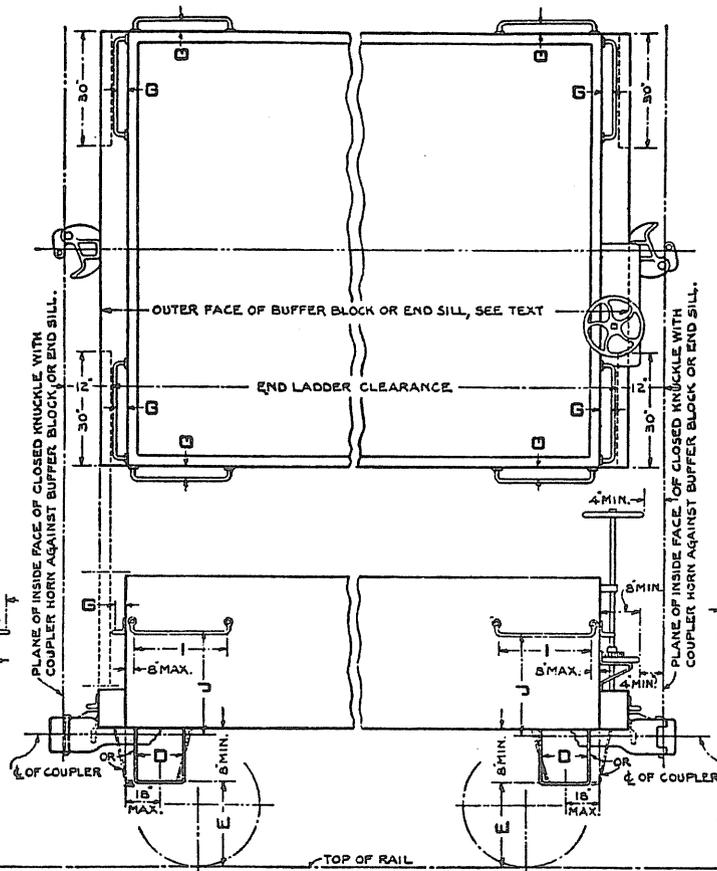
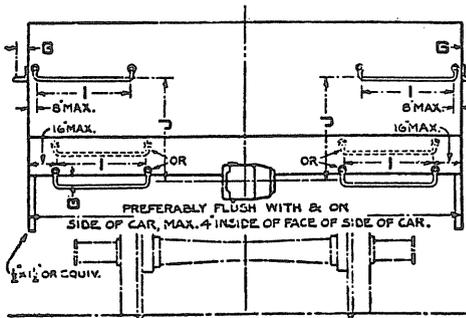
THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE 2 & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
 SEE PLATE 3 & TEXT.



APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
① SILL STEPS (LENGTH OF TREAD)	D	12"	11"	10"
" (HEIGHT ABOVE RAIL)	F	22"	24"	11"
HANDHOLDS (CLEARANCE)	G	2 1/2"	1"	2"
② HOR. SIDE & END HANDHOLDS (LENGTH)	I	24"	16"	16"
" (HEIGHT)	J	30"	24"	

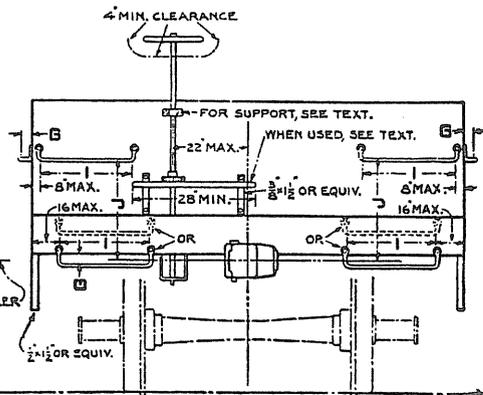
③ ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ※ HORIZONTAL END HANDHOLDS: WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.
 Ⓞ IF CAR CONSTRUCTION WILL PERMIT - SEE TEXT.

ALL BOLTS & RIVETS 1/2" MIN. DIA.
 ALL IRON OR STEEL HANDHOLDS 3/8" MIN. DIA.
 MINIMUM CLEARANCE OF ALL HANDHOLDS
 2" PREFERABLY 2 1/2".



**FIXED-END LOW-SIDE GONDOLA &
 LOW-SIDE HOPPER CARS.**
 (CARS WITH SIDES 36" OR LESS ABOVE FLOOR.)
 (WITH PLATFORM END SILLS)
PLATE J

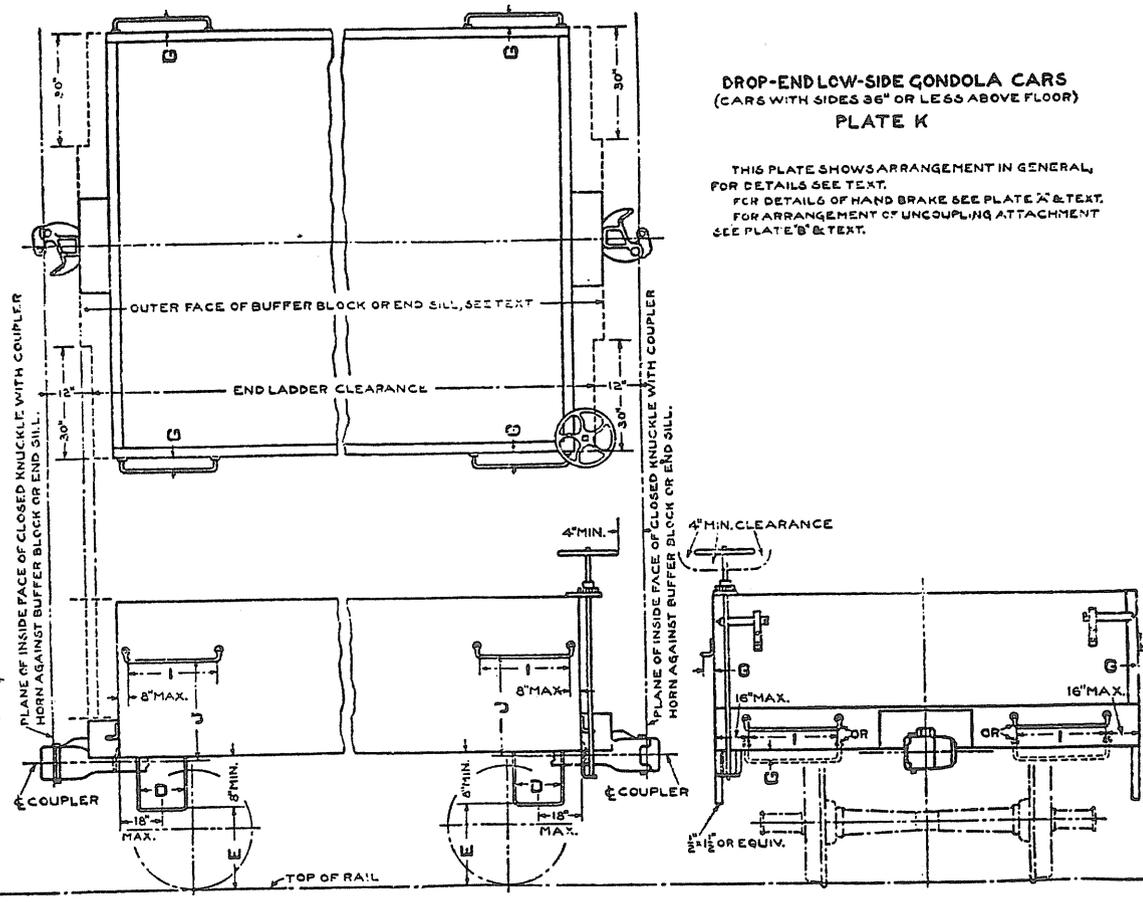
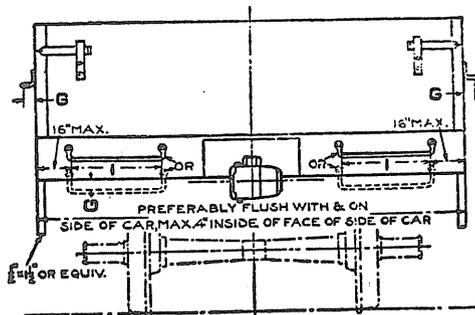
THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE 'A' & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
 SEE PLATE 'B' & TEXT.



APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
① SILL STEPS (LENGTH OF TREAD)	D	12"	10"	
" " (HEIGHT ABOVE RAIL)	E	22"	24"	1"
② HANDHOLDS (CLEARANCE)	G	2 1/2"	2"	
③ HOR. SIDE & END HANDHOLDS (LENGTH)	I	24"	16"	
④ " " HANDHOLDS (HEIGHT)	J	30"	24"	

③ ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 * HORIZONTAL END HANDHOLDS: WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.
 † IF CAR CONSTRUCTION WILL PERMIT, SEE TEXT.

ALL BOLTS & RIVETS 1/2" MIN. DIA.
 ALL IRON OR STEEL HANDHOLDS 3/8" MIN. DIA.
 MINIMUM CLEARANCE OF ALL HANDHOLDS
 2" PREFERABLY 2 1/2"



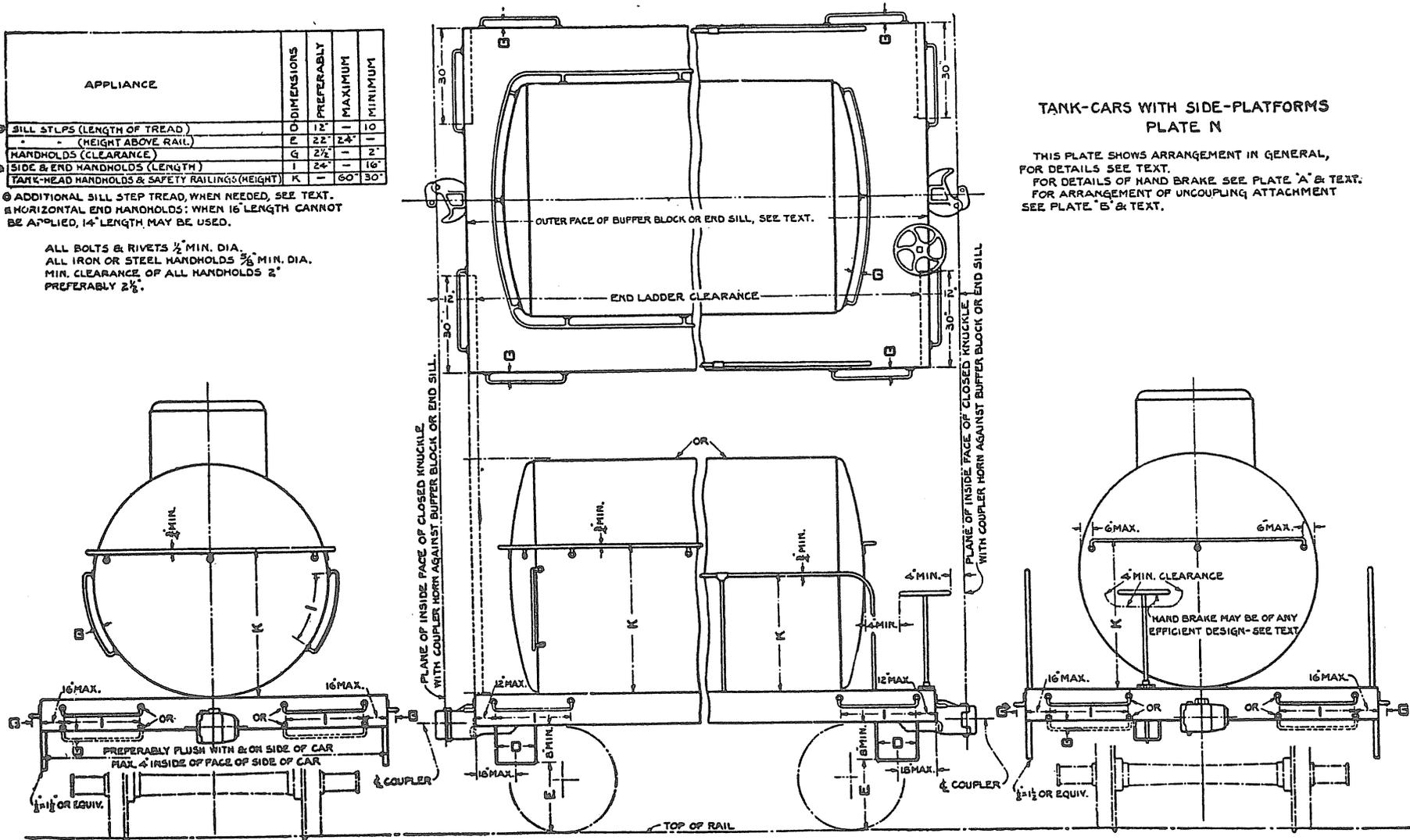
DROP-END LOW-SIDE GONDOLA CARS
 (CARS WITH SIDES 36" OR LESS ABOVE FLOOR)
PLATE K

THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE A & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
 SEE PLATE B & TEXT.

APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
⊙ SILL STEPS (LENGTH OF TREAD)	D	12"		
- (HEIGHT ABOVE RAIL)	F	22"	24"	10"
⊙ HANDHOLDS (CLEARANCE)	G	22"		2"
⊙ SIDE & END HANDHOLDS (LENGTH)	I	24"		16"
⊙ TANK-HEAD HANDHOLDS & SAFETY RAILINGS (HEIGHT)	K		60"	30"

⊙ ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ⊙ HORIZONTAL END HANDHOLDS: WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.

ALL BOLTS & RIVETS 1/2" MIN. DIA.
 ALL IRON OR STEEL HANDHOLDS 3/8" MIN. DIA.
 MIN. CLEARANCE OF ALL HANDHOLDS 2"
 PREFERABLY 2 1/2"



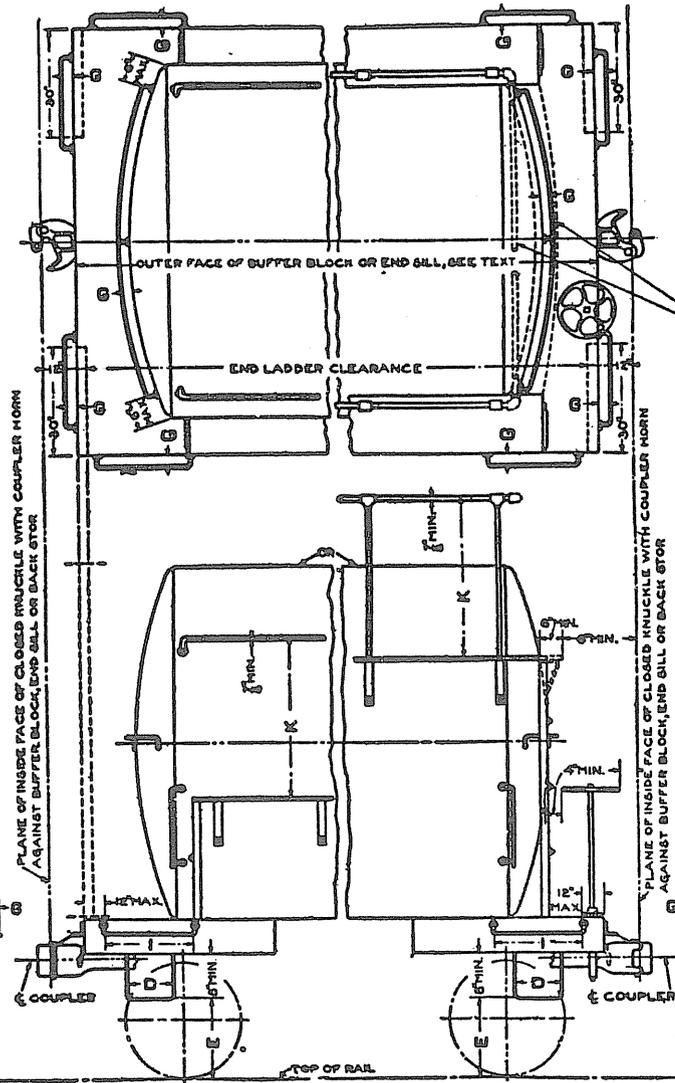
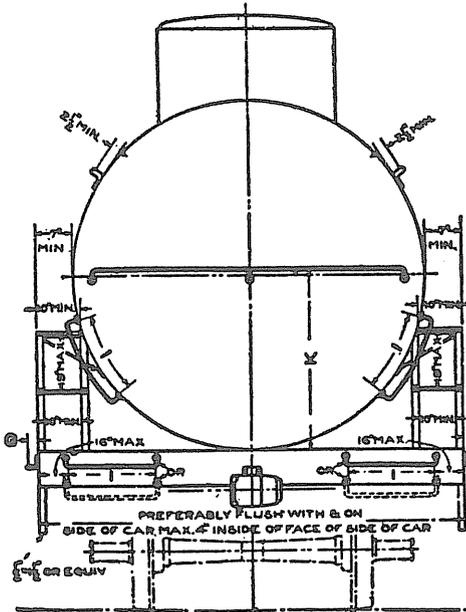
TANK-CARS WITH SIDE-PLATFORMS PLATE N

THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE 'A' & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
 SEE PLATE 'E' & TEXT.

APPLIANCE	D	E	F	G	H	I	J	K
① GILL STEPS (LENGTH OF TREAD)	0	1 1/2	1	1	1	1	1	1
" (HEIGHT ABOVE RAIL)	2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
② LADDERS & HANDHOLDS (CLEARANCE)	8	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2
③ SIDE & END HANDHOLDS (LENGTH)	1	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
TANK HEAD HANDHOLDS & SAFETY RAILINGS (HEIGHT)	K	60	60	60	60	60	60	60

① ADDITIONAL GILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ② HORIZONTAL END HANDHOLDS, WHEN 16" LENGTH CANNOT BE APPLIED, 12" LENGTH MAY BE USED.

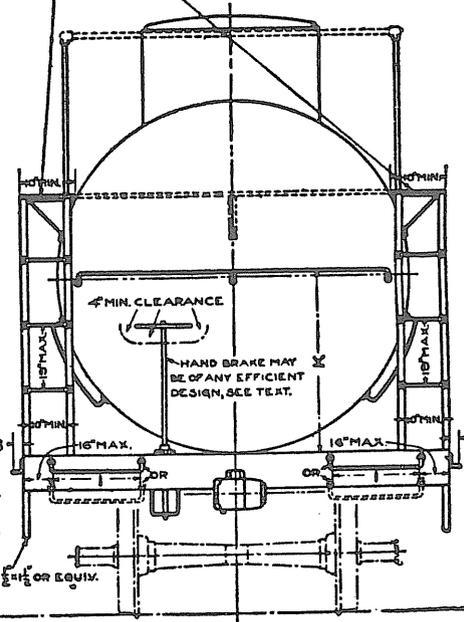
ALL BOLTS & NUTS 1/2" MIN. DIA.
 ALL IRON OR STEEL LADDER TREADS & HANDHOLDS 1/2" MIN. DIA.
 MINIMUM CLEARANCE OF ALL LADDER TREADS & HANDHOLDS 8" PREFERABLY 8 1/2".



**TANK CARS WITHOUT SIDE-GILLS
 & TANK CARS WITH SHORT SIDE-GILLS
 & END-PLATFORMS.
 PLATE O**

THIS PLATE SHOWS ARRANGEMENT IN GENERAL FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE X & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT SEE PLATE U & TEXT.

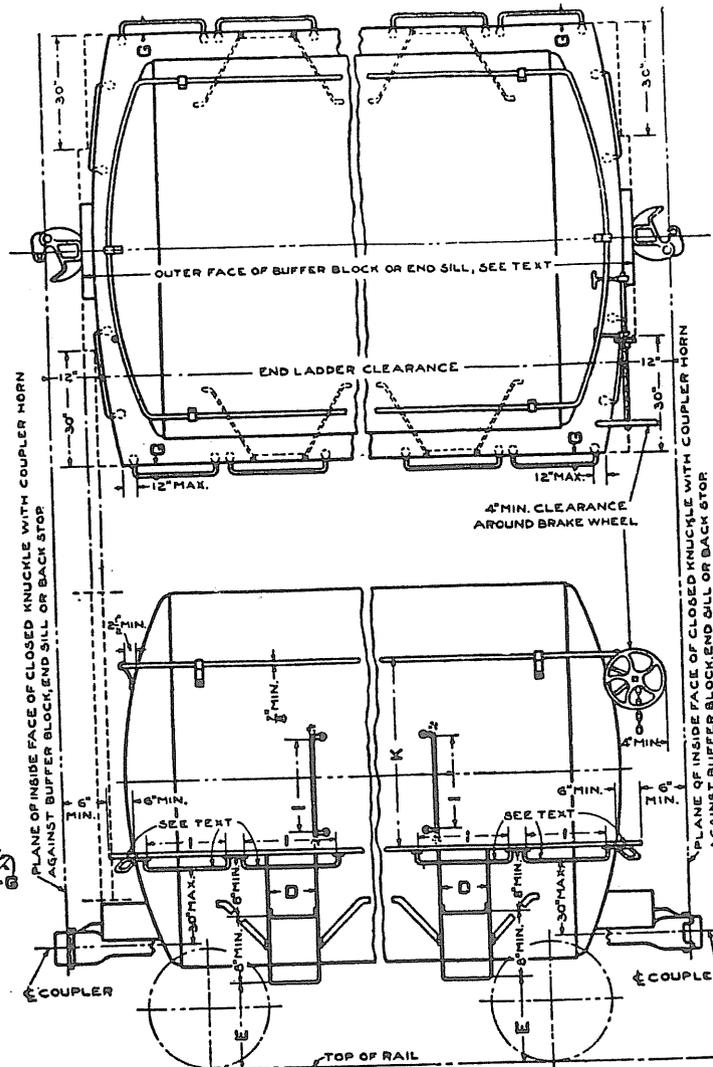
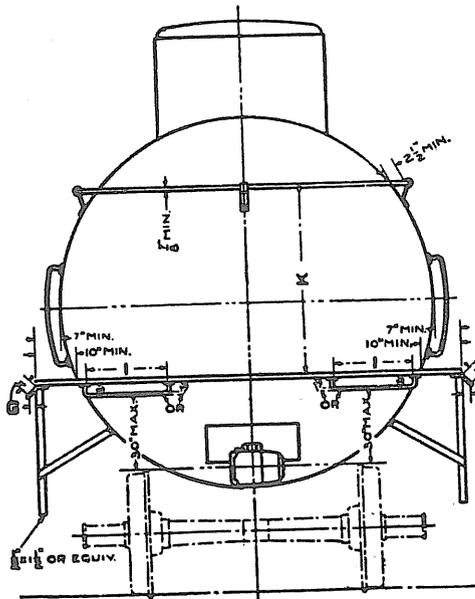
FOR LADDER & SAFETY RAILING REQUIREMENTS ON CARS WITH CONTINUOUS RUNNING BOARDS, SEE TEXT.



APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
① SILL STEPS (LENGTH OF TREAD)	D	12"	-	10"
(HEIGHT ABOVE RAIL)	E	22"	24"	-
② HANDHOLDS (CLEARANCE)	G	2 1/2"	-	2"
③ SIDE & END HANDHOLDS (LENGTH)	I	24"	-	16"
④ SAFETY RAILINGS (HEIGHT)	K	-	60"	30"

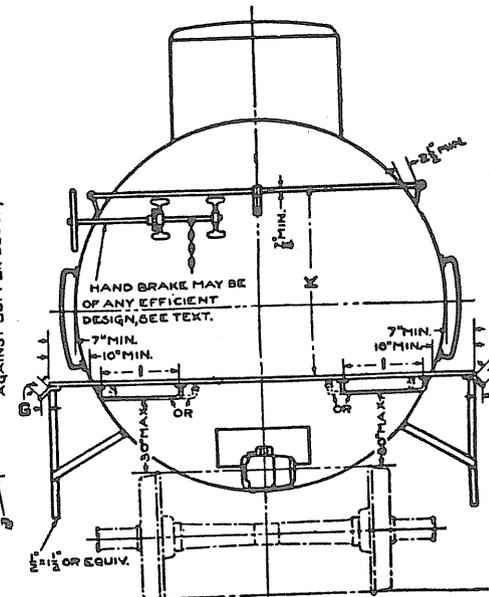
① ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT.
 ② HORIZONTAL END HANDHOLDS WHEN 16" LENGTH CANNOT BE APPLIED, 14" LENGTH MAY BE USED.

ALL BOLTS & RIVETS 1/2" MIN. DIA.
 ALL IRON OR STEEL HANDHOLDS 1/2" MIN. DIA.
 MINIMUM CLEARANCE OF ALL HANDHOLDS 2"
 PREFERABLY 2 1/2"



TANK CARS WITHOUT END-SILLS PLATE P

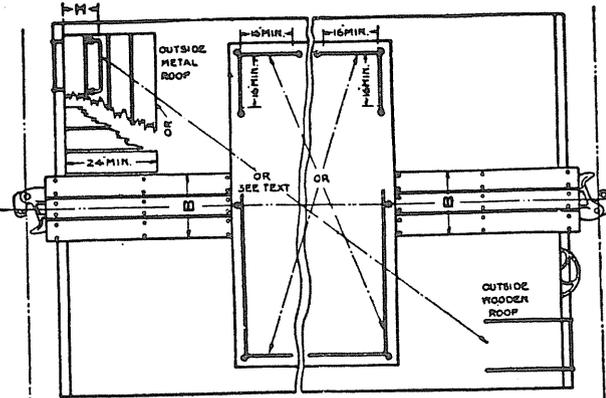
THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE 'A' & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
 SEE PLATE 'B' & TEXT.



APPLIANCE	DIMENSION	PREFERABLY	MAXIMUM	MINIMUM
RUNNING BOARD (WIDTH)	B	20"	18"	18"
(CLEARANCE)	C	10"	6"	6"
HANDHOLDS (CLEARANCE)	G	2 1/2"	2"	2"
ROOF HANDHOLDS (FROM EDGE OF ROOF)	H	15"	5"	5"
HORIZONTAL END HANDHOLDS (LENGTH)	I	24"	10"	10"

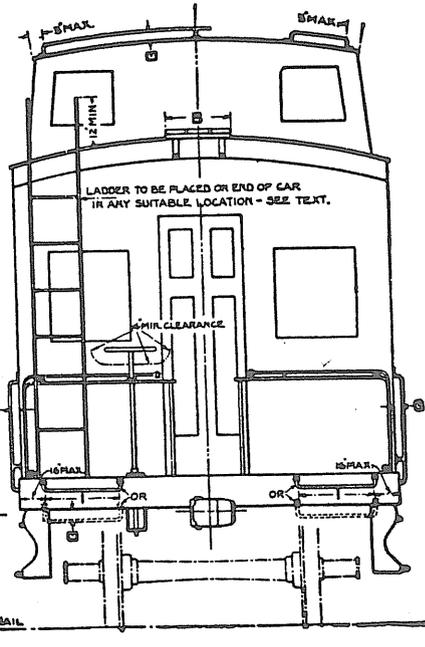
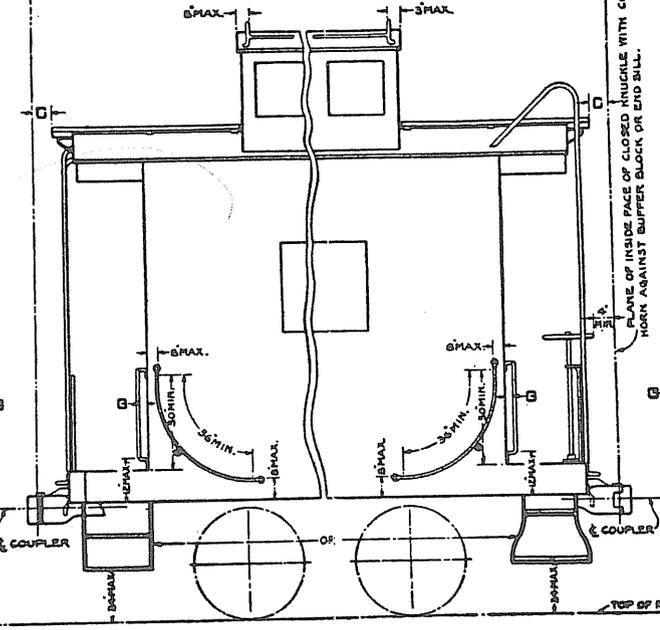
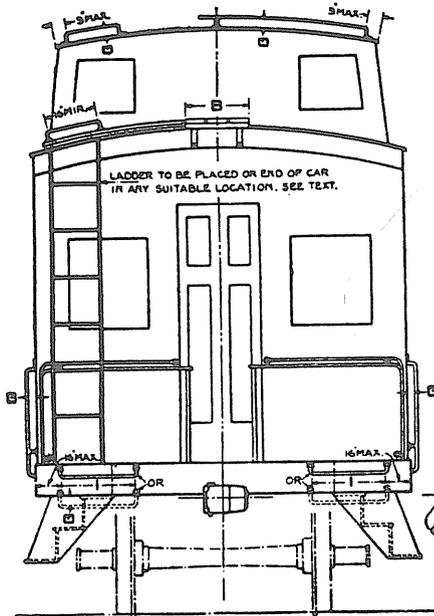
1/2" HORIZONTAL END HANDHOLDS: WHEN 10" LENGTH CANNOT BE APPLIED, 1/2" LENGTH MAY BE USED.

ALL BOLTS & RIVETS 1/2" MIN. DIA.
ALL IRON OR STEEL HANDHOLDS 1/2" MIN. DIA.
1/2" MIN. CLEARANCE OF ALL HANDHOLDS 2"
PREFERABLY 2 1/2".



CABOOSE CARS WITH PLATFORMS PLATE Q

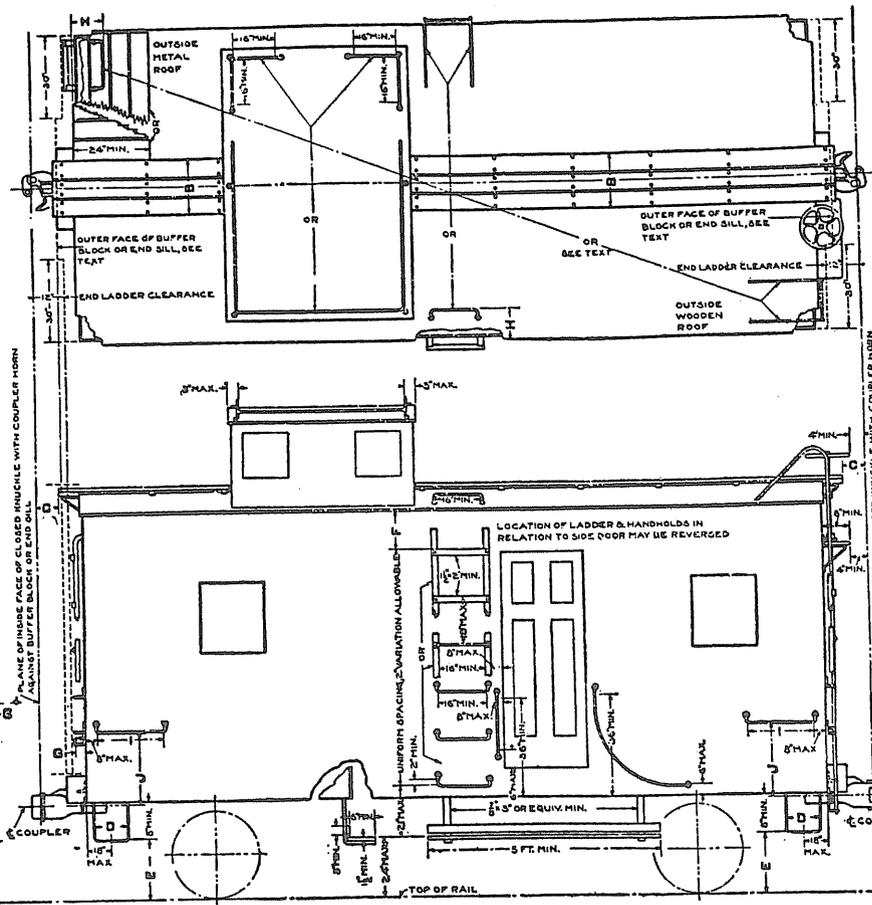
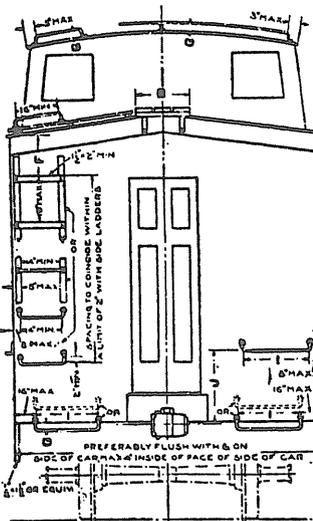
THIS PLATE SHOWS ARRANGEMENT IN GENERAL.
FOR DETAILS SEE TEXT.
FOR DETAILS OF HAND BRAKE SEE PLATE 'A' & TEXT.
FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
SEE PLATE 'B' & TEXT.



