



# Railway Locomotive Inspection and Safety Rules

July 3, 2015



Railway Association  
of Canada

# Railway Locomotive Inspection and Safety Rules

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## **PART I - GENERAL**

### **1. SHORT TITLE**

- 1.1 For ease of reference, these rules may be referred to as the “Locomotive Safety Rules”

### **2. SCOPE**

- 2.1 These rules prescribe the minimum safety standards for locomotives operated by railway companies subject to the jurisdiction of Transport Canada pursuant to the Railway Safety Act.

### **3. DEFINITIONS**

In these rules:

- 3.1 a) “bad order” means a locomotive having a defect as defined in Part III of these rules;
- b) “bad order information system” means any method, computerized or otherwise, by which a railway company controls and protects the movement of a locomotive with defects;
- 3.2 “break” means a fracture resulting in complete separation into parts. The term “break” and “broken” are used interchangeably in these rules;
- 3.3 “candela” means the unit of luminous intensity of a light source;
- 3.4 “captive service” means when a locomotive(s) is in service exclusively between specified points on one railway company, in a given geographic location for a given period of time; which does not pass through a safety inspection location;
- 3.5 “certified crashworthy” means the event recorder will protect the elements of data recorded, from unfriendly environmental conditions such as fire, impact shock, static crush, fluid immersion and hydrostatic pressure in accordance with performance criteria and testing sequence as filed with the department;
- 3.6 “certified locomotive inspector” means a person whom is qualified to perform safety inspection of locomotives pursuant to subsection 6.1
- 3.7 “certified safety glazing material” means a glazing material that has been certified by the manufacturer as having met the testing requirements that is equivalent to, or exceeds North American standards;
- 3.8 “certificate” means a document that identifies the employee and the task(s) for which such employee is certified.

- 3.9 "controlling locomotive" means a locomotive in the position from which the crew is operating the train;
- 3.10 "cracked" means fractured without complete separation into parts;
- 3.11 "cruise control" means a device that controls locomotive power output to maintain a targeted speed;
- 3.12 "dBA" means an abbreviated symbol for a sound level measured on the "A" weighted slow response scale of a sound level meter;
- 3.13 "Department" means the Department of Transport;
- 3.14 "designated service" means operation of a locomotive exclusively under conditions where it:
- (a) is not used as an independent or controlling unit in the lead position except within a single yard area;
  - (b) is not occupied by an employee when the locomotive is moving from one yard area to another, and;
  - (c) has stencilled or posted in the locomotive cab the words, "To be occupied in Designated Service only";
- 3.15 "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.
- 3.16 "dynamic brake holding feature" means a feature that holds or maintains dynamic brake if an emergency or penalty brake application occurs for any reason.
- 3.17 "event recorder" means a device design to resist tampering, that monitors and records operations data;
- 3.18 "event recorder memory module" (ERMM) means the portion of the event recorder designed to retain the data;
- 3.19 "event recorder testing" means a verification of the event recorder to ensure that data and retention parameters are respected;
- 3.20 "fire season" means the period of time from April 1<sup>st</sup> to October 31<sup>st</sup>;

- 3.21 “five flute horn” means the horn is composed of 5 projectors sounded in unison, with the following fundamental frequencies: 261 Hz, 311 Hz, 440 Hz, 470 Hz, and 512 Hz, +/- 20 Hz; The assembled horn should have the minimum 1/3 octave band SPL in the 2000-3 150 Hz range, not less than 12 dB below the maximum 1/3 octave band SPL in the 250-1250 Hz range.
- 3.22 “high level mode” means a minimum sound level, intended for emergency use, of one hundred and ten (110) dB(A), at any location on an arc of 30 meters (100 feet) radius, and subtended forward of the locomotive by angles 45 degrees to the left and to the right of the centerline of the track in the direction of travel;
- 3.23 “in service” means all locomotives except those which are:
- a) “bad order” and/or being moved to another location for repair(s) as provided in 5.2 of these rules;
  - b) in a repair shop or on a repair track;
  - c) on a storage track and are dead and drained;
- 3.24 “lead locomotive” means the first locomotive proceeding in the direction of movement
- 3.25 “locomotive consist” means a combination of locomotives operated from a single control;
- 3.26 “locomotive or engine” means a rail vehicle including cabcars propelled by any energy form, other than steam, intended for the propulsion and/or control of freight, passenger or service equipment. The term locomotive and engine are used interchangeably in these rules;
- 3.27 “locomotive remanufactured” means a locomotive rebuilt or refurbished from a previously used or refurbished underframe containing fewer than 25% previously used components of its original structure;
- 3.28 “low level mode” means a sound level, intended for normal train operation, of ninety six (96) dB(A) +6, -0, at any location on an arc of 30 meters (100 feet) radius, and subtended forward of the locomotive by angles 45 degrees to the left and to the right of the centerline of the track in the direction of travel;
- 3.29 “operative” means a component or system is in a safe condition to perform its intended function;
- 3.30 “passenger locomotive” means a locomotive used to pull an undefined number of rail car(s) designated for the transportation of passengers;
- 3.31 “person in charge” means a certified person in accordance with subsection 6.1, appointed by a railway company to ensure the safe conduct of an operation or the work of employees;
- 3.32 “qualified person” means, in respect to a specified duty, a person who, because of knowledge, training and experience is qualified to perform that duty safely and properly;

