

**FRONZ / ONTRACK**  
**APPROVED CODE OF PRACTISE**  
**FOR**  
**HERITAGE NETWORK OPERATORS**

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<b>Mechanical Supplementary Code</b> <b>B3.4.2.09</b>  <b>Axle Boxes for Locomotives and Rolling Stock</b>
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<b>Issue</b>	<b>Prepared (P), Reviewed (R), Amended (A)</b>	<b>Approved by</b>	<b>Effective Date</b>
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**Reference Material**

<b>Source</b>	<b>Description</b>	<b>Date</b>
NZ Railways	Mechanical Branch Code No 37; Issue 4	11/02/1960
NZ Railways	Mechanical Branch Code No 37, Issue 5	1/12/1970

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### Amendment History

Version	Section	Amendment
1	Issue 4; Section 6	Deleted "Used diesel engine lubricating oil" by HTC
1	Issue 5; Section 7	Deleted "(iv) For turning tyres." by HTC

## Axle Boxes for Locomotives and Rolling Stock

### Index

Section	Page
Introduction	2
NZ Railways Mechanical Branch Code No 37, Issue 3	3
NZ Railways Mechanical Branch Code No 37, Issue 4	10

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## 1 Introduction

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This Supplementary Code relates to:-

B3.1.1.01 - Mechanical Code of Practice, Section 3.4.1 - Axleboxes and Roller Bearings

It contains:-

- NZ Railways Mechanical Branch Code No 37; Issue 4 of 11/02/1960
- NZ Railways Mechanical Branch Code No 37, Issue 5 of 1/12/1970

which contains information relevant to the maintenance of axle boxes on locomotives and rolling stock. Operators are to use those sections that are relevant to their operation.

NEW ZEALAND GOVERNMENT RAILWAYS	<b>AXLEBOXES FOR LOCOMOTIVES AND ROLLING STOCK: HOT AXLEBOXES</b>	<b>CODE No. 37</b>
<b>MECHANICAL BRANCH</b>		Issue No 4; Date Issued 11/2/60 Cancelled; Issue 5; 1/12/70

**(1) Definitions**

For the purpose of this Code the following definitions will apply.

*Axlebox Horns*- The vertical faces on the axlebox that engage the horn guides on the underframe.

*Axlebox Horn Liner*- The U-shaped liners welded to the inside of the axlebox horn.

*Horn Guide Liner\**- As shown on drawing Y.35650.

*Horn Guide\**- As shown on drawing Y.35650.

*Horn Plate\**- As shown on drawing Y.35650.

\*In bogies, the corresponding parts.

*Axlebox End play*-- The total longitudinal movement of the axlebox in the horn guides, i.e., ~~along~~ ~~the line of~~ [at right angles to] the axle.

*Axlebox Side Play*-- The total sideward movement of the axlebox in the horn guides, i.e., ~~at right~~ ~~angles to~~ [along the line of] the axle.

**GENERAL INSTRUCTIONS**

**(2) Application**

The types of axleboxes, brasses, and dust shields to be used on various classes of locomotives and rolling stock are as set out in the Blue Prints enumerated below:

Car and Wagon Axleboxes	Y.35931
Locomotive Axleboxes	Y.21531
Rope Dust Shields	X.25311

**(3) Axlebox Covers**

All axlebox covers must fit tightly on the axlebox faces when closed. Badly fitting or broken covers must receive immediate attention to reduce the occurrence of hot boxes caused by the entry of dust or water.

"Isothermos" and roller bearing axlebox covers must be fitted securely to prevent leakage of oil or grease.

**(4) Liners**

The use of loose liners between axleboxes and horns is prohibited.

Four wheel wagon axleboxes less than 7/4 in. between axlebox horn faces or more than 2¾ in. between lugs must be scrapped if they cannot be brought back to standard by the use of axlebox horn liners welded to the box. Drawing Y.36004 shows how these liners are to be welded to cast iron axleboxes and X.26329 to cast steel axleboxes.

