ASSOCIATION OF
AMERICAN RAILROADS

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Assistant General Counsel

July 12, 2018

Ronald Batory
Administrator
Federal Railroad Administration
1200 New Jersey Ave, S.E.
Washington, D.C. 20590

Re: Petition for a Brake System Safety Standards Rulemaking

Dear Mr. Batory:

Pursuant to 49 C.F.R. Part 211, the Association of American Railroads ("AAR") requests, on behalf of itself and its member railroads, that the Federal Railroad Administration ("FRA") replace the existing four-hour off-air restrictions in 49 C.F.R. Part 232 with a 24-hour/48-hour off-air restriction.[1] More specifically, AAR requests that FRA modify the four-hour off-air restrictions in 49 C.F.R. §§ 232.205, 232.209, 232.211, and 232.217, consistent with the text in the attached Appendix 1, to permit a car or cars that have been off-air for up to 24 hours, or up to 48 hours if FRA is notified, to operate without receiving a brake test based solely on time off-air.[2]

The proposed rule change reflects substantial advancements in air brake technology since the four-hour off-air restrictions in Part 232 issued, will harmonize U.S. and Canadian operations, and will reduce compliance costs and increase efficiency for the industry without any adverse impact on safety.[3]

This petition responds to FRA's letter, in response to AAR's December 20, 2017 request for a waiver of the existing rules, that AAR proceed instead through a petition for rulemaking.[4] The content of this petition encompasses, in large part, the substance of AAR's prior request for waiver, as well as information from subsequent discussions with and guidance from FRA staff. In

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1 AAR is a trade association whose membership includes freight railroads that operate 83 percent of the line-haul mileage, employ 95 percent of the workers, and account for 97 percent of the freight revenues of all railroads in the United States; and passenger railroads that operate intercity passenger trains and provide commuter rail service.

2 The 48-hour provision is intended to be used as is the current practice in Canada, which is sparingly and for extreme weather or other unplanned events.

3 The four-hour off-air restrictions can be found at 49 C.F.R. §§ 232.205(b), 232.209(a), 232.211(a) and 232.217(c). *See* proposed regulatory changes in the attached Appendix 1.

4 *See* Docket No. FRA-2017-0130.

light of this history, and of the substantial evidence presented here in support, we request expedited consideration and handling of this petition.

I. The Safety Case for the Proposed Rule Change

1. Substantial Safety Improvements in Air Brake Technology Make More Frequent Testing Unnecessary.

Train brake requirements were put in place to safeguard against inadvertent train movement due to air leaking from the braking system.[5] However, air brake technology has benefited from many advancements since the Power Brake Act of 1958, the foundation for the current regulations.[6] Although FRA revised the air brake regulations in 2001, this revision did not fully reflect the safety enhancements gained since the 1950's.[7] Leakage on standing trains has been greatly reduced by welded brake piping and fittings and ferrule-clamped air hoses. The rail industry no longer uses grip type fittings, in accordance with interchange rules. Most U.S. locomotives are equipped with operable air driers or other systems to remove moisture and contaminants from the air supply system. Freight car control valves have seen continuous improvements since the last regulatory change. The industry has also adopted and complies with federal requirements to perform biannual inspections on yard air sources used to perform brake inspections.[8] Since 2001, railroads have invested millions of dollars to add automatic drains to compressed air storage tanks, air driers to yard air systems, and oil/contaminant separators to keep the compressed air system clean. Analog yard air test devices are tested for accuracy at regular intervals to ensure pressure measurements remain consistent. These and other improvements in air brake technology and testing and maintenance procedures mean that rail cars today can safely be kept off-air for extended periods of time – indeed, well beyond 24 hours -- without requiring a Class I brake test.

There have also been many broad advancements in the safety of railroad operations since the last modifications were made to the air brake inspection regulations in 2001. Many of these further reduce the need for frequent and repeated air brake testing. For example, significant investment and development has been made into the wayside detector network, which allows railroads to prevent damage and accidents before they can occur. Positioned along the 140,000 miles of railroad, multiple kinds of wayside detectors monitor passing trains and alert train crews if there is a safety critical problem with any car or locomotive in their train. Some detectors alert rail car owners to potential defects, enabling them to schedule appropriate maintenance in a safe,

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5 66 Fed. Reg. 4,104 at 4,122 (Jan. 17, 2001).
6 72 Stat, PL 85-375 (Apr. 11, 1958).
7 66 Fed. Reg. 4,104 (Jan. 17, 2001).
8 49 C.F.R. § 232.107.

timely, and cost-effective manner.[9] The data collected by these sensors is pooled as part of the Asset Health Strategic Initiative, an innovative industry-wide collaboration to enhance safety. This collaboration enables railroads to identify and address equipment problems with greater speed and accuracy. In particular, wheel temperature detectors and other emerging technologies provide the industry with insight on brake health effectiveness.

Finally, rail safety statistics show a positive correlation between increased time off-air and safety improvement. Since the 2001 rule change, which increased off-air limits from two to four hours, train accidents per million train-miles have dropped 43%. Further, equipment-caused train accidents have dropped 43% since 2001 and brake equipment-related train accidents in 2017 were 16% lower than in 2001.[10] In fact, 2017 was one of the safest years on-record for the U.S. rail industry.

2. Substantial Data Shows Safety Will Not Be Compromised.

AAR gathered data and information from its member railroads and determined that no safety risk is created by having freight railcars off-air for days. Indeed, a freight car may dwell for several days after its arrival to a rail terminal, spending virtually all its time off-air. These cars receive and routinely pass initial terminal tests without regard to the length of time they have been off air.

In response to FRA's concerns pertaining to off-air time, AAR compiled a Failure Modes and Effect Analysis ("FMEA"), which is a fault-tree analysis of known air brake defects. This analysis examines potential air brake failure modes and determines the probability that the removal of the car from a source of air was the cause of the failure. *See* Appendix 2. None of the known brake failure modes can be correlated with or attributed to time off-air.

This result is not surprising. Because all equipment receives a Class I brake test prior to entering service, any defective air brake system would be identified before it was deployed. In addition, adding a car or block of cars to a train requires a Class III brake test to ensure the integrity of the train's brake pipe.[11] Given the FMEA analysis, and the other required testing for braking systems, the four-hour off-air rule requires unnecessary redundant testing of equipment that has already been successfully tested.

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9 Including hot box and dragging equipment detectors, acoustic bearing detectors, truck performance detectors, wheel impact load detectors, and wheel profile measurement systems.

10 2001 is used as the base year because it is when the most recent air brake regulations were promulgated.

11 49 C.F.R. § 232.211

3. The Requested 24/48-Hour Rule Has Been Successfully Implemented in Canada, and Will Align U.S. and Canadian Operating Rules.

Canada's Railway Freight and Passenger Train Brake Inspection and Safety Rules permit cars to be off-air for up to 24 hours (or up to 48 hours after notifying Transport Canada) without the equivalent of a Class I brake test. *See* Appendix 3. Not only is the rail operating environment in Canada substantially like the U.S. rail operating environment, an extensive number of rail cars are operated in both countries. As this equipment can operate safely in Canada off-air for 24 hours, or 48 hours with notification to Transport Canada, there is no reason to suspect that it could not be operated safely in the U.S. under the same circumstances. The attached Appendix 4 provides information about the airbrake defect ratio at three US operations and one Canadian operation. The data shows that there is a statistical similarity between the rate of airbrake defects between cars operating in the United States with the four-hour off-air limitation and cars operating in Canada that can be off-air for up to 48 hours. The airbrake defect rates for both types of operations is around one-tenth of a percent and, as the FMEA shows, none of the defects can be attributed to time off-air.

4. Cold Weather Does Not Affect Outcomes.

In the 2001 rulemaking, FRA expressed concern that cold weather could affect the performance of the air brake system. The agency stated "FRA. . . believes[s] that in certain circumstances the length of time that equipment is removed from a source of compressed air can impact the integrity and operation of the brake system on a vehicle or train. Particularly in cold weather situations where freeze-ups in train brake systems can occur. . ."[12] However, industry testing does not support these concerns. In 2015, the Transportation Technology Center, Inc. ("TTCI") conducted Class I brake tests ten times over the course of five days on a block of cars, to understand the stability of a railcar's brake system at a variety of air temperatures and time off air. The tests concluded that there was no change in the brake system performance of any of the cars throughout the course of the testing regardless of the air temperature, amount of time off air prior to the test, or cumulative time elapsed after the initial test.[13]

This result is not surprising considering improvements in air brake technology that mitigate the impact of cold weather on the modern air brake system. Today's locomotives are equipped with air dryers or other apparatuses to remove contaminants from the airbrake supply, which dramatically reduce moisture in the brake pipe, reducing the risk of freezing in cold weather. Railroads also comply with detailed written operating procedures tailored to the equipment and

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12 66 Fed. Reg. 4,104 (Jan. 17, 2001) at 4,122.

13 *See* Cummings, S. & Williams, J. (2015). *Off Air Time Limits* (TD-15-036). Pueblo, CO: Transportation Technology Center, Inc. Provided as Appendix 5.

territory of the railroad to cover safe train operations during cold weather.[14] Pursuant to federal regulations, railroads also maintain automatic drains on yard air storage tanks and have yard air condition monitoring to greatly reduce contaminants in the brake pipes.[15] Data provided from one of AAR's Class I member railroads shows that the average brake pipe leakage for trains receiving a Class I brake test at several major terminals was less than 1.8 psi over a year.[16] Further, Canadian railroads have not logged a single incident in brake reliability associated with the Canadian 24/48-hour rule, and Canadian operations in general occur in a much colder climate compared to the U.S. Clearly, cold weather does not impact the braking performance of cars that have been off-air for extended periods of time.

5. Securement of Equipment Will Not Be Not Compromised.

In the 2001 rulemaking, FRA expressed concern that allowing equipment to remain off-air for over four hours would expand the window of opportunity for vandalism.[17] However, in addition to federal securement requirements, railroads have internal procedures in place that mitigate the risk of vandalism of railroad property and railroad rolling stock materials.[18] Airbrakes are never relied upon to hold a standing train - handbrakes must be applied, and tested, to secure unattended equipment from inadvertent movement. This applies to cars on-air or off-air, trains left standing when unattended, or cars left standing when unattended. Additionally, cars remaining off-air are still subject to the Class III brake test requirements. Finally, two-way telemetry provides real-time feedback to the engineer and any failure to respond to any increase or decrease in brake pipe pressure would be immediately apparent to the operator at the locomotive controls.

II. The Benefits to the Public and to the Regulated Industry of the Proposed Rule Change

Communities frequently complain to the railroads, FRA, and the media regarding diesel fumes from idling locomotives. Additionally, communities often complain about the noise, vibration, and emissions from idling trains. As reported in the media, FRA rules "make it impractical to stop idling completely." Redundant and unnecessary air brake testing is one of those regulations that impede reduced idling. In addition to allowing railroads to reduce idling time and thereby reduce community concerns, increasing the off-air restriction time period will have tangible environmental benefits. AAR estimates that approximately 92,500 hours of locomotive idling can be eliminated annually by increasing the off-air restriction from four to 24

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14 49 C.F.R. § 232.107(e).
15 49 C.F.R. § 232.107(a) and (d).
16 The sample size was approximately 35,000 brake tests.
17 66 Fed. Reg. 4,104 (Jan. 17, 2001) at 4,122.
18 80 Fed. Reg. 47,351 (Aug. 6, 2017). 49 C.F.R. § 232.103(n).

hours. This reduction in idling would result in an annual savings of approximately $2 million in fuel and a reduction of 3,600 tons of CO^2 emissions. Also, AAR member railroads anticipate that this proposed regulatory change will yield savings from the maintenance and new installation of a percentage of air supply systems in train yards.[19] Finally, the industry expects a reduction in nuisance complaints triggered by idling trains.

