



I.R.C.A.

CONFERENCE RULES

PART – III



**Rules for Maintenance and Examination of
BG Goods Stock of
Indian Government Railways**

2020 edition
In force from 1st February 2020

CONFERENCE RULES PART – III

**RULES FOR MAINTENANCE,
EXAMINATION AND
INTERCHANGE OF GOODS STOCK
(BG SYSTEM) OF
INDIAN GOVERNMENT RAILWAYS**

Foreword

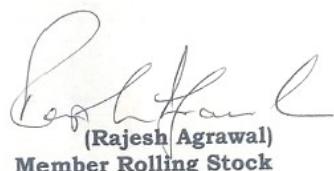


The IRCA Conference Rules Part (III) was last published in February, 1973. Since then major changes have taken place in the area of Freight Maintenance and Operations over Indian Railways. Many new designs and technologies have been adopted. Indian Railways is now operating wagons up to 25T axle load with a pay load to tare weight ratio of 4:1. Keeping in mind the changed scenario Railway Board nominated a Committee of senior Railway officials to undertake the revision of IRCA Conference Rules Part (III). After due deliberations and feedback from the various stack holders this new edition incorporating the latest technology available with Indian Railways has been prepared.

These rules will go long way in guiding the train examiners and staff involved in operations, maintenance and inspection of freight stock in discharging their duties in the best possible manner. I would also like to complement the Committee Members and CAMTECH for the efforts put in bringing out these rules.

NEW DELHI

27.1.2020



A handwritten signature in black ink, appearing to read 'Rajesh Agrawal'.

(Rajesh Agrawal)
Member Rolling Stock

PREFACE

IRCA Pt III was last published in February, 1973. Several changes in maintenance and operational system have taken place necessitating thorough revision.

Railway Board had nominated a committee of officers comprising of Executive Director Standards (Wagon)/RDSO/LKO, CWM/WC.Rly/Kota, CRSE/C.Rly, Executive Director (IRCAMTECH)/GWL as convener and NCO/IRCA/NDLS as co-opted member vide their letter No. 2008/M(N)/951/28 dated 30.10.2008 for scrutiny and updating the IRCA Pt III.

The draft report was submitted to Railway Board vide letter No. IRCAMTECH/ GWL Revision of IRCA-III dated 04.05.2010. The draft was received in the Railway Board and again recommended for updation for latest maintenance practices being followed for BOXNHL & BCNHL Wagons. The necessary corrections/updatons suggested by Zonal Railways & RDSO upto June-2016 have been incorporated in the final draft.

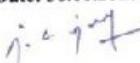
The salient features of Revised IRCA Pt.-III are as follows.

- i.) Latest instructions from Board/ changes in maintenance instructions/ feedback on the previous manual and technological up gradation upto June, 2016 have been incorporated.
- ii.) Important dimensions, clearances and references to RDSO technical instructions and drawings have been given.
- iii.) Details of Air Brake System have been added and details of Vacuum brake have been deleted.
- iv.) Repairing methods of Barrels of Tank wagon have also been incorporated in this revised IRCA Pt.III.
- v.) The details of Meter Gauge stocks have been deleted.
- vi.) The details of Plain Bearing stocks have also been deleted.

Future Addition/Deletion/Modification to this IRCA pt. III will be issued through correction slips or reprints of chapters by IRCA and will require approval of the Railway Board.

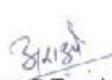
The committee is thankful to Shri P.K.Agrawal, AMME, Railway Board, Shri Ajay Nandan EDME/ Freight, Railway Board and Shri K.P. Yadav, Director/ Mechanical, CAMTECH for their valuable contribution in finalization of Revised IRCA.-Pt. III.

Date: 30.06.2016


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REGISTER OF CORRECTION SLIPS

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CHAPTER - I

Rule No. **DEFINITIONS**

- 1.0 For the purpose of these rules, unless there is something repugnant in the subject or context, the following terms will have the meaning herein assigned to them: -
- 1.1 "**Billing of stock**" means examination of stock for the purpose of billing for damages and deficiencies.
- 1.2 "**Owning Railway**" means the railway to which a vehicle or wagon belongs.
- 1.3 "**Working Railway**" means a railway working a junction.
- 1.4.1 "**Using Railway**" means a railway using a junction worked by another railway.
- 1.4.2 "**Receiving Railway**" means a railway-receiving vehicle or wagon in interchange from another railway.
- 1.4.3 "**Tendering Railway**" means a railway offering a vehicle or wagon for interchange to another railway.
- 1.5 "**Rolling stock**" includes both coaching and goods stock.
- 1.6 "**Coaching stock**" means all coaching vehicles including dining cars, mail vans, parcel vans, motor and carriage trucks, horse boxes, passenger brake vans, passenger road vans, milk vans, refrigerator cars and dynamometer cars etc., irrespective of contents and whether attached to passenger or goods trains.

- 1.7 Goods wagon intended for coaching traffic should be marked as passenger fit as prescribed in appendix 'L' and used for coaching traffic only. They will be treated as coaching stock for interchange purpose, but damages and deficiencies will be charged at the scheduled rates for goods stock.
- 1.8 **Goods stock** means and includes all goods wagons, i.e., all rolling stock other than coaching stock, irrespective of contents and whether attached to passenger or goods trains.
- 1.9 The term "**Vehicle**" applies only to coaching stock.
- 1.10 The term "**Wagon**" applies only to goods stock.
- 1.11 "**Unit**" of goods stock is Vehicle Unit (VU) irrespective of type of stock i.e. 4 wheeler or 8 wheeler.
- 1.12 **Bogie (trolley):** This term is used for the assembly comprising the structure including the side frame, bolster, centre pivot and side bearers, suspension components, wheels and axles etc., which support the wagon body at each end. The following main types of bogie trucks are in service: -
- 1.12.1 **Six-wheeled cast steel bogie:** - This steel bogie comprises of four cast steel side frames (two on either side) on which load is transferred by means of floating crossed bolsters resting on nests of helical springs. Over the crossed bolsters, rests the longitudinal bolster, which has the centre pivot. The corresponding side

frames are joined together by means of spring planks in the same manner as the four-wheeler cast steel bogies.

1.12.2 **Casnub Bogie:** The Cast steel CASNUB bogie comprises of two cast steel side frames and a floating bolster (cast steel). The bolster is supported on the side frame through two nests of springs, which also incorporates a load proportional friction damping. The side frames are connected by a fabricated mild steel spring plank to maintain the bogie squareness. It has the following different versions and the salient feature of each version is given below:

- (i) **Casnub 22W:** (a) IRS type centre pivot. (b) Roller type side bearer. (c) Sliding type brake beam. (d) Wide jaw adapter. (e) Cartridge bearing.
- (ii) **Casnub 22W (Retrofitted):** (a) Modified Wide jaw adapter. (b) Elastomeric pad, (c) Constant contact side bearer. (d) Lower diameter wheel sets.
- (iii) **Casnub 22 W (M):** (a) UIC type spherical centre pivot. (b) Constant contact side bearer. (c) Suspended type brake beam, (d) Wide jaw Adapter. (e) Elastomeric Pad. (f) Cartridge bearing.
- (iv) **Casnub 22NL, 22 NLB:** (a) UIC type spherical centre pivot. (b) Constant contact side bearer (c) Sliding type brake beam. (d) Narrow Jaw Adapter. (e) Elastomeric Pad. (f) Cartridge bearing,
- (v) **Casnub 22HS & IRF 108 HS Bogie:** (a) UIC type

spherical centre pivot/ Flat centre pivot.(b) Constant contact side bearer (c) Sliding type brake beam. (d) Narrow Jaw Adapter. (e) Elastomeric Pad. (f) Cartridge bearing. (g) Two stage suspension is softer in tare and stiffer in gross. (h) Higher lateral clearance between frames and bolster.

