



(Govt. of India)
(Ministry of Railways)

Procedure for I.O.H of Broad Gauge BVZI



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अभ्यास RDS
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PREFACE

The BVZI Wagon 08 wheeler brake vans are in service from a longer time but there is no standard document for standard procedure for IOH of BVZI. The main objective of preparing this document is to provide standard procedure for IOH of this wagon.

This booklet deals with the procedure to be followed for IOH of broad Gauge BVZI. Instructions detailed in the booklet need to be updated in light of data collected and experience gained during the IOH of broad Gauge BVZI.

This book contains the introduction of this type of wagon, safety instructions, inspection procedure etc.

This booklet does not supersede any instructions laid down by Railway Board & RDSO and instructions given by Zonal Railways, these instructions are only for the purpose of guidance.

CAMTECH, Gwalior
Date : 30.03.2012

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CORRECTION SLIPS

The correction slips to be issued in future for this instruction will be numbered as follows:

CAMTECH/2012/Mech/BVZI/1.0/C.S. # XX date

Where “XX” is the serial number of the concerned correction slip (Starting from 01 onwards)

CORRECTION SLIPS ISSUED

[illegible]



Procedure for I.O.H of Broad Gauge BVZI

1.0 INTRODUCTION

This 8-wheeled (BVZI) brake van was designed with ICF bogie to achieve comfort level (Ride Index) equivalent to loco criteria for goods guard and capable of running 100kmph. The brake van was 5 meter longer than BVZC brake van shown in Figure 1.

<u>STANDARD FEATURES OF 'BVZI' WAGON</u>		
S.No.	PARTICULARS	BVZI
1.	Length over head stocks	13540 (mm)
2.	Length over couplers	14469 (mm)
3.	Length inside	13540 (mm)
4.	Width inside/Width Overall	-----/3200 (mm)
5.	Height inside/Height(max.) from RL.	2448/3894 (mm)
6.	Bogie center	9026 (mm)
7.	Journal length × dia.	2896 (mm)
8.	Journal centers	2156 (mm)
9.	Wheel dia. on tread (New/Worn)	915/813 (mm)
10.	Height of C.B.C. from R.L.	1105 (mm)
11.	C.G. from R.L. (empty)	0.981 (m)
12.	C.G. from R.L. (loaded)	0.981 (m)
13.	Floor area	36.15 (Sq.M)
14.	Cubic Capacity	
15.	Maximum axle load	5.875 (tonne)
16.	Tare Weight	23.5 (tonne)
17.	Pay load	-----
18.	Gross load (Pay+Tare)	23.5 (tonne)
19.	Ratio gross load/Tare	1.00
20.	Ratio (Pay load to tare)	
21.	Track Loading density (tonnes/meter)	1.624
22.	No. of wagons per train	1
23.	Brake System	Air brake
24.	Coupler	C.B.C.
25.	Bearing	R.B.
26.	Maximum Speed (Loaded) (Empty)	100 kmph 100 kmph

2.0 SAFETY PRECAUTIONS

- Whenever a BVZI is examined at maintenance depot, it should be ensured that the prescribed number of safety straps, safety wire rope, axle box safety strap, bolster safety loop, centre pivot cap, hangers or brackets of specified dimension and sections required for various components are fitted at specified location.
- All fasteners e.g. bolts, nuts, cotters etc. used in under frame equipments, brake gear, buffing and draw gear should be checked.

3.0 DISMANTLING

Following procedure should be adopted for lifting and running out the bogies:

- Remove split pin & cotter from top CP pin.
- Remove Bogie pull rod pin.
- Remove flexible brake pipe connections.
- Unscrew Air vent Screw.
- Uncouple dashpot safety strap.

4.0 PREPARATION BEFORE INSPECTION

BVZI body should be lifted off the bogies either by two overhead electric cranes of 15 tonnes capacity each with suitably designed lifting tackles or by four powered lifting jacks of 10 tonnes capacity each operated simultaneously by one control switch. The BVZI body should be lifted uniformly without jerks and should remain horizontal during the lifting/ lowering operation.

The BVZI should never be lifted from one end only. If lifted from one end, the Centre pivot is likely to suffer damages.

After the BVZI body is lifted, it should be kept on trestles. The revolving steel trestles of the design shown in Figure 2. would prove useful for this purpose Lines should be protected by scotch blocks with locking arrangement and key should be kept with Engineer till the time maintenance work is carried out.

4.1 CLEANING

The entire under frame should be cleaned of dust, rust etc. from underneath by pneumatic/water jet followed by wire brushing at critical locations and check for cracks/damage, corrosion etc. on the under frame members

After carrying out all repairs, the under frame should be painted.

5.0 INSPECTION

5.1 BOGIE FRAME

Thoroughly cleaned and dried bogie frame should subjected to visual check for possible cracks and weld cracks. Adoption of standard procedure for the inspection and rectification of metal and weld failures is to be done for the first 10 bogie frames.

5.2 BOGIE FRAME DIMENSIONS AND COMPONENTS

Bogie frame dimensions to be checked as per Figure 3.

The following dimensional parameters should be checked and rectified as per given format:

S. No.	Description	Parameters
1.	Maximum Axle load bearing capacity	6 t
2.	Wheel base	2896mm
3.	Wheel diameter (New)	915mm
4.	Axle guidance	Telescopic axle guide with oil damping and Friction Snubber type.
5.	Primary suspension	Coil spring
6.	Secondary suspension	Coil spring
7.	Shock absorbers	i) Vertical dashpot in primary suspension. ii) Hydraulic double acting vertical shock absorber in secondary suspension.
8.	Transfer of coach body weight	Through bogie side bearer pitched at 1600mm.

6.0 AXLE BOX

On Indian Railway system, only single bearing type axle box arrangement is used. The inner ring of the bearing is provided with either a cylindrical bore (Direct Mounted type) or with a taper bore and withdrawal sleeve (Sleeve Mounted type). use only direct mounted type spherical roller bearings.

7.0 BEARING

Roller bearing consist of an outer ring having a continuous spherical raceway within which operate, two rows of barrel shaped rollers, which in turn are guided by an inner ring with two raceways separated by a centre rib. The roller bearings have self-aligning properties and therefore can automatically adjust to any deviation in the centre line of the axle.

Roller bearings have a large capacity for radial loads, axle loads in either direction, and complex loads. They are suited for the applications such as railway rolling stocks where vibrations and shock loads are encountered.

