

NEW ZEALAND GOVERNMENT RAILWAYS MECHANICAL BRANCH	BOILER OPERATION AND MAINTENANCE	CODE No. 73 Page No. 1 of 3 Issue No 4 Date Issued 31/3/67
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{Includes page 5 of Issue 5 and Notes}

(1) EXAMINATIONS:

Members shall not be placed in charge of any type of boiler unless they have passed the prescribed examination set out below for the type of boiler concerned.

(a) Stationary Enginedrivers Examination:

- (i) Members who have passed this examination may be placed in charge of stationary boilers.
- (ii) Workshop officers who have passed this examination and who have been authorised by the Chief Mechanical Engineer may be placed in charge of a locomotive or steam crane undergoing trial at a workshop after the completion of repairs (Note: This does not authorise workshop officers to operate a steam crane while load and stability tests are being conducted when a crane is on trial after the completion of repairs. During these tests the crane shall be operated by an experienced cranedriver).

(b) Steam Cranedrivers Examination:

Members who have passed this examination may be placed in charge of steam cranes or coaling grabs.

(c) Boiler Examination:

- (i) Locomotive trainees, who have this examination may be placed in charge of stationary boilers, locomotive boilers or coal grab boilers in locomotive depots (Note: This does not authorise locomotive trainees to operate coal grabs but merely authorizes them to be placed in charge of a coal grab boiler in steam.)
- (ii) Locomotive assistants and enginedrivers who have passed this examination may be placed in charge of stationary boilers, locomotive boilers or coal grabs.

(2) TESTING WATER LEVEL:

Employees in charge of boilers shall test the water level before any fire is lighted. When a boiler is in steam the water level shall be tested at frequent intervals to ensure that there is sufficient water in the boiler and that the water columns are functioning correctly, and when fires are banked the water levels shall be tested again and the gauges must register a "full glass" of water.

When any boiler in steam is handed over from one attendant to another, both members shall test the water level together before the original attendant ceases duty.

The correct method of testing water level is as follows:—

- (a) Close steam cock, open try cock, and see that water blows through freely.
- (b) Close water cock, open steam cock, (the try cock is already open) and see that steam blows through freely.
- (c) Open water cock and blow through (all cocks are now open.) Close try cock and see that water returns smartly to the glass.
- (d) Repeat test on other glass. Check water level in both glasses.

(3) 'BOILER EMPTY' NOTICES:

When the water is drained from a boiler, a 'boiler empty' notice must be hung over the firehole door, and this notice must not be removed until the boiler is filled.

(4) STORING BOILERS:

When a boiler is stored or only used intermittently, the water shall be drained and sufficient plugs removed to allow a current of air to pass freely through the boiler when it is not in use.

(5) DISCHARGE FROM WATER-COLUMN DRAIN-COCKS:

The discharge pipes from the water-column drain-cocks must be situated so that there is no possibility of the water coming in contact with the boiler shell.

(6) REMOVAL OF BRICK ARCH CARRYING BOSSES::

When boilers are undergoing Class A repairs, all brick arch carrying bosses must be renewed. Replacement bosses shall be fillet welded to the firebox plates as detailed on drawing S.3489. N.B. This method obviates the drilling and tapping operations required for studs to drawing Z.7429. New fireboxes are also to have brick arch carrying bosses attached by fillet welding.

(7) PATCHING BOILER OR FIREBOX PLATES:

The nature of the repairs to be effected shall be determined by the Chief Mechanical Engineer after the consideration of the Boiler Inspector's report, and shall be specified on the Loco. 59 report. Full details of the repairs effected and patches applied must be included in the Loco. 57A report.

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(8) CLEANING THE INTERIOR OF BOILERS:

At the completion of boiler repairs and before the replacement of tubes and flues, all scale and loose material must be removed from the interior of the boiler. No descaling compounds or other substances shall be introduced into any boiler without the authority of the Chief Mechanical Engineer.

(9) RENEWING PORTIONS OF OLD BOILERS:

When any portion of a boiler is renewed, a description of the new material used, together with the maker's name and brand, must be included in the Loco. 57A report. The material used for renewal purposes shall be of similar quality to that used in the construction of new boilers and, where possible, the same types and pitch of rivets and stays must be observed.

For materials used in boiler and firebox construction or repairs, refer to Drawings W16296 to W16299 inclusive (Materials used for Loco. Work, etc) compiled in book form.