(vi) **Casnub 22 HS Mod1/Mod II:** (a) flat centre pivot. (b) Constant contact side bearer (c) Sliding type brake beam. (d) Narrow jaw adapter. (e) Elastomeric Pad. (f) Cartridge bearing. (g) Higher lateral clearance between frames and bolster.

(vii) **CASNUB 22 NLC (25 t axle load):** Same as CASNUB 22 NLB, except modification in suspension.

(viii) **LCCF-20(C):** (a) These bogies shall be suitable for fitment of 840 mm dia. wheel sets (b) Cartridge bearings with wide jaw adapter (c) Elastomeric pads (d) spring loaded side bearers (e) These bogies are to be fitted under low platform BG Container Flat.

1.13 **Empty load box** is a device which has been provided in the brake rigging by means of which lower leverage ratio for the tare condition and higher leverage ratio for the loaded condition of the wagon can be obtained by a simple manual operation of the handle provided on each side of the wagon.

1.14 **Brake regulator (Slack adjuster):** - This has been provided in the main pull rod. It is a device for

- automatic adjustment of predetermined slack between brake blocks and wheels and restricts travel of the piston.
- 1.15 A "**Day**" is twenty-four hours from midnight to midnight.
- 1.16 A "**Week**" is seven days from midnight of Saturday to midnight of the next Saturday.
- 1.17 **One metric tonne** is 1000 kg or 0.984 ton.
- 1.18 **Hot Box:** - Every journal which runs warm necessitating a vehicle, wagon or brake-van being detached from a train from the commencement of its journey to its booked destination inclusive should be considered a hot box.
- 1.19 **Distributor Valve (DV):** It is provided in the air brake system to effect application and release of brake in the wagon. The reference pressure for the DV comes from the control reservoir. During application the DV admits air from the auxiliary reservoir into the brake cylinder and release takes place when the air from the brake cylinder exhausts through the choke provided in the DV. A malfunctioning DV can be isolated from the brake system by an isolating handle.
- 1.20 **Automatic Load Sensing Device (LSD):** The device is interposed between the bolster and spring plank. It takes the signal from the amount of spring deflection and transfers it to the distributor valve, which then regulates the air pressure into the brake cylinder. Thus,

- a higher brake cylinder pressure is obtained in loaded condition than empty state of the wagon to give the desired braking force.
- 1.21 **Automatic brake cylinder pressure modification device (APM):** APM device is interposed between bogie side frame of Casnub bogie and the under frame of wagons. It is fitted on one of the bogie of the wagon for achieving 2- stage load braking with automatic changeover of brake power. It restricts the brake cylinder pressure coming from D.V to $2.2 \pm 0.25 \text{ kg/cm}^2$ in empty condition and allows the brake cylinder pressure of $3.8 \pm 0.1 \text{ kg/cm}^2$ in loaded condition of wagon. APM should sense the gap only at the time of air brake application. During remaining time, it should not be in contact with the bogie side frame.
- 1.22 **Electro Pneumatic Door Operating Mechanism:** It comprises of a solenoid valve that is energized by line side electrical voltage and admits air from a reservoir into the master cylinder. The movement of the piston and associated linkages open the bottom doors of the hopper wagon. The doors are closed when the process is reversed.
- 1.23 **Bogie Mounted Brake Cylinder:** Two bogie mounted brake cylinder (1 per bogie of 254 mm diameter) are fitted in BMBS.
- 1.24 **BVCM:** The Brake Van fitted with CASNUB Bogie.

1.25 **Unloadable Wagons:**

Category A: BOXN wagons requiring petty repairs which can be attended in sick lines.

Category B: Unloadable BOXN wagons, which require attention/body repairs in well equipped sick lines or ROH depots.

Category C: Unloadable BOXN wagons requiring very heavy repair on body/floor. These may be attended in wagon depots nominated for Category C repairs or in workshops.

CHAPTER- II

- 2.0 **Repair Practice for Workshops and Maintenance Depots**
- 2.1 All goods stock owned by individual railways shall be *subjected to Periodic overhaul (POH)/ Routine Overhaul (ROH)* at the prescribed intervals. *POH* shall consist of lifting, thorough examination of all parts of the wagon and its gear and execution of such repairs as may be necessary with full painting and lettering to enable the wagon to run for the full period until the next periodical overhaul. For tank wagons the barrels and valves shall be specially tested according to the prescribed methods.
- 2.2 The materials used for manufacturing components and the processes for their reconditioning/repairing for use on *POHed / ROHed* stock or for supply to maintenance depots shall be in accordance with the current specifications and procedures approved by the RDSO/CMEs and those indicated in these rules.
- Note 1:** For list of must change items during *POH* and *ROH* (See Appendix N)
- Note 2:** For list of important modifications to be carried out on freight stock (See Appendix O)
- 2.3 The shop issue sizes for components and the clearances/tolerances for assemblies to be followed during *POH* shall be as prescribed in these rules or according to the approved dimensions.

2.4 During POH, standard painting and lettering shall be done on the wagons as prescribed by RDSO in the respective marking diagram. Marking diagrams of some of the common wagons like BOXN, BCN, BOBRN, BRN/BFNS & **other wagons**, etc. are given in Plates **1 to 10**. Following markings shall also be stenciled by properly deriving the relevant figures.

Note: During POH / ROH all the wagon numbers must be purified and converted to 11 digits if not already converted.

2.4.1

Carrying Capacity:-

(a) The carrying capacity of Wagons should be marked in tonne up to one decimal place, derived from the gross load, limited by the axle load capacity, minus the tare weight.

(b) For the tank wagons, the carrying capacity should be derived depending upon the limitations imposed either by the provision of air space or by the axle load capacity, whichever is less. This should be marked in liters to the nearest multiple of 10 and by weight in tonnes up to one decimal place. The permissible percentage of air space and liters/tonnes, for different types of fluid generally loaded in tank wagons, are shown in Appendix 'A'.

2.4.2

Tare weight: -

(a) All wagons after POH should be weighed and the tare weight marked in tonnes up to one decimal place. While weighing on the weighbridge, wagon should be un-coupled from the adjacent wagon to eliminate any errors in the weighment.

(b) All manufacturers will arrange to weigh each wagon and mark individual tare weight on it by actual weighment in tonne up to one decimal place. The tare weight arrived shall be deducted from the gross load to arrive at the correct carrying capacity that shall be marked on the wagons in tonne up to one decimal place.

2.4.3 **Return Date:** Each wagon must bear the return date (month and year) on which it is required to be sent for POH/ROH. Wagons become due overhaul from the last date of the month indicated in the return date. The periodicity of *POH* shall be marked as shown in Rule 2.4.3.1 and 2.4.3.2.