Roller Bearings are named according to the shape of rollers. Roller Bearings with spherical rollers are called as Spherical Roller Bearings.(see figure 4for roller bearing arrangement)

These roller bearings need to be inspected periodically at a pre-defined schedule. However, the following must be checked as per given format:

S.N	Description	Specified	Actual	Rectification
1.	Visual inspection by rotating the bearing to see breakage in any part of bearing	Free rotation without noise		Replace
2.	End play must be checked	As per manual		As per manual

8.0 BRAKES

The brake vans shall be equipped with single/Double pipe graduated release air brake equipment. A typical arrangement and its details for fitment of these equipments of M/s Escorts have been shown in Drg. No. WD – 810 35 / S- 21, 22 and 23. The arrangement shall be suitably altered for fitment of equipments of other makes.

The brake arrangement shall be as shown in Drg. No. WD – 81035 / S – 10. Only Nylon – 66 bushes in lieu of steel bushes wherever indicated in drawings to be provided as per details given in Annexure 1

The following should also be inspected as per given format:

S.N	Description	Specified	Actual	Rectification
1.	Visual inspection for any crack or loosening of the components	No cracks or loosening		Cracked part to be replaced.
2.	Hose cracks	Even wear		Alignment to be right.
3.	Function of Angle cocks	As per manual		Replace, if not functioning
4	Functioning of piston & stroke	As per manual		Replace, if not functioning
5.	Joint and connections	As per manual		Replace, if not functioning

9.0 WHEEL AND AXLE

The wheel should be inspected for rejectable defects in accordance with RDSO's instructions.

9.1 Pre-inspection of wheels

During pre-inspection of incoming wheels, the wheel-set is inspected for assessing the condition of the components. Following measurements are carried out on all the wheels, received in shop for repairs.

9.2 Measurement of a wheel gauge (distance between two wheels flanges on the same axle)

The distance between two wheel flanges on the same axle should be **1600 mm + 2/-1 mm**. This measurement should be taken at three locations apart with the help of an adjustable pi gauge.

9.3 Measurement of Wheel Diameter (Tread Diameter)/Wheel Flanges

The wheel diameter is measured with the help of a trammel gauge with a least count of **0.5 mm**. on both sides. However, a gauge with a least count of **0.1 mm**. is recommended as the measurement of a diameter would be more accurate with this gauge.

The difference in tread diameter of the two wheels on the same axle should not exceed **0.5 mm** after tyre turning. There is no 'In service' limit for this variation and rejection shall be decided by tyre defect gauge.

9.4 Inspection of Wheel Flanges

The flanges on both sides of a wheel set are checked with the help of a profile gauge to measure the height and thickness of flanges. Accurate measurement of flange height and flange thickness is not possible with the profile gauge. It is, therefore, recommended to use a wheel profile gauge with which accurate measurement of flange height and flange thickness to the extent of **0.1 mm** can be made.

10.0 AXLE BOX GUIDE WITH DASH POT ARRANGEMENT

Axle box guides are of cylindrical type welded to the bottom flanges of the bogie side frame with close dimensional accuracy. These guides together with lower spring seats located over the axle box wings, house the axle box springs and also serve as shock absorbers. These guides are fitted with guide caps having nine holes of diameter 5 mm equidistant through which oil in the lower spring seat passes under pressure during dynamic oscillation of coach and provide necessary damping to primary suspension to enhance better riding quality of Brake van. This type of rigid axle box guide arrangement eliminates any longitudinal or transverse relative movement between the axles and the bogie frame.

The quantity of oil required to achieve **40 mm** oil level above the guide cap is approximately **1.6 liters**.

11.0 AIR VENT SCREWS

On the bogie side frames, directly above the dash-pots, tapped holes are provided for replenishing oil in the dash pots. Special screws with copper asbestos washers are screwed on the tapped hole to make it air tight

12.0 BOGIE BOLSTER SUSPENSION

The bolster rests on the bolster coil springs - two at each end, located on the lower spring beam which is suspended from the bogie side frame by means of bolster-spring-suspension (BSS) hangers on either side. The two anchor links diagonally positioned are provided with silent block bushes. The links prevent any relative movement between the bogie frame and coach body.

13.0 SPRINGS

In ICF bogie, helical springs are used in both primary and secondary suspension. The springs are manufactured from peeled and centreless ground bar of chrome vanadium/chrome molybdenum steel conforming to Drawing no. WD-04050-S-02

14.0 CENTRE PIVOT ARRANGEMENT

The centre pivot pin joins the body with the bogie and transmits the tractive and braking forces on the bogies. It does not transmit any vertical load. It is equipped with rubber silent block bushes which tend to centralise the bogies with respect to the body and, to some extent, control and damp the angular oscillations of the bogies. (see figure 5.)

15.0 SIDE BEARERS

The side bearer arrangement consists of a machined steel wearing plate immersed in an oil bath and a floating bronze-wearing piece with a spherical top surface kept in it, on both sides of the bogie bolster. The coach body rests on the top spherical surface of these bronze-wearing pieces through the corresponding attachments on the bottom of the body-bolster. The whole arrangement is provided with a cover to prevent entry of dust in the oil sump. (see Figure 6.)

Wear limit for wearing plate

New size	Shop renewal size	Condemning size
10 mm	9 mm	8.5 mm

Wear limit for wearing piece

New size	Shop renewal size	Condemning size
45 mm	43.5 mm	42 mm

16.0 ANCHOR LINKS

The floating bogie bolster which supports the coach body is held in position longitudinally by the anchor links which are pinned to the bolster sides and the bogie Transoms. One anchor link is provided on each side of the bolster diagonally across. The links can swivel universally to permit the bolster to rise and fall and sway side wards. They are designed to take the tractive and braking forces. The anchor links are fitted with silent block bushes (see figure 7)

17.0 SILENT BLOCK

This is a synthetic rubber bush fitted in anchor link and center pivot of ICF bogies to transmit force without shock and reduce noise.

18.0 BRAKE RIGGING

Brake rigging is provided to control the speed of the coach by transferring the braking force from the brake cylinder to the wheel tread.

18.1 Bogie Mounted Brake Rigging

Bogie brake rigging has been modified to incorporate a total mechanical advantage of **7.644** per bogie.

The components of bogie mounted air brake.