**(5) Manufacture, Branding, and Cleaning of Axleboxes**

The width over axlebox horn faces of four wheel wagon axleboxes as cast is to be 7 7/16 in. (maximum) - 7 3/8 in. (minimum).

Locomotive axleboxes must be branded ("L.L.", "R.D.", etc.) on the outer face to denote their positions. The brands are to be made in locations that will be readily visible when the axleboxes are in position.

Before axleboxes are issued to Stores or placed direct into service they must be thoroughly cleaned and all sand, core nails, protruding fins, and scale must be removed. Before axleboxes are

stored they must be given an internal and external coating of suitable rust preventive.

**(6) Lubricants**

The types of oil and grease to be used in axleboxes are as follows:

Locomotive plain bearings	Locomotive bearing oil.
Roller bearings-Grease lubricated	Roller bearing grease.
	Oil lubricated "Timken" roller bearing axlebox oil.
Car and Van bearings (plain or "Isothermos")	New car and wagon axle oil.
Wagon bearings-plain	(1) <del>Used diesel engine lubricating oil.</del> [HTC] (2) New car and wagon axle oil.

Only the currently approved brands of the above lubricants are to be used.

**ROLLER BEARING AXLEBOXES  
GENERAL INSTRUCTIONS**

**(7) Inspection: Examination**

(1) *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 dirt or dust.*

(2) The inspection of roller bearing axleboxes is to be undertaken only at Workshops. Axlebox covers must not be removed elsewhere than in Workshops, except in the following circumstances:

(i) If any locomotive or vehicle with roller bearing axleboxes is derailed or damaged and it is evident that one or more axleboxes have been damaged, Car and Wagon Inspectors or Locomotive Supervisors may authorise removal of the covers to examine the bearings to ensure that the axleboxes concerned are in a fit condition to run to Workshops.

The wheels must be jacked up and spun in the axleboxes to see if the bearings make any unusual noise or restrict rotation of the wheels. Before being returned to service the vehicles must be given a trial run and the axleboxes carefully tested for heating.

(ii) If a locomotive or vehicle with roller bearing axleboxes is involved in a minor derailment and an external examination reveals no bent axles or apparent defects in the axleboxes, Locomotive Supervisors or Car and Wagon Inspectors may authorise removal of the covers to ensure that the bearings are in good condition before the vehicle returns to service.

If any doubt exists concerning the condition of axleboxes or if axles are bent the wheelset must be sent to Shops immediately for inspection and under no circumstances must repairs to the interior of roller bearing axleboxes be attempted by Depot staff.

(iii) In order to carry out a supersonic flaw detector test on an axle or to attend to the tachometer fitted to the axle.

(iv) For turning tyres- At Auckland Diesel and Railcar Depot only.

**(8) 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 front of the axlebox the temperature is satisfactory. If this is exceeded the vehicle must be forwarded to the nearest Depot for attention. The wheelset will be replaced there or the axlebox will be relubricated so that the vehicle can be run to the nearest main workshop.

*If a roller bearing axlebox runs hot the vehicle or wheelset concerned must be shopped for examination.*

*Water must not be applied to roller bearing axleboxes.*

**(9) Maintenance**

Locomotive Supervisors and Car and Wagon Inspectors must arrange for the frequent external examination of all roller bearing axleboxes under their supervision to detect any leakage of lubricant.

**(10) Overhaul**

Roller bearing axleboxes are to be overhauled at Otahuhu, Hutt, Addington. and Hillside Workshops only.

[When a wheelset fitted with roller bearings has the tyres turned, the axleboxes must be checked, greased or oiled, as the case may be, before the wheelset is returned to service or forwarded to a depot.]

[24/563 of 30.10.1962]

**S.K.F ROLLER BEARING AXLEBOXES**

(Refer also to the General Instructions, Clauses 3, 4, ~10.)

**(11) Special Instructions**

(1) The inside journal roller bearing axleboxes on Ab. and Wab. locomotives are to be greased every three months. The cannon box roller bearings on locomotive coupled wheels are to be greased every 12,000 miles.

