CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: LOCOMOTIVE PAINTING.

REGULATION NO. SL-53-12
PAGE 1 of 3
DATE February 1952
SUPERSEDES September 1950.

ISSUE: MAIN SHOPS.

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1. General Instructions

(a) To get the full benefit of new synthetic paint materials, all specified paints and enamels should be applied with modern spray gun equipment where local conditions permit. This method not only reduces costs, but definitely produces a more satisfactory paint film in every respect when full coats are applied with the proper equipment and correct air pressure.

(b) To ensure the proper drying of all paint applications, the shop temperature should be maintained at not less than 60° F.

(c) There must be no water in the tender while any of the coats of paint are being applied, nor until the paint is completely dry.

2. Blast Cleaning

(a) All new steel plate, and old paint films on steel which have disintegrated must be blast cleaned before painting.

(b) Immediately after blast cleaning make sure the steel surface is thoroughly clean and free from dust then apply one coat of red oxide metal primer.

(c) If blast cleaning is done at outside winter temperatures, the priming coat must be applied and allowed to dry hard before moving the engine or tender into a warm shop.

3. Cleaning and Washing

(a) Prior to repainting, all surfaces which are in such a condition that they can be recoloured should be cleaned and washed in the following manner: remove all grease and oil accumulation with Varsol, then wash the entire surface with a solution containing 8 ounces of Economic Cleaner No. 109 dissolved in one gallon of warm water. (Other cleaning compounds may be used as directed, subject to approval.)

(b) This solution must be brushed on the surface with a car body brush and allowed to work for two or three minutes, keeping the surface wet at all times. It should then be rinsed off with clean water. Rinsing is very important and should be accomplished by means of a water hose.

4. Exterior Painting - Passenger Engines.

(a) On all blast cleaned surfaces on cabs, tenders, and running boards on passenger engines use the following procedure:

1. Apply one coat of red oxide metal primer.
2. Apply one coat of red sealer surfacer.
3. Spot knife, and knife complete.
4. Rub wet with "wet or dry" paper.
5. Apply a sealer coat of red sealer surfacer.
6. Apply one coat of black engine finish.
7. Apply second coat of black engine varnish.
8. Letter and stripe, using two coats of gold colour enamel.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

over -

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: LOCOMOTIVE PAINTING.

REGULATION NO. SL-53-12
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DATE February 1952
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4. Exterior Painting - Passenger Engines. (Continued)

(b) Follow the same procedure as outlined in 4 (a) for passenger engines on which authority has been received to finish in Tuscan enamel, with the exception of item number 6. Tuscan enamel is to be used instead of the black engine finish. (See blue prints).

(c) All passenger engines finished in either Tuscan or black will be distinguished by the striping lines on the cab, tender, and running boards.

5. Exterior Painting - Freight Engines.

(a) The painting procedure will be the same as outlined for passenger engines, except that the striping will be eliminated.

On all recolour work, painted surfaces must be properly cleaned, then abrasions touched up with red oxide metal primer.

(b) In cases where the old paint film has perished, it will be necessary to prime the entire surface. Spot knife and apply sealer surfacer where necessary. Rub and finish.

6. Miscellaneous Painting

(a) CAB ROOF, TENDER VESTIBULE AND TENDER TOP.
After blast cleaning apply one coat of red oxide metal primer and two coats of no. 59-V black. On repainted work, clean then apply one coat of no. 59-V black.

7. Cab Interior

(a) When the cab lining is removed, see that the inside of the steel plates are thoroughly clean and free from rust, then apply one coat of red oxide metal primer.

(b) Prime new wood lining on both sides before application to cab and finish with one or two coats as required of no. 57-V cab green.

(c) On Tuscan colour engines, finish the cab sash on both sides with Tuscan enamel. On all other engines finish the sash with no. 115 enamel.

8. Boiler Exterior

(a) Remove thoroughly all rust, scale, dirt and grease from the boiler sheet and apply while boiler is hot, one coat of boiler paint compound.

9. Jacket - Boiler and Cylinder.

(a) On planished steel, clean the surface and apply valve oil, then wipe dry.

(b) On painted jackets, clean the interior side and apply one full coat of red oxide primer before placing the sheet on the engine. Clean and prime the exterior of the sheets then apply one full coat of black engine finish.

(c) On Tuscan coloured engines apply one full coat of heat resisting grey jacket enamel instead of the black engine finish.

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10. CYLINDER CASINGS - LINK SUPPORT CASTINGS - COUNTER BALANCE BLOCKS - WHEEL HUBS.

(a) Passenger engines.

1. If the old paint is removed, prime with red oxide metal primer. Spot glaze and knife, rub to a smooth finish then apply two coats of black engine finish.
2. On recolour work, clean, then apply two coats of black engine finish.

(b) All Other Engines

1. If the old paint is removed, apply one coat of red oxide metal primer and two coats of no. 59-V black.
2. On recolour work, clean and apply one coat of no. 59-V black.

11. Underframe and all other black painted metal surfaces.

If the old paint is removed apply one coat of red oxide metal primer and one coat of no. 59-V black. On recolour work, clean, then apply one coat of no. 59-V black.

12. Wheel Tires

On passenger engines only, apply one coat of grey under lacquer primer then one coat of grey, tire lacquer.

13. Coal Space

Clean, then apply one coat of no. 59-V black.

NOTE: All paints used on locomotives must be standard specified materials.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: PREPARATION OF STEAM LOCOMOTIVES FOR A NO. 1 REPAIR

REGULATION NO. SL-53-13
PAGE 1 of 15
DATE June 1953
SUPERSEDES Feb. 1951

ISSUE: SHOPS

PREPARATION OF STEAM LOCOMOTIVES

for

NO. 1 REPAIR

Section 1

Paragraph 1. Explanation.

The rules as laid down in this regulation are intended to govern the method of handling a steam locomotive received at main or back shops for No. 1 repair, from the time of its arrival to the completion of the stripping process.

The actual method of repair will be covered by separate instructions.

Paragraph 2. Application.

These regulations must be closely followed by all shops affected, in order to standardize procedure. Any desired change must be referred through the proper channels to the office of the Chief of Motive Power and Rolling Stock.

Section 2

Paragraph 1. Preparation.

(a) If the engine arrives under steam -- dump fire and empty ash pan hoppers, blow down boiler, remove coal and water from tender, drain water from oil skimmer and empty sand boxes.

(b) If the engine arrives dead -- empty boiler, remove coal and water from tender, drain water from oil skimmer, and empty sand boxes.

(c) Engines to be left outside during freezing weather -- care must be taken to see that the boiler is properly drained and that all superheater units, auxiliaries, steam chests and cylinders are properly blown out; water to be drained from tender and oil skimmer.

(d) Remove paint and dirt as required. All parts cleaned by blast cleaning are to be given a protective coating.

(e) Separate engine and tender.

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Section 2 - - - cont'd.

Paragraph 2. Boiler Examination (Important.)

(a) To prevent any heavy firebox repairs from progressing too far before boiler barrel defects (if any) are discovered, it is imperative that the boiler shell examination be completed as soon as possible after the engine is shopped.

(b) This examination includes magnaflux testing where and when specified, and careful inspection of all areas where defects usually occur.

Paragraph 3. Stripping.

The removal of parts is listed under the drawing index system and the list is sub-divided into four columns as follows:-

Column 1. Group & item.

Column 2. Those which must be removed at every No. 1 repair from any engine so equipped.

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Column 3. Those which must be removed at specified intervals, for instance - - All tubes and flues at internal inspection.

Column 4. Those which may be removed only if it is impossible or impractical to inspect properly or repair them in place, or parts which have to be removed to facilitate other work.