S.N	Description	Ref. Drg. NO ICF)	Quantity
1	Brake Head & block complete (L.H. Assembly)	T-3-1-801	4
2	Brake Head & block complete (R.H. Assembly)	T-3-1-801	4
3	Brake beam	T-3-1-804	4
4	lever	T-3-1-802	4
5	lever	T-3-1-802	4
6	lever Hanger	T-3-1-802	4
7	Pull rod	T-3-2-802	2
8	Brake block Hanger	T-3-1-645	8
9	Pin	T3-2-648	22
10	Plain Washer	ICF/STD-3-2-103	32
11	Split Cotter	T-3-2-632	26
12	Pin	T-3-2-648	2
13	Plain Washer	ICF/STD 3-2-103	2
14	Pin	T-3-2-648	2
15	Pin for lever Hanger	T-3-2-802	8
16	Pin for safety wire rope	WFT AC3/3-2-307	16
17	Plain washer M20	IS: 2016-67	16
18	Split cotter	EMU-3-2-048	16
19	Safety wire rope	T-3-2-651	8

19.0 EQUALISING STAYS

This device has been provided on bogies between the lower spring plank and the bolster to prevent lateral thrust on the bolster springs which have not been designed to take the lateral forces. These links have pin connections at both ends and, therefore, can swivel freely.

20.0 BOLSTER SPRING SUSPENSION HANGERS (BSS HANGERS)

In the secondary suspension, the bolster is supported on helical coil springs which are placed on the lower spring plank. The lower spring plank is suspended from the bogie side frame through BSS hangers on hanger blocks.

21.0 SHOCK ABSORBERS

Hydraulic shock absorbers with capacity of ± 600 kg at a speed of 10 cm/sec. are fitted to work in parallel with the bolster springs to provide damping for vertical oscillations.

22.0 THOUGHTLY EXAMINATION AND REPAIR PRACTICE IN IOH DEPOT

Depot maintenance staff should ensure the following things in respect of proper functioning and safety of Bogie & Bogie components.

22.1 Bogie Frame

- Examine visually condition of bogie side frame, transom, longitudinals and all welded locations.
- Examine rubber stopper/stop screw of axle box crown for damage/missing/loose.
- Inspect axle box safety straps/loops for damage/broken/missing.
- Bolster safety straps/loops for damage/broken/missing.
- Brake hanger brackets for damages.
- Inspect safety brackets for brake hanger pins.
- Check visually BSS hanger brackets.
- Examine visually anchor link brackets.
- Visually examine centre pivot mounting bolts and attend if needed.
- Visually inspect centre pivot cover.
- Side bearer oil to be replenished, if needed.
- Examine condition of wearing piece and wearing plate
- Examine oil level in side bearer oil baths and replenish if oil level has gone down below the level of last thread of oil filling cup.

22.2 Primary Suspension

- Visually examine axle box springs for breakage.
- Visually examine dash pot oil filling special screw for deficiency.
- Check oil leakage in dash pot through defective seals/vent screws.
- Visually examine axle box clearance
- Add specified grade of oil in dash pot.
- Visually examine axle box clearance.
- Check and attend axle guide assembly if necessary.
- Check axle box clearance with gauge

22.3 Secondary Suspension

- Visually examine bolster springs breakages/damages.
- Visually examine Bolster lower spring beam.
- Visually examine BSS hangers, hanger blocks, BSS pins.
- Check bolster clearance between top of bolster and bottom of bogie frame.
- Visually examine equalising stay rods and pins (small and big).
- Visually check anchor links
- Examine Visually anchor link securing bolts and attend if needed.
- Visually examine Equalising stay rod brackets.
- Examine and attend safety loops of bolster.
- Check and attend safety loops of Equalising stay rod.
- Examine vertical shock absorbers for damages

22.4 Brake Rigging

- Check brake gear and adjust so that the piston stroke is within the limit.
- Examine brake beams breakages/damages.
- Check and attend brake beam safety wire ropes/safety straps.
- Check and attend brake shoe head and key & replace if necessary.
- Check and replace worn brake blocks.
- Visually inspect and replace brake hangers, brake gear pins and cotters/split pins if necessary.
- Visually inspect and replace damaged/missing brake gear bushes if necessary
- Check and attend brake block adjuster.
- Examine and attend brake levers.
- Examine and attend floating lever suspension brackets
- Examine lever hanger pins.

23.0 DRAFT AND BUFFING GEAR

The brake van shall be equipped with automatic high tensile center buffer coupler of knuckle type.

23.1 INSPECTION OF CBC

Coupler and operating mechanism:

When inspection of coupler and coupler operating mechanism is made, it is important to check and make sure that when the coupler operating mechanism is operated to fully open the knuckle, the handle released and the knuckle slowly closed, the lock drops freely and the mechanism returns to fully locked position. The lock position is indicated by the toggle, which is clearly visible below the coupler head.

Only dry lubricant shall be applied to the coupler head or the coupler head fittings. This lubricant may be applied using water, alcohol, or other non-petroleum based carrier.

Only exposed surfaces of Coupler and Yoke shall be painted with Black quick drying paint in accordance with IRS R6. Paint must be applied to the inside of the Coupler or internal fittings. Painting shall be done after the completion of inspection of Coupler & Yoke of acceptable casting lot.

When in the transition Centre Buffer Coupler, the knuckle does not move freely, grind the top face of "top pulling lug" and "lock face" of knuckle in position. If still not free, remove knuckle and clean "pin protector guides" on coupler head. If, after attending to knuckle, the lock still does not fall, remove the lock and grind "locking face knuckle side" on lock so that the lock falls freely.

Inspection of couplers, whilst fitted to wagons, should be made to ensure that proper clearance is available to prevent interference in any position which it can assume during train operation. The procedure is as follows:-

- a. Check correct operation in order to ascertain that full knuckle throw, lock set, lock-to-lock (anti-creep) and locking is obtained, if any of these functions be unsatisfactory, they should be corrected by replacing the defective components.
- b. Check that the shank is not bent out of alignment with the head. If defective, the coupler shall be removed for straightening of shank.
- c. Examine shank wear plates (when fitted) and if worn through, the couplers shall be removed for fitting of new plates. Examine wear on shank (when wear plates not fitted) and if wear is approaching 6.5 mm (1/4"), the coupler shall be removed for building up of shank by welding.
- d. Examine head for cracks in the knuckle side wall. If cracked, the coupler shall be removed for reclamation.
- e. Check the distance between the nose of the knuckle and the guard arm with gauge No. 1. If it passes (which is 5.5/16" long), it indicates that the coupler has its condemning limit. In such a case the knuckle pivot pin, lock etc. should be replaced so that gauge No.2 does not pass. If this gauge passes, then the coupler should be removed for reclamation.
- f. Examine the operating mechanism. If defective or deficient, the defective or deficient components should be replaced to ensure free movement.