Locomotive Supervisors must arrange for a record to be kept of the greasing of these axleboxes.

When using power greasing guns grease must be fed in slowly to prevent excessive pressures being built up.

(2) The outside journal S.K.F. roller bearing axleboxes fitted to locomotive and rolling stock bogies are to be lubricated, at main workshops only, during overhaul or lift, or top overhaul in the case of diesel electric locomotives.

(3) The roller bearing axleboxes fitted to diesel shunters are to be lubricated as instructed in the Loco. 30 DS Inspection and Servicing Report.

(4) Axlebox greasing points on the classes of stock listed below are to be attended to as instructed in the drawings quoted.

Class	Drawing
J. Jb.	X.12490
Ja (S.K.F.)	X.12822
Ka. Kb	X.12089
Articulated railcars	X.14726

(5) All cars, vans, and wagons (except "UI") fitted with S.K.F. roller bearing axleboxes are to have small brass plates bearing the following inscription, attached to the covers by the two bolts, or by set screws in the case of the "Vs" wagons

<p>This Axlebox to be Lubricated at Workshops only. Name of Shop</p>
--

(6) The following information is to be recorded after new S.K.F. axleboxes are assembled and after each subsequent internal inspection:

- (a) Number of axlebox and roller bearing.
- (b) General condition of bearing.
- (c) Diametral slackness between rollers and race prior to and after assembly of race on journal

**OIL-LUBRICATED ROLLER BEARING AXLEBOXES  
("HYATT" and "TIMKEN")**

(Refer also to the General Instructions Clauses 4, 6-10.)

**(12) Special Instructions**

(1) "Hyatt" and "Timken" oil-lubricated roller bearing axleboxes are to be checked with the oil level gauges provided and the oil "topped-up", if necessary, at the following times:

	(1)	(2)	(3)
Rolling Stock	At lift	One month after lift	Every three
Ja. class locomotives	At overhaul	One month after overhaul	months subsequently.
Da. class locomotives	Every 5,000 miles		
Articulated railcars	Every 8,000 miles		

(2) Axlebox covers and oil feeders must be thoroughly cleaned before lubrication is commenced. Precautions must be taken to ensure that dust and dirt are prevented from entering the axleboxes.

At each oiling between lift or overhaul the drain plugs must be removed and any water in the bottom of the axlebox run off.

Axleboxes should be filled to the maximum oil level, the plugs replaced loosely, and the oil allowed to settle for approximately half an hour before the boxes are finally filled and the plugs sealed.

Oil and drain plugs must be cleaned and sealed immediately on completion of work

(3) "Timken" axlebox greasing points on the Ja class locomotives must be attended to as instructed in drawing X.12825.

### "ISOTHERMOS" AXLEBOXES

#### (13) Special Instructions

(1) "Isothermos" axleboxes must be fitted with new car and wagon axlebox oil up to the level of the oil plug at the side of the axlebox. After the first run, the level should be checked and more oil added, if necessary.

Oiling should be carried out at monthly intervals thereafter and the oiling tablet must be stamped with the Depot symbol.

(2) Car and Wagon staff must examine "Isothermos" axleboxes frequently and have the oil replenished if leakage develops.

(3) Should, a serious leakage of oil develop the wheelset must be replaced.

### PLAIN BEARING AXLEBOXES

#### (14) Locomotives

All locomotive plain bearing axlebox cellars (except those of C. and K. locomotives, which are fitted with "Franklin" solidified grease lubrication, and some diesel shunters with Armstrong oiler pads) are to be packed with flax hemp worked into pads and saturated with locomotive bearing oil. The hemp is to be drained until in a resilient condition without the appearance of excess oil on the surface of the pads.