- 3.33 “railway company” means a railway company subject to the Railway Safety Act;
- 3.34 “railway safety inspector” means a Department of Transport inspector designated pursuant to section 27 of the Railway Safety Act;
- 3.35 “safety control” means a device(s) which will cause a brake application to be initiated automatically if the locomotive operator becomes incapacitated;
- 3.36 “safety defect” means any item or component that is defective on a locomotive as prescribed in Part III of these Rules;
- 3.37 “safety inspection” means an examination of a locomotive for safety defects while stationary by a certified locomotive inspector or a person in charge as defined herein, to verify that it may move safely, and to identify those defects listed in Part III of these rules which may inhibit such movement and require correction. Safety inspections are intended to be of a visual nature;
- 3.38 “safety inspection location” means a location designated by a railway company where certified locomotive inspector perform safety inspections;
- 3.39 “safety inspection record” means a record in hard copy form or otherwise, including a computer record, which attests that a safety inspection as defined herein was performed;
- 3.40 “three flute horn” means the horn is composed of 3 projectors sounded in unison, with the following fundamental frequencies: 261 Hz, 311 Hz, 470Hz, +/- 20Hz; the assembled horn should have the minimum 1/3 octave band SPL in the 2000-3150 Hz range, not less than 12 dB below the maximum 1/3 octave band SPL in the 250-1250 Hz range.
- 3.41 “train” means locomotive(s), with or without cars, so designated by its operating authority, displaying marker(s);
- 3.42 “yard service” means locomotives involved exclusively in switching, marshalling, humping, trimming and industrial switching.

#### **4. RAILWAY COMPANY RESPONSIBILITY -**

- 4.1 A railway company is responsible for the inspection and repair of all locomotives to ensure safe operation. All components, appurtenances and control apparatuses of all locomotives must be designed and maintained to perform their intended function.

4.2 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 violation/defect reported by a railway safety inspector. The reply, from an appropriate railway officer, shall also include the unit initials and number and the date and location of the corrective action taken.

**5. APPLICATION OF SAFETY INSPECTIONS AND MOVEMENT RESTRICTIONS -**

5.1 A railway company shall ensure that locomotives placed or continued in service are free from all safety defects described in Part III of these rules.

5.2 Locomotives identified with safety defects may be moved to a designated location for repair, when authorized by a person in charge, who shall ensure that:

- (a) the locomotive is safe to move; (in operating or dead head mode in the direction of travel);
- (b) a means to protect the locomotive's safe movement is implemented, including, identifying to all employees involved the defects which restrict the locomotive(s) movements, the designated location for repair and the name of the person in charge authorizing the movement; and,
- (c) the movement of a locomotive with safety defects shall be controlled and protected by the use of a bad order information system, the appropriate records will be retained for a period of ninety two (92) days.

**6. CERTIFIED LOCOMOTIVE INSPECTOR**

6.1 A railway company shall ensure that certified locomotive inspectors are trained to perform safety inspections of locomotives in compliance with these Rules. Certified locomotive inspectors must demonstrate to a railway company by means of oral or written examination and on-the-job performance, a knowledge and ability concerning safety inspection of railway locomotives.

6.2 A railway company shall maintain a record of certified locomotive inspectors who perform safety inspections. This record shall be made available to a railway safety inspector upon request.

6.3 Certified locomotive inspectors shall be recertified if they have not been performing the duties prescribed in these rules for a period extending over three years.

## **7. SAFETY INSPECTION LOCATIONS**

- 7.1 A railway company shall file with the Department a list of its safety inspection locations. Any changes to the list of safety inspection locations shall be filed with the Department sixty (60) days prior to implementing such changes.
- 7.2 At safety inspection locations:
- a) all locomotives placed in service or placed on a train for freight service only shall receive a safety inspection;
  - b) all locomotives on a train for the purpose of passenger use only placed in service or laid over for more than eight (8) hours shall receive a safety inspection.
- 7.3 A railway company shall maintain a record of all locomotives which received a safety inspection. This information will be retained for a minimum of ninety two (92) days and will be made available to a railway safety inspector upon request.
- 7.4 At safety inspection locations, locomotives operating in "yard service" or "designated service" shall receive a safety inspection at intervals not exceeding ten (10) days.
- 7.5 At those locations, prior to departure of a train where locomotive(s) receiving a Safety Inspection have been placed in service or placed on a train, the locomotive operator shall be notified that a Safety Inspection has been made. Such notification shall include any information required for movement of safety defects as provided in Section 5.2 of these Rules.