- g. Check knuckle pin & clevis pin to ensure that pin of correct size has been used. Check fastening arrangement of knuckle pin and clevis pin. The former has a welded washer while the later has a riveted head over a washer in position.
- h. Coupler height should be checked in accordance with IRCA Part III Rule No. 2.13.7.
- i. All defective/deficient components shall be replaced in CBC, clevis and screw coupling (in case of transition couplers).

23.2 Inspection of draft gears

- A. Excessive slack in draft gears is not permitted and this should be either reduced or eliminated. The maximum permissible free slack in the draft gear is 25 mm(1") after which, it shall be removed and reclaimed or condemned. The free slack can be determined by first sledging the coupler back solid and then measuring the clearance between the coupler horn and the striker face. Next by inserting a long bar between the horn and striker face, pry coupler out as far as possible and again measure the space between the horn and the striker. The difference between these two measurements is the amount of free slack.
- B. Visual examination of the rubber pads when the draft gear is in place in the wagon can be misleading and the draft gears shall therefore, be inspected at every POH of the wagon, irrespective of the amount of free slack existing.

24.0 BODY EXAMINATION

- Properly check Guard's Hand brake components and oiling of gears.
- Inspect door fittings
- Inspect and check quick coupling for function properly.
- Inspect and check Guard's sheet and table.
- Inspect and check side look out glass, window glass and window shatter.
- Inspect and check hand rail and foot step.

25.0 ROOF

The roof shall be checked for mild rusting and leakage of water. rust shall be removed by use of suitable emery and a matching coat of paint applied. any accumulated waste matter should be removed from the corrugations.

26.0 PAINTING

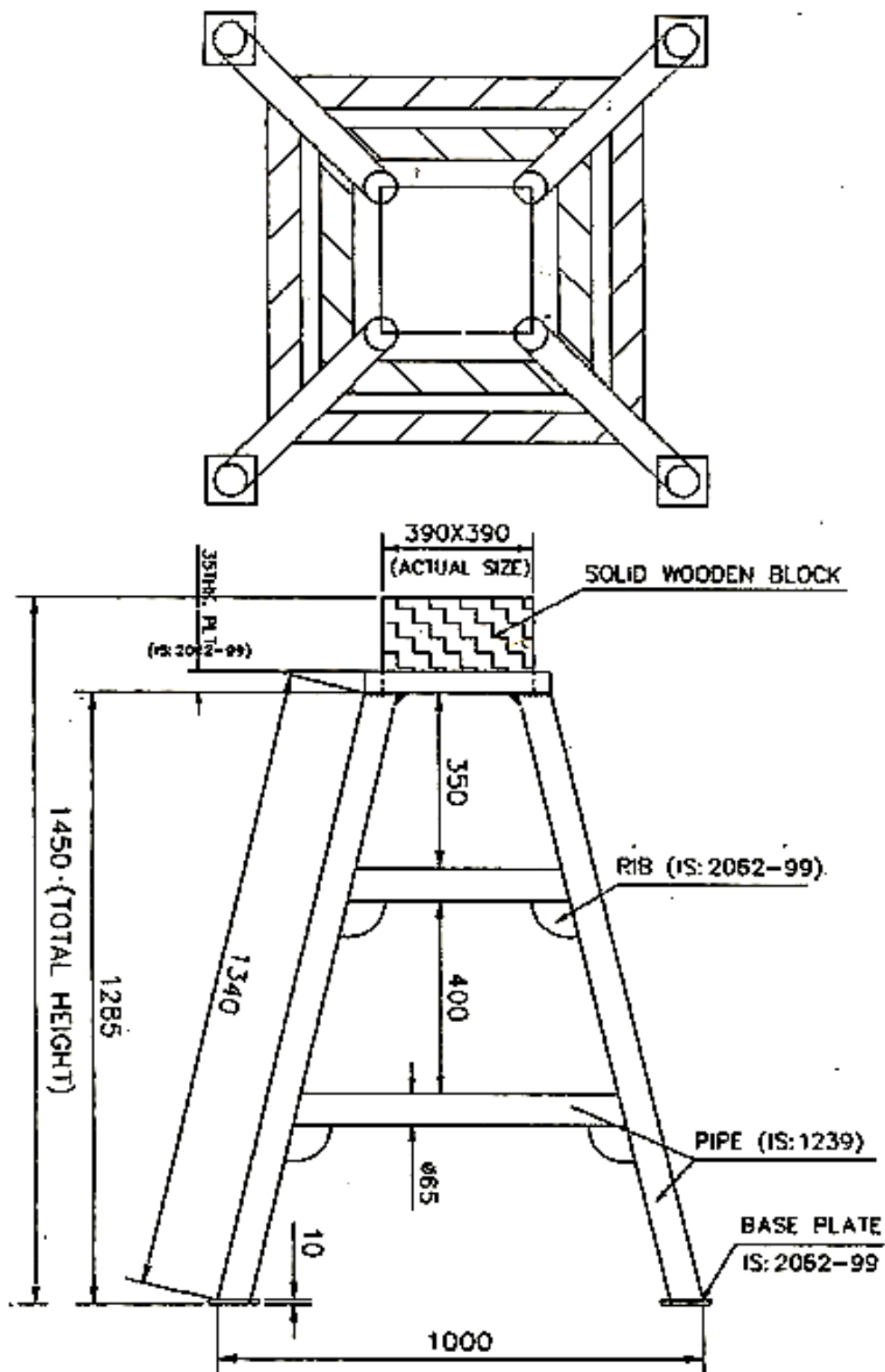
The surface preparation and Schedule of Painting of Brake Vans shall be as indicated in Clause 11 of General Standard – Specification no. G-72 (Rev. 2).

Figure: 1

WAGON DIRECTORATE R.D.S.O.	BOGIE BRAKE VAN		PAGE NO.-130
GAUGE-B.G.	D I A G R A M		OPERATIONAL CODE 'BVZi'
			TYPE OF WAGON CODE 86
<p>The drawing shows a side view and an end view of a bogie brake van. The side view includes dimensions for overall length (12000 mm), wheelbase (4700 mm), and various internal components like the U-frame, floor plate, and air brake fittings. The end view shows the bogie assembly with dimensions for the bogie frame and wheelbase. Labels include 'MAXIMUM WORKING DIMENSIONS OF 1922', '100% GAUGE', '2000 MM ROLL OVER', and '100% GAUGE'.</p>			
SPECIAL FEATURES		Wt. OF ASSEMBLY SUB-COMPONENT Wt. of U'frame & iron work 5.511 t. Wt. of floor plate 1.415 t. Wt. of air brake fittings & piping and brake gear on U'frame..... 0.750 t. C.B.C. complete including uncoupling gear 1.320 t.	
SPEED CERTIFICATE NO:- MW/BVZC Dt. 28.03.2003		REFERENCE:- DRAWING NO:- WD-00039/S-02	