APPLIANCE	DESCRIPTION	PREFERRED	MINIMUM	MAXIMUM
ROBBING BOARD (HEIGHT)	B	20"	18"	
(CLEARANCE)	C	10"	6"	
① SILL STEPS (LENGTH OF TREAD)	D	12"	10"	
(HEIGHT ABOVE RAIL)	F	24"	24"	
LADDERS (SPACING FROM ROOF)	G	21"	18"	12"
HANDHOLDS (CLEARANCE)	H	12"	12"	14"
ROOF HANDHOLDS (FROM EDGE OF ROOF)	I	24"	18"	14"
② SIDE END HANDHOLDS (HEIGHT)	J	20"	20"	24"

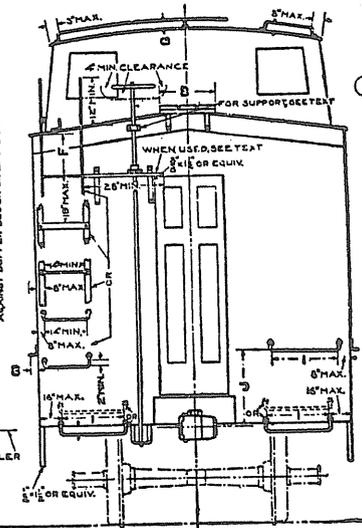
① ADDITIONAL SILL STEP TREAD, WHEN NEEDED, SEE TEXT
 ② HORIZONTAL END HANDHOLDS, WHEN 12" CLEARANCE CANNOT BE OBTAINED, LENGTH MAY BE USED

SIDE DOOR STEP SPLITS, 2" MIN. DIA.
 ALL OTHER BOLTS, RIVETS, 1/2" MIN. DIA.
 BOLTS 1/2" DIA. MAY BE USED FOR WOODEN TREADS WHICH ARE SAWN INTO 6" TILES.
 ALL IRON OR STEEL LADDER TREADS & HANDHOLDS 1/2" MIN. DIA.
 MINIMUM CLEARANCE OF ALL LADDER TREADS & HANDHOLDS 2" PREFERABLY 2 1/2"



CABOOSE CARS WITHOUT PLATFORMS PLATE R

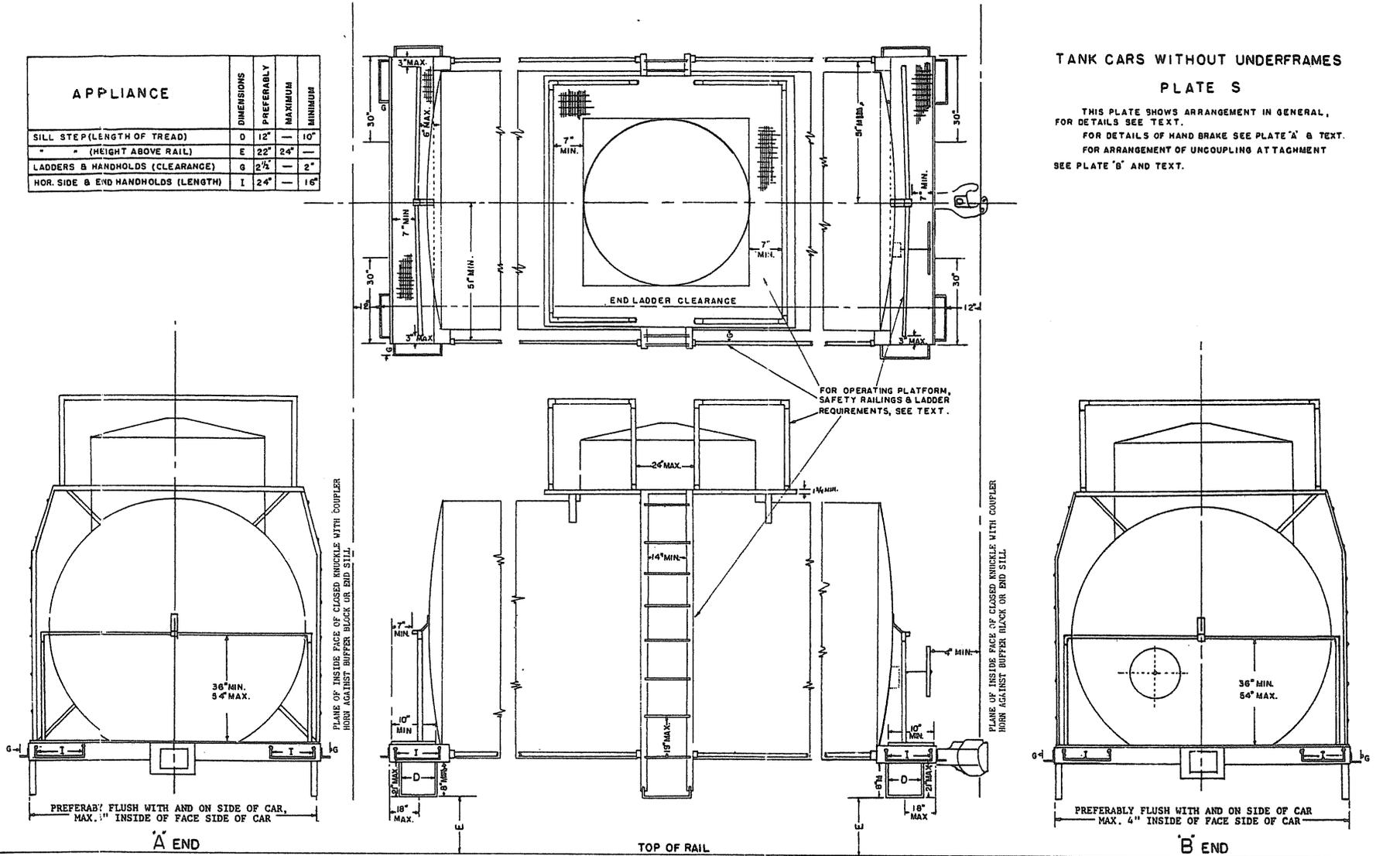
THIS PLATE SHOWS ARRANGEMENT IN GENERAL.
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE, SEE PLATE X & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
 SEE PLATE S & TEXT.



APPLIANCE	DIMENSIONS		
	D	E	F
SILL STEP (LENGTH OF TREAD)	12"	12"	10"
" " (HEIGHT ABOVE RAIL)	22"	24"	—
LADDERS & HANDHOLDS (CLEARANCE)	2 1/2"	—	2"
HOR. SIDE & END HANDHOLDS (LENGTH)	24"	—	16"

TANK CARS WITHOUT UNDERFRAMES
 PLATE S

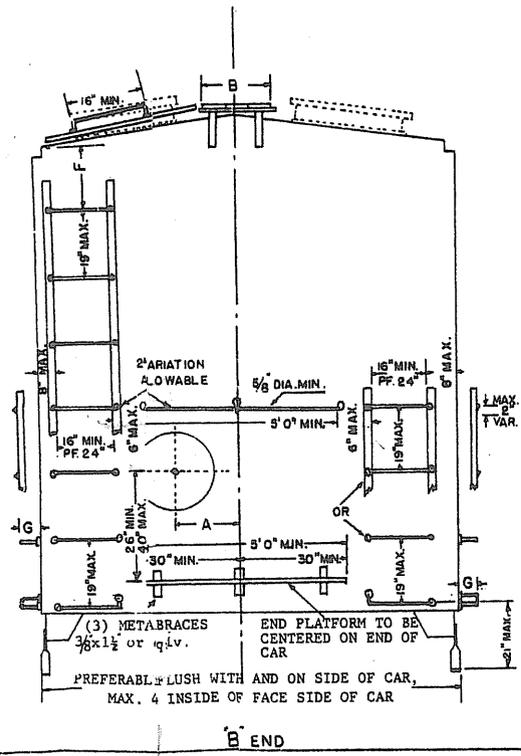
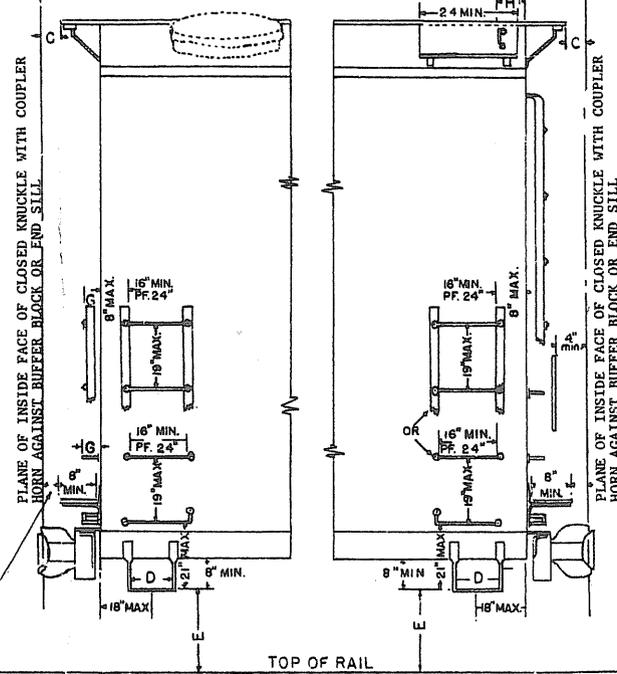
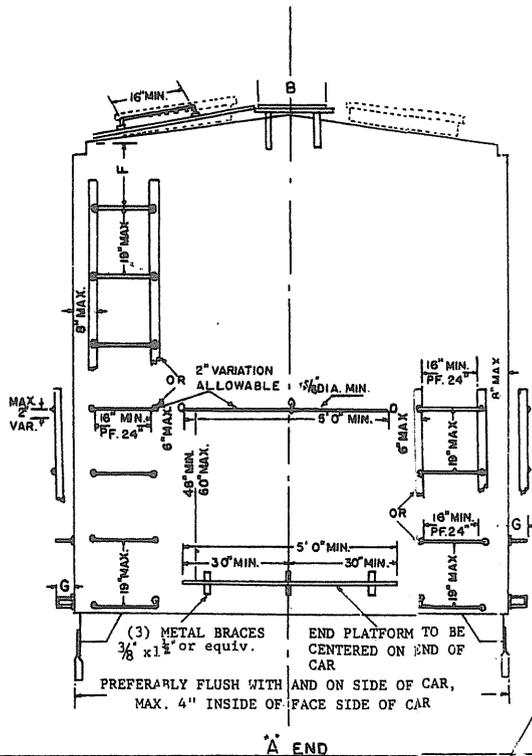
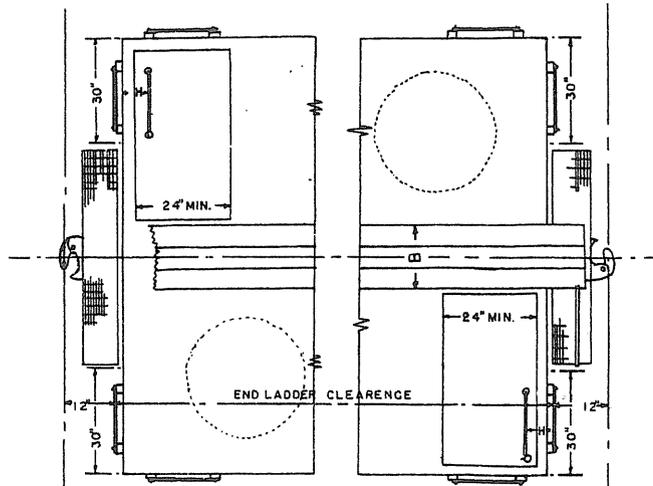
THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
 FOR DETAILS SEE TEXT.
 FOR DETAILS OF HAND BRAKE SEE PLATE 'A' & TEXT.
 FOR ARRANGEMENT OF UNCOUPLING AT TAGMENT
 SEE PLATE 'B' AND TEXT.



APPLIANCE	DIMENSIONS	PREFERABLY	MAXIMUM	MINIMUM
BRAKE SHAFT	A	22"	17"	
RUNNING BOARD (WIDTH)	B	20"	18"	
" (CLEARANCE)	C		6"	
SILL STEPS (LENGTH OF TREAD)	D	12"		10"
" (HEIGHT ABOVE RAIL)	E	22"	24"	
LADDERS (SPACING FROM ROOF)	F	18"	12"	
" & HANDHOLDS (CLEARANCE)	G	24"	2"	
ROOF HANDHOLDS (FROM EDGE OF ROOF)	H	15"	8"	

BOX AND OTHER HOUSE CARS
WITH ROOF HATCHES
PLATE V

THIS PLATE SHOWS ARRANGEMENT IN GENERAL,
FOR DETAILS SEE TEXT.
FOR ARRANGEMENT OF UNCOUPLING ATTACHMENT
SEE PLATE B AND TEXT.



