ALBERTA STEAM LOCOMOTIVE INSPECTION, AND MAINTENANCE, GUIDELINES

March 4, 2014

This set of guidelines is based on the Rail Association of Canada Circular # MC3, Steam Locomotive Inspection, Maintenance, and Operating Standards. Changes have been made to align with the Alberta Heritage Railway Regulation, and to better suit Heritage Railways. All Boiler requirements have been removed as Boilers in Alberta must be maintained to the Alberta Boilers Safety Association's Standard.

ALBERTA STEAM LOCOMOTIVE INSPECTION, AND MAINTENANCE, GUIDELINES

INDEX

Subpart A--General

General Inspection Requirements

Recordkeeping Requirements

Subpart B--Steam Locomotives and Tenders

Brake and Signal Equipment

Cabs, Warning Signals, Sanders and Lights

Throttles and Reversing Gear

Subpart A--General

1. **Short Title**
   For ease of reference, these standards may be referred to as the "Steam Locomotive Guidelines".

2. **Scope**
   These guidelines describe the minimum safety requirements for steam propelled locomotives in the Province of Alberta

3. **Person qualified to operate**
   A person who is qualified to operate a steam locomotive shall, be qualified as per the Heritage Railway Regulations of the Railway (Alberta) Act

4. **Exemptions**
   Any exemptions to any part of this guide must be submitted to Alberta Transportation for approval. Such an exemption, if approved, will be valid only for operation on that railway companies tracks. Separate exemptions are required in order to operate on another railway.

5. **Definitions.**

   As used in this standard, terms listed in this section have the following definitions:

Break.	A fracture resulting in complete separation into parts.
Locomotive owner.	Person or entity which owns, but which does not necessarily operate, one or more steam locomotives that is operated on a railway to which this standard applies. For purposes of inspection and maintenance responsibility, this term includes that entity's delegate as well.
Person.	An entity of any type, including but not limited to the following: a railway; a manager, supervisor, official, or other employee or agent of a railway; any owner, manufacturer, lessor, or lessee of railway equipment, track, or facilities; any independent contractor providing goods or services to a railway; and any employee of such owner, manufacturer, lessor, lessee, or independent contractor.
Railway.	Any railway company certified by the Alberta Transportation and subject to the Railway (Alberta) Act.
Repair.	Any work which results in a restoration in kind.
Service day.	Any calendar day that the boiler has steam pressure above atmospheric pressure with fire in the firebox. In the case of a fireless steam locomotive, any calendar day that the boiler has steam pressure above atmospheric pressure.

Steam locomotive. 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.

6. Information collection

All documents required by this guide, including but not limited to inspections, repairs, and qualifications, shall be collected and maintained by the locomotive owner and/or operator, and shall be made available to a Rail Safety Officer within a reasonable time.

GENERAL INSPECTION REQUIREMENTS

7. Repair of non-complying conditions.

The steam locomotive owner and/or operator shall repair any steam locomotive that fails to comply with the conditions of this guide, and shall approve any such repairs made, before placing the locomotive back into service.

8. Daily inspection.

(a) General.

A person qualified according to the Heritage Railway Regulation shall inspect each steam locomotive and its tender each day that they are offered for use to determine that they are safe and suitable for service. The daily inspection shall be conducted to comply with all Sections of this guide, and a daily inspection report shall be kept by the steam locomotive owner and/or operator in the place where the steam locomotive is normally maintained and shall be made available upon reasonable request. (See appendices A for examples)

(b) Pre-departure.

At the beginning of each day the steam locomotive is used, an individual competent to do so shall, together with the daily inspection required in paragraph (a) of this Section, inspect the steam locomotive and its tender and appurtenances to ensure that they are safe and suitable for service, paying special attention to the following items:

(i) Water glasses and gauge cocks;
(ii) Boiler feedwater delivery systems, such as injectors and feedwater pumps; and
(iii) Air compressors and governors, and the air brake system.

(c) Inspection reports.

The results of the daily inspection shall be recorded and shall contain, at a minimum, the name of the railway, the initials and number of the steam locomotive, the place, date and time of the inspection, the signature of the employee making the inspection, a description of the non-complying conditions disclosed by the inspection, conditions found in non-compliance during the day and repaired and the signature of the person who repaired the non-conforming conditions. This report shall be retained even if no non-complying conditions are detected. A competent individual shall sign the report, certifying that all non-complying conditions were repaired before the steam locomotive is operated. This report shall be retained on file for at least 92 days at the location designated by the steam locomotive owner and/or operator.