Figure: 2

TRESTEL FOR BVZI



A	
C	
D	

W.R	ML-352/C
JG & TOOL DRG. OFFICE	
29/04/04	<i>W.R</i>
DATE	For CWM/PL

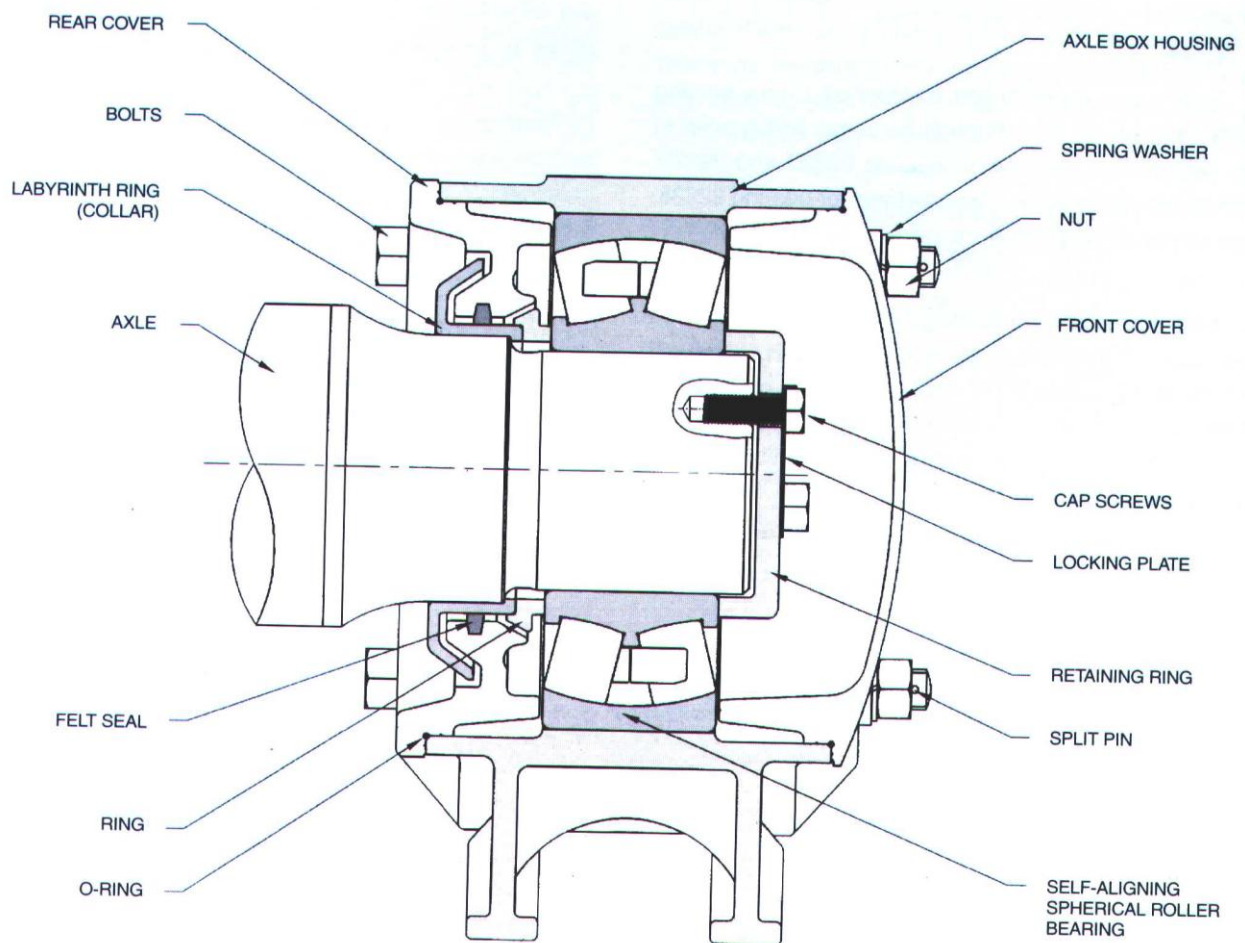
Figure: 4**DIRECT MOUNED ROLLER BEARING ARRANGEMENT**