In addition to the environmental benefits and fuel savings, allowing equipment to be off-air for longer periods will eliminate the need for employees to unnecessarily walk trains to inspect air brake equipment and conduct redundant tests. AAR calculates that, assuming a railroad would save one hour of time from extra moves that currently are performed simply to move cars to yard air sources, or to keep locomotives attached to cars to avoid exceeding the 4-hour rule, the industry will save approximately $2.6 million annually.[20] Importantly, increasing the off-air restriction from four to 24/48 hours will reduce employee exposure to safety hazards including slips, trips, and falls, inclement weather, and passing trains on adjacent tracks.[21]

Finally, FRA should also incorporate savings associated with more efficient use of locomotives. Locomotives currently being used to keep cars on air would be free for use in providing transportation service to customers. AAR estimates that this proposed regulatory change would also save the industry $7 million annually, which is based upon the value of a locomotive in service, or the horsepower hour cost.[22]

The total estimated annual cost savings presented by this petition for rulemaking is approximately $11.6 million.

III. Responses to Comments in Docket No. FRA-2017-0130

AAR initially sought regulatory relief pursuant to a waiver, which FRA denied on June 19, 2018.[23] Two of the four public comments received supported the petition.[24] However, the other comments, from the Transport Workers Union of America, AFL-CIO and joint comments from the American Train Dispatchers Association, the Brotherhood of Locomotive Engineers and Trainmen,

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19 One AAR member railroad reports that they would be able to eliminate approximately $600 million in capital expenditures and $75,000 annually for maintenance costs related to yard air supply systems if this regulatory change is adopted.

20 This assumes an hourly labor rate of $139 multiplied by 18,500 hours of work, which is 20 percent of the annual hours of estimated locomotive idling.

21 *See* AAR's analysis of employee injuries while conducting injuries and the relevant casualty reports in Appendix 6.

22 This assumes a value of $75 an hour for the horsepower hour cost multiplied by 92,500 hours of idling. Horsepower hour is a metric used by the railroads to quantify the value of an hour of locomotive power.

23 *See* Docket No. FRA-2017-0130.

24 *See* comments from the American Short Line and Regional Railroad Association and the joint comments submitted on behalf of Wabtec and New York Air Brake.

the Brotherhood of Railroad Signalmen, the Brotherhood Railway Carmen Division TCU/IAM, and Sheet Metal, Air, Rail and Transportation, expressed concerns regarding the petition. We have taken this opportunity to respond to issues raised in the comments regarding employee injuries, the breadth of the data provided on air brake defects, and notification to railroad employees.

The comments requested that AAR provide data identifying employees who have been injured while performing inspections necessitated by the 4-hour off-air rule. In response to this concern, AAR is providing data derived from FRA's public website, which shows that hundreds of freight railroad worker injuries occur on or near track while walking "on, beside or between track" or "alongside on track equipment."[25] While the data does not reflect how many of these injuries occurred while conducting freight air brake tests, reducing the number of brake inspections would undeniably reduce the exposure to the possibility of such injuries. Information in the narrative statements does provide examples of anecdotal support for this obvious proposition: in January 2017, an employee was performing a brake test on an outbound train when he stepped out from the cars and the ballast shifted rolling his ankle causing him to fall resulting in a shoulder tear; in August 2014 and 2015, conductors walking the train as part of a brake tests at night were assaulted and suffered injuries; and in September 2014, a conductor walking a brake test hit his head on a railcar.[26] Clearly, a reduction in the amount of time that employees spend walking on, beside or between track will result in a reduction in these types of injuries.

The comments also claim that data collected from the TTCI test is not indicative of rail operations over the entire rail network. This objection overlooks the fact that the AAR waiver petition also provided air brake failure information from four yards in the U.S. and Canada as shown in the attached Appendix 4. This data represents over 3 million air brake tests. The locations from which the data was collected are in different areas in the US and Canada, and data was collected throughout an entire calendar year. This data set demonstrates that climate and seasonality does not affect the air brake failure rate. Further, each yard in the appendix is a hump yard. Operational practices dictate that for cars classified at hump yards, once a car arrives, it is placed off-air. The data shows that an average dwell time for a car in a hump yard in the U.S. and Canada is approximately 26 hours. Additionally, the failure rate data provided in the attached Appendix 7 compares line-of-road failure, no-cause-found events in the U.S. to those in Canada. The data shows that failure rates are not higher in Canada, even though cars can remain off-air for 24 hours or longer. Collectively, the data, which goes well beyond the TTCI tests, shows that substantially longer periods off-air do not impact brake performance.

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25 *See* The FRA Office of Safety Analysis Website, available at https://safetydata.fra.dot.gov.

26 *See* Appendix 6.

Finally, the comments claim that increasing the time off-air will require yard personnel, qualified inspectors and train crews to speculate as to whether the cars they have on their train were tested or not. No railroad would require its staff to speculate on whether a car has been tested. Each railroad will use its own process to track time off-air and demonstrate compliance with the revised rule.[27]

* * *

For all the foregoing reasons, AAR requests a rulemaking to modify the four-hour off-air restrictions in 49 C.F.R. §§ 232.205, 232.209, 232.211, and 232.217, consistent with the text in Appendix 1, to permit a car or cars that have been off-air for up to 24 hours, 48 hours if FRA is notified, to operate without receiving a Class I, Class II, or Class III brake test based solely on time off-air.

Sincerely,

Sarah Yurasko

Sarah G. Yurasko

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[27] The labor comments also argued that FRA's waiver process "contemplates that an individual railroad is the appropriate petitioner for relief." On the contrary, the regulations do not prohibit an association from submitting a petition; they provide that "any person" may petition FRA for issuance, amendment, repeal or waiver of any rule or regulation. 1 U.S.C. § 1 defines "person" to include corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals. Indeed, petitions by AAR have proven to be an efficient means of coordinating the interests of all AAR member railroads regarding a shared initiative. See, e.g., Docket No. FRA 2005-21613, Docket No. FRA 2013-0077, and Docket No. FRA 2015-0105.

APPENDIX 1

Proposed Regulatory Text

1. Revise § 232.205 to read as follows:

§ 232.205 Class I brake test-initial terminal inspection.

* * *

(b) Except as provided in § 232.209, each car and each solid block of cars added to a train shall receive a Class I brake test as described in paragraph (c) of this section at the location where it is added to a train unless:

(1) The solid block of cars is comprised of cars from a single previous train, the cars of which have previously received a Class I brake test and have remained continuously and consecutively coupled together with the train line remaining connected, other than for removing defective equipment, since being removed from its previous train and have not been off air for more than 24 hours, or 48 hours after notification to FRA; or

* * *

2. Revise § 232.209 to read as follows:

§ 219.209 Class II brake tests-intermediate inspection.

(a) At a location other than the initial terminal of a train, a Class II brake test shall be performed by a qualified person, as defined in §232.5, on the following equipment when added to a train:

(1) Each car or solid block of cars, as defined in §232.5, that has not previously received a Class I brake test or that has been off air for more than 24 hours, or 48 hours after notification to FRA;

* * *

3. Revise § 232.211 to read as follows:

§ 219.211 Class III brake tests-trainline continuity inspection.

(a) A Class III brake test shall be performed on a train by a qualified person, as defined in §232.5, to test the train brake system when the configuration of the train has changed in certain ways. In particular, a Class III brake test shall be performed at a location where any of the following changes in the configuration of the train occur:

* * *

(3) At a point other than the initial terminal of the train, where a car or a solid block of cars that is comprised of cars from only one previous train the cars of which have remained continuously coupled together with the trainline remaining connected, other than for removing defective equipment, since being removed from its previous train that has previously received a Class I brake test and that has not been off-air for more than 24 hours, or 48 hours after notification to FRA, is added to a train;

* * *

4. Revise § 232.217 to read as follows:

§ 219.217 Train brake tests conducted using yard air.

* * *

(c) Except as provided in this section, when yard air is used the train air brake system must be charged and tested as prescribed by §232.205(c) and when practicable should be kept charged until road motive power is coupled to train, after which, a Class III brake test shall be performed as prescribed by § 232.211.

(1) If the cars are off air for more than 24 hours, or 48 hours after notification to FRA, the cars shall be retested in accordance with §232.205(c) through (f).

* * *

APPENDIX 2

Failure Modes and Effects Analysis (FMEA)-24 Hour Off Air			
Failure Mode	**Possible Cause**	**Minimum Mitigation**	**Affected by time off air**
Train Service Brake Fails to Apply	Closed Angle Cock	Class III test / 232.211	No
	Obstructed Brake Pipe	Class III test / 232.211	No
	Blocked Brake Pipe	Class III test / 232.211	No
	Incomplete system charge	RR OP Rules / AFM	No
	Locomotive set-up improperly	Class III test / 232.211	No
Train Brake Fails to Stay Applied	Auxiliary Reservoir leakage (High # Cars Req'd)	Class 1 / 232.205	No
	False gradient at time of application, undesired release	RR OP Rules	No
Brake Fails to Release	Brake Pipe leakage	Air Flow Meter / 232.103(m)	No
	Retainer set to high pressure	Wayside Detection	No
	Blocked Brake Pipe	Class III test	No
	Hand Brake set	Wayside Detection	No
	False gradient at time of application, stuck brakes	RR OP Rules / AFM	No
	Car system charged to higher pressure than train BP setting	RR OP Rules	No
	Closed Angle Cock	Class III test / 232.211	No
	Obstructed Brake Pipe	Class III test / 232.211	No
Emergency Brake Fails to Propogate Along the Brake Pipe or Activate at a Single Car	Closed Angle Cock	Class III test / 232.211	No
	Blocked Brake Pipe	Class III test / 232.211	No
	Obstructed Brake Pipe	Class III test / 232.211	No
	Locomotive set-up improperly	Class III test / 232.211	No

APPENDIX 3

RAILWAY FREIGHT AND PASSENGER TRAIN BRAKE INSPECTION AND SAFETY RULES

October 27, 2014

Contents

PART I – GENERAL

1. SHORT TITLE

1.1 For ease of reference, these rules may be referred to as the "Train Brake Rules".

2. SCOPE

2.1 These Rules prescribe the minimum safety standards for the safe operation of train brakes on all freight and passenger trains operated by a railway company subject to the jurisdiction of Transport Canada pursuant to the *Railway Safety Act*.

3. DEFINITIONS

In these Rules:

3.1 "bad order" means railway equipment that has been identified with a defect.

3.2 "bad order card" means a railway company form that is affixed to railway equipment to indicate repair or maintenance requirements.

3.3 "bad order information system" means any method by which a railway company can monitor, control and protect the movement of railway equipment identified with defects.

3.4 "block of cars" means two (2) or more cars that have previously received a No.1 or No.1A brake test, as a solid coupled block, for which a record is available.

3.5 "block swap" means the addition to a train of a maximum of two (2) solid coupled block(s) of cars that have previously received a No.1 brake test.

3.6 "brakes" means pneumatic (air) or electronically controlled pneumatic (ECP) brake systems.

3.7 "brake indicator device" means any device used to indicate the application and release of the brakes when the piston is not visible.

3.8 "brake system defect" means a defective or inoperative brake component that prevents the brake system from functioning as intended.

3.9 "brake test" means a test performed for the purpose of establishing that the brake system functions as intended, as outlined in Part II of these Rules and railway company procedures/work instructions.

3.10 "cab control car" means a railway vehicle without propelling motors with one or more control stands.

3.11 "calibrated" means an indication on the airflow indicator at a position that corresponds to a flow of air into the brake pipe of sixty (60) cubic feet (one point seven (1.7) cubic metres) per minute.

3.12 "certified car inspector" means a person who is trained, qualified and certified to inspect and maintain car brake equipment.

3.13 "continuity" means the capability of transmitting a signal between the leading locomotive and the rear of the last piece of equipment of a train.

3.14 "conventional train" means a train with the brake pipe air supplied from the controlling locomotive only.

3.15 "Department" means the Department of Transport.

3.16 "dynamic brake" means a train braking system whereby the kinetic energy of a moving train is used to generate electric current at the locomotive traction motors, which is then dissipated through resistor grids or into the catenary or third rail.

3.17 "equipment" or "railway equipment" means railway locomotives, freight cars, passenger cars, cabooses or service equipment operating in a train or transfer.

3.18 "integrity" means having the unimpaired capability to supply air to the rear of the last piece of equipment of a train.

3.19 "interchange" means the transfer of railway equipment between railway companies.