9. 31, 62, 93 and 124 day Inspection.

(a) General.

A person qualified according to Heritage Railway Regulation shall perform the inspections after the steam locomotive has accrued the required service days. Days in service shall be counted, recorded and readily available for inspection upon reasonable request.

(b) Documentation.

A report of inspection (Form No. 1 as an example) shall be kept by the steam locomotive owner and/or operator in the place where the steam locomotive is normally maintained and shall be made available upon reasonable request.

RECORDKEEPING REQUIREMENTS

10. Service day record.

For every steam locomotive currently in service, the steam locomotive owner and/or operator shall have available, and be able to show the affected railway company and/or Alberta Transpotation upon request, a current copy of the service day record that contains the number of service days the steam locomotive has accrued since the last 31, 62, 95, 124 service day inspections.

11. Steam locomotive number change.

When a steam locomotive number is changed, the steam locomotive owner and/or operator must reflect the change in the upper right-hand corner of all documentation related to the steam locomotive by showing the old and new numbers: Old No. 000 New No. XXX.

Subpart C--Steam Locomotives and Tenders

12. Design, construction, and maintenance.

The steam locomotive owner and operator are responsible for the general design, construction, alterations and maintenance of the steam locomotives and tenders under their control, and shall be in keeping with accepted safe heritage railway operating practices.

13. Responsibility for inspection and repairs.

The steam locomotive owner and/or operator shall inspect and repair all steam locomotives and tenders under their control. All defects disclosed by any inspection shall be repaired in accordance with accepted Heritage Railway standards, before the steam locomotive or tender is returned to service. The steam locomotive owner and/or operator shall not return the steam locomotive or tender to service unless they are in good condition and safe and suitable for service.

14. Ash pans.

Ash pans shall be securely supported from mud-rings or frames with no part less than 2 1/2 inches above the rail. Their operating mechanism shall be so arranged that they may be safely operated and securely closed.

BRAKE & SIGNAL EQUIPMENT

15. Air gauges.

(a) Location.

Air gauges shall be so located that they may be conveniently read by the engineer from his or her usual position in the cab. No air gauge may be more than 3 psi in error.

(b) Frequency of testing.

Air gauges shall be tested prior to reapplication following removal, and whenever any irregularity is reported.

(c) Method of testing.

Air gauges shall be tested using an accurate test gauge or dead weight tester designed for this purpose.

16. Piston travel.

(a) Minimum piston travel.

The minimum piston travel shall be sufficient to provide proper brake shoe clearance when the brakes are released.

(b) Maximum piston travel.

The maximum piston travel when steam locomotive is standing shall be as follows:

Type of wheel brake	Maximum piston travel (in inches)
Cam Type Driving Wheel Brake	3 1/2
Other forms of Driving Wheel Brake	6
Engine Truck Brake	8
Tender Brake	9

17. Foundation brake gear.

(a) Maintenance.

Foundation brake gear shall be maintained in a safe and suitable condition for service. Levers, rods, brake beams, hangers, and pins shall be of ample strength, and shall not be fouled in any way which will affect the proper operation of the brake. All pins shall be properly secured in place with cotter pine, split keys, or nuts. Brake shoes must be properly applied and kept approximately in line with the tread of the wheel.

(b) Distance above the rails.

No part of the foundation brake gear of the steam locomotive or tender shall be less than 2 1/2 inches above the rails.

CABS, WARNING SIGNALS, SANDERS & LIGHTS

18. Cabs and cab amenities .

(a) General provisions.

Cabs shall be securely attached or braced and maintained in a safe and suitable condition for service. Cab windows of steam locomotives shall provide an undistorted view of the track and signals for the crew from their normal position in the cab. Cab floors shall be kept free of tripping or slipping hazards. The cab climate shall be maintained to provide an environment that does not unreasonably interfere with the engine crew's performance of their duties under ordinary conditions of service.

(b) Steam pipes.

Steam pipes shall not be fastened to the cab. Live steam heating radiators must not be fastened to the cab. Exhaust steam radiators may be fastened to the cab.

(c) Oil-burning steam locomotives.

If the cab is enclosed, oil burning steam locomotives that take air for combustion through the fire-door opening shall have a suitable conduit extending from the fire-door to the outside of the cab

19. Cab aprons.

(a) General provisions.