Where the necessity for authority of a particular foreman is specified in this group, he must make a personal inspection of the item and base his decision on the following factors:

(a) That the part or parts cannot be repaired in place.

(b) That less expense is involved by removal to repair it or other parts than by leaving it in place.

(c) That it is practical if not essential to remove one part not in need of repair in order to facilitate the repair or removal of some other part.

(d) That recognized limits of wear or allowable tolerances demand its removal.

(e) That due consideration has been given to any reports received from the S.M.P. & C.D. as to the condition existing before engine was shopped.

REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
11-L Ashpans	Ashpan hoppers. Ashpan operating gear. Ashpan door hangers.		Ashpan - on authority of general boiler foreman after personal inspection. Ashpan locking gear. Ashpan supports - also when ash-pan is removed.
12-L Axle and Crank pin.	All wheel assemblies		
13-L Boiler			Splash plates and deflector plates (see also 74-L group) Foam collapsing trough.
15-L Boiler details		All tubes and flues when internal inspection of boiler is due.	All or partial removal of tubes & flues only on request of Supt. of M.P. & C.D. or at discretion of General Boiler Foreman. Suitable no. of tubes and flues may be removed to facilitate repair or cleaning of splash or deflector plates.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

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REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK
16-L Boiler attachments	Dome Cover Bell & Ringer Sanders Washout pad covers Smoke stack Cast iron safety valve domes	Sandbox - at external inspection of boiler	Sandbox. Cast steel safety valve domes Smoke stack base.
17- L Driving Box	Driving boxes. Shoes & Wedges. Lateral Motion Device.		
18-L Engine & Tender Truck Boxes	Engine, Tender & Trailing truck boxes.		
19-L Brackets Stands, etc.	Headlight, number light & classification lamp brackets Steam separator brackets. Dynamo brackets.	All runboard and pump brackets from boiler barrell at external inspection in order to examine studs.	All remaining brackets. Cab holding down brackets. Mechanical lubricator brackets.
20-L Engine Brake	All brake gear & rigging, Brake Cylinder heads. Brake brackets.		Bell crank. Brake cylinders.
21-L Tender Brake	All brake gear and rigging. Brake cylinder heads. Brake cylinder pistons.		Brake cylinders.

REMOVAL OF PARTS			
Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK
22-L Brake Equipment	Air compressor & governor. Air intake strainer. All Westinghouse air brake equipment from engine & tender except brake cylinders. Air brake pedestals. Air manifolds on engine & tender. Air hoses. Main & equalizing reservoirs. Cooling coils.		Distributing valve air chamber.
23-L Cab	Side doors. Windows sash. Side window shields. Card holders. Equipment holders. Window sash runners. Window sills.		Cab - on authority of General Locomotive Foreman. Main & Side wood decks (if 60% or more in need of renewal, or for inspection of main deck) Back doors. Diaphragm. Cab lap plate. Cab roof ventilators. Side and roof sheathing (if 60% or more in need of renewal)

REMOVAL OF PARTS

Column 1 GROUP & ITEM	Column 2 MUST BE REMOVED AT EVERY NO. 1 REPAIR	Column 3 MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in column 4	Column 4 REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK
24-L Cocks & Valves	All globe and angle valves, Saturated turrets, Super. shut-off valve bonnets Super. steam manifold. Top check & line checks. Blow-off cocks. Blow-down equipment. Water glass mountings & Try cocks. Booster throttle valve - see also 81-L. All automatic blow-down foam collapsing equipment except as noted in column 3.		Saturated turret dry pipe and whistle dry pipe. Foam collapsing trough and electrode glands.
26-L Cross Heads	Right and left crossheads.		
27-L Cylinders			Cylinder bushings - for renewal
28-L Cylinder attachments.	Front cylinder covers. Front and back cylinder casings.		Back cylinder covers - on authority of Erecting Shop Foreman.
30-L Relief Valves	Cylinder cocks.	Relief valves when external inspection is due.	Cylinder cock-rigging.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
31-L 32-L Engine & Tender Draw Gear.	Draw bars & pins. Floating block of radial buffer. Radial buffing gear on tender. Pilot coupler. Tender coupler. Draft gear.		Pilot coupler bracket if not already welded on. Stationary chafing block.
33-L Eccentric	Eccentric rod. Eccentric crank; Eccentrics, straps & rods.		
34-L Trucks, Engine	Engine and trailing trucks removed and stripped.		
37-L Exhaust & Steam pipes.	Exhaust nozzle. Exhaust pipe.		Main & Auxiliary steam pipes, when necessary to repair, or to remove superheater units.
38-L Expansion & Foot Plate	Expansion slides.		Front & back expansion plates.
39-L Firebox fittings.	Arch brick. Arch tube plugs. Firedoor.		Arch tubes. Arch tube sleeves.
40-L Bolts.			

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REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
41-L Main Frame	Pedestal binders.		
42-L Frame details			Frame crosstics.
43-L Oil burner	Firebrick. Burner. Firepan & Bootleg. Damper & operating rods. Operating gear complete with oil regulating valve.		Oil tank.
44-L Pilot			Pilot. Pilot braces. Pilot knee brackets.
46-L Guide bar & attachments.	Dean type guide bars		Alligator & Laird type Guide bars - on authority of Erecting & Machine Shop General Foreman (See Sec. 2 par. 3)

REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
47-L Grates	Gratebars Grate shaker castings if hollow bolts are not used behind them. Grate shaker levers. Connecting bars & rods. Side bearers.	Combination grate shaker & stoker support castings or separate grate shaker castings at every external inspection of boiler.	Grate centre bearers.
48-L Handrail & Footstep	All handrails & footsteps on firebox & combustion chamber sections.	All handrails & footsteps from barrel & firebox sections if external inspection of boiler is due.	Cab handrails. Smoke box door handrails. Tender handrails & grab irons.
48-L Feed water attachments	Feed water bundle from Elesco type heater. Cover & float mechanism from Worthington type heater. Elesco F.W. pump.. Worthington hot and cold water pump. Inspirators & Injectors. Feed water and condensate hose bags. Tank well valves & strainers T.Z. couplings & strainers.	Exhaust pipe from cylinders to heater and exhaust pipe casings at external inspection from Worthington and Elesco Coil type heaters except where oil separators are applied.	Exhaust pipe from cylinders to heater. Feed water heater casings. from Elesco bundle type heaters.

REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
50-L Lagging & Jacket	All jacket and lagging from firebox & combustion chamber Jacket & lagging from cylinder & steam pipes. Dome casing. Safety valve dome casing. Sufficient jacket and lagging to be opened up or removed to permit proper inspection of waist sheet connections and belly pads.	Complete removal of shroud, jacket and lagging from entire boiler when external inspection is due.	
51-L Motion	All motion		Right or left link support if necessary to remove reverse shaft - decision by Erecting Shop Foreman.
52-L Lubrication	All cellars. Spreaders. All oil boxes and grease cups Force feed & hydrostatic lubricators. Syphon oil cups.		Alemite fittings where liable to be damaged.
53-L Miscellaneous			
56-L Piston & Rod	Piston heads & rods.		
57-L Packing.	Piston & valve stem packings.		

Approved as System Standard by Chief of Motive Power & Rolling Stock.

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REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK
58-L Piping	All piping in cab except steam heat line. Feed water discharge lines. Barco lines between engine and tender. Air manifolds - Engine and tender, (See 22-L)	Only such piping as is necessary to permit a proper external inspection of boiler when due. All pipe joints must be broken & inspected at each external inspection of boiler.	Steam heat line if in need of renewal. As much piping as possible should remain on engine provided it can be inspected and repaired in place. Condensate line.
59-L Reverse gear	All reverse gear in cab and on side of boiler. Reverse shaft bearing cap & bronze bearings.		Reverse gear brackets in cab and on side of boiler. Reverse shaft & arms.
60-L	All Stephenson valve gear Front & back steam chest covers.		
61-L Runboards			Sections of runboard. Complete runboard only on authority of general locomotive foreman.
62-L Rods.	Main & side rods with knuckle pins.		