6" MIN. FOR CARS WITH CUSHIONING DEVICE HAVING 6" OR MORE TRAVEL WITH DEVICE CLOSED-FULL BUFF
12" MIN. FOR CARS WITH CONVENTIONAL DRAFT GEARS OR CUSHIONING DEVICE HAVING LESS THAN 6" TRAVEL



U.S. Department
of Transportation

**Federal Railroad
Administration**

April 13, 2007
Draft Revision 0

**Statistically Driven Inspection
Guidance
for
Motive Power & Equipment
Inspectors and Safety Specialists**

Federal Railroad Administration
Office of Safety Assurance and Compliance
Motive Power & Equipment (MP&E) Division
April 2007

Statistically-Driven Inspection Guidance for Motive Power & Equipment Inspectors and Safety Specialists

Overview: The FRA has collected railroad safety data for decades, and now has the information and databases available for direct use by Motive Power & Equipment (MP&E) Inspectors via the Internet. With increasing traffic over the North American freight railroads with ever-increasing axle loads and payloads, increased demand for high-speed passenger trains, new-technology commuter railroad equipment and service, new wayside train inspection devices, and ever increasing duties for MP&E inspectors, the use of statistically driven inspections will provide a baseline to plan inspection itineraries and optimize the regulatory enforcement strategies and use of the MP&E inspection workforce.

Background: FRA developed the National Inspection Plan (NIP) that provides the overall inspection philosophy for the Office of Safety Assurance and Compliance. In conjunction with the NIP, each FRA Region develops an Annual Inspection Plan tailored to the specific railroads, traffic, and personnel unique to their Region. The guidance provided, herein, builds upon the Regional Inspection Plans (RIP's), and does not supercede them. By formulating data queries tailored to an Inspector's territory, a report unique to that area or railroad can be generated, indicating the "top five" or more causes of accidents/incidents, train accidents, or casualties historically found at that location and also the identification of detrimental or higher "safety risk" trends. In addition, rail car and locomotive defects can be identified in the RISPC Database and additional trend-line "drill-downs" performed.

Applicability: At this time the "Drill-down" procedures to evaluate potential trends in the safety data will only be applied to the Accident/Incident, Train Accident, and Casualty Databases. In accordance with the criteria stated in the Regional Inspection Plan, an MP&E Inspector or Safety Specialist will select the railroad(s) and location(s) to be inspected based upon past experience and knowledge of traffic patterns. This also builds on the "expert" knowledge base of the MP&E Inspector. Based upon the railroad selected, the corresponding Class of railroad is determined: Class I (Major Railroad), II (Regional), or III (Shortline) and noted for use in generating the "Drill-down" Report (see "Drill-down Procedure, page 5).

Pilot Project: To validate the statistically-driven inspection procedures developed by the MP&E Division, Inspectors from FRA's Region 2 participated in a short evaluation program in 2006 (Pilot Project) to use the goals of the NIP, RIP, and FRA's Safety Database to predict what type of defects with a potential to cause a derailment or serious incident may be present in the Inspector's territory. The locations visited by the project team were CSX Transportation at Cumberland, Maryland and Crofton, West Virginia; Appalachian and Ohio Railroad at Buckhannon, West Virginia; and Norfolk Southern Railway (NS) at Pittsburgh, Pennsylvania.

The findings from this pilot project were that the methodology proposed by the MP&E Division was viable in determining the mechanical issues associated with a railroad/region. Further, FRA's MP&E's Inspectors found the proposed methodology, and FRA's safety data on the web site practical and easy to use.

The "top-five" mechanical causes for derailment were identified for the example inspection area, Allegheny County, Maryland. The validation team visited the location(s) and the process for determining the "top-five" items for all railroads and just for Region 2 were found not to be cumbersome, as there are similarities between these two lists. Wheel-caused derailments were indicated in the query as being one of the top-five causes. During the inspection on CSXT at Cumberland, Maryland a high-flange wheel was identified. However, the Inspectors' knowledge of his/her inspection locations is key to the success of this approach as the number of accidents/incidents is not statistically significant (too few incidents randomly occurring) compared to the number of car movements per year .

During the pilot project it was discovered that the FRA safety database not appear to have reported all accidents that occurred, and in some cases the reported cause contained errors. For example, the Appalachian and Ohio Railroad filed four accident/incident reports between May, 2005, and February, 2006. However, the FRA database only indicated three derailments. One of the reports indicated a cause code of "T-316" for track, but the actual cause was found to be a burnt-off wheel journal bearing. Thus, it was verified that FRA MP&E Inspectors are not working with a "perfect" database and the Inspector's knowledge base is ever more important in cross checking of "drill-down" data summaries and determining "high-risk" causes and in identifying detrimental trends.

Based upon the experience gained by the first field pilot trial, a refinement was made to the data-acquisition procedures. A matrix may be created at the Regional level for each inspection point that correlates to an identifier (symbol) of a train which was involved in an accident/incident to the origination location. That is the point where an inspection can yield a benefit to prevent a future accident/incident, as the defect that caused the derailment may have been present at the origin location. By using the top-five causes of accident/incident identified from a query, a search of the accident/incident report will provide the train identifier (symbol). The procedure will then tie the train involved in the accident/incident to the originating point where a focused inspection can then be scheduled. Thus, the procedure solves for the "where" and "what" to inspect for at the originating location.

A second validation inspection was conducted at the NS Conway Yard, Conway, PA using the revised procedures. Similar results to the first inspection were observed in that the team found the procedures easy to use, and the "Top-five" derailment causing defects verified only one defect related to those being given focused attention was identified (related to defective roller bearings).

Based upon a review of FRA's safety database there are very few MP&E-caused accidents/incidents. From January 2002, to December 2005, there were only 7

accidents/incidents in Region 2 in Maryland. Their causes were: brakes cause code (E0) - two (2) incidents, axles & journal bearings (E5) - two (2) incidents, coupler & draft system (E3) - one (1) incident, truck components (E4) - one (1) incident, and wheels (E6) - one (1) . With the number of accidents/incidents being so few, the potential for finding a targeted defect by trend analysis is extremely low. However, one of the “top-five” causes, high-flange wheel was found in Cumberland yard on CSX in an outbound train during the pilot project inspection.

Pilot Project Summary: The proposed procedures for using a “drill-down” method of predicting elevated levels of mechanical defects were found easy to use by the MP&E Inspectors. One of the “top-five” causes of derailment nationwide was identified during the pilot program inspection. However, the number of MP&E-related defects that cause derailments are very low on an annual basis, and extremely low on an individual Regional or inspection location (not statistically significant). Therefore, the overall usefulness of a statistical approach to defect identification should only be used in combination with the “expert” judgement of the MP&E Inspector and trends develops on a nationwide basis as identifying in safety oversight of the railroads and received and review of headquarters trends analysis.

The number of MP&E related defects that may cause a derailment appear to be too low to be statistically significant. However, a defect predicted to be present was identified during both validation inspections. Based upon even these marginal results, a program could be developed to use a statistically driven approach to assist MP&E Inspectors in the identification of critical safety defects. If an Inspector queries the FRA database on a bi-annual basis to develop a list of the “top-five” causes of derailment on a nationwide and Regional basis, they will have a heightened awareness of these defects during their regular inspections. Later sections in the in the MP&E Compliance Manual will be useful in explaining the process and providing the MP&E Inspectors with examples using the database and trend charts (see page 6). It is obvious that this process is not a “perfect science” and greatly dependent upon the knowledge base and judgement of the MP&E Inspector.

“Drill-down” Procedure: The “Drill-down” procedures below apply only to the following databases:

Accident / Incident, Train Accident, and Casualty Database

Inspection Data Selection:

1. The MP&E Inspector or Safety Specialist selects the railroad to inspect based upon past experience, and knowledge of traffic patterns in accordance with the criteria stated in the Regional Inspection Plan; also, in consultation with the Regional MP&E Safety Specialist.
2. Based upon the railroad selected, the corresponding Class of railroad is determined, such as Class I (Major Railroad), II (Regional), or III (Shortline) and noted for use.
3. Upon selecting the railroad and Class, the MP&E Inspector will then access the Internet, and go to the FRA’s Home Page at www.FRA.DOT.GOV. On the Home Page, select the Icon for “SAFETY”, then open “Safety Data”. There are nine (9) categories to choose from regarding safety data, and many subcategories.
4. From the list of categories and subcategories, select the type of information desired, such as 2 - Query Accident/Incident Trends, 3 - Train Accidents, or 4 - Casualties for MP&E related data.

“Drill-Down” for the “Top Five” Causes of Derailments

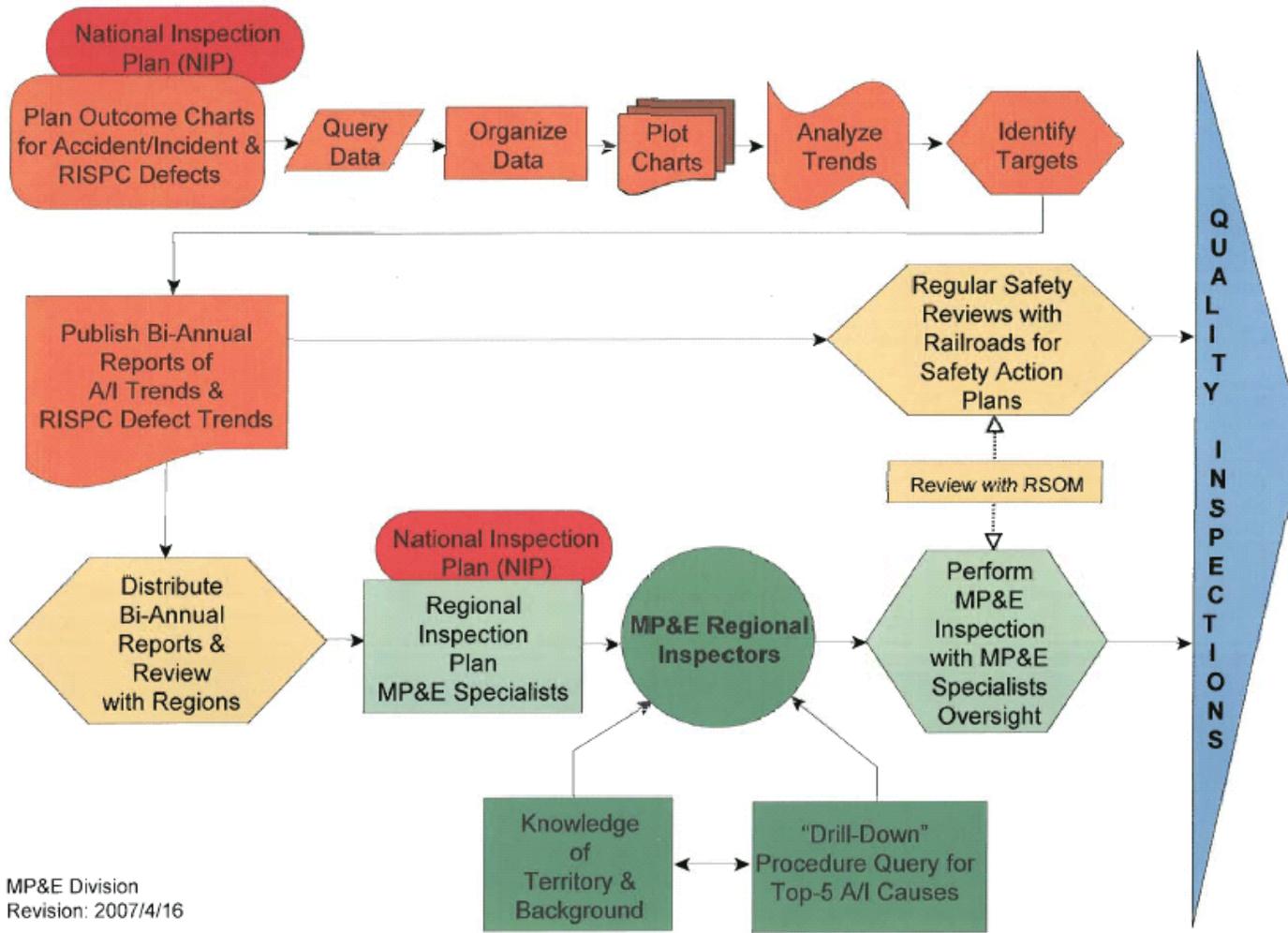
5. For example, the Inspector selects “2-Query Accident/Incident Trends, 2.01 Train Accidents.” From the Railroad Group, select Class I Railroads; then Region 6; then State - Missouri; then Type of Accident - Derailment; then Primary Cause of Accident - Mechanical and Electrical Failures; and finally the Inspector selects the time period (by year) 2005. Click on “Generate Report”, and the “drill-down” results will be displayed. The “Top Five” causes of derailment, related to Mechanical and Electrical Failures are viewed as:

Year 2005 Results to Date:

- E40C Side bearing clearance insufficient;
- E46C Truck bolster stiff;
- E0HC Hnd brk link and/or connect defect;
- E21C Center sill broken or bent;
- E34C Draft gear/mechanism broke/defective

6. This process can then be repeated to assess other Accident/Incident trends by the MP&E Inspectors for as many states and locations as desired.