2.4.3.1 **POH INTERVAL OF WAGON STOCK (FITTED WITH AIR BRAKE)**

SN	Wagon Stock	POH (Years)	
		First	Subsequent
01	BOXN, BOXNHS, BOXNHA, BOXNCR, BOXNHL	6	4.5
02	BOXNR	4.5	4.5
03	BOST, BOSTHS, BOSTHSM2	6	4.5
04	BCN, BCNA, BCNAHS, BCNHL	6	6
05	BRN, BRNA, BRNAHS, BRN22.9, BFNS, BRHNEHS, BLC-A,BLC-B,BLL-A,BLL-B	6	4.5
06	BLCAM/BLCBM	6	4.5
07	BFKN	4	3.5
08	BOY	3	3
09	BTPH	4.5	4.5

10	BTPN	6	6
11	BOBR, BOBRN, BOBYN	6	6
12	BTPGLN, BTCS	4	4
13	BTALN, BTALNM	4.5	4.5
14	BOXNLW (Stainless steel wagons)	6	6
15	BOXNEL, / BOYEL (25 t axle load)	3	3
16	BOBRNEL, BOBSNM1	3	3
17	BVZI, BVZC (Brake Van)	2	2
18	BVCM	2	2
19	BOMN	6	4.5
20	BRSTN, BWTB	6	6
21	BCACM, BCACBM	4.5	4.5
22	BTFLN, BTOH	6	6
23	BCFC	6	4.5
24	BCCNR	6	6
25	BAFRDR	6	4.5

After the POH of a wagon the due date of ROH be stenciled on the body in the following manner by workshops.

Due date of 1st ROH: D + P

Due date of 2nd ROH: D + 2P

Due date of 3rd ROH: D + 3P

D = Date of Manufacture / Date of Last POH

P = Periodicity of ROH (See Rule 2.4.3.3)

Note:

1. Wagons become due POH on the last date of the month indicated in the return date.

2. Empty wagon will be marked sick for POH up to 30 days in advance of the due date
3. Loaded wagons will be allowed up to 30 days after the due date of POH.

SCHEME FOR MARKING RETURN DATE WORKSHOP (FREIGHT STOCK)					
2.4.3.2	SI. No	Residual life (Years) 'R'	Maintenance schedule to be given	Month of dispatch from workshop	Return Date
	1	4.5 or more	POH	a	a + 4.5 years
	2	$3 \leq R \leq 4.5$	POH	a	'a + R' (i.e. end of codal life)
	3	$R < 3$	ROH	a	a + 18 months
The above table covers BOXN, BOXNHS, BOXNR, BOXNCR, BOXNHL, BOXNLW, BOXNEL, BRN, BOX, BCX, BRH, BOXK, BOXKH, BFK, BFKN & BTPH wagons					
	1	6 or more	POH	a	a + 6 years
	2	$3 \leq R \leq 6$	POH	a	'a + R' (i.e. end of codal life)
	3	$R < 3$	ROH	a	a + 18 months
The above table covers BCN, BCNA, BCNAHS, BCCN, BCCNR, BCNHL, BTPN & BOST wagons					
	1	6 or more	POH	a	a + 6 years

	2	$4 \leq R \leq 6$	POH	a	'a + R' (i.e. end of codal life)
	3	$R < 4$	ROH	a	$a + 24$ months
The above table covers BOBR, BOBRN, BLCA/B and BLLA/BLLB wagons					
	1	4 or more	POH	a	$a + 4$ years
	2	$R < 4$	ROH	a	$a + 18$ months
The above table covers BTPGL, BTPGLN, BTAL & BTALN wagons					
	1	3 or more	POH	a	$a + 3$ years
	2	$R < 3$	ROH	a	$a + 18$ months
The above table covers BOY, BOBX, BOBS wagons					
Wagons having POH periodicity less than 3 years should be undertaken for ROH in case the residual life is less than one POH cycle and return date may be marked as "a" + ROH periodicity, where "a" is the month of dispatch from workshop.					

2.4.3.3 ROH Interval of Wagons: The following types of wagons should be given routine overhaul (ROH) at intervals shown below at nominated major sick line/Wagon Maintenance depots where proper facilities are provided

Sr. No.	Wagon Stock	ROH (Months)		
		First ROH	Subsequent ROH of First POH Cycle	ROH of Subsequent POH Cycle
1	BOXN, BOXNHS, BOXNHA, BOXNCR, BOXNR	18	18	18
2	BOXNHL	24	24	18
3	BOST, BOSTHS, BOSTHSM2	18	18	18
4	BLCAM/BLCBM, BLLA, BLLB, BLC-A/BLC-B	24	18	18
5	BFKN (Container)	18	18	18
6	BCN, BCNAHS, BCNA, BCNHL	24	24	24
7	BCCNR	24	24	24
8	BOXNLW	24	24	24
9	BRN, BRNA, BRNA HS, BRN22.9, BFNS, BRHNEHS,	18	18	18
10	BOBR, BOBRN, BOBRNEL, BOBSNM1	24	24	24
11	BTPN, BTPH, BTALN, BTAL, BTFLN, BTOH, BTALNM	18	18	18

12	BTCS, BTPGLN	24	24	24
13	BOY	18	18	18
14	BOBYN	24	24	24
15	BOXNEL, BOYEL	12	12	12
16	BVZI (IOH), BVZC, BVCM Bk Van	12	12	12
17.	BOMN, BRSTN, BWTB	24	24	24
18.	BCACM, BCACBM	18	18	18
19.	BCFC	18	18	18
20.	BAFRDR	18	18	18

- 2.4.3.4 Empty wagons will be marked sick for POH/ROH upto 30 days in advance of the due date.
- 2.4.3.5 Wagons placed in sickness with proper ROH facilities must be given ROH if due. In Case of wagon is overdue POH, the same should be sent to Workshop. If any wagon sent in C-Category ROH/POH depot for rehabilitation/rebuilt, It should be felt as return date as POH due.
- 2.4.3.6 Loaded wagons may be allowed upto 30 days after the due date of POH/ROH.
However the above provision will not be applicable for LPG stock TG/BTPG/BTPGLN. These wagons shall not be permitted to run over due POH/ROH.
- 2.4.4 Transportation and Mechanical codes are shown in Appendix 'B'

2.4.5 PR plates: On stock fitted with roller bearing axle boxes PR plates shall be stenciled in conformity with plates 11 to 14 respectively on the left hand end of each sole bar or on the wagon body immediately above the standard position of PR plates.

In the PR plate, PR represents the following:

P = POH particulars

R = ROH (Routine Overhaul) particulars.

2.4.6 On non-pooled stock standard plate as shown in plates 15 and 16 shall be stenciled at the prescribed location.

2.5 Punching of wagon particulars:

2.5.1 On all newly manufactured stock and POHed stock a M.S. plate size 100 mm x 200 mm x 6 mm shall be welded adjacent to builder's plate on the sole bar of BG wagons. The particulars to be engraved are:

- a) Wagon number in 12 mm letters;
- b) Owning railway code in 12 mm letters;
- c) Year of manufacture in 20 mm letters;
- d) Mechanical code in 20 mm letters;
- e) Initials of wagon Builder;

2.5.2 Whenever a wagon is transferred from one railway to another railway on permanent basis or is renumbered, the old number and owning railway code as punched earlier shall be ground off lightly and a plate welded and punched with the new wagon No., owning railway and year of manufacture (Refer Plate No. 17).

2.6 During POH, special check will be exercised to ensure that the number and owning railway code as painted on the sides and sole bar of the under frame tally with the punched marks on the sole bars/plate welded thereon. (Rule 2.5.1).