Approved as System Standard by Chief of Motive Power & Rolling Stock.

REMOVAL OF PARTS

Column 1 GROUP & ITEM	Column 2 MUST BE REMOVED AT EVERY NO. 1 REPAIR	Column 3 MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	Column 4 REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
63-L Safety valves Gauges	Safety valves. Steam gauge. Stoker gauge. F.W.H. gauge. Booster gauge. Air gauges. Cut-off control gauges. Steam heat valve.		
64-L Piston Valve	All valve gear. Front steam chest covers. Back steam chest covers.		Valve Bushes - (a) for excess movement. (b) for renewal (c) to rebore valve chamber.
65-L Superheater	Superheater units. V. & H. Superheater headers		Elesco superheater headers.
66-L Signal equipment.	Headlight, number light. Classification lamps. Back up lamp door and inside fixtures. Cab spot light. Cab fixtures. Dynamo. All wiring on engine except cab.		All wiring on tender. Cab wiring.
67-L Smokebox	Smokebox front & door. All drafting plates & netting.		

REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
68-L Springs	All driving springs. Coil springs from back of idler. All springs from engine and tender trucks.		
69-L Spring gear.	All driving spring gear. All spring gear from engine, trailing & tender trucks.		Two wheel engine truck equalizer fulcrum under cylinders. Diagonal equalizer fulcrums. Diagonal equalizer safety hangers.
70-L Tools	Any tools which may not have been removed at home terminal.		
71-L Tender tank.	Top cover plates from tender tank oil skimmers for cleaning, testing, inspection & repairs.		Tender tank from frame. Coal gates.
72-L Tender frame.	Washout plugs from water bottom underframes.		Safety chains. Centre plates. Side bearing plates. Holding down brackets.
73-L Tender trucks.	All removed and stripped. Side bearings.		

Approved as System Standard by Chief of Motive Power & Rolling Stock.

REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM.	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
74-L Throttle	Dome throttle: (a) Standpipe & throttle. (b) Valve (c) Throttle rod Lever from cab. Multiple throttle shaft, valves and glands.		Throttle lever quadrant bracket. Dry pipe. Throttle header.
75-L	Cab seats		
76-L Wheels	All driving & truck wheel assemblies from engine. Wheel assemblies from all trucks.		
77-L Washout plugs.	All washout plugs.		
78-L Whistle	Whistle & shield. Whistle operating valve. Whistle control valve. Whistle shut-off valve bonnet.		

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REMOVAL OF PARTS

Column 1	Column 2	Column 3	Column 4
GROUP & ITEM	MUST BE REMOVED AT EVERY NO. 1 REPAIR	MUST BE REMOVED AT SPECIFIED INTERVALS otherwise as in Column 4	REMOVE ONLY IF UNABLE TO REPAIR IN PLACE, OR IF NECESSARY TO FACILITATE OTHER WORK.
~~80-L Stokers~~ no Stoker D4g	Stoker engine. Engine conveyor troughs. Tender conveyor trough & screw, Stoker screws. Stoker controls in cab & on tender. Distributing table. Deflector plates or vanes.	Discharge box or elevator pipe at external inspection of boiler.	Discharge box or elevator pipe.
81-L Booster	Remove booster and all controls for complete overhaul. Booster throttle valve at front end.		

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF PAINT FINISH ON STEAM LOCOMOTIVES AT ROUNDHOUSES.

REGULATION NO. SL-53-14
PAGE 1 of 2
DATE February 1952
SUPERSEDES March 1951

ISSUE: ROAD.

General Instructions:

The repainting of steam locomotives at roundhouses should be limited to such engines on which the existing paint film has perished to the extent that the paint work cannot be satisfactorily touched up, or if it is considered that re-painting is absolutely necessary.

The decision to completely repaint an engine or tender should be made by the District Master Mechanic and when it is necessary, Maintenance Regulation SL-53-12 should be followed.

Any decision to completely repaint should be based on:

1. Length of service obtained since last painted.
2. Failure of paint film from use of unauthorized caustic materials for washing.
3. Failure of paint film as a result of blow down operations.

Unless the paint film has prematurely failed due to reasons above, the average length of service between repainting should be at least 12 months.

It is considered that the condition of the paint film during this twelve month period can be maintained in reasonable condition by the use of proper and regular cleaning methods and re-touching.

Any re-touching of the paint film should be done with materials as specified in Maintenance Regulation SL-53-12 for the various parts to be done.

Cleaning Methods

Important - The proper cleaning process for the various parts of the locomotive is as follows, and no other cleaning compounds are to be used unless the brand and quantity has been approved by the Chief of Motive Power and Rolling Stock.

TENDERS, CABS OR RUNNING BOARDS.

1. Washing

(a) Washing should be done before the accumulation of dirt gets too heavy, and if kept regularly washed, no harm will result to the paint film.

(b) In order to clean the varnish or enamel surface, wash when necessary with the following solution:

6 ozs. of Economic Cleaner No. 109 dissolved in one gallon of warm water, not hot or boiling.

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Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF PAINT FINISH ON STEAM LOCOMOTIVES AT ROUNDHOUSES.

REGULATION NO. SL-53-14
PAGE 2 of 2
DATE February 1952
SUPERSEDES March 1951

ISSUE: ROAD.

This solution should be brushed over the surface with a car body brush, covering an area just large enough so that the solution will not dry out; keep the surface wet at all times, then rinse off with clean pure water - using a water hose or perforated brush with a continuous supply of clean water.

2. Wiping

(a) Periodical wiping with renovating oil will renew the gloss and give added protection to the existing paint film, and should be done at least once each month.

(b) Method of application: mix equal parts of renovating oil and mineral spirits and apply sparingly with a damp cloth over the complete surface, then wipe dry with clean soft rags.

(c) To ensure a satisfactory finish, keep the following points in mind, use damp cloth when applying oil mixture, use as little oil mixture as possible, and wipe dry.

BOILER JACKETS, CYLINDER CASING AND FRONT END

Wipe surface dry using the same oil mixture as applied on tenders.

UNDERFRAMES AND UNDERGEAR

At roundhouses equipped for outdoor cleaning, the underframe and undergear of engines should be cleaned prior to entering the roundhouse, using a one gallon spray container and spraying the entire undergear with the following mixture:

1 part of Permag Compound No. 1568 mixed with
4 parts of fuel oil.
Then rinse off thoroughly with hot water by means
of steam hose.

If the cleaning of the underframe and undergear is confined to the inside of roundhouses, use the following method and authorized materials listed below:

Permag Undergear Cleaner - 3/4 oz. max. to one gallon of water.
or Douglas Chemical Compound No. 382 - 3/4 oz. max. to one gallon of water.
or Dearborn Chemical Compound No. 44 - 3/4 oz. max. to one gallon of water.
or Bird-Archer Chemical Compound H-10-C - 3/4 oz. max. to one gallon of water.

Maximum - 2 lbs. of compound to each 45 gallons of water.

Fill up a 45 gallon drum to which is attached a Turco spraying unit with the specified amount of authorized cleaning compound.

Spray over the underframe and undergear until the oil and grease has been removed as the result of the action of the cleaning compound and pressure.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: PISTON RODS - New and Maintenance of present rods.

REGULATION NO. SL-56-1
PAGE 1 of 2
DATE August 1951
SUPERSEDES 56-MR-1 Sept. 1925

ISSUE: ROAD AND SHOP.