Figure: 5

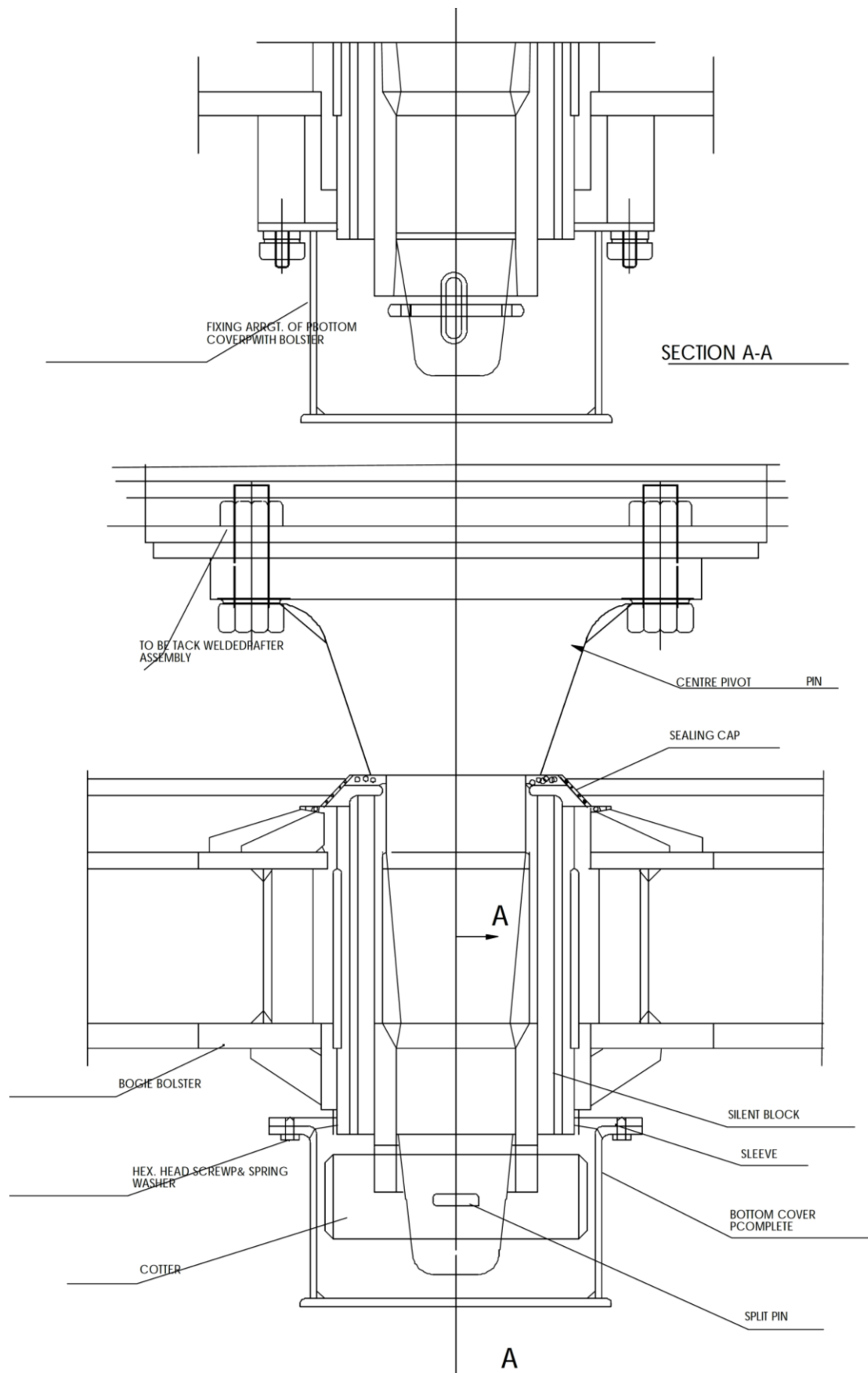
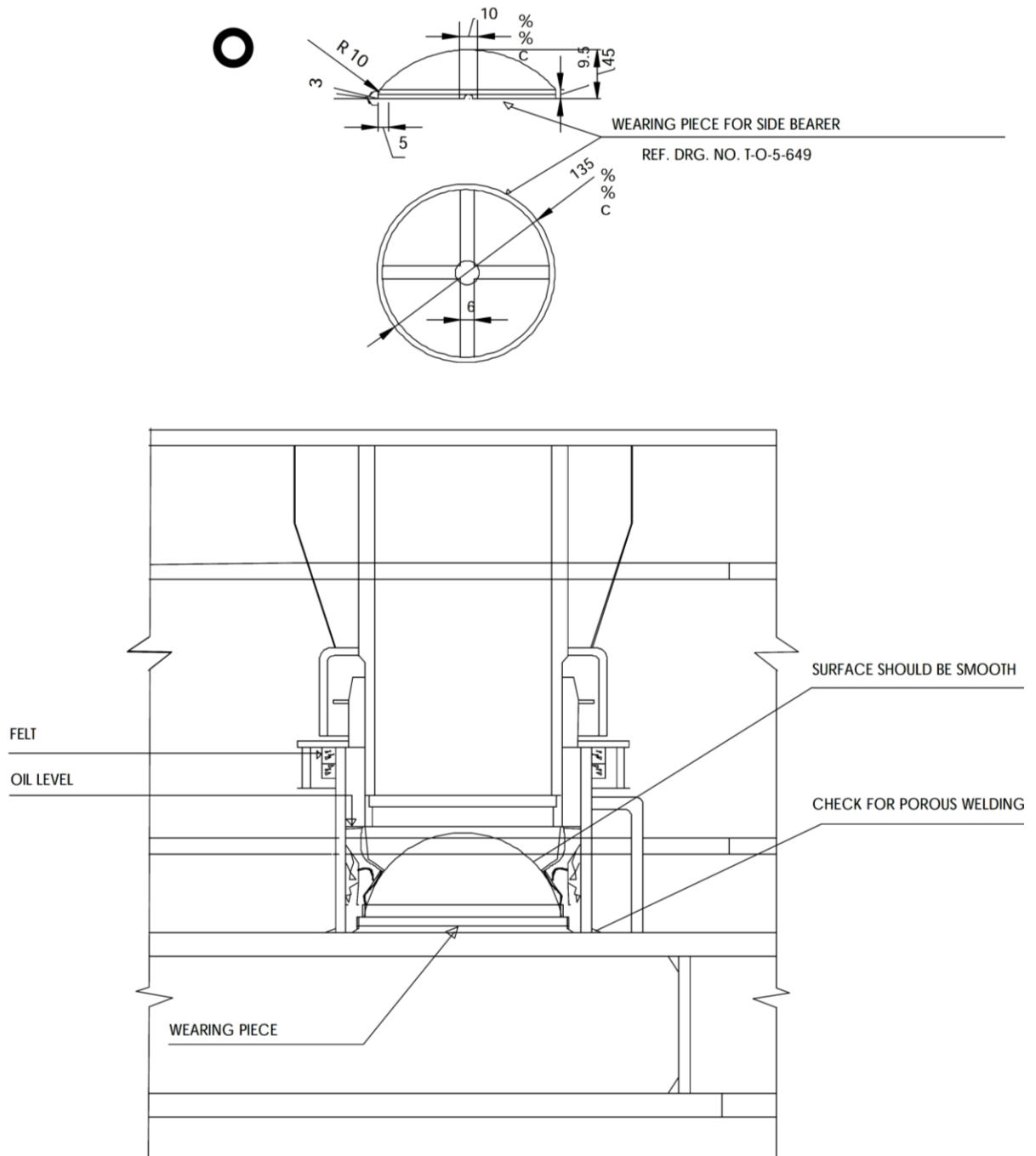
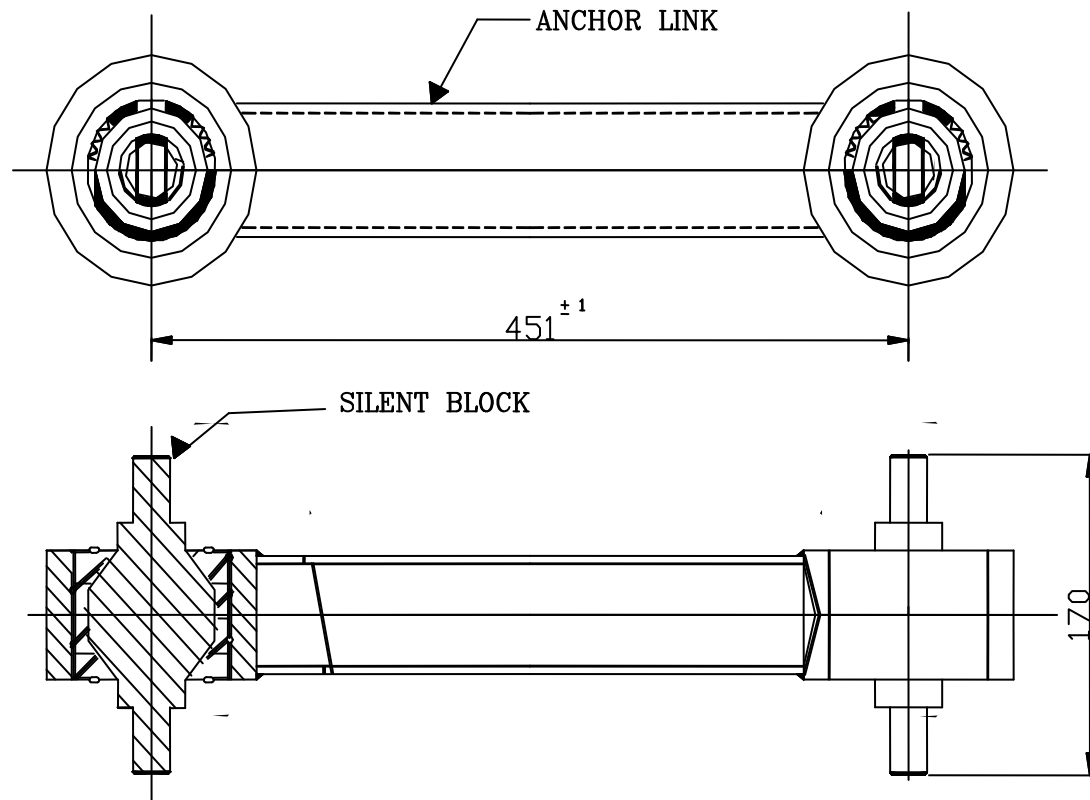
CENTRE PIVOT ARRANGEMENT