Cab aprons shall be of proper length and width to ensure safety. Cab aprons shall be securely hinged, maintained in a safe and suitable condition for service, and roughened, or other provision made, to afford secure footing.

(b) Width of apron.

The cab apron shall be of a sufficient width to prevent, when the drawbar is disconnected and the safety chains or the safety bars are taut, the apron from dropping between the steam locomotive and tender.

20. Fire doors.

(a) General provisions.

Each steam locomotive shall have a fire door which shall latch securely when closed and which shall be maintained in a safe and suitable condition for service. Fire doors on all oil-burning locomotives shall be latched securely with a pin or key.

(b) Mechanically operated fire doors.

Mechanically operated fire doors shall be so constructed and maintained that they may be operated by pressure of the foot on a pedal, or other suitable appliance, located on the floor of the cab or tender at a suitable distance from the fire door, so that they may be conveniently operated by the person firing the steam locomotive.

(c) Hand-operated doors.

Hand operated fire doors shall be so constructed and maintained that they may be conveniently operated by the person firing the steam locomotive.

21. Cylinder cocks.

Each steam locomotive shall be equipped with cylinder cocks which can be operated from the cab of the steam locomotive. All cylinder cocks shall be maintained in a safe and suitable condition for service.

22. Cab lights.

Each steam locomotive shall have cab lights that sufficiently illuminate the control instruments, meters and gauges to allow the engine crew to make accurate readings from their usual and proper positions in the cab.

These lights shall be so located and constructed that the light will shine only on those parts requiring illumination and does not interfere with the engine crew's vision of the track and signals. Each steam locomotive shall also have a conveniently located additional lamp that can be readily turned on and off by the persons operating the steam locomotive and that provides sufficient illumination to read train orders and timetables.

THROTTLES & REVERSING GEAR

23. Throttles.

Throttles shall be maintained in safe and suitable condition for service, and efficient means shall be provided to hold the throttle lever in any desired position.

24. Reverse gear.

(a) General provisions.

Reverse gear, reverse levers, and quadrants shall be maintained in a safe and suitable condition for service. Reverse lever latch shall be so arranged that it can be easily disengaged, and provided with a spring which will keep it firmly seated in quadrant. Proper counterbalance shall be provided for the valve gear.

(b) Air-operated power reverse gear.

Steam Locomotives that are equipped with air operated power reverse gear shall be equipped with a device or system to return the gear to neutral in the event of a failure of the main reservoir air pressure.

(c) Power reverse gear reservoirs.

Power reverse gear reservoirs, if provided, must be equipped with the means to automatically prevent the loss of pressure in the event of a failure of main air pressure and have storage capacity for not less than one complete operating cycle of control equipment.

DRAW GEAR AND DRAFT SYSTEMS

25. Draw gear between steam locomotive and tender.

(a) Maintenance.

The draw gear between the steam locomotive and tender, together with the pins and fastenings, shall be maintained in safe and suitable condition for service. Suitable means for securing the drawbar pins in place shall be provided. Inverted drawbar pins shall be held in place by plate or stirrup.

(b) Safety bars and chains generally.

One or more safety bar(s) or two or more safety chains shall be provided between the steam locomotive and tender. The combined strength of the safety chains or safety bar(s) and their fastenings shall be not less than 50 percent of the strength of the drawbar and its connections. These shall be maintained in safe and suitable condition for service, (and inspected at the same time draw gear is inspected).

(c) Minimum length of safety chains or bars.

Safety chains or safety bar(s) shall be of the minimum length consistent with the curvature of the railway on which the steam locomotive is operated.

(d) Lost motion.

Lost motion between steam locomotives and tenders not equipped with spring buffers shall be kept to a minimum and shall not exceed 1/2 inch. Unless track conditions necessitate additional lost motion.

(e) Spring buffers.

When spring buffers are used between steam locomotives and tenders the spring shall be applied with not less than 3/4 inch compression, and shall at all times be under sufficient compression to keep the chafing faces in contact.

26. Chafing irons.

Chafing irons that permit proper curving shall be securely attached to the steam locomotive and tender, and shall be maintained to permit lateral and vertical movement.

27. Draw gear and draft systems.

Couplers, draft gear and attachments on steam locomotives and tenders shall be securely fastened, and maintained in safe and suitable condition for service.