## **8. PRE-DEPARTURE INSPECTION**

- 8.1 At locations other than Safety Inspection Locations, where a locomotive is placed in service, or a locomotive layover of more than 8 hours has occurred, the locomotive shall, as a minimum requirement have a pre-departure inspection by either the locomotive operator or other qualified person for those conditions listed in Appendix I.
- 8.2 The locomotive operator shall be responsible for determining that the prescribed inspection has been completed prior to departure.
- 8.3 At locations other than Safety Inspection Locations all operating locomotives shall receive a safety inspection at intervals not exceeding forty five (45) days.

## **9. CAPTIVE SERVICE**

- 9.1 Section 7.1 of these rules do not apply to locomotives used exclusively in captive service if a railway company:
- (a) establishes safety inspection criteria, and;
  - (b) files railway schedules with the department that specify the locations of the captive service, and the applicable inspection criteria imposed on such locomotive(s), thirty (30) days prior to operation.

## **PART II - LOCOMOTIVES DESIGN REQUIREMENTS**

### **10. GENERAL DESIGN**

10.1 The locomotive shall be designed and constructed to provide for safe operation and protection of the operating crews and property from accidents caused by functional failure of locomotives.

#### 10.2 (a) Freight Locomotives

After January 1, 2015 new and remanufactured locomotives travelling at speeds exceeding 25 MPH (40 KPH) shall be designed and constructed as a minimum in accordance with the latest revision of the "Association of American Railroads Manual of Standards and Recommended Practices" (S-580) or to an equivalent standard to provide for safe operation and for the protection of operating crews, and property from accidents caused by functional failure of locomotives. Such standard shall be kept on file by the railway company and made available to the Department upon request. (Appendix II)

#### (b) Passenger Locomotives

After January 1, 2015 new and remanufactured locomotives travelling at speeds exceeding 25 MPH (40 KPH) shall be designed and constructed as a minimum in accordance with the latest revision of the "American Public Transit Association" (APTA), the Association of American Railroad Manual of Standards and Recommended Practices or equivalent standard.

10.3 Passageways and walkways shall be properly treated with anti-skid decking to provide secure footing.

10.4 A locomotive consist with open end platforms shall have a means of safe passage between them. There shall be a continuous barrier across the full width of the end of a locomotive or a continuous barrier between locomotives.

### **11. AUDIBLE SIGNALS**

All locomotives must be equipped with horns and bells that meet the specifications of these rules;

#### 11.1 PASSENGER LOCOMOTIVES

11.1.1 Passenger locomotives must be equipped or retrofitted with horns capable of producing a high and a low level sound, as per the following schedule:

- a) new locomotives ordered after January 1st, 2007 and delivered after January 1<sup>st</sup> 2008;

- b) locomotives in a controlling or lead position on trains in passenger service, traveling at speeds exceeding 105 km (65MPH), must be retrofitted before January 1st, 2012;
- c) this section does not apply to non-Canadian owned passenger locomotives, with incidental usage in Canada.

#### 11.1.2 CONTROLS

- (a) The horn switch shall be located in such a manner as to allow for convenient access from the locomotive operator's normal working position.
- (b) The control valve shall be located at or near the horn, to ensure a crisp sound and minimize the time delay response.

#### 11.1.3 LOCATION

The horn shall be mounted:

- in the direction of travel
- near the front of the roof
- no further than 1.5 meter (5 feet) behind the rear of the cab
- near the centerline of the locomotive with no obstructions or exhaust outlets ahead of or beside the horn.

#### 11.1.4 DESIGN TYPES

Locomotives shall be equipped with:

- (a) one single five flute horn capable of producing two different sound levels- low level mode or high level mode; or
- (b) two separate horns:
  - i. one three or five flute horn that produces the low level mode; and
  - ii. one five flute horn that produces the high level mode;

#### 11.1.5 COMPLIANCE

- (a) When tested in an anechoic chamber meeting the requirements of ISO 3745 (18-22 deg C, 45%-65% rel. hum., 990-1025 millibars), the horn shall produce a minimum sound pressure level of 143 dB(A) at one meter from the front of the horn. The railway shall retain the horn manufacturers Certificate of Compliance and test records for not less than 10 years.
- (b) On new and retrofitted locomotives, the railway must ensure that the horn design is certified and the installation is tested as per the requirements of these rules.