Statistically-Driven Inspection Guidance (Process) Motive Power & Equipment Inspectors and Safety Specialists



MP&E Division
Revision: 2007/4/16

Focused Enforcement: Focused enforcement entails concentrating enforcement efforts primarily on the types of violations most likely to cause an actual train accident or injury. FRA's accident/injury database provides a wealth of information on what these leading causes of accidents and injuries are. The basic principle here is allocating our finite enforcement resources on those areas where improvements in compliance are most likely to produce maximum safety benefits. The principle is the same with regard to allocating inspection resources; as discussed in a separate document on inspections, we need to use available information on safety risk criteria to better guide our selection of inspection priorities.

FRA Inspectors shall utilize FRA's accident, injury, and inspection data to gain better insight into the types of violations that are actually causing large numbers of accidents and injuries. While much of the information is already available to the field, FRA will distribute to the field data summaries showing the leading causes of train accidents and injuries by safety discipline, cause code, and regulatory section. The data will be industry-wide and broken down by railroad. With this information, Inspectors will be better equipped to weigh the discretion criteria concerning the inherent seriousness of violations and the level of risk posed in specific circumstances. This is not to suggest that enforcement decisions are to become entirely driven by data. Direct observations and experience will always be necessary elements of these decisions. However, because the agency has adopted certain performance goals linked directly to reducing the rate of certain unsafe events, we need to make better use of the data we collect to help guide our achievement of those goals.

In-depth accident analyses are conducted to determine if any laws, rules, or orders within FRA's jurisdiction have been violated and what remedial action should be taken. In addition, Inspectors must study accident trends in their inspection territory, especially those attributed to human factors and mechanical practices; to include inspections, tests and repairs. Information is available for each railroad in the Inspector's territory and will be helpful in outlining inspection plans and setting safety priorities. Site-specific inspections should be performed on the basis of each Inspector's knowledge of enforcement areas requiring more attention to ensure safety. An Inspector's knowledge of each railroad within the inspection territory should determine the types of inspections which must be performed. For example, if a recent human factors-caused accident was related to an improper air brake inspection, concentrated inspections of the railroad's air brake inspections should be conducted at various times throughout a 24-hour period, to include weekends. Where Inspectors are focusing on leading causes of accidents and injuries, their violation reports should summarize the factors underlying their decision.

In the meantime, Inspectors are encouraged to make use of data already at their disposal, including accident data, inspection data, and their own experience about the most important safety hazards. Inspectors should give this information great weight and strongly consider enforcement action whenever these especially unsafe conditions occur, with a goal of maximizing the safety return on enforcement efforts. While some enforcement actions will continue to be necessary on matters that are not likely to actually cause accidents or injuries, but violate regulations that are important underpinnings of an effective regulatory program (e.g., recordkeeping), those matters that are serious safety concerns are more likely to be the prime candidates for enforcement actions. Reporting, recordkeeping, and inspection violations become more important to the extent they are widespread and/or bear directly on compliance with substantive requirements.

Over time, this more careful focus on how enforcement discretion is exercised should significantly improve FRA's utilization of limited resources regarding compliance oversight. On the other hand, as we refine the process, we may decide to adopt a "zero tolerance" (i.e., always enforce) policy for the most egregious and flagrant violations. The goal is not to achieve a particular volume of enforcement actions on the high or low side. The goal is a compliance program in which enforcement discretion is routinely exercised in a commonsense way to address important problems that more cooperative methods have not resolved.

Interpretation of the Nationwide Mechanical Equipment Accident/Incident Statistics & Trends (Bi-annual Report): The MP&E Division reviews the accident/incident database on a continuous basis throughout the year. A report is prepared tailored to a specific railroad on a bi-annual basis (i.e. UP, CSX, NS, BNSF, KCS, Amtrak etc.). These reports display the nationwide equipment caused accident/incident trend, and recommendations from the MP&E Division to the Regional Safety Specialists and Inspectors regarding focus areas.

The analysis process for these bi-annual reports uses a "feed-back" loop, in that it takes raw data that has been organized and interpreted looking for trends. Then the charts are reviewed with Regional MP&E Specialists, representatives from the railroads, and the FRA's RSOM's. The Regional MP&E Inspectors develop focused inspections, the railroads action plans, and the RSOM's an oversight plan based upon the trends and "top-10 defects".

From the FRA's Safety Database, Inspectors can develop queries based upon "All Regions" or just their own for the "Primary Cause of Accidents" (for MP&E use "Mechanical and Electrical Failures"). The output from this query will yield the "top-10" from the Primary Cause Code ("E" (for equipment) XX (specific defect code) and "C" car or "L" (for car/locomotive). The raw data is then summarized into a series of charts based upon the actual count of incidents, then normalized by million train-miles. By normalizing the data the MP&E Inspector can compare a large Class I railroad with other railroads, regardless of class.

By graphing the raw and again for the normalized data the MP&E Inspector and Specialist will gain a powerful tool to see trends in the data. One caution is that for many of the MP&E causes of accidents/incidents, the number on a nationwide basis is very small, and on a Regional or county level may be so small that no trend can be established. The other issue is that large variations in the data may be observed, as the count from a railroad may go from 1 occurrence in a year to three, then the following year to zero. These small changes in the count will yield a large change in the graph. By normalizing the count by million-train miles, then comparing the rate to other railroads within the Class, the MP&E Inspector will be able to make a determination whether the change is of concern, or statically not important.

Examples of the FRA Safety Database outputs for selected defects such as: The Total MP&E Caused A/I Count, Axle-Caused, and Journal Bering Overheated Caused are provided for reference, along with their corresponding normalized rate charts. In addition, the MP&E Division developed a "Bad-Actor" Chart with targeted area for focused inspections on various railroads. If an "X" is annotated on the matrix, then that specific defect (such as E30-30 Coupler & Draft Gear) is either higher in count or rate than that nationwide average, or the slope of the line on the graph indicates an undesirable increase (trend) over the previous 2-3 years.

In summary, by developing a specialized “top-10” list of defects, an MP&E Inspector will gain insight into the type of mechanical defects that are causing accidents/incidents on a nationwide and/or Regional level. By paying close attention to these type of defects when conducting routine inspections, more potentially unsafe conditions will be identified and re-mediated in the yard before they can become an Accident/Incident statistic.

Nationwide Mechanical Equipment Accident/Incident Statistics & Trends (Biannual Report)

Norfolk Southern Corporation Annual Mechanical Safety Review

Motive Power and Equipment Division
Office of Safety Assurance & Compliance
Federal Railroad Administration

October 23, 2006
Washington DC



10/23/2006

Data as of June, 2006



Overview

- Goal: Optimize use of available resources
- Approach: Develop periodic reports displaying nationwide equipment-caused accidents/incidents trends, and recommend MP&E inspection targets for the Regional Specialists
- The process: How the trend charts are created?
- Additional Option: Reference for NIP adjustments

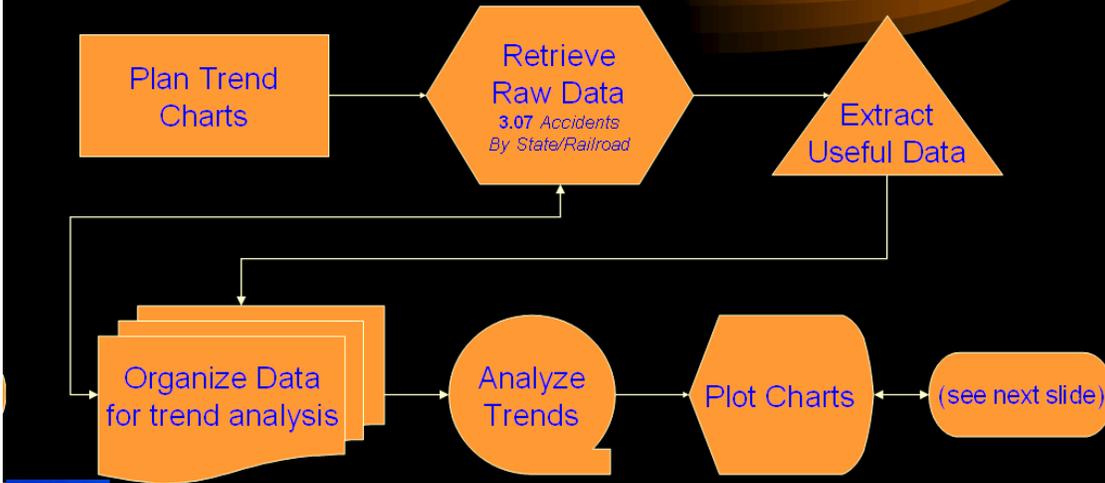


10/23/2006

Data as of June, 2006



Approach: The MP&E Analysis Process

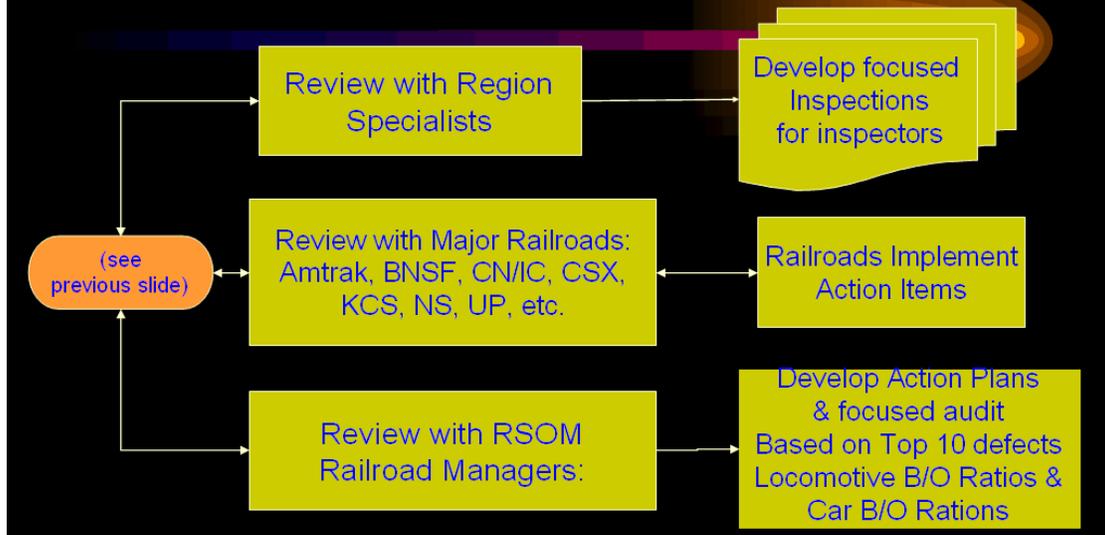


10/23/2006

Data as of June, 2006



Approach: The MP&E Analysis Process



10/23/2006

Data as of June, 2006



FRA Office of Safety Home Page - Microsoft Internet Explorer

Address: http://safetydata.fra.dot.gov/OfficeofSafety/Query/default.asp?page=incabbr.asp

