

NEW ZEALAND GOVERNMENT RAILWAYS	AXLE BOXES FOR LOCOMOTIVES ETC, AND ROLLING STOCK	CODE No. 37
MECHANICAL BRANCH		Page No. 1 of 4 Issue No 5 Date Issued 1/12/70

(1) DEFINITIONS

For the purpose of this Code the following definitions will apply:-

Axlebox guides	The vertical faces on axleboxes that engage with the horn guides.
Axlebox guide liner	The replaceable liner attached to axlebox guides to absorb wear.
Horn plates*	The vertical members attached to the underframe to locate the axleboxes.
Horn guide*	The steel section secured to each horn plate and in contact with the axlebox guides.
Horn guide liner*	A replaceable liner which may be attached to each horn guide to absorb wear.
Horn plate keep*	The bolted-on bar joining the lower ends of each pair of adjacent horn plates.
Axlebox end play	The total longitudinal movement of the axlebox between its horn guides, i.e. at right angles to the axle.
Axlebox side play	The total sideways movement between the axlebox and its horn guides, i.e. along the line of the axle.

* In bogies, the corresponding parts.

(2) APPLICATION

The types of axleboxes, bearings and dust shields to be used on various classes of locomotives etc. and rolling stock are shown on the following drawings:-

Locomotives, shunting tractors, railcars and multiple units	Y21531
Cranes	See relevant drawings
Cars, vans and wagons	Y35931

(3) AXLEBOX SEALING

Axlebox lids of the spring-loaded type must seat fully and tightly on the axlebox sealing face when closed. Badly fitting or broken lids must receive immediate attention to reduce the occurrence of overheated axleboxes caused by the entry of dirt and water.

"Isothermos" and roller bearing axlebox covers must be fitted securely to prevent leakage of oil or grease. Leakage in service must be attended to at once by depot staff. See also Clause 12.

(4) LINERS

The use of unsecured liners between axleboxes and horn guides is prohibited.

Four-wheeled wagon plain bearing axleboxes which are less than 184 mm (7¼ ins) over the guide faces or more than 70 mm (2¾ ins) between the guide face lugs must be scrapped if they cannot be restored to the original dimensions by the use of axlebox guide liners welded to the axle box.

Drawing X26330 shows the method of welding guide liners to axleboxes.

(5) MANUFACTURE, BRANDING AND STORING OF WAGON PLAIN BEARING AXLEBOXES

The dimension over axlebox guide faces shall be 187+0.5-0mm ($7\frac{3}{8}+\frac{1}{64}-0$ ins) when new.

Before axleboxes are delivered to stores or placed direct into service all sand, core nails, fins and scale must be removed and the axlebox given an internal and external coating of red oxide wagon paint (CME Specification No. 449). The lower portion of new axleboxes shall be filled with water to test for leakage before the axleboxes are machined or painted.

(6) LUBRICANTS

The oils and grease to be used in axleboxes are as follows:-

Roller bearings	(oil lubricated, Timken)	CME Specification No.483
“ “	(oil lubricated, Hyatt)	CME Specification No.364 or 400
“ “	(grease lubricated)	CME Specification No.409
Plain bearings		CME Specification No.400

(7) ALL ROLLER BEARING AXLEBOXES (INSPECTION)

Before a roller bearing axlebox cover is removed, the front of the axlebox and the cover must be thoroughly cleaned and care taken to prevent the entry of dust and dirt.

The internal inspection of roller bearing axleboxes is to be undertaken at Otahuhu, Hutt, Addington and Hillside Workshops only. Axlebox covers must not be removed elsewhere than in workshops, except in the following circumstances:

- (i) If any vehicle with roller bearing axleboxes is derailed or damaged and it is evident that one or more axleboxes have been damaged, the Mechanical Branch officer in charge may authorise removal of the covers to examine the bearings to determine whether the axleboxes concerned are in a fit condition to run to a suitable depot or workshop.

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Before being run to a suitable depot or workshop, a vehicle, where driving wheels were derailed, must be moved a short distance to detect any unusual sound from the axleboxes which are to be checked frequently for overheating during the run.

Before moving a vehicle where non-driving wheels were derailed, the wheels must be jacked up and spun in the axleboxes to see if the bearings make any unusual sound or restrict rotation of the wheels.

- (ii) If a vehicle with roller bearing axleboxes is involved in a derailment and an external examination reveals no bent axles or apparent defects in the axleboxes, the Mechanical Branch officer in charge may authorise removal of the covers to ensure that the bearings are in good condition before the vehicle is returned to service.

If any doubt exists concerning the condition of axles or axleboxes the wheelset must be sent to a workshop for inspection and under no circumstances may repairs to the interior of roller bearing axleboxes be attempted by depot staff.