## 11.2 FREIGHT LOCOMOTIVES

All locomotives other than in designated service operating in a controlling position shall be equipped with a horn that is tuned in chords of not less than three tones meeting the following design criteria:

- (a) a horn capable of producing a minimum sound level of 96 (db)A at any location on an arc of 30 meters (100 feet) radius subtended forward of the locomotive by angles 45 degrees to the left and to the right of the centerline of the track in the direction of travel;
- (b) the control of the horn shall be located to allow for convenient operation from the locomotive operator's normal operating location.

## 11.3 BELL

All locomotives operating in a controlling position shall be equipped with a bell, or other device capable of producing an equivalent sound, meeting the following design criteria:

- (a) must produce a minimum sound level of 60 dBA at any location on an arc of 15 meters (50 feet) radius subtended forward of the locomotive by angles 45 degrees to the left and to the right of the centreline of the track in the direction of travel;
- (b) the control of the bell shall be located to allow for convenient operation from the locomotive operator's normal operating location.

## 12. EVENT RECORDERS

Controlling locomotives operated as trains or transfers on main track or subdivision track, shall be equipped with an event recorder meeting the following minimum design criteria : (Exception - Locomotives dedicated to a yard may move between yards for a distance no greater than 32 KM (20 miles) and at speed no greater than 25 KM/H (15 mph) without being equipped with an event recorder.)

- (a) the Event Recorder Memory Module (ERMM) shall meet the survivability criteria established in the crashworthiness standards of the Institute of Electrical and Electronics Engineers, Inc., modified for the locomotive environment;
- (b) new certified crashworthy event recorder shall be installed at a location on a locomotive that provides for its maximum protection;
- (c) the event recorder shall have suitable means to transfer the stored data to an external device for processing and analysis;
- (d) the outer surface of the event recorder containing a certified crashworthy ERMM shall be coloured international orange;
- (e) the locomotive event recorder shall retain the following data where applicable:

- i) train speed,
- ii) selected direction of motion,
- iii) time,
- iv) distance,
- v) throttle position,
- vi) applications and operations of the train automatic air brakes, 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 brake application or release that is responsive to a command originating from or executed by an onboard computer (e.g. electronic braking system controller, locomotive electronic control system, or train control computer), the system shall record, or provide means of determining, the involvement of any such computer; (this includes brake pipe and brake cylinder pressure)
- vii) applications and operations of independent brake,
- viii) applications and operations of dynamic brake, if so equipped,
- ix) cab signal aspect, if so equipped and in use,
- x) end-of-train device (EOT) device lost of communication front to rear and rear to front,
- xi) electronic controlled pneumatic braking(ECP) message and loss of such message, if so equipped,
- 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, high and low signal

- 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 or off, if so equipped and in use,
- xxv) safety-critical train control data routed to the engineer's display with which the engineer is required to comply, specifically including text messages conveying mandatory directives, and maximum authorized speed,
- xxvi) reset safety control (RSC).

## 12.1 IMPLEMENTATION PERIOD

- (a) all locomotives, built prior to January 1, 2007 shall be equipped with an event recorder designed with a solid state memory module and shall record as a minimum the following data elements:
  - time,
  - distance,
  - speed,
  - brake pipe pressure,
  - throttle position,
  - emergency brake application,
  - independent brake cylinder pressure,
  - horn signal and where applicable the reset safety control function;
- (b) all new locomotives built after Jan. 1, 2007 and delivered after January 1, 2008 shall be equipped with an event recorder designed with a "Certified Crashworthy" ERMM that records all data elements contained in 12(e);
- (c) effective January 1, 2010, should an event recorder be replaced on a locomotive built prior to January 1, 2008, the event recorder shall be replaced by an event recorder with a hardened memory module or by an event recorder with a certified crashworthy ERMM (event recorder memory module) recording as a minimum the same number of data elements as the recorder replaced.

## 12.2 MAINTENANCE

- (a) event recorder and ERMM shall be inspected and tested on an annual basis;
- (b) test results shall be maintained for one year by the railway and made available to a Railway Safety Inspector upon request.
- (c) at safety inspection locations during safety inspections a download of the date, time and locomotive number must be performed upon request of a Railway Safety Inspector, to insure event recorder operation and accuracy.

### 12.3 PRESERVATION OF DATA

- (a) under normal operation, data shall be recorded and retained for a period of forty eight (48) hours.
- (b) when a locomotive is involved in an accident or incident the railway company involved must preserve the event recorder data for a period of ninety (90) days, when advised by TSB that an investigation will take place.