Federal Railroad Administration
Office of Safety Analysis

What's New Contact
** Visitor # 450733

Home Crossing Forms/Publications Downloads Query FAQ

Abbreviated Accident Report

Railroad: [CLICK HERE FOR A COMPLETE LISTING OF RAILROADS](#)

Region:

State: County:

Type of Accident: Type of Track:

Primary Cause of Accident:

Hazmat Options:

Passenger Trains Only:

Damages:

Report Sort Order:

Search Time Frame:

For Train Accidents occurring through the end of December, 2002

FRA Office of Safety Home Page - Microsoft Internet Explorer

Address: http://safetydata.fra.dot.gov/OfficeofSafety/Query/default.asp?page=incabbr.asp

Federal Railroad Administration
Office of Safety Analysis

What's New Contact
** Visitor # 450591

Home Crossing Forms/Publications Downloads Query FAQ

Date Selected - Jan through Dec, 2002

ALL REPORTS FOR ALL RAILROADS ARE SHOWN. PRIMARY CAUSE OF ACCIDENT DEFINED BY FIRST POSITION OF CAUSE, T = TRACK, H = HUMAN FACTOR, E = EQUIPMENT, S = SIGNAL, M = MISCELLANEOUS

Acc Rpt Nbr	Report RR Number	Mo	Day	ST	County	Type Track	Trk Maint	Type Acc	Pri Cause	Cont Cause	Equip Damage	Track Kld Inj	RR Equip	Spd Npht	Locos Der	Cars Der		
1NS	007580	01	03	VA	MONTGOMERY	Main	NS	Der	E41C		4,312	291,882	0	0	FREIGHT TRAIN	021	0	1
2NS	007826	01	23	VA	BEDFORD	Main	NS	Der	E53C		4,000	35,000	0	0	FREIGHT TRAIN	013	0	6
3NS	008223	02	28	PA	BEAVER	Main	NS	Der	E47C		120,154	45,000	0	0	FREIGHT TRAIN	023	0	4
4NS	008303	03	08	MI	JACKSON	Main	NS	Der	E00C		38,600	3,500	0	0	FREIGHT TRAIN	043	1	9
5NS	008313	03	08	GA	HARRIS	Main	NS	Der	E53C		10,200	19,000	0	0	FREIGHT TRAIN	028	0	6
6NS	008800	03	08	PA	NORTHUMBERLAND	Main	NS	Oth	E61C		1,000	7,000	0	0	FREIGHT TRAIN	045	0	0
7NS	008578	03	27	PA	INDIANA	Industry	NS	Der	E45C		20,800	0	0	0	FREIGHT TRAIN	008	0	4
8NS	008543	03	29	PA	CUMBERLAND	Yard	NS	Coll	E30C		16,850	0	0	0	CUT OF CARS	000	0	0
8NS	008543	03	29	PA	CUMBERLAND	Yard	NS	Coll	E30C		14,300	0	0	0	CUT OF CARS	000	0	0
8NS	008543	03	29	PA	CUMBERLAND	Yard	NS	Coll	E30C		0	500	0	0	YARD/SWITCHING	006	0	5
9NS	008554	03	31	NC	DAVIDSON	Yard	NS	Der	E39C		11,595	0	0	0	YARD/SWITCHING	004	0	1
10NS	008652	04	10	PA	CAMBRIA	Main	NS	Der	E36C		49,878	200	0	0	FREIGHT TRAIN	018	0	2
11NS	008755	04	20	IN	DELAWARE	Main	NS	Der	E41C		5,000	2,500	0	0	FREIGHT TRAIN	028	0	2
12NS	008804	04	24	OH	HAMILTON	Yard	NS	Der	E39C		5,700	2,500	0	0	YARD/SWITCHING	004	0	3
13NS	008961	05	11	OH	FRANKLIN	Main	NS	Der	E00C		8,200	1,500	0	0	FREIGHT TRAIN	014	0	8
14NS	009980	07	01	GA	JACKSON	Siding	NS	Der	E08L		45,494	250	0	0	LIGHT LOCO(S)	020	1	0
15NS	009714	07	28	PA	HUNTINGDON	Main	NS	Der	E53C		275,864	46,723	0	0	FREIGHT TRAIN	045	0	21
16NS	009762	08	03	AL	COLBERT	Main	NS	Der	E99L		76,870	92,608	0	0	FREIGHT TRAIN	019	0	30
17NS	009892	08	19	VA	WISE	Main	CSX	Der	E51C		850	0	0	0	FREIGHT TRAIN	024	0	1
17NS	080204008	08	19	VA	WISE	Main	CSX	Der	E51C		0	15,000	0	0	NOT RPD OR N/A	000	0	0
18NS	009947	08	27	VA	WISE	Main	NS	Der	E68C		643	198,504	0	0	FREIGHT TRAIN	022	0	1
19NS	010142	09	17	KY	JEFFERSON	Yard	NS	Oth	E39C		28,700	200	0	0	YARD/SWITCHING	004	0	2
20NS	010162	09	19	WV	WYOMING	Main	NS	Der	E41C		50	10,000	0	0	FREIGHT TRAIN	017	0	1
21NS	010328	10	08	GA	BIBB	Main	NS	Der	E67C		14,500	1,000	0	0	FREIGHT TRAIN	024	0	3
22NS	010557	10	11	AL	TUSCALOOSA	Main	NS	Der	E02C		30,600	50	0	0	FREIGHT TRAIN	012	0	3
23NS	010441	10	19	KY	MARTIN	Industry	NS	Der	E85C		3,803	14,281	0	0	FREIGHT TRAIN	001	0	6
24NS	010611	11	06	VA	ROANOKE	Yard	NS	Der	E39C		17,564	0	0	0	YARD/SWITCHING	004	0	2
25NS	010633	11	07	VA	PRINCE WILLIAM	Yard	NS	Der	E67C		6,000	1,500	0	0	FREIGHT TRAIN	005	0	1
25NS	010633	11	07	VA	PRINCE WILLIAM	Yard	NS	Der	E67C		2,350	0	0	0	CUT OF CARS	000	0	0
26NS	010900	12	02	VA	ROANOKE	Yard	NS	Der	E21C		21,000	0	0	0	YARD/SWITCHING	004	0	1
27NS	010958	12	05	VA	NOTTOWAY	Yard	NS	Oth	E39C		156	24,725	0	0	FREIGHT TRAIN	003	0	2
28NS	010979	12	07	GA	TELFAIR	Main	NS	Der	E53C		47,600	51,800	0	0	FREIGHT TRAIN	031	0	8
28NS	010979	12	07	GA	TELFAIR	Main	NS	Der	E53C		1,000	0	0	0	CUT OF CARS	000	0	0
29NS	010991	12	08	GA	RICHMOND	Yard	NS	Oth	E39C		18,700	0	0	0	YARD/SWITCHING	004	0	0
30NS	011104	12	18	AL	MADISON	Siding	NS	Oth	E08C		6,750	2,500	0	0	FREIGHT TRAIN	007	0	1
31NS	011126	12	20	VA	NOTTOWAY	Yard	NS	Oth	E39C		13,000	0	0	0	YARD/SWITCHING	003	0	2

Results-Nationwide Trends

- **Summary charts:**

- Train-miles—Normalization factor
- Total equipment-caused trend
- Chart of targets for MP&E inspection

- **Detailed charts—A/I counts & rates, A/I causes breakdown by system:**

- Brake
- Truck
- Axle & Journal Bearing
- Body
- Wheels, Locomotive
- Locomotives
- Coupler & Draft
- Wheels, Car
- Door



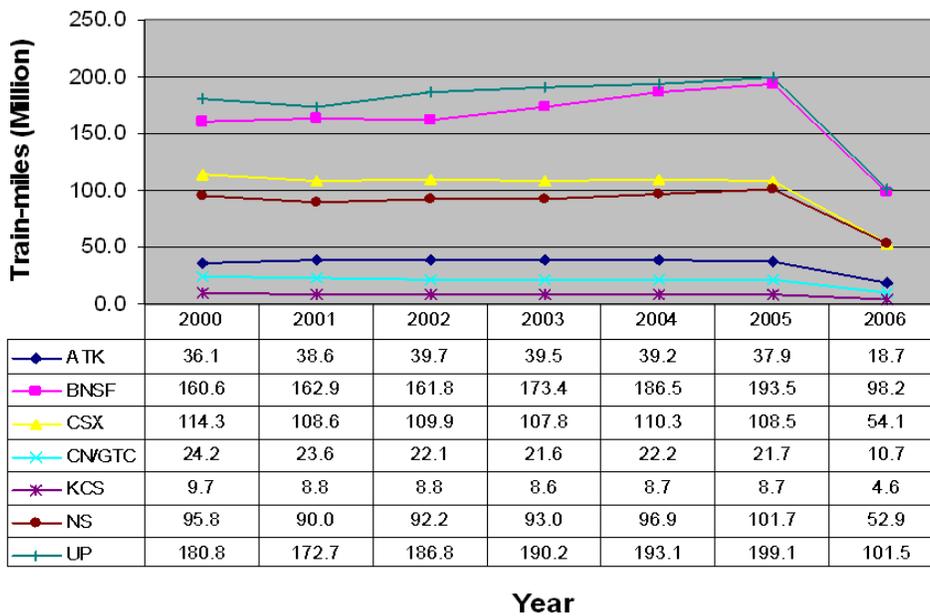
10/23/2006

Data as of June, 2006



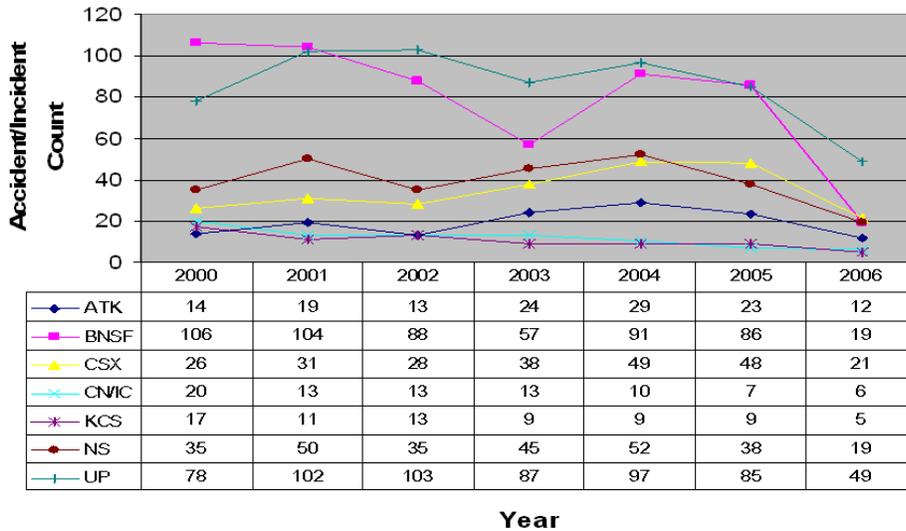
Normalization Factor: Train-Miles (Millions)