3.20 "lift" means the addition to a train of a solid coupled block of cars that have previously received a No.1A brake test at that location.

3.21 "locomotive or engine" means a rail vehicle propelled by any energy form, intended for the propulsion and/or control of freight, passenger or service equipment.

3.22 "locomotive consist" means a combination of locomotives coupled together and operated from a single control.

3.23 "modified tilt test" means a test of the portable locomotive remote control device in which the operator control unit is tilted until an alarm is generated.

3.24 "operative" means a brake that applies and releases and is in a suitable condition to retard and/or stop equipment.

3.25 "person in charge" means a person certified in accordance with Section 4 of these Rules, appointed by a railway company to ensure the safe conduct of a railway operation.

3.26 "portable locomotive remote control device" means a device that is a component part of a system for remotely operating a locomotive(s).

3.27 "psi" means pressure in pounds per square inch ("kpa" means the equivalent to 1000 newtons per square metre).

3.28 "pull-by inspection" means a visual examination, by a stationary qualified person, of a train operating at a speed not exceeding five (5) miles per hour (mph) (eight (8) kilometres per hour (km/h)) to verify that all brakes have released.

3.29 "push-pull operation" means a train operation in which the control of the train can be from either end.

3.30 "qualified person" means in respect of a specified duty, a person who, because of knowledge, training and experience, is qualified to perform that duty safely and properly.

3.31 "railway company" means a railway or railway company subject to the *Railway Safety Act.*

3.32 "railway safety inspector" means a Department of Transport inspector designated pursuant to Section 27 of the *Railway Safety Act.*

3.33 "railway schedule" means an electronic or paper record that indicates the type of inspection, brake test and operational activity performed by a railway and the location where the activity is performed.

3.34 "running brake test" means a test of brakes performed on a moving train to ascertain that the brakes are operational and to confirm the operation of the dynamic brake prior to operating in territory set out in subsection 7.4 of these Rules.

3.35 "safety control" means a device(s) that will cause a brake application to be initiated automatically if the locomotive operator becomes incapacitated.

3.36 "safety inspection location" means a location designated by a railway company where certified car inspectors perform an inspection and testing of train brakes.

3.37 "supplemental source of air" means a supply of air to the brake pipe from a location other than the controlling locomotive.

3.38 "train information breaking system" (TIBS) means a system with rear and front of train radio communication components capable of:

a) monitoring and displaying brake pipe pressure on the rear piece of equipment; and
b) calculating and displaying distance measurement; and
c) initiating an emergency brake application at the rear of the train from the head end.

3.39 "train" means an engine that is intended to operate at speeds greater than fifteen (15) mph (twenty-five (25) km/h):

a) without cars; or
b) with cars and equipped with TIBS or a supplemental source of air with TIBS capability at the rear; or
c) with cars including a caboose occupied by a crew member; or
d) with cars in passenger service.

3.40 "train brake status system" means any method by which a railway company maintains information on the status of train brake inspections.

3.41 "Transfer" means an engine with cars operating on main track at speeds not exceeding fifteen (15) mph (twenty-five 25 km/h) and need not be TIBS equipped.

3.42 "train brake test device" means equipment, either fixed or mobile, used to control the supply of compressed air to operate the brakes on railway equipment.

4. CERTIFICATION OF CAR INSPECTORS

4.1 A railway company shall ensure that its certified car inspectors are trained and qualified to perform brake tests on freight and/or passenger cars and trains and perform associated repairs in compliance with these Rules and in accordance with company procedures/work instructions, and all amendments, as filed with the Department. Certified car inspectors shall be conversant with these Rules and be able to demonstrate to a railway company, by means of oral or written examinations and on-the-job performance, a knowledge and ability concerning the performance of brake tests and associated repairs.

4.2 A railway company shall file with the Department a full description of the training program, criteria and all amendments used for certifying car inspectors.

4.3 A railway company shall maintain a record of all certified car inspectors. This record shall be made available to a railway safety inspector upon request.

4.4 Certified car inspectors shall be re-certified if they have not been performing the duties prescribed in these Rules within the past three (3) years.

5. QUALIFIED PERSONS

5.1 A railway company shall ensure that its qualified persons are trained and qualified to perform the inspection and testing of brakes, associated control devices and safety controls in compliance with these Rules and in accordance with company procedures/work instructions, and all amendments, as filed with the Department.

5.2 A railway company shall file with the Department a full description of the training program, criteria and all amendments used for qualifying those employees performing brake tests in accordance with these Rules.

5.3 A railway company shall maintain a record of all qualified persons. This record shall be made available to a railway safety inspector upon request.

6. PRE-DEPARTURE REQUIREMENT FOR LOCOMOTIVES

6.1 When taking charge of a locomotive(s), except when changing off with another crew, the locomotive engineer or qualified person shall determine that all brakes are functional.

6.2 When the brake test is done by other than the locomotive engineer, the results of the test shall be made available to the locomotive engineer and be retained on record for ninety-two (92) days.

7. OPERATING REQUIREMENTS

7.1 A freight train shall operate with no less than eighty-five (85) percent of the train brakes operative, except as provided in Subsection 8.4 of these Rules.

7. 2 A railway company shall instruct its operating employees of the territory in which pressure-retaining valves and/or dynamic brakes shall be used.

7.3 A passenger train shall be operated with no less than eight-five (85) percent of the train brakes operative, including the locomotive(s), unless a reduction in train speed is made, as determined by the locomotive engineer, in accordance with company procedures/work instructions, and all amendments, as filed with the Department.

7.4 A running brake test of passenger train brakes shall be performed after leaving any location where the crew is changed in accordance with company procedures/work instructions.

7.5 When a train experiences a brake system or a safety control failure or malfunction en route which cannot be readily corrected, the conductor, or in his/her absence, the locomotive engineer, shall report the location, date, time, description of the failure or malfunction and the appropriate action taken by the engineer, in accordance with company procedures/work instructions.

7.6 When the safety control on the controlling locomotive becomes inoperative while a train is en route, it may be cut out, and as soon as possible, corrective action shall be taken to either repair the safety control or change the locomotive.

7.7 The locomotive engineer and the conductor shall be provided with the initial brake test results and en route updates of the status of the train brakes

Conventional Trains

7.8 A freight train having received a No.1 or 1A brake test or a continuity test may only depart a terminal if:

a) the train line brake pipe pressure on the tail end of the train is within fifteen (15) psi (one hundred (100) kpa) of the locomotive brake pipe pressure, and,

b) air flow to the brake pipe does not exceed sixty (60) cubic feet (one point seven (1.7) cubic metres) per minute, as indicated by the flow indicator or brake pipe leakage does not exceed five (5) psi (thirty-five (35) kpa) in sixty (60) seconds.

7.9 While enroute, if the brake pipe air flow exceeds sixty (60) cubic feet per minute (CFM), when the automatic brake handle is in the release position, other than during intended brake application and/or release activity, corrective action must be taken if the flow does not return to sixty (60) CFM or below within a reasonable period of time, as determined by the locomotive engineer.

7.10 When the leading locomotive ceases to control a train en route, a continuity test shall be made from the controlling locomotive, and as soon as possible, the controlling locomotive will be placed in the lead position.

Trains with Supplemental Source(s) of Air

7.11 A train having received a No. 1 or 1A brake test or a continuity test may only depart a terminal if the combined air flow to the brake pipe does not exceed ninety (90) CFM with no individual source of air having a flow greater than sixty (60) CFM, as indicated by the flow indicator.

7.12 While en route, if the combined brake pipe air flow exceeds ninety (90) CFM, or if any individual source of air has a flow greater than sixty (60) CFM when the automatic brake handle is in the release position, other than during intended brake application and/or release activity, corrective action must be taken if the flow does not return to a combined ninety (90) CFM or sixty (60) CFM at an individual supply of air or below within a reasonable period of time, as determined by the locomotive engineer.

7.13 When one or more supplemental sources of air are placed in a train or the controlling locomotive and/or supplemental source(s) are changed, communications between the controlling locomotive and supplemental sources of air shall be verified to ensure the equipment is operating as designed.

7.14 A railway company shall have operating instructions or procedures that address the following:

a) maximum distance between multiple source(s) of air;
b) communications loss between multiple sources of air; and
c) allow the locomotive engineer to determine air flow, brake pipe pressure and status of brake valve from each supplemental source(s) of air.

7.15 When the leading locomotive ceases to control a train en route, a continuity test and a communications test of the supplemental source(s) of air shall be made from the controlling locomotive, and as soon as possible, the controlling locomotive will be placed in the lead position.

7.16 A supplemental source of air being used as the Train Information Braking System, at the rear of the train shall comply with Section 14 of these Rules.

8. EXCEPTIONS

8.1 A car found to have bad order brakes at a safety inspection location or while en route in a train, may remain in the train, provided all the following requirements are observed:

a) where appropriate, the brakes of the car or the affected truck shall be cut out;
b) there are no more than two (2) consecutive inoperative control valves;
c) except as provided in Subsections 8.6, 8.8 and 8.9 of these Rules, there shall be a minimum of three (3) cars with operative brakes at the rear of a freight train;
   i. on cars of articulated or permanently coupled multi-platform design, at least fifty (50) per cent of the control valves must be operational for car to be considered as having operational brakes
d) passenger trains shall have the brakes operational on at least one (1) truck on the last car in the train and no less than eight-five (85) percent of the brakes shall be operative; and

e) passenger trains having cars with bolted couplers design may depart from other than a safety inspection location, with the brakes cut out on the last car, when:
   i. appropriate action is taken by the locomotive engineer, in accordance with company procedures/work instructions, and
   ii. the defective car is repaired, set off, or relocated in the consist of the train at the first safety inspection location in the direction of travel, and
   iii. the Department is advised of each occurrence.

8.2 A railway company shall control and protect the movement of a car with inoperative brakes with a train brake status system in accordance with company procedures/work instructions. This may include the use of a bad order card.

8.3 The conductor, or in his or her absence, the locomotive engineer, shall be notified of cars with inoperative brakes in the train, and in turn, is responsible to ensure the train brake status system is updated in accordance with company procedures/work instructions.

8.4 Cars or locomotives with inoperative brakes due to damage may be moved in a train when authorized by a person in charge. In accordance with company procedures/work instructions, the person in charge will ensure that appropriate measures have been taken to move such equipment safely and identify the destination in the direction of travel where the equipment will be repaired.

8.5 On trains of eighteen (18) cars or less, when it is not possible to comply with Subsection 11.6 of these Rules, a train may proceed with equipment that has inoperative brakes provided that:

a) the conductor and locomotive engineer are advised of the placement of such equipment in the train;
b) the appropriate action, such as the reduction of train speed, is taken so as to ensure safe operation, in accordance with company procedures/work instructions;
c) the requirements of Subsection 7.1 of these Rules are not exceeded.

8.6 Scale test cars without brakes may be moved in a freight train provided they are placed ahead of the rear car of the train and they are coupled to cars with operative brakes.

8.7 Other railway equipment without brakes, because of design, may operate in a freight train provided the equipment is identified to the Department.

8.8 A test car with inoperative brakes may be moved at the rear of a freight train in test mode provided it is coupled and secured to a car with operative brakes.

8.9 In accordance with company procedures/work instructions, the person in charge may move cars or locomotives with inoperative brakes, due to damage en route, at the rear of the train when no other option exists.

9. CORRECTIVE ACTION REPORTING

9.1 A railway company shall reply in writing or by acceptable electronic means, within fourteen (14) days, to the Department's regional office concerned, on the corrective action taken to correct a non-compliance(s) reported by a railway safety inspector. On defective equipment, the reply, from a railway officer, shall also include the equipment initials and number and the date and location of the corrective action taken.

PART II – BRAKE TEST REQUIREMENTS

10. GENERAL

10.1 A train shall not depart from any location until a successful brake test(s), as outlined in this Part and in railway company procedures/work instructions has been performed and all appropriate documentation has been completed.

10.2 No.1 and No.1A brake tests shall be performed on every train as specified in these Rules and company procedures/work instructions by:

a) the brake pipe leakage method; or
b) the air flow method.