#### (15) Rolling Stock

When vehicles are lifted, all axleboxes are to be repacked with newly prepared packing of approved thrum. The thrum is to be soaked in clean oil in dust-proof containers for at least four days to ensure thorough saturation. The skeins are then to be drained until all excess oil has drained off and the thrum is in a resilient condition. Oil should not drip from prepared thrum but should flow when pressure is applied. Prepared thrum that has been stored should be turned over daily. Thrum removed from axleboxes, if free from impurities and not discoloured, may be used for repacking after being resaturated with clean lubricating oil.

If, after lifting, it is necessary for any vehicle to stand for more than two days before being passed out, the top of the thrum must be given additional oil before the vehicle concerned goes into service.

Wagons must not be passed out with non parallel horn guides. The standard gap between horn guides is 7½ in.

#### (16) Dust Shields

Dust shields must be a neat fit on the axle to prevent the entry of foreign matter. ~~Special care must be exercised when fitting rope dust shields to ensure that the correct types shown on B.P. X.25311 are~~

~~utilised and that there is no distortion of the shield when axleboxes are placed on the journals.~~

The type of dust shield to be used with each class of axlebox is set out on B.P.'s ~~Y.21531 and 35931~~ [Y35931]

[24/563 of 3.5.1967]

**(17) Limits of Wear In Axlebox Horns**

Clearance between axleboxes and horns must not exceed the limits set out in the following table when vehicles are passed out after lift or overhaul.

	END PLAY			SIDE PLAY		
	After Overhaul (Min.)	Maximum Out of Shops*	Maximum in Service	After Overhaul (Min.)	Maximum Out of Shops*	Maximum In Service
Four wheel vehicles	in. 1/8	in. 1/4	in. 3/8	in. 1/8	in. 1/4	in. 7/16
Bogie vehicles						
Plain bearings	1/8	3/16	5/16	1/8	1/4	3/8
Roller bearings	1/16	1/8	1/4	3/16	1/4	3/8
Articulated railcars	1/16	1/8	1/4	5/16	7/16	1/2

\* Vehicles not lifted

**HOT AXLEBOXES**

**(18) Definition**

A hot axlebox occurs when:

~~(1) The defect necessitate repacking the axlebox, renewal of the brass or removal of the vehicle from the train, OR~~

~~(2) If the defect causes a train delay.~~

~~If a brass is changed in a hot axlebox for the sole purpose of getting the vehicle to its destination or to the repair siding and the axle again runs hot, then the second incident is not to be treated as a second hot box. In all other cases, if a brass is changed on an axlebox that has run hot and that axlebox later runs hot again, then it is to be treated as a second hot box~~

~~When axleboxes become overheated but do not subsequently require any repairs or do not cause train delay they do not constitute "Hot Boxes".~~

[A hot axlebox occurs when overheating necessitates repacking or renewal of the brass. When an axlebox is repacked or a brass is renewed for the sole purpose of getting a vehicle to its destination or to a repair siding for further attention a completed Loco. 58 card must be placed in the waybill clip. If the axlebox subsequently runs hot before it can receive further attention it is not then to be recorded as a further hot box.

When an axlebox becomes overheated but does not subsequently require any attention other than oiling, it does not constitute a hot box.]

[24/563 of 30.10.1962]

(3) In the case of locomotives:

(i) When the defect necessitates the dropping of wheels or attention to the axlebox brass and/or journal, OR

(ii) When the defect causes a train delay.

*Water must not be applied to roller bearing axleboxes.*



**19) Reporting of Hot Boxes -**

~~All hot axleboxes on *rolling stock* are to be reported to the Car and Wagon Inspector as they occur, in duplicate, on Loco. 71 forms by Train Examiners. After certification, the Car and Wagon Inspector will forward the original Loco. 71 form to the District Mechanical Engineer.~~

[All hot axleboxes are to be reported to the Car and Wagon Inspector in duplicate on Loco. 71 forms as soon as the Loco. 58 card is removed on completion of permanent repairs to the hot axlebox.

Details of repairs received en route as stated on the Loco. 58 card are to be entered on the Loco 71 form.