Material: All new piston rods are to be Grade "B" steel to Spec. No. 66, heat treated as specified.
All piston rod nuts are to be made from No. 15 steel to Spec. No. 2.
All taper pins for piston rod nuts are to be made from No. 15 steel to Spec. No. 2.

Finish: Both new and re-finished rods are to be made perfectly round and parallel either by grinding or by turning and rolling. Where grinding equipment is available, they are to be ground to a mirror finish and where not available they are to be rolled as smooth as possible. The radius at each end of the rod must also be ground or rolled true and smooth so that no ridges will be left at the juncture between the radii and the parallel portion of the rod.

Length: When reassembled the length of the piston rod measured from the front of the piston head to the front of crosshead shall not exceed drawing dimensions nor shall it be more than 1/16" under drawing dimensions as a result of refitting crosshead or piston to rod.

The collar on the piston head end of rod may be built up on the front face by welding and re-machined to standard in order to correct the length of rod from piston head face to crosshead face.

Threaded Portion: The threaded portion of the rod shall be maintained in good condition and at all times, it shall be necessary to run the nut up to position by means of a wrench. Nut must not be loose enough that it can be run up by hand.

Final Turning Diameters: The final turning diameter for the body of any piston rod when same is re-machined at any shop shall be as shown in the list on page 2.

Limits of Wear: Any piston rod which will not re-finish to the above specified limits must be removed and a new rod applied. Any piston rod which has been turned to the final turning diameter at no. 1 repair may not be re-machined on the line. A new rod must always be applied if the rod shows damage or more than 1/32" out of round or taper before the next general repair is due.

Inspection: All rods are to be tested at every no. 1 repair by magnafluxing where equipment is available, or by white lead and hammer testing where not available. All rods are to be parted from crosshead every three months and taper fit examined and either white lead or magnaflux tested. Piston rod nut must be hammer tested monthly when cylinder head is removed for examination of rings and cover.

Stamping: Piston rods are to be stamped in accordance with instructions covered by the latest issue of drawing B-56-L-1079. See ICC Rolling on Him

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: PISTON RODS- New and Maintenance of present rods.

REGULATION NO. SL-56-1
PAGE 2 of 2
DATE August 1951
SUPERSEDES 56-MR-1 Sept. 1925

ISSUE: ROAD AND SHOP.

Dia. New Rod		Final Turning Diameter
2 3/4"	A1, A2.	2 5/8"
3 1/4"	D4g, J3, J5, U3de.	3 1/16"
3 1/2"	F1, F2.	3 5/16"
3 5/8"	D6bd.	3 7/16"
3 3/4"	D9, D10, G1, G2, M3, M4, N4ab, V3, V4, QC. 44	3 9/16"
4"	G5.	3 3/4"
4 1/4"	N2, N4cd, P1, R2, W1.	4"
4 1/2"	G3, G4, H1, P2, R3, V5.	4 1/4"
4 3/4"	S2.	4 1/2"
5"	K1, T1.	4 3/4"

NOTE: It is desired that the diameter of piston rods when new be in increments of one quarter inch and not in eighths as in the case of D6bd class (viz 3 5/8). In such instances, when rods are renewed, they should be made to the nearest quarter inch above. In the case of D6bd class this would then be 3 3/4".

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: APPROVED PACKINGS

REGULATION NO. SL-57-1
PAGE 1 of 3
DATE January 1958
SUPERSEDES - In part 57-MR-1 dated Sept. 1934

ISSUE: ROAD AND SHOP

1. IMPORTANT:

Maintenance Regulation Card 57-MR-1 dated September 1934 covered approved packings for use on Steam Locomotives and on Power Plant Machinery.

The new regulation SL-57-1 covers approved packings for Steam Locomotives only and therefore the previous regulation 57-MR-1 is superseded in part only, necessitating the continuance of same until a new regulation is prepared and issued to cover packings for power plant use.

2. The approved packings for use on steam locomotives is covered by the tables on Pages 2 and 3 of this regulation.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: APPROVED PACKINGS

REGULATION NO. SL-57-1

PAGE 2 of 3

DATE January 1958

SUPERSEDES In part 57-MR-1 dated Sept. 1934

ISSUE: ROAD AND SHOP

ITEM NO.	WHERE USED	SIZE	MANUFACTURERS' NAME OR NUMBER			
			ANCHOR	GARLOCK	JOHNS-MANVILLE	SPECIALTY SUPPLIER
X1	Throttle, Dome Type	GIVE SIZE OF ROD AND BOX WHEN ORDERING		530	AX-6436-F	
2	" Multiple Type					Durametallic
3	Air Compressor, 9½" Air End	2-1/8" O.D. X 1-3/8" I.D. X 1-3/4" Long	166	2200	55	
4	" " 9½" Steam End	2" " X 1-3/8" I.D. X 1¼" "	166	2200	15	
X5	" " 11" and 8½" cc., Air and Steam Ends	See Drawing D. 57.L.496 Have it				
6	Expansion Joint, Inspirator Line	3-3/8" O.D. x 2-5/8" I.D. x 1" Long		249	R222	
7	" " Exhaust Steam Pipe	5⅜" O.D. x 4½" I.D. x 2⅜" Long	110	222	R222	
8	" " " " "	6¾" " x 5½" " x 2" "	110	222	R222	
9	Reverse Gear Rod, Casey-Cavin	2½" " x 1½" " x 1¾" "	ULIP	530	SEA RING	
10	" " " Ragonnet Type "R"	2¾" " x 1⅝" " x 2½" "	ULIP	530	SEA RING	
11	" " " " " "S"	4¼" " x 3¼" " x 2-7/8" "	ULIP	530	SEA RING	
12	" " " Barco M1-M2	4¼" " x 3¼" " x 2-3/8" "	ULIP	530	SEA RING	
13	" " " Piston, Casey-Cavin (Cup)	7" Dia.	AJAX	813-A	82	
14	" " " Ragonnet (Cup)	10" "	AJAX	813-A	82	
15	" " " Barco (Cup)	10" "	AJAX	813-A	82	
16	Booster Type C2 3" Joint Pall	7-3/8" O.D. x 6" I.D. x 1½" Long				NITRAM 36922
17	" " " 3½" " "	8-3/8" O.D. x 7" I.D. x 1½" Long				36923
18	" " " Valve Rod	1-7/8" O.D. x 1-1/8 I.D. x 1" Long				30552-1
19	Elesco F.W. Pump Water End	1⅜" Dia. to 1-45/64" Dia.				5360
20	" " " " "	1-11/16" Dia. to 1-41/64" Dia.				5362
21	" " " " "	1-5/8" Dia. to 1-37/64" Dia.				5364
22	" " " " "	1-9/16" " to 1-33/64" Dia.				6182
23	" " " " "	1½" "				6184
24	" " " " " Plunger	5-7/8" O.D. x 4¼" I.D. x 1½" Long				6228
25	" Exhaust Steam Injector Overflow Piston					9565
26	Elesco Exhaust Steam Injector Nozzle					2216
27	" " " " Starting Valve					11111
28	Exhaust Pipe Joint	1/16" Sheet		900	60	
29	Foam Meter Electrode			1700		
30	Oil Burner Regulator Valve	2" O.D. x 1-5/16 I.D. x 2¼" Long		530		
31	Okadee Blow Off Cock					N-85
32						

ELESCO

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CANADIAN PACIFIC RAILWAY COMPANY
MECHANICAL DEPARTMENT
MAINTENANCE REGULATION - STEAM LOCOMOTIVES
SUBJECT: APPROVED PACKINGS
ISSUE: ROAD AND SHOP