### 13. SAFETY CONTROL EQUIPMENT

13.1 A controlling locomotive must be equipped with a safety control system which shall, as a minimum, initiate a full service brake application and remove all tractive effort in the event that the person operating the locomotive becomes inattentive or incapacitated.

13.2 A controlling locomotive equipped with a safety control system with roll-away protection must:

- a) be wired such that the safety control system power source is fed through the battery knife switch or circuit breaker;
- b) meet the requirements of the most current "Association of American Railroads Manual of Standards and Recommended Practices" (S-5513); and
- c) commence safety control system warning timing cycle and subsequently initiate a penalty brake application of the train air brakes should any of the following occur:
  - i) power is interrupted to the safety control system;
  - ii) locomotive brake cylinder pressure is less than 25 psi;
  - iii) speed is detected.

### 14. SAFETY APPLIANCES

14.1 Safety appliances on locomotives shall be in compliance with General Order No. 0-10, "Regulations Respecting Railway Safety Appliance Standards".

### 15. SPARK ARRESTING DEVICES

15.1 Locomotives shall be equipped with a spark arresting device or a turbo-charger.

### 16. ILLUMINATING DEVICES

16.1 Locomotives operating in a leading position shall be equipped with headlight(s) meeting the following design criteria:

- (a) must be equipped with a minimum of one headlight that produces at least 200,000 candela;
- (b)
  - i headlight(s) on locomotives other than in designated service must be aligned to centreline in the horizontal plane and depressed in the vertical plane to strike the rail at 244 metres (800 feet) ahead of the locomotive in the direction of travel;
  - ii headlight(s) on designated or yard service locomotives must be aligned to centreline in the horizontal plane and depressed in the vertical plane to strike the rail at 91.5 metres (300 feet) ahead of the locomotive in the direction of travel;
- (c) headlight(s) must be provided with a dimming device that reduces normal operating voltage in nominally 50%. The control of such device must be located to allow for convenient operation from the locomotive operator's normal operating location;
- (d) locomotives must be equipped with a rear headlight or have an illuminating device to provide for a safe switching operation.

16.2 Leading locomotives, other than in designated and/or yard service, must be equipped, in the direction of travel, with ditch lights or a suitable alternative that is filed with the Department meeting the following design criteria:

- (a) must be equipped with two ditch lights in the direction of travel, each of which produces at least 200,000 candela;
- (b)
  - i ditch lights must be mounted at least 91.5 cm (36 inches) above the top of rail. They shall be spaced a minimum of 91.5 cm (36 inches) apart, unless the vertical distance between the headlight and the ditch light center lines is less than 152.5 cm (60 inches), in which case the ditch lights must be spaced at least 152.5 cm (60 inches) apart;
  - ii diesel multiple units, electric multiple units and control cab cars are exempted from the mounting height requirement in paragraph [(b)i] where such placement would compromise the integrity of the car body or be otherwise impracticable. In such cases ditch lights must be mounted at least 61 cm (24 inches) above the top of rail;
- (c) ditch lights shall be aligned in the horizontal plane to cross the locomotive centreline 122 metres (400 feet) ahead of the locomotive and depressed in the vertical plane to strike the rail at 244 metres (800 feet) in the direction of travel.

16.3 Locomotives operating in a controlling position must be equipped with means of illuminating the control instruments, meters and gauges to enable the locomotive operator to make accurate readings from the normal operating location without interfering with the operator's vision of track and signals.

## **17. SAFETY GLAZING**

17.1 Locomotives, other than in designated service, must be equipped with certified safety glazing material on all windows of the operating and/or occupied cabs.

## **18. FAIL SAFE CIRCUITS AND SYSTEMS**

18.1 Any component of electrical or mechanical systems, vital to the safety of locomotive occupants or the general public, shall in the case of failure retain the locomotive in a safe operating condition.

## **19. FUEL TANKS**

19.1 After January 1, 2015 fuel tanks, on new and remanufactured locomotives travelling at speeds exceeding 25 MPH (40 KPH) purchased subsequent to the approval of this rule, are to be of high impact resistant design which meet or exceed current Association of American Railroads Manual of Standards and Recommended Practices (S-5506).

19.2 Fuel tanks shall be provided with suitable liquid level gauges, so located that the fuel level in the tanks can be determined when the tanks are being filled. Gauges must be protected against accidental breakage where loss of fuel would be incurred.

## **20. WHEELS AND AXLES**

20.1 Traction motors support bearing, on new locomotives purchased subsequent to the approval of this rule, are to be of the roller bearing type.