(10) AVOIDING EXTRA SEAMS:

When defective firebox plates require patching and it is necessary to cut away some of the existing plates, the defective plates should be cut away to the nearest seam to avoid making more seams than are actually required.

(11) GAS CUT AND DRILLED HOLES:

The face of a gas cut hole shall be ground or machined smooth. All rivet holes, etc. must be drilled and reamed out if necessary and on no occasion must holes in boiler plates be punched. Sharp edges on all holes shall be removed.

(12) CAULKING:

All caulking shall be done with a broad-faced tool and on no occasion must the breadth of the caulking-tool be less than the thickness of the boiler plate. Drifting must be reduced to a minimum, and caulking must not be effected while boilers are in steam.

(13) BOILER AND FIREBOX EXPANSION;

To ensure that the expansion is not restricted in any direction, particular care must be exercised when fitting sling stays, firebars, and expansion brackets. Longitudinal stays should also receive particular attention and all such stays in any boiler must have the same rigidity when fitted.

(14) STAYS:

New or repaired stays, other than crown stays, shall be welded inside the firebox as detailed on drawing S3489 and are to be rivetted cold on the boiler outer plates.

Broken stays shall be renewed as directed by the Chief Mechanical Engineer and details of the replacement shall be recorded on the Loco. 57A reports.

(15) LAGGING BOILERS:

Boilers shall not be permitted to work until they have been lagged in such a way that no external portion of the boiler is exposed to the action of rain, exhaust steam, damp ashes, or coal.

(16) CLEANING ASHPANS:

Ashpans shall be cleaned at every available opportunity, and damp ashes or coal must not be permitted to accumulate against any portion of a boiler.

(17) BRICK ARCHES AND BAFFLE PLATES:

Brick arches and baffle plates must be maintained in good condition and renewed as soon as defects occur.

(18) RECORDS OF NEW BOILERS:

When new boilers are manufactured in Workshops, a detailed description of the material used in every portion of the boiler, together with the maker's name and brands, must be shown on the Loco. 57A report forwarded to the Chief Mechanical Engineer.

(19) MAINTENANCE AND REPORTING DEFECTS:

Officers in Charge shall ensure that all stationary, crane and locomotive boilers under their supervision are maintained in the best condition possible, and that all defects are reported and attended to immediately they are detected.

(20) UNAUTHORISED WORK:

When a boiler is in workshops for repairs, no alterations or repairs other than those authorised on the covering Loco. 59 report for the boiler concerned shall be effected without the Chief Mechanical Engineer's authority.

NOTE: For instructions re boiler cleaning, see Code No. 74.

For instructions re boiler testing, see Code No. 75.

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21) BOILER SHUT DOWN:

(a) Up to 30 days:

Completely fill the boiler with alkaline water containing sufficient "ALFLOC" 23 (sodium sulphite) to combine with the dissolved oxygen and leave an excess of 200 p.p.m. Before sealing the boiler it is preferable to raise the water to boiling point to induce mixing by circulation and to complete the chemical reaction.

The pH of the water should be maintained at not less than 9.5 by adding the particular "ALFLOC" powder used for normal water conditioning.

It is necessary to check periodically the excess of inhibitor in the boiler and to restore any which has been oxidised.

If the boiler is not being emptied when taken off line then the "ALFLOC" 23 should be added a short time before steaming ceases. The alkaline treatment, in solution, should be directly injected into the boiler or added as a single slug dose by one of the recommended methods.

(b) Exceeding 30 days:

Empty the boiler and hose out any sludge that has accumulated. Dry out the boiler by gentle heat and insert trays of quick lime before sealing the boiler.

On boilers where trays cannot be readily placed inside quick lime should be inserted through plug holes.

Twenty eight pounds of quick lime should be sufficient for a locomotive type of boiler.

All quick lime should be hosed out before a boiler is returned to service.

NOTES ON CODE 73

- 1/ The requirements of Clause 14, Code 73, Issue No.4 were introduced towards the end of steam locomotive operation so there was no extended experience with this type of repair.

For Locomotive Societies repairs to stays should be carried out in the traditional manner in accordance with Clause 13, Code 73, Issue No.3 and CME's 23/547 of 26 March 1964.

- 2/ Brick arch studs should be renewed to Clause 6, Code 73, Issue No.3.