Data Source: <http://safetydata.fra.dot.gov/OfficeofSafety/>



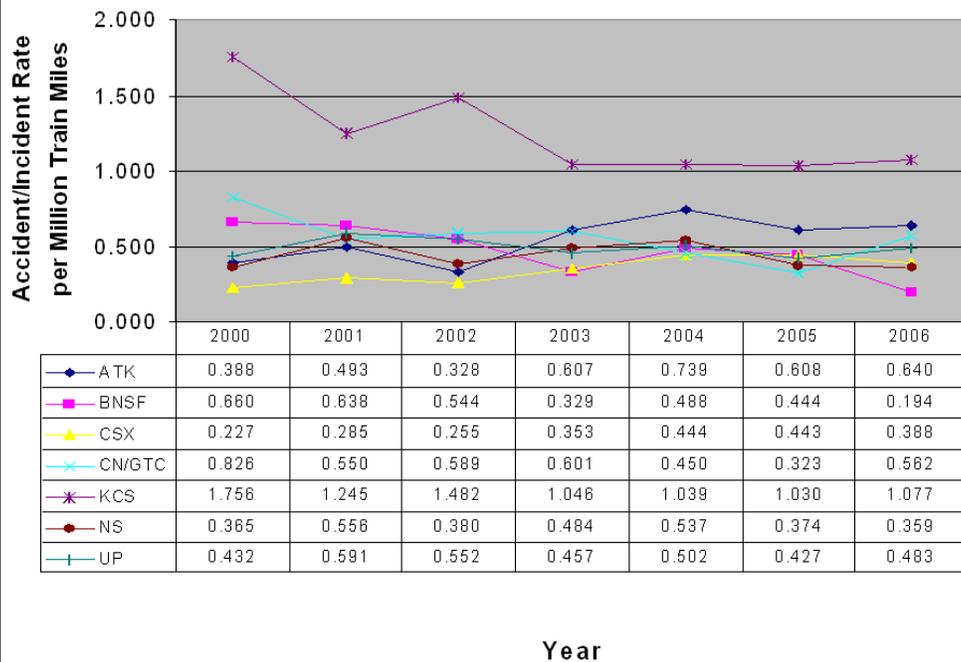
Total MP&E-Caused A/I Count

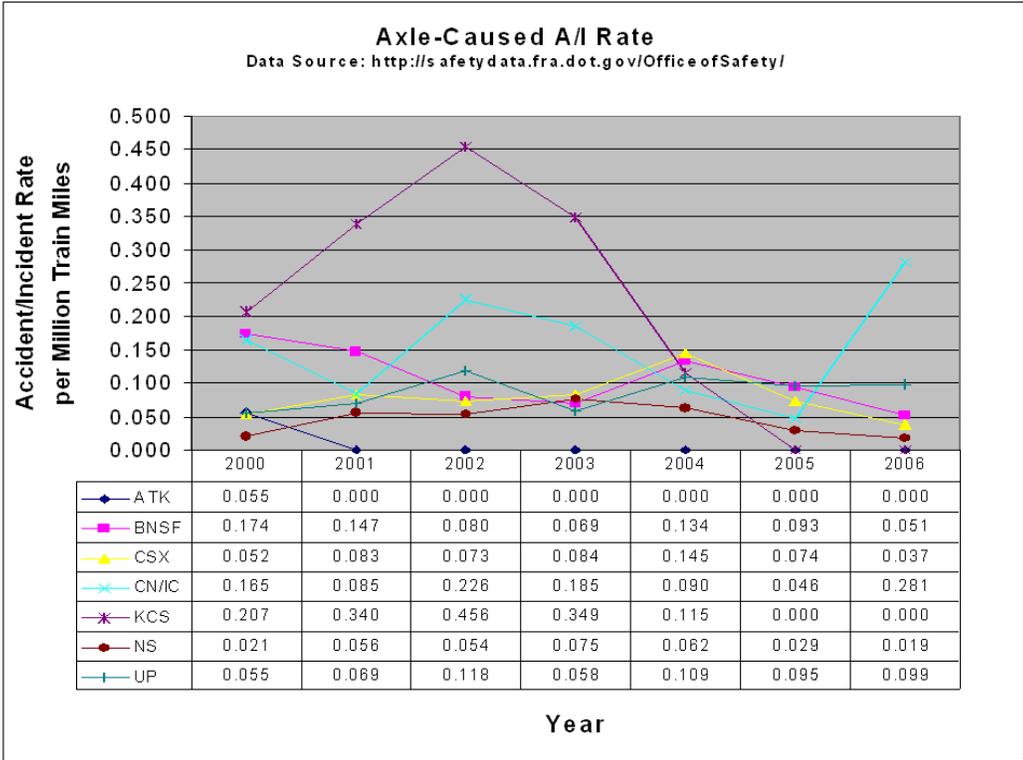
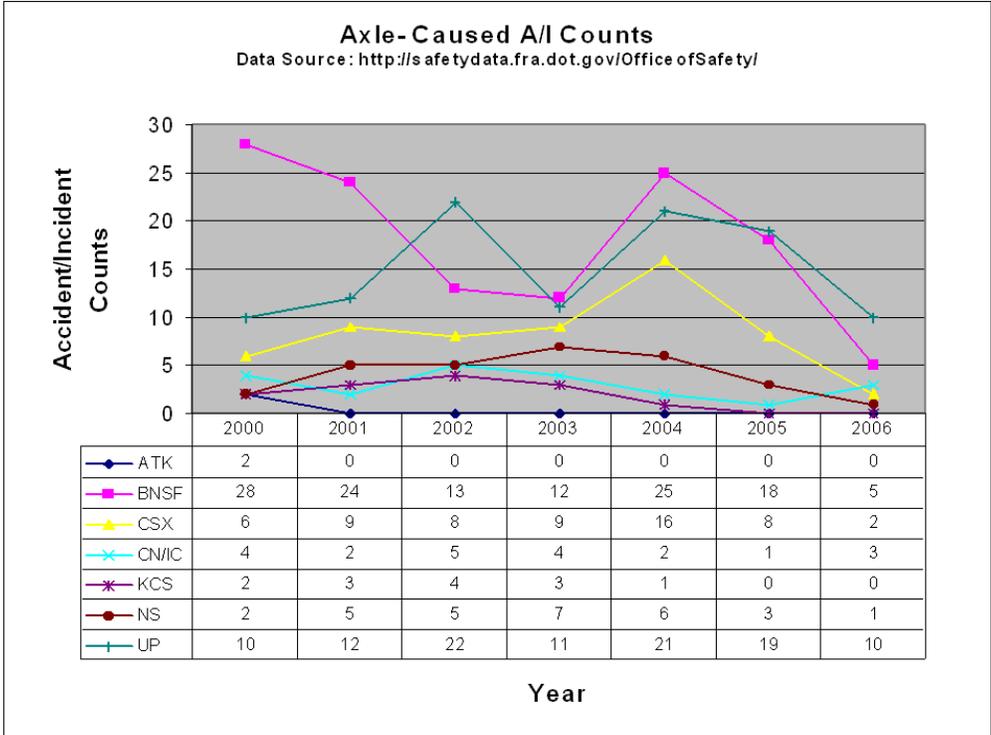
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Total MP&E A/I Rate

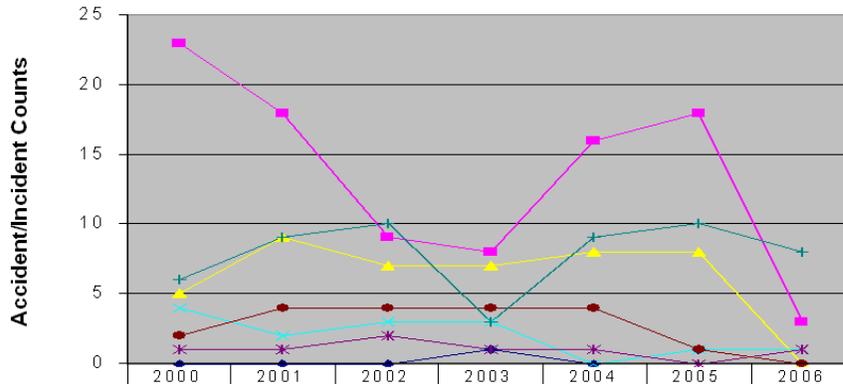
Data Source : <http://safetydata.fra.dot.gov/OfficeofSafety/>





Journal Bearing Overheat Caused A/I (E53) Counts

Data Source: <http://safetydata.fra.dot.gov/OfficeofSafety/>

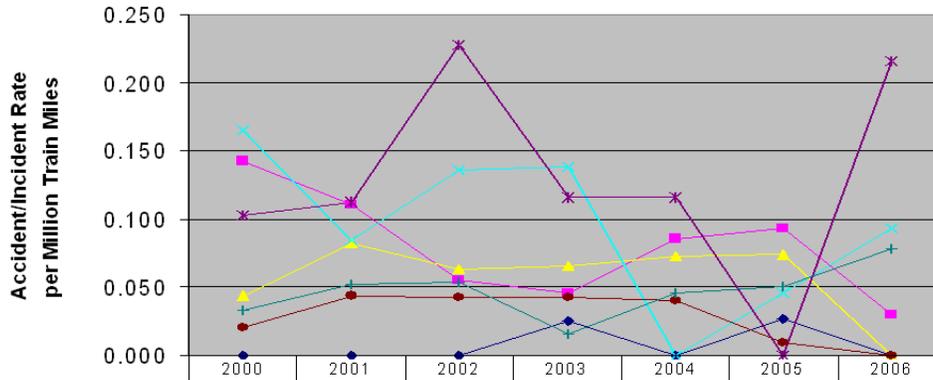


Year	ATK	BNSF	CSX	CN/ICC	KCS	NS	UP
2000	0	23	5	4	1	2	6
2001	0	18	9	2	1	4	9
2002	0	9	7	3	2	4	10
2003	1	8	7	3	1	4	3
2004	0	16	8	0	1	4	9
2005	1	18	8	1	0	1	10
2006	0	3	0	1	1	0	8

Year

Journal Bearing Overheat Caused A/I (E53) Rates

Data Source: <http://safetydata.fra.dot.gov/OfficeofSafety/>



Year	ATK	BNSF	CSX	CN/ICC	KCS	NS	UP
2000	0.000	0.143	0.044	0.165	0.103	0.021	0.033
2001	0.000	0.110	0.083	0.085	0.113	0.044	0.052
2002	0.000	0.056	0.064	0.136	0.228	0.043	0.054
2003	0.025	0.046	0.065	0.139	0.116	0.043	0.016
2004	0.000	0.086	0.073	0.000	0.115	0.041	0.047
2005	0.026	0.093	0.074	0.046	0.000	0.010	0.050
2006	0.000	0.031	0.000	0.094	0.215	0.000	0.079

Year

“Bad-Actor” Chart Targets for MP&E Inspection

Cause Code	E00 -09	E20 -29	E30 -39	E40 -49	E50 -59	E53	E60L -69L	E60C -69C	E70 -79	E80 -89	E90 -99
Category	Brake	Body	Coupler & Draft Gear	Truck	Axle	Journal Brg Overheat	Locomotive Wheel	Car Wheel	Locomotive	Door	General
									X		
					X	X	X				
	X	X	X		X					X	
	X				X	X		X		X	
	X		X	X		X		X			
		X		X						X	
		X		X	X		X	X			

X: Indicates the a/l rate is relatively high or is on the rise in the last 2-3 years.
 *Data cover a period from January 2000 through June 2006.
 *Data have been normalized by million train-miles.