DRIVING GEAR

28. Pistons and piston rods.

(a) Maintenance and testing.

Pistons and piston rods shall be maintained in safe and suitable condition for service. Piston rods shall be inspected for cracks each time they are removed, and shall be renewed if found defective.

(b) Fasteners.

Fasteners (keys, nuts, etc.) shall be kept tight and shall have some means to prevent them from loosening or falling out of place.

29. Crossheads.

Crossheads shall be maintained in a safe and suitable condition for service, with not more than 1/4 inch vertical or 5/16 inch lateral clearance between crossheads and guides.

30. Guides.

Guides shall be securely fastened and maintained in a safe and suitable condition for service.

31. Main, side, and valve motion rods.

(a) General.

Main, side or valve motion rods developing cracks or becoming otherwise defective shall be removed from service immediately and repaired or renewed.

(b) Repairs.

Repairs, and welding of main, side or valve motion rods shall be made in accordance with an accepted national standard. The steam locomotive owner and/or operator shall maintain detailed repair records available for railway company or Alberta Transportation inspection for all welding of defective main rods, side rods, and valve gear components.

(c) Bearings and bushings.

Bearings and bushings shall so fit the rods as to be in a safe and suitable condition for service, and means shall be provided to prevent bushings from turning in the rod. Straps shall fit and be securely bolted to rods. Floating bushings need not be provided with means to prevent bushings from turning.

(d) Side motion of rods.

The total amount of side motion of each rod on its crank pin shall not exceed 1/4 inch.

(e) Oil and grease cups.

Oil and grease cups shall be securely attached to rods, and grease cup plugs shall be equipped with a suitable fastening that will prevent them from being ejected.

(f) Main rod bearings.

The bore of main rod bearings shall not exceed pin diameters more than 1/8 inch at front or back end. The total lost motion at both ends shall not exceed 3/16 inch.

(g) Side rod bearings.

The bore of side rod bearings shall not exceed pin diameters more than 3/16 inch on main pin not more than 3/16 inch on other pins

32. Crank pins.

(a) General provisions.

Crank pins shall be securely applied. Securing the fit of a loose crank pin by shimming, prick punching, or welding is not permitted.

(b) Maintenance.

Crank pin collars and collar fasteners shall be maintained in a safe and suitable condition for service.

RUNNING GEAR

33. Driving, trailing, and engine truck axles.

(a) Condemning defects.

Driving, trailing, and engine truck axles with any of the following defects shall be removed from service immediately and repaired (see appendix A for inspection requirements):

(i) Bent axle;
(ii) Cut journals that cannot be made to run cool without turning;
(iii) Seams in axles causing journals to run hot;
(iv) Axles that are unsafe on account of usage, accident or derailment;

34. Tender truck axles.

The minimum diameters of axles for various axle loads shall be as follows:

Axle load (in pounds)	Minimum diameter of journal (in inches)	Minimum diameter of wheel seat (in inches)	Minimum diameter of center (in inches)
50000	5 1/2	7 3/8	6 7/16
38000	5	6 3/4	5 7/8
31000	4 1/2	6 1/4	5 5/16
22000	3 3/4	5	4 3/8
15000	3 1/4	4 5/8	3 7/8

35. Steam locomotive driving journal boxes.

(a) Driving journal boxes.

Driving journal boxes shall be maintained in a safe and suitable condition for service. Not more than one shim may be used between the box and bearing.

(b) Broken bearings.

Broken bearings shall be renewed.

(c) Loose bearings.

Loose bearings shall be repaired or renewed.

36. Driving box shoes and wedges.

Driving box shoes and wedges shall be maintained in a safe and suitable condition for service.

37. Lateral motion.

(a) Condemning limits.

The total lateral motion or play between the hubs of the wheels and the boxes on any pair of wheels shall not exceed the following limits:

	Inches
Engine truck wheels (with swing centers).....	1
Engine truck wheels (with rigid centers).....	1 1/2
Trailing truck wheels.....	1
Driving wheels.....	3/4

(b) Limits increased.

These limits may be increased on steam locomotives operating on track where the curvature exceeds 20 degrees when it can be shown that conditions require additional lateral motion.

(c) Non-interference with other parts.

The lateral motion shall in all cases be kept within such limits that the driving wheels, rods, or crank pins will not interfere with other parts of the steam locomotive.