2.7 During service all goods stocks held by railways shall be examined and repaired by maintenance depots in accordance with the procedures fixed by the CMEs and laid down in these rules and relevant maintenance manuals. The method of inspection, replacement or repair of

components/assemblies as laid down gear-wise in these rules hereafter shall be equally applicable to the workshops and maintenance depots except where indicated otherwise.

2.8 **Axles & wheels**

- 2.8.1 Standard axles and wheels used on goods stock are shown in plates 18 to **29**.
- 2.8.2 The building up of any part of an axle is prohibited.
- 2.8.3 On 22.9 tonne axles fitted under cast steel bogies, any nicks/gouges or deep scratch/notches less than 5 mm deep on account of pull rod grazing on the axle body as measured from the original body contour (185 mm dia.) must be ground/machined out to smooth contour and blended into contour of the axle body. Sharp edges/radius are not permitted as they act as stress raisers. In case machining is done it should be smooth so as not to leave any deep tool marks. Axle body that has been ground/machined to smooth contour must be subjected to magna flux testing after grinding/machining and should be completely free of defects before application. Nicks/gouges or notches as mentioned above are not permitted on other portion of the axle like journal, wheel seat area, etc.
- 2.8.4 (a) All wheels sets entering workshops whether under a wagon going in for repair (POH or NPOH) or loose axle must be subjected to ultrasonic testing before being dispatched from workshop. Those found defective during such test or those, which are notched or have tool marks on the surface, which may affect the strength, shall be withdrawn from service other than mentioned in Clause 2.8.3.

- (b) Wheel sets run out from a wagon in any open line establishment for maintenance other than ROH will not require ultrasonic testing if they are fitted back under the same wagon. All other wheel sets must be subjected to ultrasonic testing before re-fitment. All wheel sets to be fitted under ROH wagons should be subjected to ultrasonic testing for axles.
- (c) The marking for the ultrasonic testing of axles shall be stamped cold on the inner hub of wheel disc as per plate **30**. Size of letters to be used should be 8 to 12 mm. The punch marks should be legible but in no case be more than 1.5 mm deep.

(d) Codification of Railway Repair Workshops/ ROH depots (Wagon Care Centre)

The code will be a five-digit code of which the first two digits will indicate the Railway in which the workshop/depot is situated. The third digit will indicate the type of workshop or the depot, and the fourth and fifth digits will indicate the individual number of the workshop/depot.

The codes allotted to the Railways are as follows: -

Name of the Railway	Code
1. Central Railway	01
2. Eastern Railway	02
3. Northern Railway	03
4. North Eastern Railway	04
5. N.F. Railway	05
6. Southern Railway	06
7. South Eastern Railway	07
8. Western Railway	08
9. South Central Railway	09
10. East Central Railway	10
11. North Western Railway	11
12. East Coast Railway	12
13. North Central Railway	13
14. South East Central Railway	14
15. South Western Railway	15
16. West Central Railway	16

For the type of Workshops, the following codification will be made use of: -

Type of Workshop	Code
1. Loco workshops	1
2. Carriage and Wagon workshops	2
3. Loco, Carriage & Wagon workshops	3
4. Wagon Care Centre	4

(I) accordingly, the following is the codification for various workshops: -

Railway	S. No.	Name of Workshop	Code
Central 01	1	Parel	01101
	2	Matunga	01201
	3	Kurduwadi	01301
Eastern 02	4	Jamalpur	02101
	5	Kancharapara (Loco)	02102
	6	Kancharapara (C&W)	02201
	7	Liluah	02202
Northern 03	8	Charbagh	03101
	9	Amritsar	03102
	10	Alambagh	03201
	11	Jagadhri	03202
	12	Kalka	03203
North Eastern 04	13	Gorakhpur	04301
	14	Izatnagar	04302

Northeast Frontier 05	15	New Bongaigaon	05201
	16	Dibrugarh	05301
	17	Tindharia	05302
Southern 06	18	Perambur (Loco)	06101
	19	Perambur (C&W)	06201
	20	Golden Rock	06301
South Eastern 07	21	Kharagpur	07301
Western 08	22	Dahod	08301
	23	Parel & MX	08201
	24	Junagarh	08202
	25	Pratapnagar	08302
	26	Bhavnagar	08203
South Central 09	27	Guntapalli	09201
	28	Tirupati	09202
	29	Lalaguda	09203
East Central 10	30	Samastipur	10201
	31	Harnaut	10202
North Western 11	32	Ajmer (Loco)	11301
	33	Ajmer (C&W)	11201
	34	Jodhpur	11202
	35	Bikaner	11203
East Coast 12	36	Mancheswar	12201
North Central 13	37	Jhansi	13201
	38	Jhansi MLR	13202
South East Central 14	39	Raipur	14201
	40	Nagpur	14301
South Western 15	41	Mysore	15201

	42	Hubli	15202
West Central 16	43	Bhopal	16201
	44	Kota	16202

(II) The following is the codification for various Wagon Care Centers

RAILWAY	S.No.	Depot	Code
CR	1	CLA	01401
	2	DD	01402
	3	BSL	01403
	4	AQ	01404
ER	1	CP	02401
	2	UDL	02402
	3	BGB	02403
	4	NH	02404
NR	1	UMB	03401
	2	KJGY	03402
	3	TKD	03403
	4	MB	03404
NER			
NFR	1	NJP	05401
	2	NBQ	05402
	3	NGC	05403
SR	1	JTJ	06401
	2	IPN	06402
	3	TNPM	06403
	4	TVS	06404
	5	SSR	06405
SER	1	BKSC	07401
	2	NMP	07402
	3	BNDM	07403
	4	TATA	07404

	5	DPS	07405
	6	ADTP	07406
WR	1	VTA	08401
	2	BRCY	08402
	3	SBI	08403
	4	RTM	08404
	5	HXP	08405
	6	GIM	08406
	7	SMP	08407
	8	KRCA	08408
SCR	1	GY	09401
	2	RDM	09402
	3	BZA	09403
	5	BPA	09405
ECR	1	MGS	10401
	2	BRWD	10402
	3	PEH	10403
	4	GHZ	10404
NWR	1	MD	11401
	2	FL	11402
ECoR	1	VSKP	12401
	2	VSKP/OEC	12402
	3	VSPS	12403
	4	ANGL	12404
	5	PRDP	12405
NCR	1	GMC	13401
	2	JHS	13402
	3	BAD	13403
SECR	1	BIA	14401
	2	BIA(PP YARD)	14402
	3	BSP	14403
	4	DRZ	14404
SWR	1	SGWF	15401
	2	MRJ	15402
	3	UBL	15403
	4	HPT	15404

	5	MNGT	15405
WCR	1	NKJ	16401
	2	STA	16402
	3	KT	16403
	4	ET	16404

Note: All sick lines/ROH depots where Ultrasonic testing is being done or shall be done shall bear the codes of their station.

2.8.5 When axles and wheels are renewed, the maximum and minimum distances between wheel flanges shall not exceed the following limits over the standard dimension (see also Plate 31):-

	B.G.
Standard	1600 mm
Maximum	1602 mm
Minimum	1599 mm

Note: (a) The wheels to be gauged on a level track in empty condition.

(b) The wheel gauge should be measured below the top of flange "at three locations at 120 degree apart"

2.8.6 Whenever axles are renewed, the workshop shall punch by electrical etching in 10 mm letters the following particulars on the outer face of the wheel/wheel centre hub as shown in plate 32.