10.3 The conductor, or in his or her absence, the locomotive engineer, shall be responsible for determining that the prescribed test(s) has been completed prior to departure. When a pull-by inspection for the brake release is performed on freight trains, the conductor or locomotive engineer shall be provided with the results of the release and in turn, will update the train brake status system.

10.4 A vehicle assisted No.1 brake test may be performed by a certified car inspector(s) in accordance with company procedures/work instructions, and shall be made available to a safety inspector upon request.

11. NO. 1 BRAKE TEST

11.1 A No.1 brake test shall be performed by a certified car inspector(s) at safety inspection locations on:

a) trains that are made up at that location;
b) cars added to a train at that location;
c) cars that are interchanged.
d) If a train is made up at other than a safety inspection location, a No. 1 brake test will be performed at the safety inspection location designated for that train by the railway company in the direction of travel.

11.2 Exceptions: A No.1 brake test is not required on:

a) trains operating over main tracks, between yards, up to a maximum of a thirty (30) mile (fifty (50) kilometre) radius. Such trains shall be engaged exclusively in the setting off or lifting of equipment at industry(s), and/or the transfer of equipment between yards, and they shall be filed with the Department.
b) a block swap of cars that have been off air for no more than 24 hours or 48 hours after notifying the department.

11.3 A No.1 brake test shall verify:

a) the integrity and continuity of the brake pipe;
b) that the condition of the brake rigging on each car in the train meets the minimum requirement specified in Sections 20, 21 and 22 of these Rules;
c) that the application and release of the brakes on each car is performed by visible verification of the piston or brake indicator device displacement; and
d) that piston travel on each car is within the specified limits.

11.4 A pull-by inspection by a certified car inspector may be performed to verify the release of the train brakes.

11.5 Certified car inspectors shall report, in accordance with company procedures/work instructions, the results of all brake tests performed. Any brake system defect(s) discovered during the brake test and not repaired prior to departure shall be documented as bad order and reported to the conductor, or in his or her absence, the locomotive engineer. The conductor/engineer shall update the train brake status system with the identified defect(s). The results of the tests performed by certified car inspectors shall be retained for ninety-two (92) days.

11.6 After completing a No.1 brake test, a train may depart from a safety inspection location with ninety-five (95) percent of the train brakes operative, once every reasonable effort has been made to maintain one hundred (100) percent operative brakes. This requirement does not apply to cars referred to in Subsection 8.4 of these Rules.

11.7 A No. 1 brake test is not required at an interchange point and/or when entering Canada provided the locomotive engineer has access to records that indicate that a No.1 brake test, as per these Rules, or an initial terminal brake test by mechanical personnel in the United States, was performed.

12. NO. 1A BRAKE TEST

12.1 No.1A brake test shall be performed by a qualified person(s) on:

a) trains made up at other than a safety inspection locations;
b) cars lifted en route; and/or
c) trains operating over main tracks, between yards, up to a maximum of a thirty (30) mile (fifty (50) kilometre) radius. Such trains shall be engaged exclusively in the setting off or lifting of equipment at industry(s), and/or the transfer of equipment between yards, and shall be filed with the Department.

12.2 A No.1A brake test is not required on blocks of cars lifted en-route that have:

a) previously received a No.1 brake test for which the brake status information is received; and/or
b) previously received a No.1A brake test at that location within twenty-four (24) hours of the lift for which the brake status information is received.

12.3 A No.1A brake test shall be performed by a walking inspection of stationary equipment. A pull-by inspection by a qualified person may be performed to verify the release of the train brakes.

12.4 A No.1A brake test shall verify:

a) the integrity and continuity of the brake pipe; and
b) the application and release of the brakes on each car.

12.5 When applying the brakes on each car, a brake pipe reduction of at least six (6) psi must be indicated on the Sense and Braking Unit (SBU) or air gauge attached to the rear car. When not equipped with an air gauge or SBU, a full service application must be made.

12.6 A qualified person(s) shall record and report the test results, and any brake system defect(s) discovered during the brake test, to the train brake status system, in accordance with company procedures/work instruction.

12.7 The conductor, or in his or her absence, the locomotive engineer, shall be responsible for determining that the prescribed test(s) has been completed prior to departure.

12.8 The results of the No.1A brake tests performed:

a) by the train crew while enroute shall be recorded and retained until the train reaches it's final destination.
b) by other than the lifting train crew shall be retained for a period of thirty (30) days.

13. CONTINUITY TEST

13.1 A continuity test shall be performed by a qualified person(s) when:

a) a solid block(s) of coupled cars which have received a No.1 or No.1A brake test are added to a train;
b) the controlling locomotive has been attached to a train having received a No.1 or No.1A brake test;
c) the locomotive consist has been exchanged or altered;
d) the locomotive engineer has been changed (unless provisions of 13.3 are met);
e) the brake pipe has been re-coupled after being uncoupled; and/or
f) the locomotive is re-coupled to the train after setting off cars.

13.2 The continuity test shall verify the capability to transmit a signal between the leading locomotive and to the rear of the last piece of equipment on the train.

13.3 A continuity test need not be performed when the locomotive engineer has been changed, provided that all of the following provisions are met:

- must be a direct handoff at the crew change location (crew to crew at controlling locomotive). Does not apply to trains left unattended while waiting for the outgoing crew.

- train must not perform any lifts or set-offs at the crew change location. In such case, continuity must be established, unless the lift or setoff has occurred and continuity has been established prior to a direct handoff;

- the controlling locomotive must be equipped with operative dynamic brake (this provision does not supersede the requirements of Item 21.1 of the *Railway Locomotive Inspection and Safety Rules).*

14. TRAIN INFORMATION BRAKING SYSTEM (TIBS) TEST

14.1 A TIBS test shall verify that an emergency brake application, initiated from the controlling locomotive or dedicated IDU through the TIBS system, will cause an emergency brake application on the last piece of equipment on the train.

14.2 When the sense and braking component of the TIBS system is first added to a train or when it is suspected that the sense braking component has been stricken or damaged while en route the operation of TIBS will be verified by a qualified person(s) in accordance with railway company procedures/work instructions.

14.3 In the event of a TIBS failure, where the standard locomotive gauges and air flow indicator display no loss of air pressure, the train may proceed at a speed not to exceed twenty-five (25) mph (forty (40) km/h), until the TIBS resumes normal operation.

15. TRANSFER BRAKE TEST

15.1 Prior to departure, the locomotive engineer, or the portable locomotive remote control device operator must verify that there is sufficient braking effort to control the transfer. Except where block signals provide protection, transfers must have air applied throughout the entire equipment consist and the last three cars must be verified to have operative brakes.

15.2 Transfers carrying dangerous goods must have air applied throughout the consist.

16. PUSH-PULL OPERATION

16.1 On a train operated in a push-pull mode, a continuity test must be made from the controlling cab car or locomotive after changing ends.

17. PORTABLE LOCOMOTIVE REMOTE CONTROL DEVICE TILT TEST

17.1 A portable locomotive remote control device tilt test shall be performed once every twenty-four (24) hours, and when it is not a direct operator to operator hand off. The test shall be performed in accordance with company procedures/work instructions, and shall verify:

a) application and release of the train brakes;
b) that an emergency brake application is initiated as per its design;
c) when tilted, the device will apply the brakes and nullify the transmission of power to the locomotive traction motors.

17.2 A modified tilt test may only be performed on a direct operator to operator hand off, in accordance with company procedures/work instructions.

18. TRAINS USING BACK-UP HOSE OR VALVE

18.1 Before starting a train from any point where the brakes are to be controlled by the use of a back-up hose or valve at the rear of the train, the brakes shall be applied by using the back-up hose or valve.

19. SNOW PLOW TRAIN BRAKE TEST

19.1 Following the appropriate train brake test, as outlined previously in this Part, and before starting a snow plow operation, an emergency application of train brakes shall be obtained from the operator cab of the snow plow.

PART III – EQUIPMENT REQUIREMENTS

20. MAINTENANCE

20.1 All brake equipment shall be maintained in a safe and serviceable condition.

a) freight car brakes shall be maintained in accordance with the current AAR requirements and railway company procedures/work instructions;

b) passenger car brakes shall be maintained in accordance with the current American Public Transit Authority (APTA) requirements and railway company procedures/work instructions. At the end of the Clean Oil Test & Stencil (COT&S) periodic maintenance interval passenger car brake valves shall be maintained:

i. to APTA requirements or;
ii. a single car air brake test shall be performed every 365 days or less and defective components are to be replaced as required.

c) locomotive brakes shall be maintained as a minimum in accordance with manufacturer's recommendations and railway company procedures/work instructions. Locomotive brake systems shall receive COT&S maintenance as follows:

i. At intervals that do not exceed 1,104 days for locomotives equipped with a 26-L or equivalent brake system; or

ii. At intervals that do not exceed 1,472 days for locomotives equipped with an air dryer and a 26-L or equivalent brake system and for locomotives not equipped with an air compressor and that are semi-permanently coupled and dedicated to locomotives with an air dryer; or

iii. At intervals that do not exceed 1,840 days for locomotives equipped with air dryers and electronic air brake system including the following: CCB-1, CCB-2, CCB-26, EPIC 1 (formerly EPIC 3102), EPIC 3102D2, EPIC 2, KB-HS1, or Fastbrake brake systems; or

iv. At intervals that do not exceed 736 days for locomotives equipped with a brake system not specifically identified in paragraphs i, ii, and iii.

20.2 On locomotives or self-propelled equipment, the date of testing or cleaning of brake equipment and the name of the shop or station at which the work was done shall be retained in the cab in a format in accordance with railway company procedures/work instructions.

20.3 Train brake test devices shall be cleaned, repaired and tested every ninety (90) days, to maintain safe and satisfactory operation, in accordance with company procedures/work instructions.

20.4 A locomotive that is out service for 30 or more consecutive days may use the time to extend the Clean Oil Test & Stencil maintenance date. An out of service record shall be retained as per company procedures/work instructions. A locomotive can have one or more periods of 30 or more consecutive out of service days. Each period must be recorded as above. Once COT&S air-brake changeout is completed, all credit days revert to zero days.

21. BRAKE CYLINDER PISTON TRAVEL

21.1 A car with a body-mounted brake cylinder has piston travel out of adjustment when:

a) on a freight car, the piston travel is less than six (6) inches (one hundred fifty (150) mm) or more than nine (9) inches (two hundred thirty (230) mm);

b) on a passenger car, the piston travel is less than seven (7) inches (one hundred eighty (180) mm) or more than nine (9) inches (two hundred thirty (230) mm).

21.2 A car with truck-mounted brake cylinders shall have piston travel, unless otherwise governed by design, sufficient to provide brake shoe clearance when the brake is released.

a) on a freight car, piston travel shall not exceed five (5) inches (one hundred twenty-five (125) mm);
b) on a passenger car, piston travel shall not exceed six (6) inches (one hundred fifty (150) mm).

21.3 A freight car with a special type of brake equipment, not covered by the above, shall have piston travel adjusted as indicated on the badge plate or stenciling applied in a conspicuous location near the brake cylinder.

21.4 A passenger car with a special type of brake equipment, not covered by the above, shall have the brakes maintained in accordance with company procedures/work instructions.

21.5 On a locomotive, the maximum physical limit of brake cylinder piston travel will be indicated in the cab. In operation, piston travel must not come within two (2) inches (fifty (50) mm) of the limit. For example, should the brake cylinder permit an eight (8) inch (two hundred (200) mm) travel, the maximum piston travel shall not exceed six (6) inches (one hundred fifty (150) mm).

22. LOCOMOTIVE FEED VALVES AND PRESSURE SETTINGS

22.1 Air pressure feed valves shall be adjusted to the following pressures in accordance with company procedures/work instructions:

a) the minimum brake pipe pressure with the automatic brake valve in release position shall be ninety (90) psi (six hundred twenty (620) kpa) for passenger service and eighty (80) psi (five hundred fifty (550) kpa) for freight and remote control locomotive operation;
b) the minimum differential between the brake pipe and main reservoir air pressures with the brake valve handle in release position shall be fifteen (15) psi (one hundred (100) kpa);
c) the independent brake cylinder pressure shall be the full application pressure, as posted in cab.