After certification, the Car and Wagon Inspector will forward the original Loco. 71 form to the District Mechanical Engineer]

[C.M.E.,s 24/563 of 27 October 1966]

At the close of each period Locomotive Supervisors will render a return of all hot axleboxes that occurred on *locomotives* under their supervision during the period to the District Mechanical Engineer. The quantity of each brand of locomotive bearing oil and grease issued during the period must also be shown.

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NEW ZEALAND GOVERNMENT RAILWAYS MECHANICAL BRANCH	AXLE BOXES FOR LOCOMOTIVES ETC, AND ROLLING STOCK	CODE No. 37
		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<sup>3</sup>/<sub>8</sub>+<sup>1</sup>/<sub>64</sub>-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
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“ “ lubricated, Hyatt) “ “ (grease lubricated) Plain bearings	(oil CME Specification No.364 or 400  CME Specification No.409  CME Specification No.400
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**(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.

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. [HTC]~~

**(8) ALL ROLLER BEARING AXLEBOXES (RUNNING TEMPERATURE)**

The normal running temperature of roller bearing axleboxes is about 50<sup>o</sup>C (122<sup>o</sup>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.

#### **(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.

##### [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.]~~

##### [Attention After Underfloor Wheel Lathe Work

Loco and carriage bearings are not to be greased on the underfloor wheel lathe.

Wagons package bearings are not receive grease on the underfloor wheel lathe.

Wagon roller bearings other than package bearings are to be inspected and grease is to be added only if the amount of grease in the box is insufficient.]

#### **(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.

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 ( <sup>1</sup> / <sub>8</sub> - <sup>3</sup> / <sub>16</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	9 mm ( <sup>3</sup> / <sub>8</sub> in)	3-4.5 mm ( <sup>1</sup> / <sub>8</sub> - <sup>3</sup> / <sub>16</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	10.5 mm ( <sup>7</sup> / <sub>16</sub> in.)
Four-wheeled vehicles (plain bearings, 'B' package replacements, YH wagons) KS, LB, NA wagons NH, NK, wagons (link suspension)	3-4.5 mm ( <sup>1</sup> / <sub>8</sub> - <sup>3</sup> / <sub>16</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	9 mm ( <sup>3</sup> / <sub>8</sub> in)	3-4.5 mm ( <sup>1</sup> / <sub>8</sub> - <sup>3</sup> / <sub>16</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	10.5 mm ( <sup>7</sup> / <sub>16</sub> in.)
	3 mm	6 mm	9 mm	14 mm	17 mm	20 mm
	24 mm	24 mm	24 mm	50 mm	50 mm	50 mm
Bogie vehicles (plain bearings)	3-4 mm ( <sup>1</sup> / <sub>8</sub> - <sup>5</sup> / <sub>32</sub> in.)	4.5 mm ( <sup>3</sup> / <sub>16</sub> in.)	7.5 mm ( <sup>5</sup> / <sub>16</sub> in.)	3-4.5 mm ( <sup>1</sup> / <sub>8</sub> - <sup>3</sup> / <sub>16</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	9 mm ( <sup>3</sup> / <sub>8</sub> in)
Bogie vehicles (roller bearings)	1.5-2.5 mm ( <sup>1</sup> / <sub>16</sub> - <sup>3</sup> / <sub>32</sub> in.)	3 mm ( <sup>1</sup> / <sub>8</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	4.5-5.5 mm ( <sup>3</sup> / <sub>16</sub> - <sup>7</sup> / <sub>32</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	9 mm ( <sup>3</sup> / <sub>8</sub> 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 ( <sup>1</sup> / <sub>16</sub> - <sup>3</sup> / <sub>32</sub> in.)	3 mm ( <sup>1</sup> / <sub>8</sub> in.)	6 mm ( <sup>1</sup> / <sub>4</sub> in)	7.5-9 mm ( <sup>5</sup> / <sub>16</sub> - <sup>3</sup> / <sub>8</sub> in.)	10.5 mm ( <sup>7</sup> / <sub>16</sub> in.)	12 mm ( <sup>1</sup> / <sub>2</sub> 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.

**(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.