- a) Workshop code
- b) Month & year of pressing
- c) Pressing on pressure (in tones)

2.8.6.1 For re-disced wheels the stamping particulars shall be in conformity with Plate 33. In addition to this, pressing on pressure shall be stamped on the axle end face. Old stamping, if any, on the axle end face should be ground before fresh stamping.

- 2.8.7 Each railway workshop shall maintain a register of the contract number and consecutive number of wheels and axles attended by it month wise.
- 2.8.8 Roller bearing axles. The gross load at rail/axle load and sizes of journals shall be as under:

Maximum Gross load at Rail (tones)	Journal Diameter (mm)	Wagon on which used
22.9*	144.5+0.064/+0.039	BOXNHL, BOXNR, BOXNHAM, BOXN,BOXNHS, BOBS, BOY, BFK, BTCS, BTCS*,BCNHL, BCNAHS, BTPN, BOBYNHS, BOBYN, BOBYB, BRN, BRNA, BOXNHA,
22	144.5+0.064/+0.039	BLCAM, BLCBM
20.3	144.5+0.064/+0.039	BLCA/B, BLLA/B, BOBRN

* Max axle load in operation in individual wagons has been fixed on other constraints.

- 2.8.9 While changing wheels, the following conditions shall be observed:-
- 2.8.9.1 The axle used shall conform to the correct drawing/design and Journal centers. Standard axles in use are mentioned in plate 18/para-2.8.1.
- 2.8.9.2 At the time of wheel changing in sick line/workshop, the variation in tread diameters should not exceed the permissible maximum limits indicated below:-

Type of trolley/Wagon	On the same axle	On the same trolley	On the same wagon
	BG	BG	BG
	mm	mm	mm
Four-wheeled Trolleys	0.5	13	25
Six-wheeled Trolleys	0.5	6	6
Six-wheeled Units	0.5	6	6
Four-wheeled Units	0.5	-	25
BLC Wagons	0.5	5	13

Note: (1) Buffer height shall remain within specified limits.
 (2) The thickness of packing used in maintaining buffer height shall be strictly within the specified limits applicable to relevant springs.

(3) The wheel diameter should be measured at 63.5 mm from gauge face (Back face of flange).

(4) Variation in tread diameter on the same axle as specified above shall apply only at the time of re-profiling/tyre turning of tread on a wheel lathe. There is no "in service" limit for this variation. Rejection during service is governed by tyre defect gauge.

2.8.9.3 The date and code initials of maintenance depot concerned shall be stenciled on the sole bar directly above the axle boxes.

2.8.9.4. The new wheel tread/tyre profile of all BG wagons shall be turned to worn wheel profile as shown in **plate 28** & in service wheel should be turned/re-profiled as per the nearest immediate profile as shown in **plate 29**.

2.8.9.5 Stock coming out of shop, maintenance depot and sick lines should not have any wheel defects on check with the help of tyre defect gauge.

Bearings, Adapter & Axle boxes

2.9

2.9.1

2.9.1.1

Cartridge Taper Roller Bearing

Cartridge Taper Roller Bearing and their components shall be inspected in the workshops during POH of stock or when wheel sets are received for repairs of any nature as per technical pamphlet No. G-95 & G-81 issued by RDSO: During this inspection, all components shall be examined and replaced as necessary. The grease used shall be conforming to the relevant specification.

2.9.1.2

Bearings that have been serviced during POH or otherwise because of re-discing, hot box, accident etc. have to be permanently and legibly marked over hauling particulars on the cup/outer ring (on the straight portion in the centre between the raceways.) and also on backing ring as per details shown in plate numbers 36 & 37 respectively. The overhauling particulars shall also be laser-etched over grease seals.

2.9.1.3

The shop code and date shall be stenciled against 'P' in PR plate.

2.10

(a) Adapter used in Casnub Bogie: Whenever Casnub bogies are dismantled for any reason; the adapters must be thoroughly inspected for soundness and wear using proper gauges according to RDSO publication no. G-95 and G-81.

(b) Reclamation of adapter is not permitted.

2.10.1

Axle guard clearance:

Clearances	New (in mm)	At the time of POH in Workshop	Max. Limit (In mm)
(a) Permissible total lateral and longitudinal clearance between axle guard and axle box groove or between the horn cheek and axle box (Plate 39) is given below for BG bogies and four wheeler wagons:			
Lateral	6	8	10
Longitudinal	3	6	The axle guard leg

			should may work out of the axle box groove.
(b) BVZC			
Lateral	30	32.5	35
Longitudinal	21	24	27
(c) Tank Wagons (Roller Bearing) (16.3 t & 20.3 t)			
Lateral	10	15	20
Longitudinal	3	6	9
UIC Bogie:			
Lateral	20	20	25
Longitudinal	12	12	18

- 2.10.2 Repairs to pressed steel type axle guards shall be undertaken according to the methods indicated below:-
- 2.10.2.1 Axle guards with cracks up to 25 mm in length shall be repaired by welding only.
- 2.10.2.2 When a crack is more than 25 mm in length, in addition to welding, the cracked area shall be supported by a mild steel patch plate 10 mm thick an electrically seam-welded on the reverse side of the axle guard covering the entire cracked portion except the portion covered by the packing plate or horn cheek.
- 2.10.2.3 The axle guard should be scrapped when it is cracked more than half the width of its section.
- 2.10.2.4 Pressed steel axle guards shall preferably be repaired by electric welding only.
- 2.10.3 Stock when turned out from sick lines shall not have any axle guard rivet slack.
- 2.11 **Body, Roof, Door and Floor:** During POH structural members viz., stanchions, car lines, etc., will be properly straightened and it will be ensured that the plates are properly mated before **riveting/welding**. Plates with cracks, perforation, cuts or corrosion shall be replaced or patched as necessary. The rivets must be sound and with snap heads and welding, where done, must be continuous and sound. The end angle irons/plates should not project

- beyond the head stock more than 100 mm from their original position. All covered wagons must be made water-tight.
- 2.11.1 In workshops the patch plates to body, roof, door or floor plates should be of the specified thickness and should cover the full span between two vertical angle irons.
Note: PCMEs may grant relaxation as a temporary measure when considered essential.
- 2.11.2 The diameter of rivets securing patches to rolled or pressed sections must not be less than the diameter of the existing rivets. The diameter of other rivets must not be less than 6 mm for body, roof and door patches and 10 mm for floor patches. The pitch of rivets in rolled or pressed sections must conform to the pitch of the original rivets, the pitch of all other rivets must be 64 mm except where this has to be reduced between an existing and a new rivet.
- 2.11.3 The patch plate should be of specified thickness but not less than 1.6 mm for body, roof and door plates, 3 mm for floor plates of covered wagons and 5 mm for floor plates of open wagons. However, instructions given in wagon structure drawings for different wagons by RDSO should be followed for different patch thicknesses.
- 2.11.4 In sick lines body, roof, door or floor plates, which are torn, punctured or perforated due to corrosion, should be repaired by applying a welded or riveted patch, which shall not be less than 100 mm on any one side. In the case of riveted patches the numbers of rivets shall not be less than 8 and pitched at not more than 89 mm. In case of welded patches, the welding must be continuous and without craters.
- 2.11.5 Existing patches must not be patched.
- 2.11.6 Patches must be painted with primer followed by finishing coat as per RDSO specification G-72 (rev.III) or latest.
- 2.11.7 Floor patches must be applied on the inside of the wagon and other patches on the outside.
- 2.11.8 Repairs to body, floor, roof or door plates should be executed on empty wagons only in sick lines. All empty covered wagons especially those attended to for body repairs must be water tight and a suitable legend should be