TRUCKS, FRAMES AND EQUALIZING SYSTEMS

38. Steam locomotive frame.

(a) Maintenance and inspection.

Frames, decks, plates, tailpieces, pedestals, and braces shall be maintained in a safe and suitable condition for service, and shall be cleaned and thoroughly inspected as often as necessary to maintain in a safe and suitable condition for service.

(b) Broken frames.

Broken frames properly patched or secured by clamps or other suitable means which restores the rigidity of the frame are permitted.

39. Tender frame and body.

(a) Maintenance.

Tender frames shall be maintained in a safe and suitable condition for service.

(b) Height difference.

The difference in height between the deck on the tender and the cab floor or deck on the steam locomotive shall not exceed 1 1/2 inches.

(c) Gangway minimum width.

The minimum width of the gangway between steam locomotive and tender, while standing on tangent track, shall be 16 inches.

(d) Tender frame condemning defects.

A tender frame with any of the following defects shall be removed from service immediately and repaired:

(i) Portions of the tender frame or body (except wheels) that have less than a 2 1/2 inches clearance from the top of rail;

(ii) Tender center sill that is broken, cracked more than 6 inches, or permanently bent or buckled more than

(iii) 1/2 inches in any six foot length;

(iv) Tender coupler carrier that is broken or missing;

(v) Tender center plate, any portion of which is missing or broken or that is not properly secured; or

(vi) Tender that has a broken side sill, crossbearer, or body bolster.

40. Steam locomotive leading and trailing trucks.

(a) Maintenance.

Trucks shall be maintained in safe and suitable condition for service. Center plates shall fit properly, and the male center plate shall extend into the female center plate not less than 3/4 inch. All centering devices shall be properly maintained and shall not permit lost motion in excess of 1/2 inch.

(b) Safety chain required.

A suitable safety chain shall be provided at each front corner of all four wheel engine trucks.

(c) Clearance required.

All parts of trucks shall have sufficient clearance to prevent them from interfering with any other part of the steam locomotive.

41. Tender trucks.

(a) Tender truck frames.

A tender truck frame shall not be broken, or have a crack in a stress area that affects its structural integrity. Tender truck center plates shall be securely fastened, maintained in a safe and suitable condition for service, and provided with a center pin properly secured. The male center plate must extend into the female center plate at least 3/4 inch. Shims may be used between truck center plates.

(b) Tender truck bolsters.

Truck bolsters shall be maintained approximately level.

(c) Condemning defects for springs or spring rigging.

Springs or spring rigging with any of the following defects shall be taken out of service immediately and renewed or properly repaired:

(i) An elliptical spring with its top (long) leaf or any other five leaves in the entire spring pack broken;
(ii) A broken coil spring or saddle;
(iii) A coil spring that is fully compressed;
(iv) A broken or cracked equalizer, hanger, bolt, gib or pin;
(v) A broken coil spring saddle; and
(vi) A semi-elliptical spring with a top (long) leaf broken or two leaves in the top half broken, or any three leaves in the entire spring broken.

(d) Tender securing arrangement.

Where equipped, tender devices and/or securing arrangements intended to prevent the truck and tender body from separating in case of derailment shall be maintained in a safe and suitable condition for service.

(e) Side bearings and truck centering devices.

Where equipped, side bearings and truck centering devices shall be maintained in a safe and suitable condition for service.

(f) Friction side bearings.

Friction side bearings shall not be run in contact, and shall not be considered to be in contact if there is clearance between them on either side when measured on tangent level track.

(g) Side bearings.

All rear trucks shall be equipped with side bearings. When the spread of side bearings is 50 inches, their maximum clearance shall be 3/8 inch on each side for rear trucks and 3/4 inch on each side for front trucks, where used. When the spread of the side bearings is increased, the maximum clearance shall be increased proportionately.

42. Pilots.

(a) General provisions. Pilots shall be securely attached, properly braced, and maintained in a safe and suitable condition for service.

(b) Minimum and maximum clearance. The minimum clearance of pilot above the rail shall be 3 inches and the maximum clearance shall be 6 inches measured on tangent level track.

43. Spring rigging.

(a) Arrangement of springs and equalizers.

Springs and equalizers shall be arranged to ensure the proper distribution of weight to the various wheels of the steam locomotive, maintained approximately level and in a safe and suitable condition for service. Adjusting weights by shifting weights from one pair of wheels to another is permissible.