REGULATION NO. SL-57-1
PAGE 3 of 3
DATE January 1958
SUPERSEDES in part 57-RR-1 dated Sept. 1934

ITEM NO.	WHERE USED	SIZE	MANUFACTURERS' NAME OR NUMBER: ANCHOR	GARLOCK	JOHNS MANVILLE	SPECIALTY SUPPLIER	
33	Worthington Hot Water Piston Rod	1¾" Dia.				"WORTHINGTON"	29437
34	" " " " "	1-11/16" Dia.					29438
35	" " " " Plunger	3/32 Dia. Oversize					29027
36	" " " "	3/16 " "					29317
37	" " " "	9/32 " "					29451
38	" Cold Water Pump Shaft						29050
39	" " " " " Strainer Cover						29030
40	" " " " " " "						29169
41	B.K. and H.T. Stoker engine piston Rod, Steam End	2¼" O.D. x 1¾" I.D. x 1½" Long	SECURITY WEDGE			ROAD STANDARD STOKER	977-B
42	HT.-1 Stoker Engine Piston Rod, Steam End	1-7/8" O.D. x 1-1/16" I.D. x 1-5/16" Long	"				1554
43	BK. and H.T. Stoker Engine Piston Rod, Oil End	2-1/8"O.D. x 1 ½" I.D. x 13/16" Long	"				977-C
44	H.T.-1 Stoker Engine Piston Rod, Oil End	1-7/8"O.D. x 1-1/16"I.D. x 1-5/16"Long	"				1554
45	B.K. and H.T. Stoker Engine Valve Stem, Steam End	1-7/8"O.D. x 5/8" I.D. x1-3/16" Long	"				[illegible]78-[illegible]C
46	H.T.-1 Stoker Engine Valve Stem, Steam End	1-1/8"O.D. x 5/8" I.D. x1-3/16" Long	"				[illegible]78-[illegible]C
47	B.K. and H.T. Stoker Engine Valve Stem, Oil End	1-1/8"O.D. x 5/8" I.D. x1-3/16" Long	"				[illegible]78-[illegible]C
48	HT.-1 Stoker Engine Valve Stem, Oil End	1-1/8"O.D. x 5/8" I.D. x 1-3/16" Long	"				[illegible]78-[illegible]C
49	Screw Reverse Gear Support Flange	1/16" Thick		660			
50	" " " " Bushing	½" x ½"		SPLIT GLOZURE			
51	Tank Well	1/8" Thick	432	22	60		
52	" " Goose Necks	1/16" and 1/8" Thick	432	22	60		
53	Valve Spindles, Superheated Steam X	3/16" Dia.	315	1700	5000		
54	" " Sat. Steam, Air and Water	3/16" Dia.	316	117	5000		
55	T.Z. Hose Coupling				116 Kearsarge		
56							
57							
58							
59							

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAIN AND SIDE RODS

REGULATION NO. SL-62-1
PAGE 1 of 1
DATE January 1952
SUPERSEDES 62-MR-1 May 1933

ISSUE: ROAD AND SHOP.

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1. RODS. All rod forgings must be heat treated before machining. Nickel steel forgings are to be heat treated to clause No. 4 specification No. 51, and carbon steel forgings to clause No. 2 in specification No. 86. Rods must be finished so as to remove all sharp edges and corners, radius at edges and corners must not be less than 1/16" nor more than 1/8". Welding on main and side rods is strictly prohibited except blacksmith welds which are only to be made at Angus, Winnipeg and Ogden.

2. BRASSES.

BORE. All main rod and main side rod brasses must be bored 1/64" larger than diameter of crank pin, all other rod brasses to be bored 1/32" larger than crank pins.

LATERAL CLEARANCE for brasses at main pin 1/8" and other brasses to have 3/64" clearance.

WEAR. Split stationary brasses must be closed up when total wear is 1/16", and solid stationary brasses must be removed from service when wear is 1/8" at the main crank pin and 3/16" at the little end. Floating brasses must be renewed when inside and outside diameters are so worn that total slack at crank pin is 3/32" or more.

FASTENING. Side rod brasses, for pins other than main pin, are to be pressed in with hydraulic pressure of 2 to 3 tons per inch diameter of pin, and secured with dowels as per drawing B-62-L-27. The method for holding main rod little end brass is shown on drawing B-62-L-1842.

RADII on edges of brasses must be 1/16" larger than radii on crank pins or bushings for all classes except where drawings show radii required.

3. REPAIR BRASSES must be stocked with bore 1/8" smaller in diameter than the limit diameter of crank pin.

4. BUSHINGS. Cast iron and steel bushings for main connections, with floating bush, are to be pressed into place by hydraulic pressure of twenty-five tons.

5. KNUCKLE PIN FIT. For fitting of knuckle pins in rods, see standard as shown on drawing D-62-L-2024.

6. LUBRICATION. For style of lubricating grooves for stationary brasses, see drawing D-52-L-768. Style of machining for lubrication of floating type brasses as shown on detail drawings must be strictly followed.

NOTE 1: The limit diameters of Main and Side Rod Bolts have been omitted from this transcript of 62-MR-1, dated May 1933.

NOTE 2: Pending revision, this Maintenance Regulation supersedes immediately MR card 62-MR-1 (dated May 1933) which should be destroyed.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: KNUCKLE PINS AND KNUCKLE PIN BUSHINGS.

REGULATION NO. SL-62-2
PAGE 1 of 1
DATE May, 1954
SUPERSEDES Issue of Jan. 1952

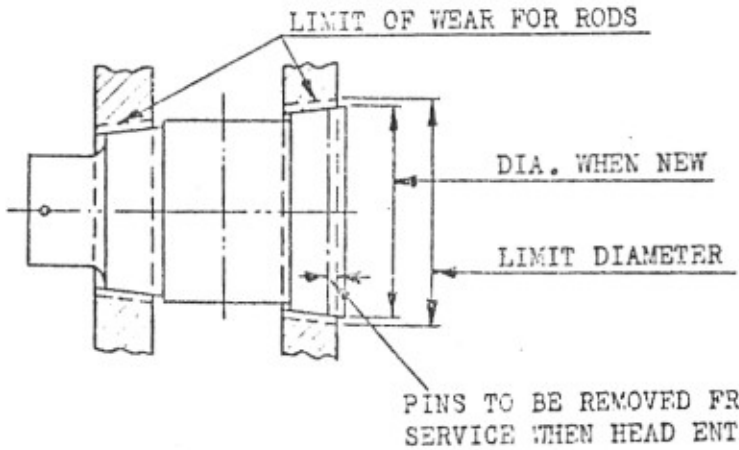
ISSUE: ROAD AND SHOP

1. PRESSURE FOR APPLYING KNUCKLE PIN BUSHINGS. Bushings must be accurately fitted and forced into place with pressure of 2 tons to 3 tons per inch inside diameter of bushing, and secured by 1/2" brass dowel.

2. KNUCKLE PINS must be removed from service when heads enter taper fit 1/8" or more as shown in sketch below.

3. LIMIT OF WEAR FOR KNUCKLE PIN HOLES IN RODS is given in the following table and illustrated in sketch below. Rods with knuckle pin holes worn in excess of these standards must be removed from service.