Figure: 6

SIDE BEARER ARRANGEMENT**Note:**

1. Bronze wearing piece should be renewed when the wear on the mating surface reaches 3 mm that is, height is less then 42 mm or dimagages occur to the oil grooves.
2. The hard ground plate should be renewed when the wear exceeds 1.5 mm that is, thickness is less then 8.5 mm or ridges are observed on the plate.

Figure: 7

ANCHOR LINK WITH SILENT BLOCK

ANNEXURE -1**NYLON BRAKE GEAR BUSHES IN THE BRAKE GEAR OF B.G.WAGONS**

1. Brake gear bushes of Nylon-66 shall be procured as per Schedule of Technical Requirements (STR) No. WD-04-Nylon Bushes-2002.
2. Nominal dimensions of Nylon-66 bushes to be used will be same as of steel bushes, inclusive of step sizes out side diameter. However, the tolerance and the chamfering should be as per Fig.1 of the 'STR'.
3. Undersized holes should be drilled initially in the fork type support brackets or fork end of pull/push rods. These holes should be drilled together to the required size only after the assembly but before the Nylon bushes are fitted therein. This will ensure that the two holes are concentric and therefore, the pins passing through the bushes fitted therein will not tilt.
4. Steel pins used with the Nylon-66 bushes shall be with fine finish machined on all contact surface with the bush.

ANNEXURE -2**COMMON DEFECTS FOUND IN AXLE GUIDE ASSEMBLY**

S.No.	Defects	Reason	Remedies
1.	Perished rubber packing ring	Poor quality of rubber packing ring	1) Replace rubber packing ring at every examination. 2) Use only rubber packing rings conforming to IRS specification no. R-47-72 and the relevant drawing.
2.	Axle guide found worn on one side	1) Misaligned fitment of axle guides to bogie frame. 2) Dust ingress to lower spring seat.	1) The alignment of axle box guide should be checked with alignment gauges and corrected. 2) Vent hole should be sealed with gaskets. Screw to be tightened well after oil topping.
3.	Axle box spring rubbing upper spring seat	Do	Do
4.	Guide bush worn	Do	Do
5	Lower spring surface worn	Do	Do
6.	Guide ring broken	1) Axle guide is hitting lower spring seat 2) Weld joint of lower spring seat and tube is porous or cracked	1) Guide securing bolt should not project out of guide cap. 2) Use good quality upper and lower rubber washers and correct number of compensating rings in the axle guide assembly. 3) Adjust A, B and C clearances on leveled track. 4) Strip and reweld lower spring seat correctly.
7	Guide cap securing assembly broken	Do	Do
8.	Lower spring seat scored and dent mark on guide cap	Do	Do
9	Dust shield spring broken or distorted	Do	Do
10	Leakage from lower spring seat	Do	Do

ANNEXURE -3**LIST OF TOOLS AND PLANT**

<i>LIFTING SHOP</i>	<i>FITTING SHOP</i>
Ball peen hammer	Ball peen hammer
Chisel	Chisel
Spanner	Welding transformer
	Gas cutting plant
<i>WASHING PLANT</i>	Hydraulic press
Bosch tank	Measuring gauges
Hot water jet system	Center lathe
Bins and pallets	Brake beam end turning m/c
Jib crane	Electrode heater
Fork lift	Hard surface plant
Platform truck	BSS hanger testing m/c
	Bins and pallets
<i>BOGIE SHOP</i>	Fork lift
Ball peen hammer	Platform truck
Chisel	
Spanner set	<i>SMITH SHOP</i>
Welding transformer	Helical spring repair tools & plant
Gas cutting plant	Shot peening plant
Bogie alignment gauges	Heat treatment plant
Spring testing machine	Smith's tongs, hammers & blocks
Magnaflux crack detector	
Paint brushes	
Floor scraper	
Bogie frame repair fixture	
Bolster repair fixture	
Bogie test rig	
Working stands	
Overhead crane	
Bins and pallets	
Fork lift	
Platform truck	

ANNEXURE -4**IOH FORMAT**

BVZI NUMBER

BASE STATION

TYPE

SERVICE

YEAR BUILT

MANUFACTURED BY

LAST POH

RETURN DATE

BOGIE DETAILS

	ICV end	NICV end
Bogie No:		
Year Built:		
Manufactured By:		