(b) Spring or spring rigging condemning defects.

Springs or spring rigging with any of the following defects shall be removed from service immediately and renewed or properly repaired:

(i) Top leaf broken or two leaves in top half or any three leaves in spring broken. (The long side of a spring to be considered the top.) Broken springs not exceeding these requirements may be repaired by

(ii) applying clips providing the clips can be made to remain in place;

(iii) Any spring with leaves excessively shifting in the band;

(iv) Broken coil springs; or

(v) Broken driving box saddle, equalizer, hanger, bolt, or pin.

WHEELS AND TIRES

44. Wheels and tires.

(a) Mounting.

Wheels shall be securely mounted on axles. Prick punching or shimming the wheel fit will not be permitted. The diameter of wheels on the same axle shall not vary more than 3/32 inch.

(b) Gage.

Wheels used on standard gage track will be out of gage if the inside gage of flanges, measured on base line is less than 53 inches or more than 53 3/8 inches. Wheels used on less than standard gage track will be out of gage if the inside gage of flanges, measured on base line, is less than the relevant track gage less 3 1/2 inches or more than the relevant track gage less 3 1/8 inches.

(c) Flange distance variance.

The distance back to back of flanges of wheels mounted on the same axle shall not vary more than 1/4 inch.

(d) Tire thickness.

Wheels may not have tires with a minimum thickness less than that indicated in the table in this paragraph (d). When retaining rings are used, measurements of tires to be taken from the outside circumference of the ring, and the minimum thickness of tires may be as much below the limits specified earlier in this paragraph (d) as the tires extend between the retaining rings, provided it does not reduce the thickness of the tire to less than 11/8 inches from the throat of flange to the Counterbore for the retaining rings. The required minimum thickness for tires, by wheel center diameter and weight per axle, is as follows:

Weight per axle (weight on drivers divided by number of pairs of driving wheels)	Diameter of whee center (inches)	Minimum thickness (inches)
30,000 pounds and under.....	44 and under.....	1
	Over 44 to 50.....	1 5/16
	Over 50 to 56.....	1 3/8
	Over 56 to 62.....	1 7/16
	Over 62 to 68.....	1 1/2
	Over 68 to 74.....	1 9/16
	Over 74.....	1 5/8
Over 30,000 to 35,000 pounds.....	44 and under.....	1 5/16
	Over 44 to 50.....	1 3/8
	Over 50 to 56.....	1 7/16
	Over 56 to 62.....	1 1/2
	Over 62 to 68.....	1 9/16

	Over 68 to 74.....	1 5/8
	Over 74.....	1 11/16
Over 35,000 to 40,000 pounds.....	44 and under.....	1 3/8
	Over 44 to 50.....	1 7/16
	Over 50 to 56.....	1 1/2
	Over 56 to 62.....	1 9/16
	Over 62 to 68.....	1 5/8
	Over 68 to 74.....	1 11/16
	Over 74.....	1 3/4
Over 40,000 to 45,000 pounds.....	44 and under.....	1 7/16
	Over 44 to 50.....	1 1/2
	Over 50 to 56.....	1 9/16
	Over 56 to 62.....	1 5/8
	Over 62 to 68.....	1 11/16
	Over 68 to 74.....	1 3/4
	Over 74.....	1 13/16
Over 45,000 to 50,000 pounds.....	44 and under.....	1 1/2
	Over 44 to 50.....	1 9/16
	Over 50 to 56.....	1 5/8
	Over 56 to 62.....	1 11/16
	Over 62 to 68.....	1 3/4
	Over 68 to 74.....	1 13/16
	Over 74.....	1 7/8
Over 50,000 to 55,000 pounds.....	44 and under.....	1 9/16
	Over 44 to 50.....	15/8
	Over 50 to 56.....	1 11/16
	Over 56 to 62.....	1 3/4
	Over 62 to 68.....	1 13/16
	Over 68 to 74.....	1 7/8
	Over 74.....	1 15/16
Over 55,000 pounds.....	44 and under.....	1 5/8
	Over 44 to 50.....	1 11/16
	Over 50 to 56.....	1 3/4
	Over 56 to 62.....	1 13/16
	Over 62 to 68.....	1 7/8
	Over 68 to 74.....	1 15/16
	Over 74.....	2

(e) Tire width.