PART IV – FILING REQUIREMENTS

23. FILING REQUIREMENTS WITH THE DEPARTMENT

23.1 A railway company shall file railway schedules with the Department. Any changes to the railway schedules shall be filed by the railway company with the Department within thirty (30) days of implementation.

23.2 A railway company shall file with the Department, procedures/work instructions, and all amendments, for:

(i) No.1 brake test,
(ii) Vehicle assisted No. 1 brake tests,
(iii) Brake tests of trains having a supplementary source of air supply at a location other than the head end locomotives,
(iv) Train brake testing device calibration,
(v) No.1A brake test, including the audit protocol used by the railway to ensure compliance,
(vi) Continuity test,
(vii) Running brake test,
(viii) Train information braking system tests,
(ix) Single car test,
(x) Locomotive functional brake test,
(xi) Calibration of locomotive brake pipe flow indicator/metre,
(xii) Portable locomotive control device tilt test and modified tilt test,
(xiii) Reporting of brake system failures,
(xiv) Control and protection of a movement of cars and locomotives with damaged or inoperative brakes due to damage,
(xv) Control and protection of a movement of cars or locomotives with inoperative brakes at the rear of the train, due to damage en route, when no other option exists,
(xvi) Movement of 18 cars or less with less than ninety-five (95) percent of operative brakes,
(xvii) Scale and test car movements,
(xviii) Repairs to air brake components,
(xix) Updating of the train brake status system,
(xx) Air pressure feed valves adjustment, and
(xxi) A brake system or a safety control failure or malfunction en route which cannot be readily corrected.
(xxii) Procedure to follow when a brake system component found to have been tampered with en route.
(xxiii) Locomotive out of service record and return to service tests.

23.3 A railway company may operate trains with advanced technological/operational improvements provided that the testing and operating procedures have been filed with the Department, sixty (60) days prior to testing or placing in service, and the results of the railways risk assessment is provided with the submission.

23.4 Museum train operations shall be filed with the Department thirty (30) days prior to its being placed in service.

APPENDIX 4

Brake-Related Defects Found at Outbound Inspections

Yard	Month	Total Outbound AB-related inspections	Bad-ordered	Defect per 100 cars
Birmingham, AL USA	Jan-17	47,601	6	0.013
	Feb-17	46,642	7	0.015
	Mar-17	49,930	10	0.020
	Apr-17	48,784	13	0.027
	May-17	49,901	30	0.060
	Jun-17	47,249	32	0.068
	Jul-17	50,544	51	0.101
	Aug-17	54,275	37	0.068
	Sep-17	50,828	24	0.047
	Oct-17	50,462	29	0.057
	Nov-17	46,246	39	0.084
	Total	**542,462**	**278**	**0.051**
Elkhart, IN USA	Jan-17	56,238	23	0.041
	Feb-17	51,065	43	0.084
	Mar-17	56,177	35	0.062
	Apr-17	59,053	50	0.085
	May-17	59,867	66	0.110
	Jun-17	56,111	72	0.128
	Jul-17	56,217	65	0.116
	Aug-17	58,171	72	0.124
	Sep-17	56,848	39	0.069
	Oct-17	60,044	75	0.125
	Nov-17	58,170	119	0.205
	Total	**627,961**	**659**	**0.104**
Kirk, IN USA	Jan-17	53,480	79	0.148
	Feb-17	52,106	90	0.173
	Mar-17	58,489	57	0.097
	Apr-17	56,471	78	0.138
	May-17	57,885	127	0.219
	Jun-17	53,268	59	0.111
	Jul-17	58,942	77	0.131
	Aug-17	62,381	109	0.175
	Sep-17	57,611	73	0.127
	Oct-17	58,109	101	0.174
	Nov-17	50,321	91	0.181
	Total	**619,063**	**941**	**0.152**

Symington, MB Canada	Jan-17	88,596	171	0.193
	Feb-17	84,591	184	0.218
	Mar-17	95,072	171	0.180
	Apr-17	98,072	70	0.071
	May-17	103,334	81	0.078
	Jun-17	99,014	42	0.042
	Jul-17	102,320	37	0.036
	Aug-17	103,060	67	0.065
	Sep-17	100,365	63	0.063
	Oct-17	106,532	73	0.069
	Nov-17	86,209	81	0.094
	Total	**1,067,165**	**1040**	**0.097**
Straight Monthly Average for all 3 US yards			0.0939	per 100 cars
Straight Annual Average for all 3 US yards			0.1024	per 100 cars
Weighted Average for all 3 US yards			0.1049	per 100 cars
Weighted Average for Canadian yard			0.0975	per 100 cars

the brake-related defects discovered at the outbound inspections is statistically similar for US and Canadian yards

APPENDIX 5

TECHNOLOGY DIGEST
TD-15-036
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TIMELY TECHNOLOGY TRANSFER

The work described in this document was performed by Transportation Technology Center, Inc., a wholly owned subsidiary of the Association of American Railroads.

Off Air Time Limits

Scott Cummings (TTCI) and Jamie Williams (Norfolk Southern Railway)

Summary

In support of the Association of American Railroads' Strategic Research Initiative on brake system performance, Transportation Technology Center, Inc. personnel conducted Class I brake tests 10 times over the course of 5 days on a block of 20 coal gondola and hopper cars to understand the stability of a railcar's brake system at a variety of air temperatures and time off air. Air temperature at the time of the tests ranged from 17°F to 57°F. There was no change in the brake system performance of any of the cars throughout the course of the testing regardless of the air temperature, amount of time off air prior to the test, or cumulative time elapsed after the initial test.

In 2001, the Federal Railroad Administration established the 4-hour off air time limit for Class I and Class II brake tests. In 2008, this limit was increased for trains equipped with electronically controlled pneumatic brake systems to between 24 and 80 hours depending on where the train is parked. The Canadian regulator allows a 24-hour off air limit.

Since 2001, the industry has increased its use of information technology systems to track the time off air and its use of wayside wheel temperature detectors to monitor brake system health.

Please contact **Scott Cummings (719) 584-0739** with questions or concerns regarding this *Technology Digest*. E-mail: scott_cummings@ttci.aar.com.

INTRODUCTION

Transportation Technology Center, Inc. (TTCI) conducted 10 Class I brake tests on a consist of 20 coal hopper and gondola cars after different intervals of off air time during winter weather conditions to illustrate the independence of brake system performance from off air time. This digest describes the current North American regulations for off air time limits, provides details about the TTCI testing, and provides an update on the current state of affairs in North American freight railroading that have relevance to the issue.

BACKGROUND

For railroad operations in the United States, the Code of Federal Regulations stipulates that the "Class I brake test-initial terminal inspection"[1] or "Class II brake tests-intermediate inspection"[2] be conducted on cars that have been disconnected from a source of pressurized air ("off air") for more than 4 hours before they are moved in a train. This 4-hour off air time limit was codified in 2001, providing an increase from an "administrative interpretation" that allowed a maximum of 2 hours off air.[3] In describing its justification for the 4-hour time limit, the Federal Railroad Administration (FRA) stated the following:[3]

"FRA tends to agree that the amount of time equipment is left off a source of compressed air is not directly related to the operation of the brake system on that equipment. However, FRA does believe that in certain circumstances the length of time that equipment is removed from a source of compressed air can impact the integrity and operation of the brake system on a vehicle or train. Particularly in cold weather situations where freeze-ups in train brake systems can occur…"

"…if equipment were allowed to be off-air for an excessive amount of time, it would be virtually impossible for FRA to ensure that equipment is being properly retested as it would be extremely difficult for FRA to determine how long a particular piece of equipment was disconnected from a source of compressed air."

In 2008, the FRA allowed 24-hour off air limit for trains operating electronically controlled pneumatic (ECP) brake systems.[4] If such a train is left at an "extended off air facility" such as a fenced-in power plant, FRA allows up to 80 hours off air without requiring a retest.

Transport Canada requires brake testing applicable to railroad operations in Canada. The No. 1 and No. 1A brake tests required by Transport Canada are similar in procedure to the Class I and Class II tests, respectively. The No. 1 and No. 1A tests also establish off air time limits, but the maximum allowable time off air without retesting is 24 hours rather than 4 hours.[5]

BRAKE PERFORMANCE TESTING

TTCI conducted testing to evaluate the effects on freight car brake system performance after being disconnected from a source of pressurized air for different periods of time during winter weather. Using a block of 20 coal gondola and hopper cars, TTCI personnel conducted Class I brake tests 10 times over the course of 5 days. Both the air flow and leakage rate tests were used to evaluate the brake pipe pressure leakage. Brake cylinder pistons and brake shoes were checked on each car to ensure that the brakes applied in response to a 20 psi brake pipe service reduction and again to ensure that the brakes released when the brake pipe pressure was increased. After each test, the glad hands were uncoupled between the locomotive and the first car to allow ambient air to infiltrate the train line as it would in a revenue service situation.

Air temperature at the time of the tests ranged from 17°F to 57°F. There was no change in the brake system performance of any of the 20 cars throughout the course of the testing regardless of the air temperature or time off air prior to the test. On all the cars, the brakes were applied in response to a 20 psi brake pipe service reduction and released when and only when the brake pipe pressure was restored. A variety of brake pipe pressure leakage rates were recorded, and all of the values met the Class I test criteria. The brake pipe pressure flow rate and gradient values likewise met the Class I test criteria. Due to the measurable leakage in the brake pipe, the flow rate and gradient values must have been slightly greater than 0 cubic feet per minute and 0 psi, respectively, as shown in the table. However, on a short consist of 20 cars using typically available measurement devices (flow meter on locomotive, pressure transducers on locomotive and end-of-train device), these values were too small to quantify.

Table 1 shows results of the testing.

Table 1: Test Results

Date	Time	Hours Off Air Prior to Test	Air Temperature	Flow Rate (Cubic Feet/Minute)	Brake Pipe Pressure Gradient (psi)	Brake Pipe Pressure Leakage Rate (psi/min)	Cars With Brakes that Failed to Apply or Release
1/12/15	9:35	N/A	21°F	0	0	4	None
1/12/15	14:42	5	23°F	0	0	4	None
1/13/15	8:02	17	17°F	0	0	4	None
1/13/15	14:05	6	25°F	0	0	4	None
1/14/15	8:10	18	26°F	0	0	5	None
1/14/15	14:40	6	39°F	0	0	3	None
1/15/15	7:20	16	18°F	0	0	3	None
1/15/15	15:40	8	50°F	0	0	3	None
1/16/15	7:50	16	28°F	0	0	3	None
1/16/15	13:15	5	57°F	0	0	2	None

This testing was intended to understand the stability of a car's brake system at a variety of air temperatures rather than

to comprehensively evaluate the relationship between brake system performance and time off air. If quantitatively establishing this relationship would be useful, a larger test effort involving many more cars tested at a wider variety of weather conditions and time off air could be conducted.

Figures 1, 2, and 3 graphically show the measured leakage rates as a function of the ambient temperature, time off air, and cumulative time since the initial test, respectively. The leakage rates do not show correlation with any of these parameters.