## PART III - LOCOMOTIVE INSPECTION REQUIREMENTS

### 21. BRAKE SYSTEM

- 21.1 The brake system and all related components, including the handbrake, must be tested and maintained in operative condition, as per procedures issued by the railway company and filed with the Department. Dynamic brake must be tested and maintained in operative condition on the number of locomotives required to be equipped with dynamic brake on trains operating, or destined for operation, in the territory filed under subsection 21.2. Locomotives that have not been previously tested cannot be set out and placed on a train requiring use of their dynamic brake feature until they have been tested at a locomotive safety inspection location.
- 21.2 A railway company shall file with the Department all territories on which locomotives with dynamic brake are required, as well as related instructions. This information shall be filed with the Department no later than ninety days from the approval of these rules.
- 21.3 All new freight locomotives, except yard locomotives, ordered after December 31, 2010 intended to operate in territory as set out in subsection 21.2, shall be equipped with dynamic brake and dynamic brake holding feature, and shall be designed to conduct an electrical integrity test of the dynamic brake to determine if electrical current is being received at the grids on the system.
- 21.4 All existing freight locomotives intended to operate in territory as set out in subsection 21.2 shall be modified prior to *December 31, 2010* to incorporate a dynamic brake holding feature if not already equipped.
- 21.5 (a) Dynamic brake is considered a supplemental braking system however company instructions and procedures shall ensure that the friction brakes are sufficient by themselves, without the aid of dynamic brakes, to stop the train safely under all operating conditions.
- (b) Except when operating pursuant to subsection 21.2 a locomotive may be operated with inoperative dynamic brake.
- (c) Should the dynamic brake become inoperative enroute while operating pursuant to subsection 21.2, the defective locomotive should be repaired, remarshalled, set off, or the train handled in accordance with the railroad companies instructions as filed with the Department.

## 22. TRUCKS

- 22.1 A railway company shall not place, or continue in service, a locomotive with any of the following truck related defects:
- (a) truck frames, swing hangers, swing hanger pins or equalizers cracked or broken;
  - (b) suspension components such as coil or rubber springs, elliptic springs, snubbers and dampers must not be missing, cracked, broken or out of place and must be properly secured.
- 22.2 All components attached to the truck frames must be properly secured.
- 22.3 The bolster side bearing and pedestal clearances shall be maintained within manufacturer's specifications.
- 22.4 The truck frame, brake rigging and associated components of locomotives shall be kept free from accumulation of oil, grease and other combustible materials.

## 23. WHEELS AND AXLES

- 23.1 A railway company shall not place, or continue in service, a locomotive with any of the following wheel defects:
- (a) flange thickness of 7/8 inches (22.2 mm) or less;
  - (b) vertical flange of 1 inch (25.4 mm) or more;
  - (c) a flange height of 1 1/2 inches (38.1 mm) or more measured from tread to the top of the flange;
  - (d)
    - i) a curved plate wheel with a rim thickness of 1 inch (25.4 mm) or less;
    - ii) a straight plate wheel with a rim thickness of 1 inch (25.4 mm) or less;
    - iii) a straight or curved plate wheel with a rim thickness of 3/4 inch (19.0 mm) or less, on locomotives used in yard services
  - (e) a flat spot of 2 1/2 inches (63.5 mm) or more in length or, in the case of multiple flat spots, 2 inches (50.8 mm) or more in length;
  - (f) a gouge or chip in the flange that is more than 1 1/2 inches (38.1 mm) in length and 1/2 inch (12.7 mm) in width;
  - (g) a shell of 2 1/2 inches (63.5 mm) or more in length or, in the case of multiple shells, 2 inches (50.8 mm) or more in length;
  - (h) tread worn hollow 5/16 inch (7.9 mm) or more;
  - (i) a crack in the rim, plate or hub;
  - (j) a loose wheel;
  - (k) the variation in the circumference of wheels may not exceed 1/4 " or 2 tapes on the same axle when applied or threaded.

23.2 A railway company shall not place or continue in service a locomotive with a traction motor support bearing that shows evidence of:

- (a) signs of overheating;
- (b) loose or missing bolts;
- (c) oil leaking from reservoir;
- (d) missing or defective reservoir filler cup, or drain plug not properly secured.

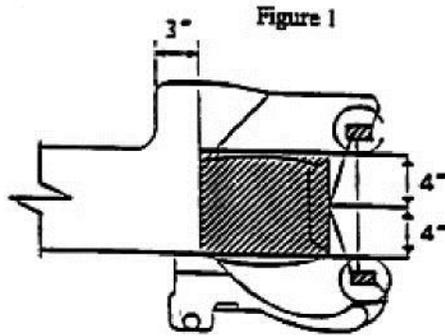
23.3 A railway company shall not place or continue in service a locomotive with any of the following journal bearing safety defects:

- (a) a loose or damaged seal;
- (b) loose or missing end cap bolt;
- (c) signs of over heating; and
- (d) a missing or defective gasket or drain plug not properly secured.