LINE NO	NEW DIAMETER "A"	LIMIT DIAMETER "B"	CLASSES
1	3 5/16"	3 1/2"	D4g, J3.
2	3 5/16"	3 5/8"	D9, D10, G1, G2, M3, M4, N2, P1, V3, V4.
3	3 3/8"	3 9/16"	N4ab.
4	3 1/2"	3 3/4"	D6bd, R2, U3.
5	3 5/8"	3 7/8"	R3.
6	4 1/8"	4 3/8"	W1.
7	4 3/8"	4 5/8"	R3.
8	5"	5 1/4"	N4cd.
9	5 3/16"	5 7/16"	G3ab, G4, P2ab, S2, (Cone 1" in 16")
10	5 1/4"	5 1/2"	G3, G4, P2, V5, S2, (Cone 1" in 6")
11	5 3/8"	5 5/8"	H1, S2, (Cone 1" in 6")
12	5 21/32"	5 7/8"	T1.
13	6 3/16"	6 7/16"	K1.
14	6 1/4"	6 1/2"	T1.



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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

(103)

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: TESTING AND CARE OF BOILER STEAM GAUGES.

REGULATION NO. SL-63-1
PAGE 1 of 1
DATE February 1952
SUPERSEDES 63-MR-1 May 1940

ISSUE: ROAD AND SHOP.

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1. USE: Every boiler must be equipped with at least one steam gauge which will correctly indicate the allowed working pressure. Gauges for boilers must be graduated to register pressures at least 50% above the allowed working pressure but when ordering new gauges, they should be graduated as follows:

For boilers with pressures up to and including 200 lbs./sq. in. . . . . 0 to 400 lbs./sq. in.
For boilers with pressures over 200 lbs./sq.in. and up to and including 300 lbs./sq. in. . . . 0 to 500 lbs./sq. in.

In all cases, when ordering new gauges, orders should specify that the figure denoting the working pressure of the boiler is to be located as near as possible to the 12 o'clock position on the dial.

2. LOCATION: Care must be taken to locate boiler steam gauges so that they will keep reasonably cool and so that they can be conveniently read by the engine men.

3. SYPHON: Every gauge must have a syphon of ample capacity to prevent steam entering the gauge. The pipe connection shall enter the boiler direct and shall be maintained steam tight and its connections to the boiler including the shut off cock must be cleaned each time the gauge is tested.

4. REPAIRS: Gauges may only be repaired and tested at points where the necessary test equipment is available and where personnel authorized to perform such work are located.

5a. TESTING: A dead weight tester shall be maintained at every point where gauges are repaired for the purpose of checking test gauges with which boiler steam gauges are to be compared. It is the responsibility of the shop foreman or locomotive foreman to see that the dead weight tester is handled carefully and maintained in good condition.

b. Test Gauges which are kept for comparing boiler steam gauges must be graduated to at least 400 lbs. per square inch pressure. They must be tested at least once each month against the dead weight tester and maintained accurate and in good condition.

6. TIME OF TESTING: All steam gauges must be tested at least once every three months at the time of the shop staybolt test, also whenever any regularity is reported. In addition, all steam gauges must be tested at every general repair. Gauges found inaccurate must at all times be corrected before being returned to service.

7. REPORTING OF TESTS: Steam gauge tests must be reported on forms M.P. 70 or 72 for engines wholly in Canadian Service or on M.P. 64 or 66 for engines in International Service when same are due as outlined in regulations covering locomotive boiler inspection and testing under the Board of Transport Commissioners' General Order 473.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: TESTING AND MAINTENANCE OF LOCOMOTIVE SAFETY VALVES.

REGULATION NO. SL-63-2
PAGE 1 of 3
DATE August 1959
SUPERSEDES July 1959

ISSUE: ROAD AND SHOP.

REQUIREMENTS

Every steam locomotive must be equipped with at least two safety valves the size and relieving capacity of which are determined by the office of the Chief of Motive Power and Rolling Stock and no change is to be made to the size and type as originally applied to the boiler unless authorized.

SETTING OF SAFETY VALVES

(a) Safety valves are to be set to pop at pressures as shown in paragraph below, but in no case may the last valve (according to whether two or more valves are used) be set at more than 6 pounds above the allowed working pressure of the boiler.

(b) Two gauges must be used when setting safety valves; one so located that it will be in full view of the person setting the valves.

(c) Before setting or resetting safety valves the gauge to be used must be checked against an accurate test gauge reserved for that purpose, or on the dead weight gauge tester.

(d) When safety valves are being set, the water level in the boiler must not be above the highest gauge cock.

POPPING PRESSURES

Safety valves must be set to pop at:

First valve (Muffled) - 2 pounds above working pressure.
Second valve (Plain) - 4 pounds above working pressure.
Third valve (Plain) - 6 pounds above working pressure.

Blow back - Safety valves must be adjusted to blow back as follows:

Boilers carrying 200 pounds pressure or under - between 3 and 4 pounds blow back.
Boilers carrying 200 to 250 pounds pressure - between 4 and 6 pounds blow back.
Boilers carrying 250 to 300 pounds pressure - between 5 and 7 pounds blow back.

BLOCKING OF SAFETY VALVES

Before blocking safety valve, a notice must be put on each side of the locomotive and one over the fire door, which cover

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: TESTING AND MAINTENANCE OF LOCOMOTIVE SAFETY VALVES.

REGULATION NO. SL-63-2
PAGE 2 of 3
DATE August 1959
SUPERSEDES July 1959

ISSUE: ROAD AND SHOP.

should read "Safety Valves Blocked" (see also SL-13-1). These notices must not be removed until engine is in proper condition for service and the blocks removed from safety valves. Methods of blocking safety valves are shown on drawing B-63-L-153.

TIME OF TESTING

Safety valves must be tested at least once every three months at time of shop staybolt test and also at every general repair or when any irregularity is reported. Testing of safety valves is to be reported at every general repair on form MP-19A and on forms MP-70 or 72 for engines wholly in Canadian service or on forms MP-64 or 66 for engines in International service whenever test is due.

SEALING OF SAFETY VALVES

All stations listed below are to be equipped with sealing presses equipped with dies bearing station symbols in accordance with Maintenance Regulation RSC-29-1 or 2.

ATLANTIC REGION

Aroostook
Bay Shore
Brownville
Farnham
Kentville
McAdam
Montreal - Angus
St. Luc
Glen Yard
Sherbrooke
Trois Rivieres

EASTERN REGION

Chapleau
London
North Bay
Ottawa
Sault Ste. Marie
Smiths Falls
Sudbury
Toronto - John Street
Lambton
West Toronto
Windsor

PRAIRIE REGION

Assiniboia
Brandon
Bredenbury
Broadview
Estevan
Fort William
Hardisty
Ignace
Kenora
Minnedosa
Moose Jaw
Outlook
Prince Albert
Regina
Shaunavon
Souris
Sutherland
Swift Current
Weston
Weyburn
Wilkie
Winnipeg
Wynyard

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APPROVED AS SYSTEM STANDARD BY CHIEF OF MOTIVE POWER & ROLLING STOCK.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: TESTING AND MAINTENANCE OF LOCOMOTIVE SAFETY VALVES.

REGULATION NO. SL-63-2
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DATE August 1959
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ISSUE: ROAD AND SHOP

PACIFIC REGION

Alyth
Brocklmere
Coquitlam
Coronation
Cranbrook
Crowsnest
Field
Grand Forks
Kamloops
Lethbridge
Medicine Hat
Nelson
North Bend
Ogden
Penticton
Red Deer
Revelstoke
Strath Edmonton
Tadenac
Vancouver
Wetaskiwin

Safety valves should be sealed at every setting in the manner shown on drawing B-63-2-271. However, should it become necessary to reset safety valves at a point not equipped with a sealing press, they must be reset as soon as the engine reaches its terminal.

RECORDS

An accurate record must be kept of the sealing of all safety valves each time they are set. Record must show the station, date set and sealed and the pressures at which they were set to pop.

When safety valves are set at general repair, the above information must be shown on form MP-19-A when submitted.