- stenciled on both sides of the wagon panel giving the station code and date.
- 2.11.9 Perforations due to corrosion shall not be built up by welding or filled up by bolts or rivets.
- 2.11.9.A Covered wagons intercepted for ROH/Sick line attention must be examined for damaged/corroded body, floor, roof or door plates and repaired in a manner that the wagon will be fit for all types of commodities and will remain water tight till next ROH schedule.
- 2.11.9.B Panel patching in open wagons should be done in such a way that it does not allow seepage of water from inside to cause crevice corrosion at the lap joints.
- 2.11.10 For the purpose of raising charges.
- 2.11.10.1 A body or roof plate is the space between two vertical angle irons or flutes and two original rows of horizontal rivets.
- 2.11.10.2 Each door is reckoned as one plate.
- 2.11.10.3 A floor plate is the space between any four underframe members exclusive of the diagonals or between the inside edge of the sole bar and the outside of the wagon in one direction and the headstock and centre of the wagon in the other direction or between a headstock and adjacent end of the wagon.
- 2.11.11 **Door fastenings.**
- 2.11.11.1 **Cotters or locking pins:** cotter or pin must be able to slip through the staple; the metal around the eye must be continuous. On covered wagons long cotter, door bolt vertical and swing doors bolt locking pin must be drilled with three, two and one hole respectively to take a locking rivet of 6-mm diameter. The long cotter should have a slot for taking E.P.Lock. To prevent unauthorized removal of E.P.Lock the door cotter hasp should be provided with a protector plate 44 x 38 mm size and the flap door should be provided with a protector bar of 6 mm diameter welded.
- 2.11.11.2 **Sealing ring:** The sealing ring attached to the cotter must be
- Continuous, or
 - With the two ends riveted together, or

- c) With the two ends riveted to a plate not less than 6 mm thick,
 - d) The section of metal through the eye must not be less than the section of the stock forming the ring or chain. Rivets when used must not be less than 6-mm diameter.
- 2.11.11.3 **Staples, eyes and eyebolts.** Staples and eyes must be secured by riveting or by bolts riveted flush over the nuts which must be outside if possible. Eyebolts shall be secured by riveting or by the end of the bolt being riveted flush over the nut.
- 2.11.11.4 Door, ventilator or shutter hooks, fixed or free. No hook shall be less than 6 mm thick and the section of securing rings shall be not less than 6-mm diameter. The hook must be so placed that it will engage with the door eye in the open position.
- 2.11.11.5 Covered wagon door way (BG) except CE and MCE type wagons:- As an anti-pilferage measure-filling strip to IRS Drawing No. W/DW-279 shall be removed and 30 mm x 20 mm x 5 mm angle or any other suitable angle shall be welded to crib angle in its place or, alternatively, 45 mm x 30 mm x 5 mm angle or any other suitable angle shall be riveted to crib angle and unsupported horizontal leg of the angle shall be welded to door hinge foot.
- 2.11.11.6 In sick lines, all door fastenings of empty wagons must be examined and replaced where necessary.
- 2.11.12 **Electro pneumatic door operating mechanism in BOBR and BOBRN wagons.**
- 2.11.12.1 Repair, servicing and adjustment of the door operating mechanism should be carried out as per RDSO technical pamphlet No. G-73 in shops and maintenance depots equipped with proper facilities.
- 2.11.12.2 Before performing any maintenance or repair on the door operating mechanism the air must be purged from the system. This can be done by closing the angle cocks at each end of the door-operating pipe and slowly opening the reservoir drain valve.

- 2.12 **Brake gear and safety brackets/loops.**
- 2.12.1 During POH all components of the brake gear system shall be examined, repaired and replaced as necessary. The pins/bushes shall be examined for wear and repaired/replaced to maintain prescribed minimum clearances. Following items shall receive particular attention: -
- 2.12.1.1 Testing and adjustment of brake gear with or without automatic slack adjusters shall be as prescribed in Appendix D.
- 2.12.1.2 Safety brackets/hangers for brake beams, brake pull and push rods shall be secured with rivets at appropriate locations. Their sizes shall be as specified but in no case less than the following cross sections. A bolt with nut welded over shall be permissible alternative to riveting.
- Broad Gauge**
- a) For brake beam**
- | | |
|-------------|------------------------------|
| Closed type | 30 x 6 mm
Or
20 mm dia |
| Open type | 45x12 mm |
| Chain type | 6 mm dia |
- b) Pull and push rod:**
- | | |
|-------------|----------------------------|
| Closed type | 30x6 mm
Or
16 mm dia |
| Open type | 40x10 mm |
- For Casnub bogie, safety arrangement for push rod & for sliding type of brake beams against falling is provided in inherent design. Regarding safety bracket for brake beam of Casnub 22W (M) type bogies, additional brake beam hanger & suspension arrangement as per RDSO Drg. No. WD-89075-s/1 shall be provided.
- 2.12.1.3 The brake beam hangers shall be secured on the sole bars/trolley frames according to the specified methods. On

- Broad gauge four-wheeler stock, the securing arrangements shall be a bolt, nut and bulb cotter.
- 2.12.2 During sick line examination the brake gear assembly shall be inspected for proper condition and necessary security fittings viz., safety brackets, coppers/and pins etc. Special care shall be taken for the items shown in rules below: -
- 2.12.2.1 Brake gear adjustment where necessary shall be done in accordance with Rule D.2.3.3 of Appendix D.

Piston stroke:

Type of wagon	Piston Stroke	
	Empty	Loaded
BOXN, BCN/BCNA, BRN, BTPGLN	85 mm +/- 10	130 mm +/- 10
BOXNHL, BCNHL	85 mm +/- 10	120 mm +/- 10
BTPN	85 mm +/- 10	130 mm +/- 10
BOY	90 mm +/- 10	135 mm +/- 10
BVZC	70 mm +/- 10	--
BOBRN	100 mm +/- 10	110 mm +/- 10
BOBYN	100 mm +/- 10	110 mm +/- 10
BLC	95 mm +/- 10	120 mm +/- 10
BVZI	32 mm	
BOSTHS, BOBSN	85 mm +/- 10	130 mm +/- 10
ALL TYPES OF WAGONS fitted with BMBS (KNORR BREMSE DESIGN)	54 mm <u>±</u> 10	
ALL TYPES OF WAGONS fitted with BMBS (ESCORTS DESIGN)	55 mm <u>±</u> 10	70 mm <u>±</u> 10mm

- 2.12.2.2 Composition and Cast Iron brake blocks shall be renewed when these are worn to the extent that the clearance

between the brake beam collar and the tyre flange is reduced to 6 mm or below, with the brakes applied. The shoe type renewable brake blocks shall be replaced when the thickness is reduced to less than 10 mm.