Flanged tires shall be no less than 5 1/2 inches wide for standard gage and no less than 5 inches wide for narrow gage. Plain tires shall be no less than 6 inches wide for standard gage and no less than 5 1/2 inches wide for narrow gage.

45. Wheels and tire defects.

Steam locomotive and tender wheels or tires developing any of the defects listed in this Section shall be removed from service immediately and repaired. Except as provided in Section 46, welding on wheels and tires is prohibited. A wheel that has been welded is a welded wheel for the life of the wheel.

(a) Cracks or breaks.

Wheels and tires may not have a crack or break in the flange, tread, rim, plate, hub or brackets.

(b) Flat spots.

Wheels and tires may not have a single flat spot that is 2 1/2 inches or more in length, or two adjoining spots that are each two or more inches in length.

(c) Chipped flange.

Wheels and tires may not have a gouge or chip in the flange that is more than 1 1/2 inches in length and 1/2 inch in width.

(d) Broken rims.

Wheels and tires may not have a circumferentially broken rim if the tread, measured from the flange at a point 5/8 inch above the tread, is less than 3 3/4 inches in width.

(e) Shelled-out spots.

Wheels and tires may not have a shelled-out spot 2 1/2 inches or more in length, or two adjoining spots that are each two or more inches in length, or so numerous as to endanger the safety of the wheel.

(f) Seams.

Wheels and tires may not have a seam running lengthwise that is within 3 3/4 inches of the flange.

(g) Worn flanges.

Wheels and tires may not have a flange worn to a 15/16 inch thickness or less, as measured at a point 3/8 inch above the tread.

(h) Worn treads.

Wheels and tires may not have a tread worn hollow 3/8 inch or more.

(i) Flange height.

Wheels and tires may not have a flange height of less than 1 inch nor more than 1 1/2 inches, as measured from the tread to the top of the flange.

(j) Rim Thickness

Wheels may not have rims less than 1 inch thick.

(k) Wheel diameter.

Wheels may not have wheel diameter variance, for wheels on the same axle or in the same driving wheel base, greater than 3/32 inch, when all tires are turned or new tires applied to driving and trailing wheels. When a single tire is applied, the diameter must not vary more than 3/32 inch from that of the opposite wheel on the same axle. When a single pair of tires is applied the diameter must be within 3/32 inch of the average diameter of the wheels in the driving wheel base to which they are applied.

46. Wheel centers.

(a) Filling blocks and shims.

Driving and trailing wheel centers with divided rims shall be properly fitted with iron or steel filling blocks before the tires are applied, and such filling blocks shall be properly maintained. When shims are inserted between the tire and the wheel center, not more than two thicknesses of shims may be used, one of which must extend entirely around the wheel. The shim which extends entirely around the wheel may be in three or four pieces, providing they do not lap.

(b) Wheel center condemning defects.

Wheel centers with any of the following defects shall be removed from service immediately and repaired:

(i) Wheels centers loose on axle;
(ii) Broken or defective tire fastenings;
(iii) Broken or cracked hubs, plates, bolts or spokes, except as provided in paragraph (b)(4) of this Section; or
(iv) (iv) Driving or trailing wheel center with three adjacent spokes or 25 percent or more of the spokes in the wheel broken.
(v) Wheels may not have rims less than 1 inch thick.

(c) Wheel center repairs.

Wheel centers may be repaired by welding or brazing provided that the defect can properly be so repaired and, following the repair, the crankpin and axle shall remain tight in the wheel. Banding of the hub is permitted.

(d) Counterbalance maintenance.

Wheel counterbalances shall be maintained in a safe and suitable condition for service.

STEAM LOCOMOTIVE TANKS

47. Feed water tanks.

(a) General provisions.

Tanks shall be maintained free from leaks, and in safe and suitable condition for service. Suitable screens must be provided for tank wells or tank hose and shall be maintained in a manner that allows the unobstructed flow of water.

(b) Inspection frequency.

As often as conditions warrant, the interior of the tank shall be inspected, and cleaned if necessary.

(c) Top of tender.

Top of tender behind fuel space shall be kept clean, and means provided to carry off excess water. Suitable covers shall be provided for filling holes.

48. Oil tanks.

The oil tanks on oil burning steam locomotives shall be maintained free from leaks. The oil supply pipe shall be equipped with a clearly labelled cut-off valve located on the tender in a safe location..