## **24. DRAFT SYSTEMS**

24.1 A railway company shall not place or continue in service a locomotive with any of the following coupler related defects:

- (a) a coupler shank that is bent out of alignment to the extent that the coupler will not couple automatically;
- (b) a coupler knuckle that is broken or cracked on the inside pulling face of the knuckle, except that shrinkage cracks or hot tears that do not significantly reduce the strength of the knuckle shall not be considered cracked;
- (c) a knuckle pin or thrower that is missing or inoperative;
- (d) a coupler retaining pin lock that is missing or broken;
- (e) a coupler with an inoperative lock lift or a coupler assembly that does not have anticreep protection to prevent unintentional unlocking of the coupler lock; locomotives in passenger service must be equipped with a device that locks the lock lift assembly to ensure prevention of unintentional uncoupling;
- (f) a coupler lock that is missing, inoperative, bent, cracked or broken;
- (g) a coupler not falling within the following heights above the rails, (except those by design and of which specifications will be filed with the Department):
  - minimum height: 31 1/2 inches (800 mm);
  - maximum height: 34 1/2 inches (876 mm);
- (h) a coupler that has a crack in the area of the shank or head represented by the unshaded portion of figure 1, except that shrinkage cracks or hot tears that do not significantly reduce the strength of the coupler shall not be considered cracked;



(i) an inoperative uncoupling device.

24.2 A railway company shall not place or continue in service a locomotive with a draft arrangement that shows evidence of:

- (a) a draft gear that is inoperative;
- (b) a cracked or broken yoke;
- (c) a vertical coupler pin retainer that is missing or defective
- (d) a draft gear carrier plate that is missing or has more than 25% of the fasteners loose or missing;
- (e) a draft stop that is missing or broken to the extent that it no longer performs its design function.

## 25. FUEL TANKS

25.1 Exterior of fuel tanks of the locomotive shall be kept free from accumulation of oil, grease and other combustible material.

25.2 Fuel tanks, filling adapters, pumps, piping, valves and connections shall be kept free from leaks, properly secured and in operative condition.

25.3 The fuel tank vent must be kept clear of obstructions.

## 26. INTERNAL COMBUSTION ENGINES

26.1 The engine and engine room shall be kept free from accumulation of oil, grease, fuel oil, and other combustible material. Pollution control tanks shall be kept free from leakage and/or from overflow.

26.2 Locomotives operated in service during the fire season, shall have exhaust passages on the discharge side of spark arresting devices or turbo-chargers kept free of oil accumulation and carbonaceous deposits in excess of 1/8 inch (3 mm) in thickness.

**27. RAIL CLEARANCE**

27.1 No part or appliance of a locomotive, excepting wheels and flexible non metallic sand pipe extension tips, shall be less than 2 1/2 inches (63 mm) above the top of the rail.

**28. WINDOWS**

28.1 Windows on controlling locomotives, shall be kept clean and free from cracks or obstructions. All related components, on controlling locomotives, such as wipers, sun visors and defrosters shall be kept in operative condition.

**29. SAFETY CONTROL EQUIPMENT**

29.1 A controlling locomotive shall not be placed in service other than in designated and/or yard service, without an operative reset safety control.

29.2 A controlling locomotive in designated and/or yard service which is not equipped with a reset safety control shall have an operative safety control foot pedal.

29.3 A controlling locomotive equipped with a safety control system with roll-away protection shall not be placed in service unless it meets the requirements listed in Part II – Locomotive Design Requirements, Section 13.2.

29.4 It must be communicated to affected railway employees when a locomotive is equipped with a safety control system with roll-away protection.

**30. SAFETY APPLIANCES**

30.1 All safety appliances, as described in General Order No. O-10, "Regulations Respecting Railway Safety Appliance Standards" shall be kept in a safe and operative condition.

**31. SPEED INDICATOR**

31.1 A controlling locomotive shall not be placed in service other than in designated service without operative speed indicator(s).

**32. EVENT RECORDER**

32.1 A controlling locomotive shall not be placed in service other than in designated and/or yard service without an operative event recorder.