APPROVED AS SYSTEM STANDARD BY CHIEF OF MOTIVE POWER & ROLLING STOCK.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF MAIN STEAM CHESTS, VALVES, BUSHINGS, GUIDES, VALVE RODS, ETC.

REGULATION NO. SL-64-1
PAGE 1 of 2
DATE February 1952
SUPERSEDES 64-MR-1 Sept. 1925

ISSUE: ROAD AND SHOP.

Section 1.

a. Valve Chests are to be rebored when they are 1/64" out of round or taper.

b. Valve Bushes are to be machined to standard drawings when new and are to be bored at first application or rebored at repairs in accordance with the table shown below:

CLASS	NEW BUSHES	TO BE REBORED
F1, F2, G3efghj, G5, H1cde, K1, P2ghjk, T1.	Bored after application.	Every General Repair and when 1/64" out of round or taper.
A1, A2, D4, D6, D9, D10, G1, G2, G3abcd, G4ab, H1ab, J3, J5, M3, M4, N2, N4, P1, P2abcd, P2ef, R2, R3, S2, U3, V3, V4, V5, W1.	Finish bored to size before application.	If 1/64" or more out of round or taper.

c. Valve Bushes are to be rebored to the nearest 1/16 of an inch that will give a proper finish. When reboring the bushes on a locomotive, the diameter of the two bushes on one side will be permitted to vary up to 3/16" in diameter from those on the opposite side, but the front and back bushes on any one side must be of the same finished diameter.

The limit diameter for reboring bushings is to be 1/4" over the nominal diameter.

d. Valve Bushes when applied to cast steel cylinders are to be held in position by a stop as shown in drawing B-64-L-1105.

e. Movement of Bushes. Bushes may be allowed to move 1/64" in valve chest without any alteration to the bush or valve. If in excess of 1/64" but not over 1/16" the bushing need not be changed or reset, but compensation is to be made on spool by building up the length. Cast iron spools can be increased in length by tobin bronzing and steel spools by welding. Spools then to be machined to suit.

If bush has moved more than 1/16", it is to be renewed and properly set.

f. Valve Spools may be restored to standard length by welding or tobin bronzing and re-machining.

g. Bull rings to be renewed if they are 3/32" or under the internal diameter of the valve bush. The clearance between bull ring and valve bush is to be 1/32" on all classes except G-5 which is 3/64".

h. Valve rings are to be renewed at every shopping. They should turned to 3/16" over bush diameter, split and finished on ends to give maximum gap of 1/32".

Approved as System Standard by Chief of Motive Power & Rolling Stock.

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF MAIN STEAM CHESTS, VALVES, BUSHINGS GUIDES, VALVE RODS, ETC.

REGULATION NO. SL-64-1
PAGE 2 of 2
DATE February 1952
SUPERSEDES 64-MR-1 Sept. 1925

ISSUE: ROAD AND SHOP.

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j. Valve Rods. After valves have been disassembled, the rod is to be thoroughly cleaned, then to be tested all over by the white lead or magnaflux method, special attention being given to the fillet ahead of the crosshead fit and the fillets on either side of the collar. Where magnaflux equipment is available, that method is to be used.

All valve rods are to be re-turned and rolled or ground. The final turning diameter of valve rods is to be as follows:

CLASS	ORIGINAL DIAMETER	LIMIT DIAMETER
A1, A2, D4z, D6, D9, D10, G2df, J3, J5, M3, M4, N4ab, R2, R3, U3, V3, V4, W1.	1 3/4"	1 17/32"
F1, F2.	1 1/2"	1 9/32"
G1, G2 conversions, G3, G4, G5, H1, N4cd, P1, P2, S2, T1, V5.	2"	1 25/32"

k. Valve Guides. Top guides may be skimmed until a limit of 5/16" under the original thickness has been reached.

l. Valve Crossheads should be brought back to standard height at general repairs and guides shimmed to suit. The running clearance on valve crosshead in guides should be 1/32" vertical and 3/64" to 1/16" lateral.

Section 2. Specific Road Maintenance.

a. Valve rods are to be white lead tested every time the crosshead is separated from the rod without the valve being removed, and they must be white lead or magnaflux tested all over any time the valve is completely removed, but with a limit of six months from the last time of complete testing.

b. Every time valve chest is opened and valve assembly is separated from the crosshead, the ports are to be examined for accumulation of carbon and same cleaned out if necessary.

c. Every time valve crosshead is separated from the rod, the lateral and vertical clearance is to be checked and corrected if necessary.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: SUPERHEATERS AND FITTINGS

REGULATION NO. SL-65-1
NO. OF SHEETS 1 of 3
DATE September 1950
SUPERSEDES 65-MR-1 April 1925 (see note

ISSUE: ROAD AND SHOP.

1. GENERAL. These regulations apply to the maintenance of type "A" and type "C" locomotive superheaters. The type "A" previously known as the "Schmidt" is now used for new applications and the type "C" refers to the Vaughan and Horsey equipment. Clauses 2, 11, 12 and 13 are common to both types of superheaters.

2. AT A No. 1 LOCOMOTIVE REPAIR all superheater equipment must be thoroughly inspected and tested as follows:
   (a) All parts worn below limit, or defective, must be replaced.
   (b) A hydrostatic test must be given to each pipe unit at a pressure of 300 pounds per square inch, after all repairs are completed, before coupling to header. If necessary to alter the length of the unit pipes so they will line up with header fittings, a further test must be applied after alterations have been made.
   (c) After application of complete superheater to boiler a hydrostatic test of 25% above the boiler working pressure must be applied. All parts and joints must be carefully inspected for leaks while under the above pressure. Leaky units or parts, if any, must be repaired and a further test given.

TYPE "C" SUPERHEATERS (VAUGHAN & HORSEY).

3. UNITS. Header end of units to be cleaned up with a disc grinder. Unit pipes having collars worn to 1/8" thick must have the end cut off and a new one formed. Pipes having flat spots worn on them 3/8" wide must be removed and replaced. The length of the units must be such that the top return bend will not be directly over the bottom one; the bottom unit should be at least 4" longer than the top one. For standard length of pipes see drawing B-65-L-47. New units must extend back into the flue to within 24" of the back tube sheet; no shortened units are to be applied that will not come within 3'6" of the back tube sheet. Pipes must be so mated that their length will suit the fittings in the header. Units must not be sprung into place so as to cause a strain on the coupling nut.

4. HEADERS. New headers must be tested, before applying, with water at a pressure of 300 pounds. Headers must rest on supports when in working position, so that there will be no strain on the dry pipe connection.

5. FITTINGS. At each repair all fittings must have a die nut, to list No. 15-T-223, run over the threads to clean them of scale and to bring them back to standard size, it not being necessary to remove fittings from the header. Thread in coupling nuts must also be clean of scale. 45° seats in fittings to be cleaned by grinding with emery and oil. Ball rings to be cleaned with wire brush, and if they are not of the proper contour they must be removed.

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Approved as System Standard by Chief of Motive Power & Rolling Stock.

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: SUPERHEATERS AND FITTINGS

REGULATION NO. SL-65-1
NO. OF SHEETS 2 of 3
DATE December 1950
SUPERSEDES 65-MR-1 April 1925 (see note)

ISSUE: ROAD AND SHOP

TYPE "A" SUPERHEATERS (SCHMIDT) 453- Vaughn Horsey

6. UNIT LENGTH. Maximum and minimum distance from back tube sheet to the end of the longest portion of unit is shown on drawing B-65-L-484 and must be strictly adhered to.