Appendix A - Inspection Requirements

The lists in this appendix are intended as guidance only. Adherence to this list does not relieve the steam locomotive owner and/or operator of responsibility for either:

(a) Completing the inspection and maintenance requirements described in this standard; or
(b) ensuring that the steam locomotive, tender and its parts and appurtenances are safe and suitable for service.

Daily Inspection Requirements; Section 13

1. Inspection of all cab lamps.*
2. Observance of compressor(s) and governor to ascertain proper operation.*
3. Inspection of brake and signal equipment.*
4. Inspection of brake cylinders for piston travel.
5. Inspection of foundation brake gear.
6. Inspection of sanders.*
7. Inspection of draw gear and chafing irons.
8. Inspection of draft gear.
9. Inspection of crossheads and guides.
10. Inspection of piston rods and fasteners.
11. Inspection of main, side, and valve motion rods.
12. Inspection of headlights and classification lamps.*
13. Inspection of running gear.
14. Inspection of tender frames and tanks.
15. Inspection of tender trucks for amount of side bearing clearance.

Note: All items marked (*) should be checked at the beginning of each day the locomotive is used.

Appendix B - Inspection Forms

Form No. 1

Monthly Inspection Report

Date of Inspection: _____ Owner: **Fort Edmonton Foundation**

Operator: **Edmonton Yukon & Pacific** Locomotive No.: **107**

Non-complying conditions shall be repaired and this report approved before the locomotive is returned to service. When condition is called for enter: Good – No defects which could be discovered by a reasonable inspection; Fair – Functioning less than optimally but is safe and suitable condition, and not in violation of the rules; Poor – Not in compliance with the regulations.

Water glass Replaced (Y/N) _____

Emergency Brake Test

Tender Brake Cylinder Travel _____
210 Brake Cylinder Travel _____
300 Brake Cylinder Travel _____
304 Brake Cylinder Travel _____
308 Brake Cylinder Travel _____
Condition of Brake Equipment? _____

Notes for the Chief Engineer:

_____

_____

_____

_____

_____

Engineer's Signature: _____

The above work has been performed and this report has been approved by:

Chief Engineer's Signature:_____ Date:_____

Form No. 2 Daily Locomotive Report

Date of Inspection: _____ Owner: **Fort Edmonton Foundation**

Operator: **Edmonton Yukon & Pacific** Locomotive No.: **107**

Locomotive and Train Irregularities

Repairs Needed: Repairs Done? (Y/N)

_____

_____

_____

_____

_____

Where condition is called for enter:

Good – No defects which could be discovered by a reasonable inspection.

Fair – Functioning less than optimally but is in safe and suitable condition, and not a violation of the rules.

Poor – Not in compliance.

N/A – Not applicable.

Crossing Signals _____ Track and Right-of-Way _____

Notes for the Chief Engineer:

_____

_____

_____

_____

_____

Engineer's Signature: _____

The above work has been performed, expect as noted, and this report has been approved by:

Chief Engineer's Signature:_____ Date:_____

EY&P Daily Operational Inspection Check List

Month	Date							
	Day of Week	Sun	Mon	Tues	Wed	Thur	Fri	Sat

Locomotive 107

Inspection Options G=Good, F=Fair, P=Poor (See Form No.2 for Definitions)

Firebox and Boiler							
Running Gear							
Suspension Systems							
Air Compressor							
Mechanical Lubricators & Packing							
Water Gauge Glass							

Daily Checks

Injectors Operational							
Running Brake Test							
Sanders Operation (Y/N)							
Fuel Taken (AM/PM)	/	/	/	/	/	/	/
Safety Valves (Pop / Reset Press.)	/	/	/	/	/	/	/
Emergency Brake Application (Y/N)							
HeadLight Operation (Y/N)							
Caboose Batteries Charged/Water							

Water Treatment

Tender Water Hardness							
Sulphite Reading (Ideal 10 - 30 PPM)							
Sulphite Added							
Nitrate (1-1/2) and Phosphate (1/2)	/	/	/	/	/	/	/
Conductivity (Keep Below 4500PPM)							
Softener Clock Operation							
Softener Salt Added							

Weekly Checks

Wheel Journal Boxes							
Brake Leakage Test (psi/min)							
Brake Travel Test Tender (inch)							
Brake Travel Test 210 (inch)							
Brake Travel Test 300 (inch)							
Brake Travel Test 304 (inch)							
Brake Travel Test 308 (inch)							

Engineers Initials							