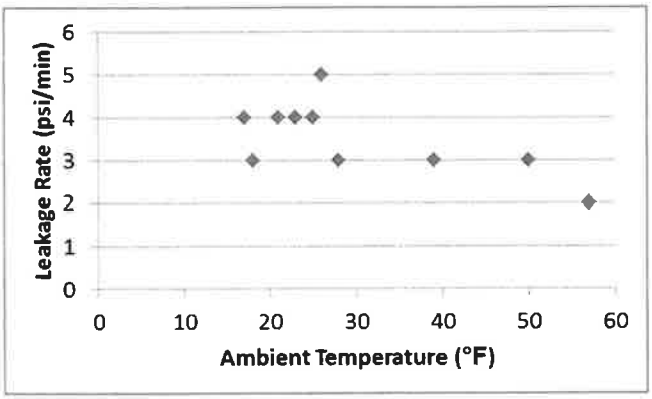

Figure 1: Leakage Rate Vs Ambient Temperature

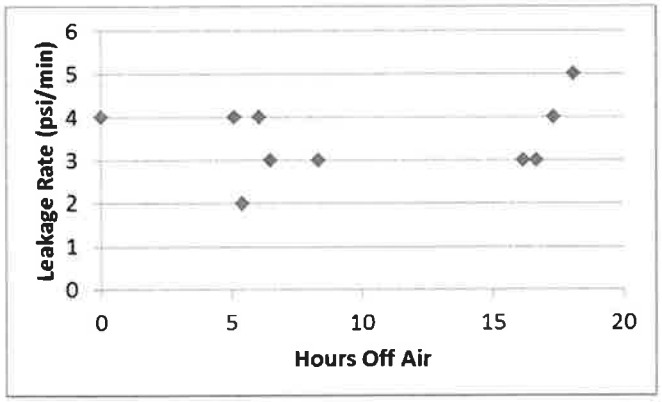

Figure 2: Leakage Rate Vs Hours Off Air

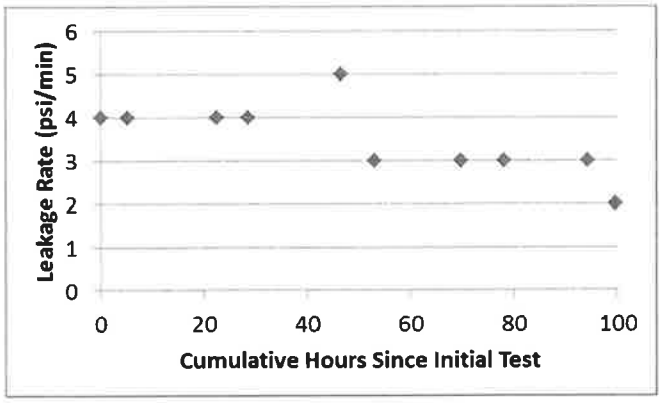

Figure 3: Leakage Rate Vs Cumulative Hours since Initial Test

DISCUSSION

Railroads are proactively pursuing improved brake system health monitoring through the use of wayside wheel temperature detectors. These devices allow an in situ evaluation of the brake system health of every car that passes the detector. Such methods are able to identify not only cars with inoperative brakes, but can also be used to identify cars with chronically under-performing brake systems.[6] For example, while the brake cylinder may look fully pressurized to an inspector, it may only have sufficient air pressure to extend the piston and may not be providing the intended brake shoe force. Wayside wheel temperature detectors are capable of identifying the symptoms of this type (and other types) of poor brake system performance.

Railroads have invested heavily in information technology over the last 20 years. Using commonly held technology, it should be possible to compute an estimate of the time off air for a car or cut of cars by querying the arrival time at the current terminal. Railroads utilizing automatic equipment identification technology have the ability to research the time a car, train, or cut of cars arrived at a location and when it departed, without the need for a physical observation of the event.

CONCLUSIONS

To investigate the stability of a car's brake system at a variety of air temperatures and time off air, TTCI personnel conducted Class I brake tests 10 times over the course of 5 days on a block of 20 coal gondola and hopper cars. Air temperature at the time of the tests ranged from 17°F to 57°F. There was no change in the brake system performance of any of the cars throughout the course of the testing regardless of the air temperature, time off air prior to the test, or cumulative time elapsed after the initial test.

Since FRA last considered the question of changing the off air time limits for non-ECP equipped trains in 2001, a number of changes in the industry have occurred. Railroads have increased the use of information technology systems to track the time off air, which should alleviate the concerns about difficulty in enforcement of the regulations. Increased use of wayside wheel temperature detectors to monitor brake system health allows for the ability to identify cars with poorly performing brake systems without a visual inspection.

REFERENCES

1. Federal Railroad Administration. "Class I brake test – initial terminal inspection," Code of Federal Regulations, Title 49 Part 232.205.
2. Federal Railroad Administration. "Class II brake tests – intermediate inspection," Code of Federal Regulations, Title 49 Part 232.209.
3. Federal Railroad Administration, DOT. Final Rule. 49 CFR Parts 229, 231, and 232 "Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment; End-of-Train Devices," 66 FR 4104, Federal Register, Vol. 66, No. 11, pp 4104-4217, January 17, 2001. http://www.gpo.gov/fdsys/pkg/FR-2001-01-17/pdf/01-606.pdf
4. Federal Railroad Administration, DOT. Final Rule. 49 CFR Part 232 "Electronically Controlled Pneumatic Brake Systems," E8-22549, Federal Register, Vol. 73, No. 201, pp 61512-61557, October 16, 2008. http://www.gpo.gov/fdsys/pkg/FR-2008-10-16/pdf/E8-22549.pdf
5. Transport Canada. "Railway Freight and Passenger Train Brake Inspection and Safety Rules," TC O 0-184, Transport Canada, October 27, 2014.
6. Robeda, J., D. Sammon, B. Madrill, "Using Wheel Temperature Detector Technology to Monitor Railcar Brake System Effectiveness," DOT/FRA/ORD-13/50, Federal Railroad Administration, Washington, DC, December 2013.

APPENDIX 6

Injuries While Conducting Inspections and Walking on Track

Walking Track

According to FRA casualty data, every year hundreds of freight railroad workers are injured while walking "on, beside, or between track" or "alongside on track equipment." The following table presents the number of such reportable incidents for 2011 through 2017 and makes clear that there is exposure.

Freight Railroad Worker Casualties on Track				
Year	Total Incidents	Bending, stooping	Stepped on	Walking
2011	335	25	6	304
2012	240	20	4	216
2013	312	30	5	276
2014	338	24	11	303
2015	281	21	4	256
2016	258	20	4	234
2017	315	20	7	288

Although the information in the FRA casualty reports cannot be used to ascertain how many injuries occurred while conducting freight air brake tests, information in some of the narrative statements was sufficient to identify the following relevant examples of injuries that occurred during a "walking" air brake test.

- In January 2017, a carman was performing a brake test on an outbound train when the ballast shifted causing him to fall and injure his shoulder resulting in180 days of missed work. (IC, incident number 911740).
- In April 2017, a conductor walking along ballast while conducting an air test at night lost his balance and fell. (KCS, incident number 17042302).
- In separate occasions in 2014 and 2015, conductors were assaulted while walking trains as part of air brake tests conducted at night. Together the injuries resulted in 132 days of missed work. (CRSH incident 111618, August 2014 and KCS incident 15081402 in August 2015).
- In September 2014, a conductor walking a brake test hit his head on a railcar. (Texas Pacifico Transportation Limited, incident number 091420142).
- In November 2011, a conductor walking an air brake test injured his knee. (MRL, incident number 2011161).

Reducing the number of brake inspections would clearly reduce the exposure to injuries such as these.

Bending, Stooping or Stepping on Objects

In addition to exposure to injury while simply "walking" on track, there is exposure while "bending or stooping" or "stepping on objects" on track, such as when conducting air brake tests. For instance, in March 2011, a yard brakeman/helper conducting a walking brake test bent over to look at brake equipment on a car and hurt his back causing him to be on restricted duty for at least 28 days. (SCXF, incident number 20110301).

Freight Inspections

Some employee injuries occur while conducting freight inspections. FRA employee casualty data for 2011 through 2017 contains reports for 74 injuries to train and engine crew and carmen that occurred while "inspecting" freight cars locomotives and trains; opening or closing angle cocks; or uncoupling air hoses on yard and siding track. These injuries are exclusive of those reported to have occurred while "walking," "bending or stooping," or "stepping on objects." Circumstances vary and include employees being struck by objects, and overexertion, as well as slips, trips and falls, among others. According to the reports, these injuries resulted in 3,259 lost work days and 615 restricted duty days.

###

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FROM FORM FRA F 6180.55A

CASUALTY RECORD			
RAILROAD:	Kansas City Southern Rwy Co. [KCS]	**INCIDENT NUMBER:**	17042302
DATE:	04 /23 /2017	**TIME:**	11:00PM
STATE:	Missouri	**COUNTY:**	CASS
TYPE PERSON:	Worker on duty - employee	**AGE:**	61
EMPLOYEE JOB:	Road freight conductors (through freight)		
INJURY:	Sprain/strain, thumb/finger		
DAYS ABSENT:	0	**DAYS RESTRICTED:**	0

EMPLOYEES TESTED FOR ALCOHOL USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEES TESTED FOR DRUG USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEE TERMINATION/PERMANENT TRANSFER:	NO
EXPOSURE TO HAZARDOUS MATERIAL:	NO
FRA FORM 6180-54 FILED:	NO
FRA FORM 6180-57 FILED:	NO

CIRCUMSTANCES	
PHYSICAL ACT:	Walking
EVENT:	Lost balance
RESULT:	Ground
CAUSE:	Environmental
LOCATION	
SITE:	Siding
ON TRK EQP:	Freight train - standing
WHERE:	Alongside of on-track equipment on ground
NARRATIVE	THE EMPLOYEE WAS WALKING ALONG BALLAST IN THE DARK TO PERFORM AN AIR TEST, WHILE HOLDING HIS LANTERN . HE FELL ON UNEVEN FOOTING , INJURING HIS THUMB.

Content-type: text/html

FROM FORM FRA F 6180.55A

CASUALTY RECORD			
RAILROAD:	Illinois Central RR Co. [IC]	INCIDENT NUMBER:	911740
DATE:	01 /22 /2017	TIME:	11:15AM
STATE:	Tennessee	COUNTY:	SHELBY
TYPE PERSON:	Worker on duty - employee	AGE:	46
EMPLOYEE JOB:	Carmen (freight)		
INJURY:	Rupture/tear, shoulder		
DAYS ABSENT:	180	DAYS RESTRICTED:	0

EMPLOYEES TESTED FOR ALCOHOL USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEES TESTED FOR DRUG USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEE TERMINATION/PERMANENT TRANSFER:	NO
EXPOSURE TO HAZARDOUS MATERIAL:	NO
FRA FORM 6180-54 FILED:	NO
FRA FORM 6180-57 FILED:	NO

CIRCUMSTANCES	
PHYSICAL ACT:	Walking
EVENT:	Slipped,fell,stumbled,etc. due to object,ballast, spike, etc.
RESULT:	Ballast, stones, etc.
CAUSE:	Human factor
LOCATION	
SITE:	Yard
ON TRK EQP:	Freight train - standing
WHERE:	Alongside of on-track equipment on ground
NARRATIVE	EMPLOYEE WAS PERFORMING A BRAKE TEST ON AN OUTBOUND TRAIN WHEN HE STEPPED OUT FROM THE CARS AND THE BALLAST SHIFTED ROLLING HIS ANKLE CAUSING HIM TO FALL.

Content-type: text/html

FROM FORM FRA F 6180.55A

CASUALTY RECORD			
RAILROAD:	Kansas City Southern Rwy Co. [KCS]	INCIDENT NUMBER:	15081402
DATE:	08 /14 /2015	TIME:	2:20AM
STATE:	Louisiana	COUNTY:	CALCASIEU
TYPE PERSON:	Worker on duty - employee	AGE:	29
EMPLOYEE JOB:	Road freight conductors (through freight)		
INJURY:	Bruise/contusion, multiple		
DAYS ABSENT:	104	DAYS RESTRICTED:	0

EMPLOYEES TESTED FOR ALCOHOL USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEES TESTED FOR DRUG USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEE TERMINATION/PERMANENT TRANSFER:	NO
EXPOSURE TO HAZARDOUS MATERIAL:	NO
FRA FORM 6180-54 FILED:	NO
FRA FORM 6180-57 FILED:	NO

CIRCUMSTANCES	
PHYSICAL ACT:	Walking
EVENT:	Assaulted by other
RESULT:	Ground
CAUSE:	Outside caused (e.g., assaulted/attacked)
LOCATION	
SITE:	Siding
ON TRK EQP:	Did not involve ontrack/other equipment
WHERE:	Alongside of on-track equipment on ground
NARRATIVE	EMPLOYEE WAS WALKING AROUND THE TRAIN AT THE SIDING AS PART OF A BRAKE TEST WHEN HE REPORTS THAT TWO MEN ATTACKED HIM.