- (iii) In order to carry out an ultrasonic flaw detection test on an axle, whether periodically or as a result of a derailment, or to attend to the tachometer fitted to the axle.

- (iv) For turning tyres.

(8) ALL ROLLER BEARING AXLEBOXES (RUNNING TEMPERATURE)

The normal running temperature of roller bearing axleboxes is about 50° C (122° F) and if the bare hand can be held against the axlebox cover the temperature is satisfactory. If this temperature is exceeded the vehicle must be forwarded to the nearest depot for attention after the bearing has cooled. The wheelset will be replaced there or the axlebox will be relubricated so that the vehicle can be run to the nearest workshop (See Clauses 7 and 9.)

If a roller bearing axlebox becomes overheated the vehicle or wheelset concerned must be shopped for examination of the axlebox assembly. The bearing should be checked at intervals to ascertain whether any running may be safely continued.

Water must not be used to cool overheated roller bearing axleboxes.

(9) ALL ROLLER BEARING AXLEBOXES (OVERHAUL)

Roller bearing axleboxes are to be overhauled at Otahuhu, Hutt, Addington and Hillside Workshops only. Overhauls will normally be carried out during classified overhauls of vehicles or when bogies are shopped separately for full overhaul. The manufacturers' literature is to be consulted for fitting instructions and limits of wear.

When a wheelset fitted with roller bearings is removed for tyre turning only, the axleboxes must be checked for slackness of bearings and freedom of rotation and greased or oiled, as the case may be, before the wheelset is returned to service or forwarded to a depot.

[Axleboxes to drawing X28025 and those fitted to the Silver Fern are to be crack tested by fluorescent magnetic particle test at every overhaul.]

[C.M.E.'s 24/563 of 3/9/1981]

When a roller bearing at one end of an axle is renewed or overhauled, the bearing at the other end of the axle is to be overhauled.

[Attention After Underfloor Wheel Lathe Work]

When a vehicle receives a full tyre turn on an underfloor wheel lathe the package roller bearings or other roller bearings on goods wagons are to have a replenishment grease charge added. Locomotive and prestige passenger stock may have varying maintenance instructions but normal practice is that grease in roller bearing axleboxes on a bogie is replenished when tyres are turned.]

(10) GREASE LUBRICATED ROLLER BEARING AXLEBOXES

Inside and outside journal axleboxes fitted to diesel-mechanical and diesel-hydraulic shunting locomotives and tractors are to be lubricated at the intervals required by the relevant Loco. 30 form.

All other outside journal axleboxes are to be lubricated at Otahuhu, Hutt, Addington or Hillside Workshops only and during axlebox overhaul. Grease must be replenished if necessary if an axlebox cover is removed on any other occasion.

(11) OIL LUBRICATED ROLLER BEARING AXLEBOXES

Axleboxes are to be checked with the appropriate oil level gauge and the oil restored to the maximum level, if necessary, as follows:-

Locomotives At overhaul and every 5,000 miles thereafter.

Cars At lift or overhaul, then one month after lift or overhaul and every three months thereafter.

An appropriate depot register is to be kept for cars to ensure that the correct oiling period is maintained.

The areas around drain and filling plugs as well as the oil feeder must be thoroughly cleaned before lubrication is commenced to ensure that dust and dirt are prevented from entering the axleboxes.

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At each oiling the drain plug must first be removed and any water in the bottom of the axlebox run off.
Make-up oil must be added slowly and allowed to settle to avoid the gauge giving an incorrect indication.
Drain and filling plugs must be cleaned, well tightened and sealed on completion of the oiling.

(12) OIL LUBRICATED PLAIN BEARING AXLEBOXES ("ISOTHERMOS" TYPE)

After overhaul, axleboxes are to be filled with new oil to the oil level plug and the oil level checked at monthly intervals thereafter. A depot register is to be kept to ensure that the correct oiling period is maintained.

The area around the oil level plug as well as the oil feeder must be thoroughly cleaned before lubrication is commenced to ensure that dust and dirt are prevented from entering axleboxes.

Car and Wagon staff must ensure that the correct oil level is maintained should some leakage develop but should serious leakage which cannot be prevented develop, the wheelset must be replaced.

(13) OIL LUBRICATED PLAIN BEARING AXLEBOXES (LOCOMOTIVES)

Where fitted, all axlebox cellars shall be packed with clean flax tow rolled into pads and saturated with oil.

(14) OIL LUBRICATED PLAIN BEARING AXLEBOXES (ROLLING STOCK)

When vehicles are lifted or overhauled, all axleboxes shall be overhauled and packed in accordance with the latest issues of Workshop Instructions Nos D5 and D6.