DATE OF IOH

DATE OF RELEASE

SSE/IOH

SE/JE/IO

BOGIE DETAILS

DESCRIPTION	ICV END	NICV END	REMARKS
Bogie frame condition	Cracked/ Worn out/ good	Cracked/ worn out / good	
Bolster	Cracked/ bent/ good/ renewed	Cracked/ bent/ good/ renewed	
Bolster suspension bracket	Cracked/corroded/good/renewed	Cracked/ corroded/good/renewed	
Lower spring seat	Cracked/ worn out/good/renewed	Cracked/ worn out/good/renewed	
Axle guide	Worn/misalign/good	Worn/misalign/good	
Axle guide cap/ modified/unmodified	Dropped /good/replaced/modified	Dropped/good/replaced/modified	
Axle guide assembly	Worn out/damaged/good/renewed	Worn out/damaged/good/renewed	
Guide bush	Worn out/good/renewed	Worn out/ good/renewed	
Packing rings rubber	Damaged/good/renewed	Damaged/good/renewed	
Protective tubes	Cracked/good/renewed	Cracked/good/renewed	
Equalizing stay	Bent/corooded/good/renewed/13/16 tonnes	Bent/corooded/good/renewed/13/16 tonnes	
Anchor links	Damaged/good/renewed	Damaged/good/renewed	
Bolster suspension hanger block	Gauged/good/renewed	Gauged/good/renewed	
Bolster suspension hanger pin	Gauged/good/renewed	Gauged/good/renewed	
Center pivot	Bolt loose/worn/good/renewed	Bolt loose/worn/good/renewed	
Center pivot silent block	Silent block damaged/renewed/good	Silent block damaged/renewed/good	
Side bearer	Damaged/good	Damaged/good	

Side wearing piece	Gauged/good/worn out/renewed	Gauged/good/worn out/renewed	
Side wearing plate	Gauged/good/worn out/renewed	Gauged/good/worn out/renewed	
Side bearer oil cup	Leaking/good/oil topped up	Leaking/good/oil topped up	
Vertical shock absorber	Damaged/good/renewed	Damaged/good/renewed	
Axle box safety strap	Missing/good/renewed	Missing /good/renewed	
Bolster safety strap	Missing /good/renewed	Missing /good/renewed	
Brake beam safety slings/wire ropes	Missing/worn out/good/renewed	Missing worn out/good/renewed	
Equalising stay safety bracket	Missing/bent/good/renewed	Missing/bent/good/ renewed	

BOGIE ASSEMBLY-BRAKE GEAR

DESCRIPTION	ICV END BOGIE	NICV END BOGIE	<u>REMARKS</u>
Brake beam	Damaged / bent / good / renewed / 13 tonnes / 16 tonnes	Damaged / bent / good / renewed / 13 tonnes / 16 tonnes	
Brake head	Damaged / good / renewed	Damaged / good / renewed	
Brake hanger	Damaged / good / renewed	Damaged / good / renewed	
Brake blocks	Good / Renewed / Ordinary / composite	Good / Renewed / Ordinary / composite	
Equalizing lever long	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Equalizing lever short	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Equalizing lever hanger	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Connecting rod	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Actuating rod	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Adjusting link	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Hanger bracket bushes	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Hanger bush	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Brake head bushes	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Collar bushes	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Sleeve bushes	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Equalizing lever bushes	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Pin No: 1	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Pin No: 2	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	
Pin No: 3	Good / Damaged / worn out / renewed	Good / Damaged / worn out / renewed	

UNDER FRAME

Head stock	Corroded / cracked / good	Corroded / cracked / good
Trough floor	Corroded / good	Corroded / good
Sole bar	Corroded / good	Corroded / good
Cross members	Corroded / good	Corroded / good
Diagonals	Corroded / good	Corroded / good
Main transom	Corroded / good	Corroded / good
Inner headstock	Corroded / good	Corroded / good
Train pipe and joints	Corroded / good	Corroded / good
Dummy carrier & dummy plug	Missing / good / Renewed	Missing / good / renewed

CONDITION OF WHEEL & AXLE – ON ARRIVAL

Location	Diameter		Wheel distance	Axle number	Tyre profile	Condition of flange & thickness	
L-1/R-1							
L-2/R-2							
L-3/R-3							
L-4/R-4							

CONDITION OF WHEEL & AXLE ON DESPATCH

Location	Tyre turned / not turned	Wheel dia		Wheel distance	Axle number	UST number	Axle pulley condition	If shop wheel, SL number
L-1/R-1								
L-2/R-2								
L-3/R-3								
L-4/R-4								

CONDITION OF AXLE SPRINGS – ARRIVAL

Axle springs	1	2	3	4	5	6	7	8
Left	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good
Right	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good	Broken / good

CONDITION OF AXLE SPRINGS – AFTER IOH

Axle spring height	1	2	3	4	5	6	7	8
Left								
Right								

CONDITION OF BOLSTER SPRINGS - ARRIVAL

Bolster springs	1	2	3	4
Left	Broken / good	Broken / good	Broken / good	Broken / good
Right	Broken / good	Broken / good	Broken / good	Broken / good

CONDITION OF BOLSTER SPRINGS – AFTER IOH

Bolster spring height	1	2	3	4
Left				
Right				

Annexure-5

DIMENSIONAL CHECK REPORT FOR BOGIE FRAME

No.

ICF DRG. NO. WTAC3 0-3-301	Measuring Point	Nominal Size (mm)	Actual Size (mm)	Variation (mm)	Measuring Point	Nominal Size (mm)	Actual Size (mm)	Variation (mm)
	E - F	1500 ± 1.0			I - J	876 ± 0.5		
	G - H	1500 ± 1.0			J - K	876 ± 0.5		
	E - G	2159 ± 1.0			L - M	876 ± 0.5		
	F - H	2159 ± 1.0			M - N	876 ± 0.5		
	E - H	2629 ± 1.0			O - P	876 ± 0.5		
	F - G	2629 ± 1.0			P - Q	876 ± 0.5		
	a	413 ± 1.0			R - S	876 ± 0.5		
	b	413 ± 1.0			S - T	876 ± 0.5		
	c	413 ± 1.0			I - K	1752 ± 1.0		
	d	413 ± 1.0			L - N	1752 ± 1.0		
	g1 - g2	570 ± 1.0			O - Q	1752 ± 1.0		
	g3 - g4	570 ± 1.0			R - T	1752 ± 1.0		
	g5 - g6	570 ± 1.0			g1 - g6	3612 ± 1.0		
	g7 - g8	570 ± 1.0			g2 - g5	3612 ± 1.0		
	z - F	750 ± 0.5			g3 - g8	3612 ± 1.0		
	z - H	750 ± 0.5			g4 - g7	3612 ± 1.0		

OUR OBJECTIVE

To upgrade maintenance technologies and methodologies and achieve improvement in productivity and performance of all Railway assets and man power which inter-alia would cover reliability, availability, utilization and efficiency.

If you have any suggestions and any specific comments, please write to us.

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