Content-type: text/html

FROM FORM FRA F 6180.55A

CASUALTY RECORD			
RAILROAD:	Texas Pacifico Transportation Limit	**INCIDENT NUMBER:**	091420142
DATE:	09 /14 /2014	**TIME:**	11:00PM
STATE:	Texas	**COUNTY:**	TOM GREEN
TYPE PERSON:	Worker on duty - employee	**AGE:**	25
EMPLOYEE JOB:	Road freight conductors (local and way freight)		
INJURY:	Bruise/contusion, forehead		
DAYS ABSENT:	0	**DAYS RESTRICTED:**	2

EMPLOYEES TESTED FOR ALCOHOL USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEES TESTED FOR DRUG USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEE TERMINATION/PERMANENT TRANSFER:	UNK/NA
EXPOSURE TO HAZARDOUS MATERIAL:	NO
FRA FORM 6180-54 FILED:	NO
FRA FORM 6180-57 FILED:	NO

CIRCUMSTANCES	
PHYSICAL ACT:	Walking
EVENT:	Ran into on-track equipment
RESULT:	Other (describe in narrative)
CAUSE:	Environmental
LOCATION	
SITE:	Yard
ON TRK EQP:	Freight train - standing
WHERE:	Alongside of on-track equipment on ground
NARRATIVE	CONDUCTOR WAS WALKING A CLASS ONE AIR TEST WHEN TALL WEEDS GOT IN HIS FACE, MOVED HIS HEAD AND HIT H IS HEAD (TOP OF FOREHEAD) ON A RAILCAR. HAS A SMALL BUMP ABOUT ONE INCH IN DIAMETER.

Content-type: text/html

FROM FORM FRA F 6180.55A

CASUALTY RECORD			
RAILROAD:	Kansas City Southern Rwy Co. [KCS]	**INCIDENT NUMBER:**	15081402
DATE:	08 /14 /2015	**TIME:**	2:20AM
STATE:	Louisiana	**COUNTY:**	CALCASIEU
TYPE PERSON:	Worker on duty - employee	**AGE:**	29
EMPLOYEE JOB:	Road freight conductors (through freight)		
INJURY:	Bruise/contusion, multiple		
DAYS ABSENT:	104	**DAYS RESTRICTED:**	0

EMPLOYEES TESTED FOR ALCOHOL USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEES TESTED FOR DRUG USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEE TERMINATION/PERMANENT TRANSFER:	NO
EXPOSURE TO HAZARDOUS MATERIAL:	NO
FRA FORM 6180-54 FILED:	NO
FRA FORM 6180-57 FILED:	NO

CIRCUMSTANCES	
PHYSICAL ACT:	Walking
EVENT:	Assaulted by other
RESULT:	Ground
CAUSE:	Outside caused (e.g., assaulted/attacked)
LOCATION	
SITE:	Siding
ON TRK EQP:	Did not involve ontrack/other equipment
WHERE:	Alongside of on-track equipment on ground
NARRATIVE	EMPLOYEE WAS WALKING AROUND THE TRAIN AT THE SIDING AS PART OF A BRAKE TEST WHEN HE REPORTS THAT TWO MEN ATTACKED HIM.

Content-type: text/html

FROM FORM FRA F 6180.55A

CASUALTY RECORD			
RAILROAD:	Montana Rail Link [MRL]	**INCIDENT NUMBER:**	2011161
DATE:	11 /29 /2011	**TIME:**	4:10PM
STATE:	Montana	**COUNTY:**	PARK
TYPE PERSON:	Worker on duty - employee	**AGE:**	52
EMPLOYEE JOB:	Road freight engineers (through freight)		
INJURY:	Sprain/strain, knee		
DAYS ABSENT:	0	**DAYS RESTRICTED:**	0

EMPLOYEES TESTED FOR ALCOHOL USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEES TESTED FOR DRUG USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEE TERMINATION/PERMANENT TRANSFER:	NO
EXPOSURE TO HAZARDOUS MATERIAL:	NO
FRA FORM 6180-54 FILED:	NO
FRA FORM 6180-57 FILED:	NO

CIRCUMSTANCES	
PHYSICAL ACT:	Walking
EVENT:	Slipped, fell, stumbled, other
RESULT:	Other (describe in narrative)
CAUSE:	Human factor
LOCATION	
SITE:	Yard
ON TRK EQP:	Freight train - standing
WHERE:	Beside track
NARRATIVE	WALKING AIRTEST ON M LAUMIS1 29A, STEPPED ON WATER BOTTLE WHILE INPSECTING RAIL CAR AND TWISTED RIGH T KNEE.

Content-type: text/html

FROM FORM FRA F 6180.55A

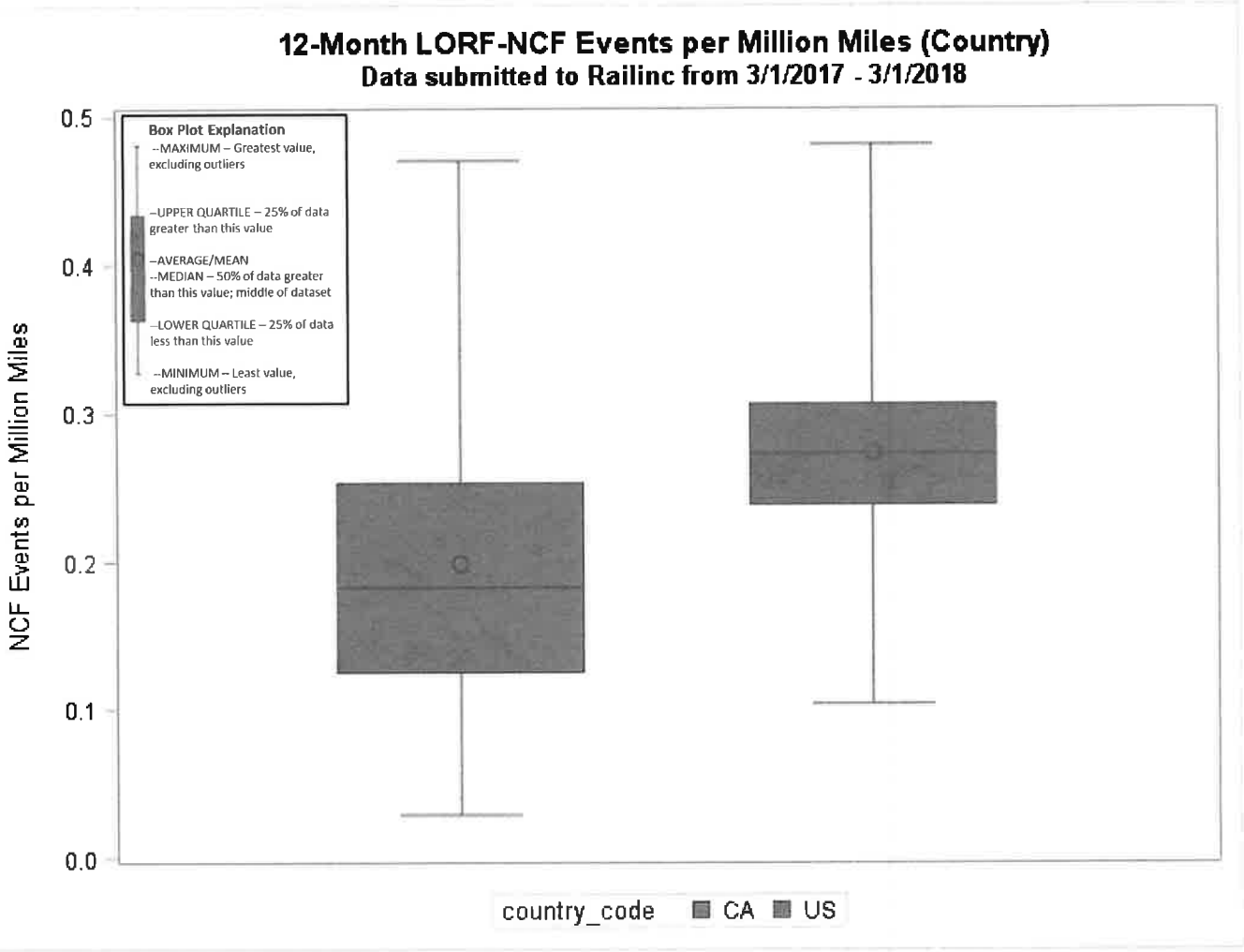
CASUALTY RECORD			
RAILROAD:	South Central Florida Express, Inc.	**INCIDENT NUMBER:**	20110301
DATE:	03 /01 /2011	**TIME:**	9:30PM
STATE:	Florida	**COUNTY:**	PALM BEACH
TYPE PERSON:	Worker on duty - employee	**AGE:**	23
EMPLOYEE JOB:	Yard brakemen and yard helpers		
INJURY:	Sprain/strain, upper back		
DAYS ABSENT:	0	**DAYS RESTRICTED:**	28

EMPLOYEES TESTED FOR ALCOHOL USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEES TESTED FOR DRUG USE:	NONE REPORTED
NUMBER OF POSITIVE TESTS:	
EMPLOYEE TERMINATION/PERMANENT TRANSFER:	UNK/NA
EXPOSURE TO HAZARDOUS MATERIAL:	NO
FRA FORM 6180-54 FILED:	NO
FRA FORM 6180-57 FILED:	NO

CIRCUMSTANCES	
PHYSICAL ACT:	Bending, stooping
EVENT:	Repetitive motion - other (describe in narrative)
RESULT:	Ground
CAUSE:	Undetermined
LOCATION	
SITE:	Yard
ON TRK EQP:	Other equipment (explain in narrative)
WHERE:	Beside track
NARRATIVE	EMPLOYEE WAS PERFORMING DUTIES AS YARD HELPER. WHILE WALKING BRAKE TEST HE BENT OVER TO LOOK AT BRAK E EQUIPMENT ON CAR AND FELT A PAIN IN HIS UPPER BACK. EMPLOYEE IS STILL ON RESTRICTED DUTY UNTIL 3/2 8/2011 HIS NEXT SCHEDULE APPOINTMENT.

APPENDIX 7

Data supports that time off air does not correlate to higher failure rates.



Country	Average Failures per Million Car Miles
Canada	0.20
US	0.27

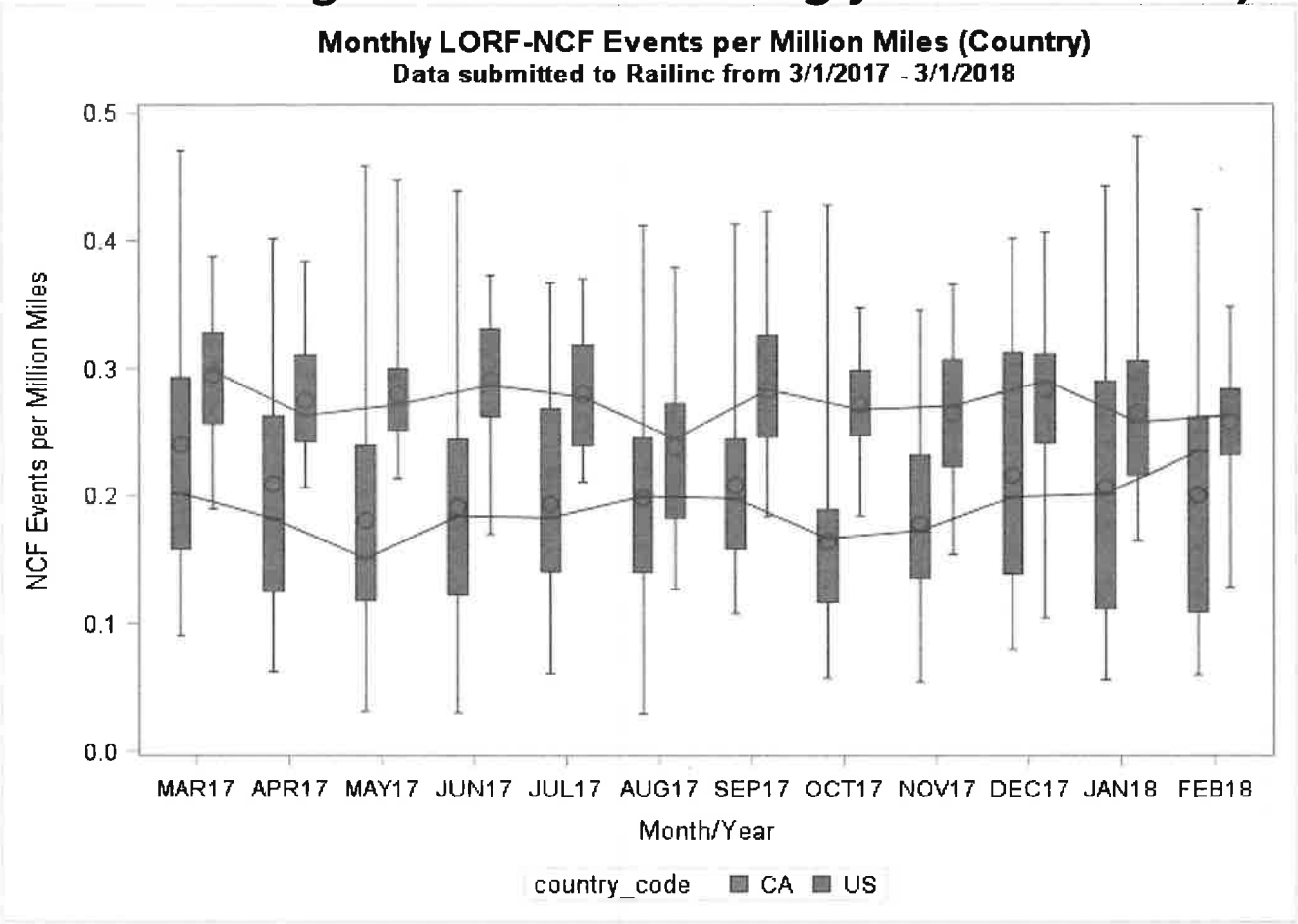
- *Failure rates are not higher in Canada than in the US despite allowing cars to remain off air for 24 hours or longer.*
- *US railroad operations experience an average of one additional LORF-NCF event for every 14 million car miles traveled.*