UNIT AND HEADER SEATS. Ball end on superheater pipes and seats in headers must be cleaned by using soft metal grinders with emery and oil. Hard grinders with dry emery must not be used under any consideration; ball joints may be re-cut with tools as shown on drawings B-15-T-986 and B-15-T-986 if the seats are scored or steam cut such that they cannot be restored to their proper contour with soft grinders. Red lead, varnish, or any other foreign substance must not be applied to joints in order to make them steam tight. Gauges for checking the contour of ball joints are shown on drawing B-15-T-987. Grinder holders and dies for making soft metal grinders are shown on drawings B-15-T-989, B-15-T-982 and B-15-T-983. When shipping units the ball joints must be protected with wooden blocks held in place by bolts and nuts. When drawing units up to header seats, use a wrench with a leverage of not more than three feet.

7. HEADER. Headers must rest on supports so that there will be no strain on the dry pipe connection. Slots in headers must be kept clean so that the unit bolt heads will have a metal to metal bearing. New headers are tested by the Superheater Company, it is not necessary to re-test them; for method of applying headers see drawing D-65-L-482.

8. UNIT CLAMPS AND WASHERS. All seats on washers and clamps are to be kept clean so that there will be a good metal to metal bearing.

9. UNIT SUPPORTS AND BANDS are to be maintained in positions as shown on standard drawings, care being taken to see that they properly support the units in the flue. Tools required for applying supports and bands are shown on drawings B-15-T-984 and B-15-T-985. Lump of spot welding should be placed on bottom of unit pipes, at both sides of bands and supports, to keep them from shifting.

10. MONTHLY SERVICE TEST. Hydrostatic test must be given to the superheater, steam pipes, exhaust pipes and nozzles, with warm water at a maximum pressure of 60 pounds and a minimum pressure of 40 pounds, at least once every month and when possible at the monthly staybolt test. Exhaust pipe nozzle to be blanked off and vent valve and gauge applied. All leaks must be repaired immediately and a further test given. A square set or chisel must not be used to tighten joints or nuts. The boiler must be thoroughly cooled down before testing.

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Approved as System Standard by Chief of Motive Power & Rolling Stock.

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: SUPERHEATERS AND FITTINGS

REGULATION NO. SL-65-1
NO. OF SHEETS 3 of 3
DATE September 1950
SUPERSEDES 65-MR-1 April 192 (see not

ISSUE: ROAD AND SHOP.

11. CLEANING OF FLUES. All superheater flues and units must be kept clean of soot, slag and cinders, with a cleaner as shown on drawing B-65-L-36, which is to be inserted in the flue at the firebox end. The air pressure used should not be less than 100 pounds.

12. BLANK SUPERHEATER UNITS. Engines may be operated with one blank unit, defective unit to be removed from the flue, repaired and replaced at the next monthly test. Engines must not be operated with two or more blank units, and repairs must be made immediately. For method of blanking type "A" units see drawing B-65-L-352. To blank type "C" unit, remove standard nut and ball ring and apply a blank nut to list No. 65-L-128, and a copper gasket to list No. 65-L-160, drawing 65-L-126.

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR card 65-MR-1 dated April 1925, which should be destroyed.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: ELECTRIC HEADLIGHT EQUIPMENT.

REGULATION NO. SL-66-1
PAGE 1 of 1
DATE January 1953
SUPERSEDES December 1950

ISSUE: ROAD.

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1. INSPECTION

(a) Turbo-generators must be kept clean and inspected for worn bearings, defective valve gear, worn brushes and loose wire connections. Commutators to be kept clean using only no. 00 sandpaper.
(b) Headlight cases must be kept tight and reflectors clean.
(c) When headlight lamps are removed for any purpose, headlight sockets must be examined and sockets showing burnt contacts must be replaced.
(d) Check all lamps after each trip and ensure that they are of proper capacity for each outlet and in accordance with Material List 66-ML-6.
(e) Switch on all lamps after each trip and before leaving terminal to determine if they light properly.
(f) Test generator voltage at least once a week with a minimum boiler pressure of 150 psi. Set governors carefully to provide 33 volts at the generator with normal running load.
(g) Turbine governors to be removed after each washout and flushed with coal oil to remove any formation of scale.
(h) Test all wiring circuits at least once a week for grounds. All grounds to be cleared.
(i) At least once a month, carefully check focus of headlight using "Focalign" where available.

2. LUBRICATION

After each trip, see that turbo-generator bearings are properly oiled. The oil to be used for ball bearings shall consist of:

1/3 valve oil
2/3 car oil,

the two proportions to be thoroughly mixed before using.

3. GENERAL

(a) Generator commutators must have the mica insulation between the bars maintained 1/64 inch below the commutator surface, and must be renewed when below 2.5/16" dia.
(b) Brushes must be fitted correctly to commutators and spring tension properly adjusted.
(c) Voltmeter regularly used by headlight maintainer must be checked at least every six months by a representative of the Superintendent of Motive Power and Car Department. Record of check to be maintained and meters which are found to be inaccurate must be re-calibrated promptly.
(d) Turbo-Generator speeds:
Pyle-National E 2 N type - 3500 to 3700 R.P.M. - full load.
Pyle-National E 3 N type - 3200 to 3600 R.P.M. - full load.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF LOCOMOTIVE TENDERS.

REGULATION NO. SL-71-1
PAGE 1 of 2
DATE February 1952 (1st issue)
SUPERSEDES

ISSUE: ROAD AND SHOP.

Section 1. Shop.

1-a. The Inside of all Tender Tanks is to be cleaned out at every general repair. Swash plates are to be hammered or scraped to remove all scale and are also to be hammer tested for loose plates, broken or loose rivets and breaks in any welds. All sides and bottom are to be scraped if necessary to remove any scale, or dirt and afterwards flushed out with water.

On water bottom tenders, care should be taken to see that the washout plugs are removed before cleaning is commenced.

b. The Coal Slope plates are to be hammer tested to determine if they are worn thin especially at the water sections.

c. Top of Tender is to be cleaned of all coal dust or oil and any drains from top of tank to be flushed out to make sure they are open.

d. All Piping on top or inside of tender to be examined and tested for leaks.

e. Oil Tanks on oil burning engines are to be thoroughly cleaned at each general repair by steaming out. Care must be taken to see that naked lights are not used around or inside oil tanks until they have been properly cleaned out. After cleaning, all oil valves, drain valves and heater pipes are to be examined to see that they are in proper condition. Special attention should be paid to see that pipes are properly clipped to prevent them from becoming loose.

f. All safety appliances to be checked on tender. No welding of any kind is permitted on safety appliances.

g. Tank Wells and Tank Well Strainers are to be removed, strainers to be thoroughly cleaned, and tank well and fittings to be removed, examined and repaired or parts renewed where necessary.

When re-applying tank well to tender a new gasket must be used.

h. All Goose Necks and Hose Bags are to be carefully examined and cleaned out and renewed if necessary. Any hose bag showing loosening of the inside lining must be renewed.

j. Stokers are to be removed from tender and compartment thoroughly cleaned out.

k. Patching of Tenders. When tenders require patching on the side or back plates the patches should be set in flush with the old plates on any locomotives built since 1920 and on any new tenders which have been applied to conversions of engines built prior to 1920. All other older types of tenders should be patched by applying the new section of plate over the old plate.

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Approved as System Standard by Chief of Motive Power & Rolling Stock.

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF LOCOMOTIVE TENDERS.

REGULATION NO. SL-71-1
PAGE 2 of 2
DATE February 1952 (1st issue)
SUPERSEDES

ISSUE: ROAD AND SHOP.

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1. Removing of tenders from Underframe. Where there is any doubt as to the condition of the outside of bottom plates on tenders, the tender is to be removed from the frame for examination, otherwise tenders should be removed from underframes for examination underneath when an external inspection of the boiler is due, but with a maximum extension of one year thereafter.

Approved as System Standard by Chief of Motive Power & Rolling Stock.