- 2.12.2.2.1 In shoe type brake block in Casnub bogie, the condition of brake head should be examined for excessive wear, damage and distortion. Such brake head can be reclaimed by welding or replaced with a new one. The reclamation of Casnub brake beams should be carried out as per RDSO Technical Pamphlet No. G-95.
- 2.12.2.3 Testing of brakes of individual wagons or of a train shall be done according to the methods laid down in Appendix D.
- 2.12.3 During POH all parts of air brake system should be removed, overhauled and tested as per RDSO maintenance Manual G-97. Testing of pipes and joints for leakages is to be done at 10-kg/cm² air pressure.

Note: During POH, AR must be dropped & additional strap should be fitted in BOXNHL & BOXNS wagons.
- 2.12.3.1 The air brake system should be attended during ROH as per RDSO Maintenance manual No. G-97.
- 2.12.3.2 During sick line maintenance of air brake wagon attention should be paid to ensure that the air brake equipment is working properly. Every time when the wagon is marked sick, auxiliary reservoir, control reservoir and dirt collector

should be drained out. After the repair is carried out the wagon should be tested with single wagon test rig as per procedure laid down in G-97.

- 2.12.3.3 Correct size of control rod to be fitted as per table given below:

Length of control rod:

BOXN/BOXNHS/BCN/BCNA HSBRN/BRNA/BOY/BTPGLN / BCNA,BLCA/B,BLLA/B	Min. 1254 mm	Max. 1256 mm
BOXNHL,BCNHL	Min. 1404 mm	Max. 1406 mm
BTPN	Min. 1229 mm	Max. 1231 mm
BCXC III	Min. 1169 mm	Max. 1171 mm
BFKN	Min. 810 mm	Max. 812 mm
BOMN	*1254 mm	*1256 mm
BRSTN	*1254 mm	*1256 mm
BCACM	--	--
BCACBM	*1404 mm	*1406 mm
BRNAHS	*1254 mm	*1256 mm
BFNS	*1254 mm	*1256 mm
BRHNEHS	*1254 mm	*1256 mm
BTALN	--	--
BTALNM	--	--
BTCS	1254 mm	1256 mm
BTPH	1254 mm	1256 mm

BTOH	1229 mm	1231 mm
BTPGLN	*1254 mm	*1256 mm
BOBSN	*1254 mm	*1256 mm
For BOBRN, BOBYN, BMBS Wagon, BLCA/B, BLLA/B & BLCAM/BLCBM , Brake Cylinder pressure	Empty: $2.2 \pm 0.25 \text{ kg/cm}^2$ Loaded: $3.8 \pm 0.1 \text{ kg/cm}^2$	
BOBSN	Empty: $2.2 \pm 0.25 \text{ kg/cm}^2$ Loaded: $3.8 \pm 0.1 \text{ kg/cm}^2$	
BOMN, BWTB, BCACBM	Empty/Loaded : $3.8 \pm 0.1 \text{ kg/cm}^2$	
BRSTN, BCACM	Empty : $2.2 \pm 0.25 \text{ kg/cm}^2$ Loaded : $3.8 \pm 0.1 \text{ kg/cm}^2$	

* End to End dimensions.

Note: Brake gear manual adjustment during changing of brake blocks and as wheel wear should be done in CASNUB bogies as per laid down procedure. Proper securing of safety loops; safety brackets of under frame brake gear should be ensured.

2.12.3.4 The automatic load-sensing device shall be maintained according to RDSO Maintenance Manual No. G-97.

2.13 **Buffing gear:** During POH all components including steel springs or rubber pads where buffing gear is incorporated in the draw gear, shall be dismantled and examined for wear/cracks or perishing and repaired/replaced as necessary. The conditions indicated below shall also apply to maintenance depots.

2.13.1 CBC heights in Broad gauge stock shall be within the limits shown below:

Broad gauge	Empty	Loaded
	Max.1105 mm	
	Min.1090 mm	1030mm Min.

Note:

- (i) To make up the CBC heights to maximum permissible limits due to reduced diameter of wheels a packing piece of required design and size may be interposed between adapter and elastomeric pads or elastomeric pad and pedestal side frame crown.

CBC height in broad gauge stock shall be within the limits shown below for BCACBM wagons –

Wagon-A (X-End)	Wagon-A(Y-End) and wagon-B (Both Ends)
Max.1105 mm	Max.861 mm
Min.1085 mm	Min.831 mm

SLDB heights in broad gauge stock shall be within the limits shown below for BLC/BLL/BLCM type wagons: Max. 845 mm and Min. 770 mm

- (ii) On wagons fitted with Casnub bogie, the CBC height will be restored within permissible limits by interposing height adjusting packing as per plate No.40 in between pedestal crown and Elastomeric

pad or adopter top and elastomeric pad as the case may be.

- (iii) Height adjustment packing pieces when used should be provided on both axle boxes on the same axle (whether packing pieces to be same size may be examined).

2.14 KNUCKLE TYPE TRANSITION / NON-TRANSITION CENTRE BUFFER COUPLERS AND DRAFT GEARS.

- 2.14.1 The knuckle type "transition" or "non-transition", centre buffer couplers fitted in Broad gauge bogie wagons and match trucks/brake vans shall be inspected during POH to ensure that the free slack in draft gear is either eliminated or reduced to 6 mm, as the maximum limit for free slack in service is 25mm.
- 2.14.2 None of the coupler components should either be painted or lubricated.
- 2.14.3 The repair practices for coupler body with shank, knuckles and draft gear to be followed in workshops and maintenance depots shall be according to instructions issued by RDSO vide their Inspection and maintenance manual No. G -76 and G-80 respectively.

2.15 SECURITY FASTENINGS.

- 2.15.1 The various types of security fastenings normally in use for bolts are shown in Plate 41. Every bolt shall have a security fastening of the prescribed type.
- 2.15.2 Bolts riveted over nuts shall be permissible only when used for securing wooden fixtures, the nut being outside if possible.
- 2.15.3 A bulb cotter fitted flush over the nut is also permissible.
- 2.15.4 For bolts through slots or slotted holes the security fastening must be of the type used on top of the nut.
- 2.15.5 Split pins or cotters used for securing any fitting shall be split to a minimum angle of 45 degree and should not be slack in the hole or slot.
- 2.15.6 Security fittings of incorrect size shall not be used. A bolt, rivet or pin shall be of a diameter that it will not be slack in the hole and also conform to the following: -
- a) The bolt should take the full nut.
 - b) The rivet should be long enough to form an effective head.
 - c) The pin where used shall be of the correct length so as to ensure fitting of correct size bulb cotter with washer.
- 2.16 **CASNUB BOGIE:**
- 2.16.1 During ROH/POH wagon shall be lifted and bogie shall be taken out from wagon. All bogie components shall be properly inspected to ensure that all its members are in

proper alignment and do not have any cracks or show any signs of crippling. The pivot assembly should also be examined.

- 2.16.2 It shall be ensured that the dimensions of bogie alignment, suspension arrangement and bogie clearances are in accordance with the tolerances laid down for each type of bogie. The side bearer assembled height prescribes for various type of bogie stock shall be maintained.
- 2.16.3 During POH, the Casnub bogie should be dismantled inspected and the worn out surfaces brought to as new condition by providing liners/build up by welding in accordance with latest RDSO publication G-95. Trammeling of assembled bogie is to be done.
- 2.16.4 Maintenance depots equipped with proper facilities for ROH of Casnub bogies should follow the procedure laid down in G-95 for reclaiming the worn out surfaces.