Notes, Caveats, & Assumptions

Failures included are based on submissions to Railinc from all 7 Class 1 railroads for the designated period.
LORF-NCF = Line of Road Failure (Emergency Brake Application) - No Cause Found.

- NCF event counts are attributed to a country based on the location reported and/or primary location of the railroad for those based in the US.
- Car miles by country are calculated based on movement event locations.
- Diagram summarizes monthly distribution of rates for a 12-month period.

Data supports that time off air does not correlate to higher failure rates, including when accounting for seasonality.



Box Plot Explanation

--MAXIMUM – Greatest value, excluding outliers

--UPPER QUARTILE – 25% of data greater than this value

--AVERAGE/MEAN

--MEDIAN – 50% of data greater than this value; middle of dataset

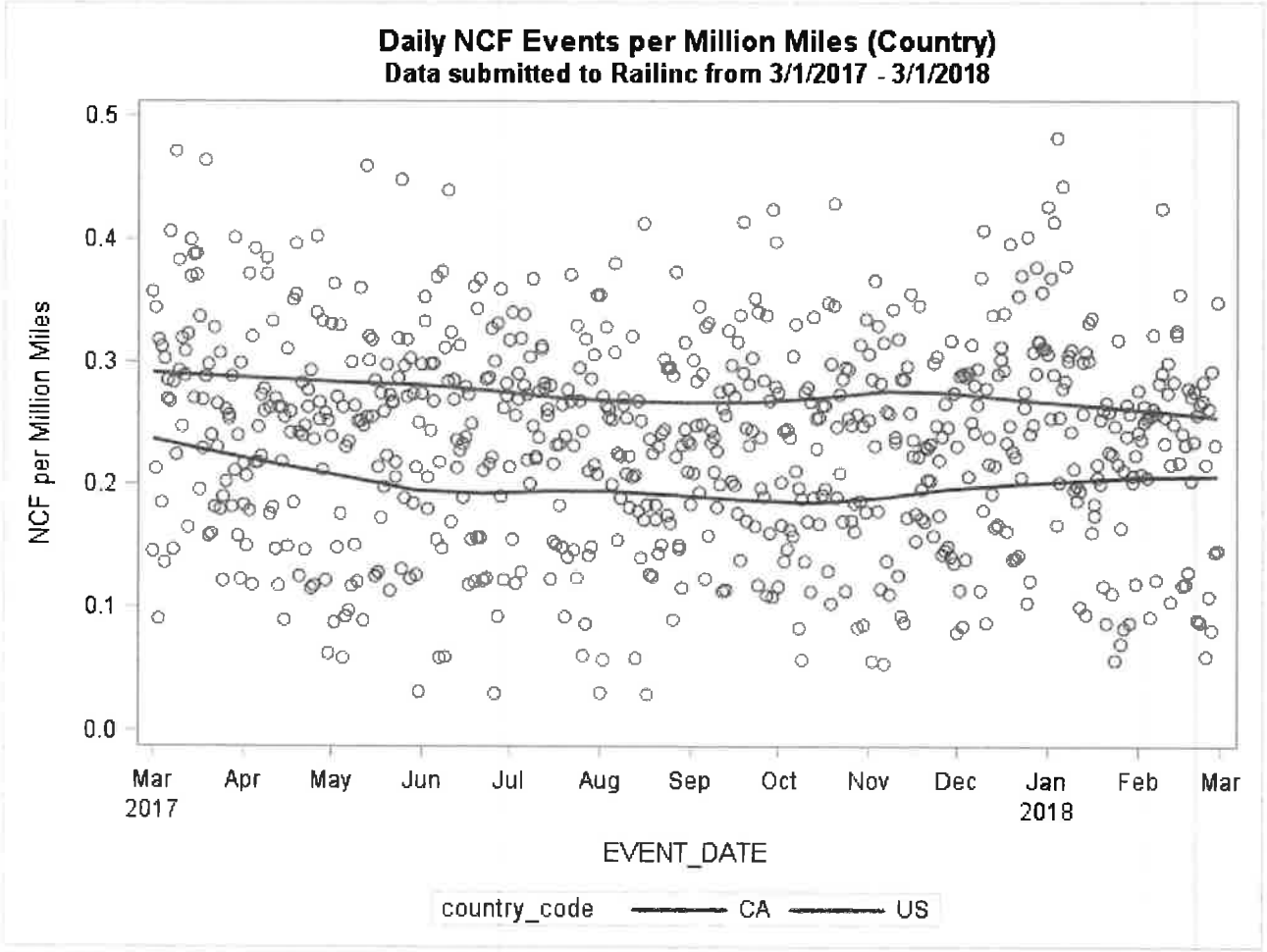
--LOWER QUARTILE – 25% of data less than this value

--MINIMUM – Least value, excluding outliers

Notes, Caveats, & Assumptions

- Failures included are based on submissions to Railinc from all 7 Class 1 railroads for the designated period.
- LORF-NCF = Line of Road Failure (Emergency Brake Application) - No Cause Found.
- NCF event counts are attributed to a country based on the location reported and/or primary location of the railroad for those based in the US.
- Car miles by country are calculated based on movement event locations.
- Diagram summarizes daily rates by month.

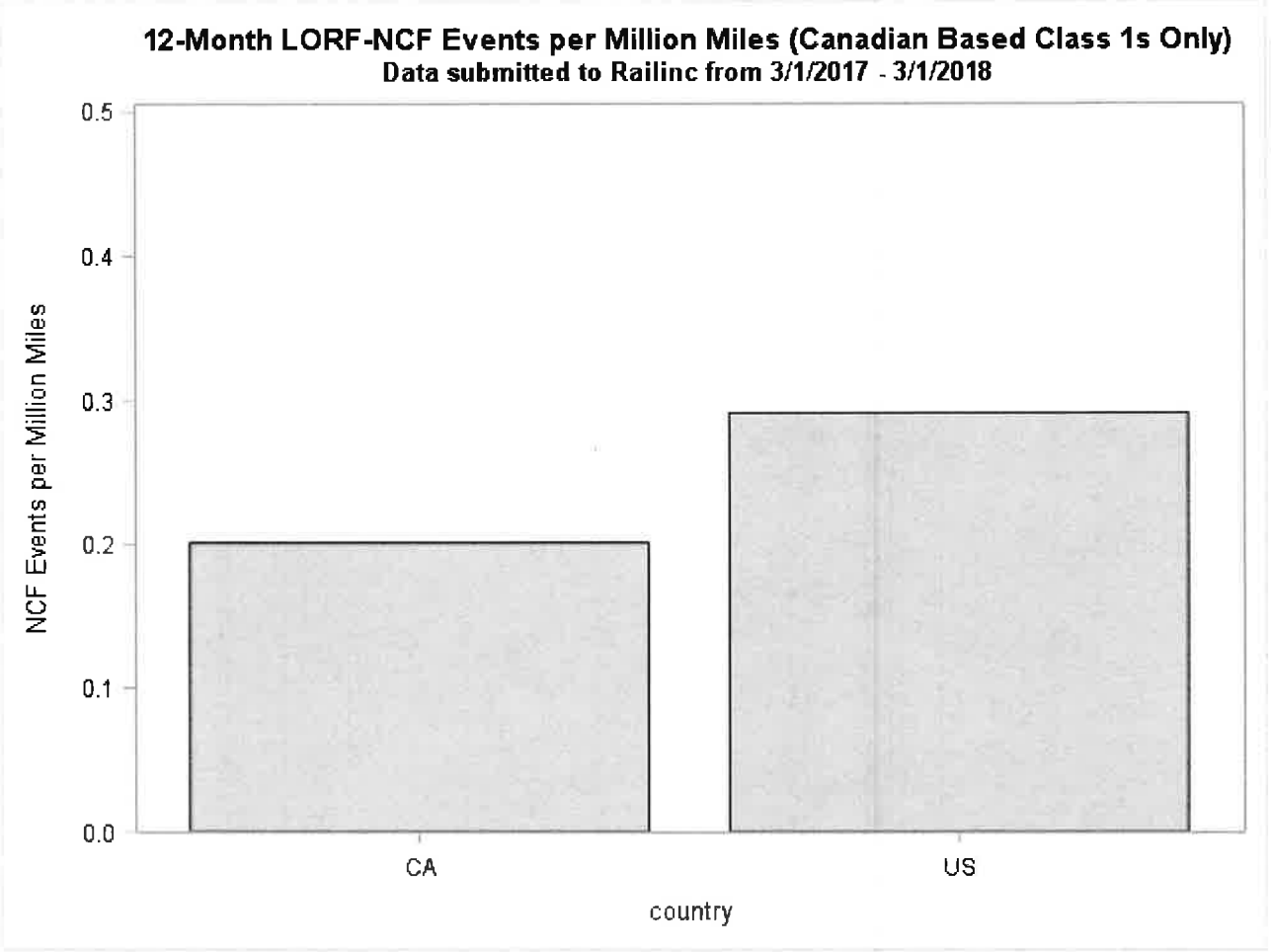
Data supports that time off air does not correlate to higher failure rates, including when accounting for seasonality.



Notes, Caveats, & Assumptions

- Failures included are based on submissions to Railinc from all 7 Class 1 railroads for the designated period.
  LORF-NCF = Line of Road Failure (Emergency Brake Application) - No Cause Found.
- NCF event counts are attributed to a country based on the location reported and/or primary location of the railroad for those based in the US.
- Car miles by country are calculated based on movement event locations.
- Diagram summarizes daily rates.

Analysis of Canadian-based Class 1 railroad failure data supports that time off air does not correlate to higher failure rates.



Country	Average Failures per Million Car Miles
Canada	.20
US	.29

- *Failure rates are not higher in Canada than in the US despite allowing cars to remain off air for 24 hours or longer.*
- *Canadian-based Class 1s experience an average of one additional LORF-NCF event for every 11 million car miles traveled in their US railroad operations (versus Canadian).*

Notes, Caveats, & Assumptions

Failures included are based on submissions to Railinc from Canadian-based Class 1 railroads for the designated period.
LORF-NCF = Line of Road Failure (Emergency Brake Application) - No Cause Found.

- NCF event counts are attributed to a country based on the location reported.
- Car miles by country are calculated based on movement event locations.
- Diagram summarizes monthly distribution of rates for a 12-month period.