**33. AUDIBLE SIGNALS**

33.1 All audible signal equipment on controlling locomotives shall be in operative condition.

**34. ILLUMINATING DEVICES**

34.1 All illuminating devices shall be secured and be in operative condition.

## **PART IV - LOCOMOTIVE FILING REQUIREMENTS 35.**

### **35. FILING REQUIREMENTS WITH THE DEPARTMENT**

- 35.1 A railway company shall maintain specification records for each of its locomotives. These records shall be made available to the Department upon request. (Appendix II)
- 35.2 A railway company shall retain on file and provide to the Department upon request the following safety guidelines and procedures as amended:
- (a) event recorder functional specifications and design criteria;
  - (b) design specifications for the configuration of speed indicators and cab speakers on passenger locomotives;
  - (c) specifications for couplers not falling within the following heights above the rails;
    - i. minimum height - 31 1/2 inches; (800 mm);
    - ii. maximum height -34 1/2 inches (876 mm);
  - (d) testing procedures for reset safety control systems;
  - (e) method of testing window and door safety glazing;
  - (f) testing procedures for audible signals.
- 35.3 A railway company shall file with the Department an annual report, or as otherwise requested from a railway safety inspector, information concerning locomotives set off from a train enroute because of suspension bearing failure, and/or other equipment failures identified by equipment fault detection devices located along a railway system.
- 35.4 A railway company if requested, shall file with the Department a full description of the training program and criteria used:
- (a) to perform safety inspections, and;
  - (b) to perform pre-departure inspections in accordance with Appendix 1.
- 35.5 A railway company may operate locomotives with advanced technology/operational improvements provided that the testing and operating procedures have been filed with the Department thirty (30) days prior to testing and placing in service.

### **36. EXCEPTION TO THE APPLICATION OF THESE RULES**

- 36.1 These Rules do not apply to locomotives used exclusively in tourist excursion train service that travels no further than a round trip of 150 miles (240 km) at a speed not exceeding a maximum of 25 mph (40 km/h) if the company uses these rules as a guide and consults with the Department to:
- (a) establish appropriate inspection, safety criteria and speed restrictions for locomotives used exclusively in tourist trains; and
  - (b) files railway schedules with the department that specify the locations of the service, the round trip distance, the type of equipment operated, along with the applicable inspection, safety criteria, and any other restrictions imposed on the operation of such equipment, ninety (90) days prior to operation.

## **PART V - STEAM LOCOMOTIVES**

### **37. STEAM LOCOMOTIVES**

- 37.1 For the purpose of Part V, a “locomotive or engine” means a self-propelled unit of equipment, powered by steam that is either designed or used for moving other equipment. This includes a self-propelled unit designed or used to carry freight and/or passenger traffic.
- 37.2 Steam powered locomotives shall be inspected and maintained in accordance with RAC Steam Locomotive Safety Inspection Circular No. MC 3.
- 37.3 Each railway company which operates, or intends to operate, steam powered locomotives shall:
- (a) notify Department at least thirty (30) days in advance of the first date of such operation, and
  - (b) notify the Department in advance of any periodic inspections, as required in RAC Circular No. MC 3.

## APPENDIX I

### PRE-DEPARTURE INSPECTION BY A LOCOMOTIVE OPERATOR OR OTHER QUALIFIED PERSON

As per subsection 8.1, a pre-departure inspection of locomotive(s) shall be performed by the locomotive operator or other qualified person for the following:

- (a) brake test including the operation of the safety control system;
  - (b) hand brake;
  - (c) headlights and ditch lights;
  - (d) trucks and running gear;
  - (e) any other apparent safety hazard likely to cause an accident or casualty.
2. Exceptions are to be reported for correction.

## APPENDIX II

### LOCOMOTIVE SPECIFICATION RECORDS

A railway company shall maintain specification records, as referenced in the "Locomotive Safety Rule, Part IV", for each of its owned or leased locomotives. This information will be made available to the Department upon request.

A railway company shall retain records of any alternations which affect data recorded;

Loco Number \_\_\_\_\_ Loco Initial \_\_\_\_\_ Loco Type \_\_\_\_\_ Loco Propulsion \_\_\_\_\_

Operating Railway \_\_\_\_\_ Built By \_\_\_\_\_ Date \_\_\_\_\_

Number and type of traction motors \_\_\_\_\_

Engine, type and horsepower \_\_\_\_\_

Locomotive brake equipment type \_\_\_\_\_

Dynamic Brake :Yes \_\_\_\_\_ No \_\_\_\_\_ Type \_\_\_\_\_

Type of safety control system \_\_\_\_\_

Event Recorder: Yes \_\_\_\_\_ No \_\_\_\_\_ Type \_\_\_\_\_

Anti-climber arrangement designed to withstand a minimum of \_\_\_\_\_ pounds

Collision posts designed to withstand a longitudinal force of \_\_\_\_\_ pounds each at 30 inches above the deck and \_\_\_\_\_ pounds at the underframe.

Short hood structured-facing area skin is equivalent to \_\_\_\_\_ steel plate psi yield strength.

Total weight in working order \_\_\_\_\_ pounds

Starting tractive effort at \_\_\_\_\_ % adhesion \_\_\_\_\_ pounds

AAR requirement for fuel tanks \_\_\_\_\_

Pilot Type Front \_\_\_\_\_ Rear \_\_\_\_\_



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