(15) LIMITS OF WEAR IN HORN GUIDES

Vehicles must not be passed out after lift or overhaul with non-parallel horn guides, and the clearance between axlebox guides and horn guides must not exceed the following limits:-

	End Play			Side Play		
	After overhaul	Out of workshops (Max)	In service (Max)*	After overhaul	Out of workshops (Max)	In service (Max)*
Four-wheeled vehicles	3-4.5 mm (¹ / ₈ - ³ / ₁₆ in.)	6 mm (¹ / ₄ in)	9 mm (³ / ₈ in)	3-4.5 mm (¹ / ₈ - ³ / ₁₆ in.)	6 mm (¹ / ₄ in)	10.5 mm (⁷ / ₁₆ in.)
Four-wheeled vehicles (plain bearings, 'B' package replacements, YH wagons)	3-4.5 mm (¹ / ₈ - ³ / ₁₆ in.)	6 mm (¹ / ₄ in)	9 mm (³ / ₈ in)	3-4.5 mm (¹ / ₈ - ³ / ₁₆ in.)	6 mm (¹ / ₄ in)	10.5 mm (⁷ / ₁₆ in.)
KS, LB, NA wagons	3 mm	6 mm	9 mm	14 mm	17 mm	20 mm
NH, NK, wagons (link suspension)	24 mm	24 mm	24 mm	50 mm	50 mm	50 mm
Bogie vehicles (plain bearings)	3-4 mm (¹ / ₈ - ⁵ / ₃₂ in.)	4.5 mm (³ / ₁₆ in.)	7.5 mm (⁵ / ₁₆ in.)	3-4.5 mm (¹ / ₈ - ³ / ₁₆ in.)	6 mm (¹ / ₄ in)	9 mm (³ / ₈ in)
Bogie vehicles (roller bearings)	1.5-2.5 mm (¹ / ₁₆ - ³ / ₃₂ in.)	3 mm (¹ / ₈ in.)	6 mm (¹ / ₄ in)	4.5-5.5 mm (³ / ₁₆ - ⁷ / ₃₂ in.)	6 mm (¹ / ₄ in)	9 mm (³ / ₈ in)
X25330	1.5-2.5 mm	3 mm	6 mm	7.5-8.5 mm	10 mm	13 mm
Articulated railcars	1.5-2.5 mm (¹ / ₁₆ - ³ / ₃₂ in.)	3 mm (¹ / ₈ in.)	6 mm (¹ / ₄ in)	7.5-9 mm (⁵ / ₁₆ - ³ / ₈ in.)	10.5 mm (⁷ / ₁₆ in.)	12 mm (¹ / ₂ in.)

*When vehicles are not lifted or overhauled [or have had specific repairs carried out].

(16) HOT AXLEBOXES (DEFINITION)

- (a) Plain and roller bearings on locomotives etc.:
When heating exceeds the normal running temperature (Clause 8) to such an extent that the removal of the wheelset is necessary or when the heating causes a train delay.
- (b) Plain bearings on rolling stock:
When heating exceeds the normal running temperature to such an extent that repacking is necessary.
- (c) Roller bearings on rolling stock:
When heating exceeds the normal running temperature (Clause 8) to such an extent that a bare hand cannot be continuously held against the axlebox.

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(17) HOT AXLEBOXES (REPORTING)

In the case of (a), Clause 16, Locomotive Supervisors will report to District Mechanical Engineers as necessary.

In the case of (b) and (c), Clause 16, only sufficient attention should be given to the axlebox to enable the vehicle to proceed to its destination, if possible, and then to the nearest repair depot or small workshop. When this attention is given, a completed Loco.58 card is to be conspicuously attached to the vehicle, in a waybill clip where provided, before it proceeds and a covering Loco.71 form (single copy) rendered to the Car and Wagon Inspector or Works Foreman and Inspector by the Train Examiner concerned who will retain a duplicate copy. Should over-heating again occur before the arrival of the vehicle at a repair depot or small workshop no further Loco.58 card or Loco.71 form is required for any additional attention given.

The Loco.58 card is not to be removed until repairs have been commenced at a repair depot or a workshop.

When a vehicle which has had an overheated axlebox is received for this reason at a repair depot or a small workshop but does not have a Loco.58 card attached, the member in charge of the depot or workshop is to render a Loco.71 form.

All hot axleboxes covered by (b) and (c), Clause 16, and found in service or in yards will therefore be accounted for only once to a Car and Wagon Inspector or a Works Foreman and Inspector.

On receipt of Loco.71 forms, Car and Wagon Inspectors and Works Foremen and Inspectors shall, after their certification, forward them to the District Mechanical Engineer for filing. The District Mechanical Engineer will have the necessary particulars extracted from the forms to compile his periodical return to the Chief Mechanical Engineer.

(18) ADDITIONAL INFORMATION

Sections of several of the Clauses in this Code which are applicable to rolling stock are more detailed in Instructions No's 50 to 54 in the Train Examiners' Manual.