Nominal clearances of CASNUB bogies (Sum of both side)

Description	22W 22W (Retro) (in mm)	22W(M) (In mm)	22NLB, 22NLC, 22NLM (in mm)	22HS, 22HS ModI, Mod.II, IRF108HS (in mm)	LCCF- 20(C) (in mm)
Lateral clearance between frame and bolster	18 ₋₃ ⁺³	18 ₋₃ ⁺³	18 ₋₃ ⁺³	25 ₋₃ ⁺³	25 ₋₃ ⁺³

Lateral clearance between side frame and axle box/adopter	25^{+3}_{-0}	25^{+3}_{-0}	$16^{+6}_{-1.5}$	$16^{+6}_{-1.5}$	25^{+3}_{-0}
Longitudinal clearance between side frames and axle box/adopter	2^{+7}_{-0}	10^{+7}_{-0}	9^{+2}_{-3}	9^{+2}_{-3}	10^{+5}_{-0}
Clearance between anti rotation lug and bolster	4^{+3}_{-0}	4^{+3}_{-0}	4^{+3}_{-0}	4^{+3}_{-0}	4^{+3}_{-0}
WEAR LIMITS: (In mm)					
Adapter Thrust shoulder				0.7	
Adapter Crown lugs				4.0	
Adapter crown seat				3.5	
Adapter side lugs				3.0	
Adapter sides				3.0	
Side frame column friction plate				4.0	
Side frame column sides				5.0	
Side frame anti rotation lug				3.0	
Pedestal crown roof				5.0	
Pedestal crown sides				4.0	
Pedestal sides				2.0	
Pedestal jaw				4.0	
Bolster liner wear limit				5.0	
Bolster land surface				3.0	
Bolster column sides – Inner/Outer				5.0	
Friction Wedge Vertical Surface				7.0	
Friction wedge slope surface				3.0	

- 2.16.5** After repair the repaired surfaces of the bogie components should be checked with proper gauges for correctness. Adapter shall not be welded at any location.
- 2.16.6** During ROH/POH, the suspension springs shall be dismantled, cleaned and examined for broken/any crack and excessive permanent set.
- 2.16.7** The usable coil suspension springs should be grouped and/or colour coded as per RDSO publication G-95. The spring shall be discarded if their free heights are below minimum specified limits.
(excessive permanent set as given below)

LOAD/SNUBBER SPRINGS OF CASNUB BOGIE

Type of Bogie	Location	Free Height (Nominal mm)	Recommended free condemning height (mm)
CASNUB 22W,W(Retro), W(M), NL, NLB, NLM, NLC	Outer	260	245
	Inner	262	247
	Snubber	294	279
CASNUB 22 HS	Outer	260	245
	Inner	243	228
	Snubber	293	278
CASNUB 22HS (Mod-I)	Outer	253	238
	Inner	225	210
	Snubber	304	289
Type of Bogie	Location	Free Height (Nominal mm)	Recommended free condemning height (mm)

CASNUG 22HS (Mod-II)	Outer Inner Snubber	253 222 304	238 207 289
IRF-108 HS	Outer Inner Snubber	264 246 296	249 231 281
LCCF-20(C)	Outer Inner Snubber	260 243 288	245 228 273

- 2.16.8 The arrangement of suspension springs (Inner, Outer and snubber) in Casnub bogies of different type of wagons with different axle loads should be as per appendix-G.
- 2.16.9 The elastomeric pads in Casnub bogies should be inspected for any crack in the metal plate, bond failures, perished rubber and permanent set and condemned if they are beyond the permissible limits laid down in the RDSO publication No. G-95/Maintenance manual for wagons.
- 2.16.10 Constant contact side bearers/PU side bearers in Casnub bogies should be inspected for any crack/damage in metal parts and bond failure, perished, permanent set etc. in non metallic parts and condemned if they are beyond the permissible limits laid down in RDSO/Approved

drawings/maintenance instructions by manufacturer.

2.16.11 Proper fitment of side frame key with square head bolt/retainer bolt and shackle lock with pin and cotter should be ensured.

2.17 **TANK BARRELS: -**

2.17.1 During POH the tank barrel and mountings should be cleaned, examined, repaired and tested for leaks according to the procedure laid down by CMEs /RDSO. The barrels of BTPGL, BTPGLN, BTAL, BTPN, BTCS, BTALN and BTPH fall under pressure vessels as per IS: 2825. The inspection, repairs and testing of such barrels and mountings should be done with proper care and strictly as per rule laid down in maintenance manuals.

Following maintenance instructions have been issued by RDSO for some of the special types of tank wagons.

Type of Tank Wagons	RDSO Publications
BTPGL, BTPGLN	G 86
BTPH	G 71
BTAL/BTALN	G 79
BTPN	G 90

BTCS G-83

BTALNM*

BTFLN*

BTOH*

* Wagons publication is under consideration at RDSO.

- 2.17.2. In-service repairs to tank barrels shall be done only at nominated sick lines where facilities for cleaning are available. After repairs the barrels and valves shall be tested to ensure that there is no leak. Safety valves shall not be permitted with any nut or bolt deficient, from sick line.

2.17.3 The tank wagons bottom discharge valves, blank flange and manhole covers shall be secured with full complement of bolts and nuts whenever the tank wagons are empty.

2.18 (a) **ROH of BTPH tank wagons:** - BTPH Tank wagon will be given ROH at an interval of 18 months in the nominated sick lines equipped with suitable facilities for attention to air brake system.

2.18 (b) **ROH of TPGLR, BTAL/BTALN wagons:** BTAL/BTALN will be given as per Para 2.4.3.3 in the nominated sick lines/workshops equipped with suitable facilities for attention as per **Appendix-E-4.1, 4.2 & 4.3 respectively.**

- 2.19 **ROH of BOXN/BCN wagons:** BOXN/BCN wagons will be given ROH as per Para 2.4.3.3 in the nominated sick lines/workshops equipped with suitable facilities for attention to the air brake system as per Appendix – E.2.
- 2.20 **Under frame.**
- 2.20.1 During POH the under frame shall be inspected to ensure that: -
- (a) There are no cracks on any member, no loose patches on any rolled or pressed steel section or built up girder forming part of the under frame and no signs of corrosion or crippling, which may weaken the under frame members.
 - (b) Headstocks are not bent or cracked or have any defects ;
 - (c) Camber of the under frame is within the prescribed limits.
 - (d) There should be no twist in the under frame.
- 2.20.2 When patches are to be provided on under frame members in shops or maintenance depots, the following conditions shall be observed;
- 2.20.2.1 Headstock and middle bars. A riveted patch shall be of same depth as the headstock or middle bar and not less than 14 mm thick and, where possible 460 mm long. The patch must cover the damaged portion entirely and shall be secured by at least four service rivets of a diameter not less than 16 mm,

use also being made of any existing bolt or rivet holes.

- 2.20.2.2 All broad gauges wagons headstock may be repaired by welding and supported by a seam welded patch of 14-mm thickness. The length of the patch should be 460 mm or as near to it as possible. The depth of the patch should be the same as the depth of the headstock.
- 2.20.2.3 Headstock must be straight at buffer seat.
- 2.20.2.4 **Sole bar:** - Patching shall be done either by riveting or by welding.
- 2.20.2.4.1 **Repair of cracks by riveting:** - wherever possible, riveted patch shall conform to plate **No.42**, but must in all cases conform to the following:
- (a) Patch plate thickness shall not be less than 10 mm and shall be provided on both sides of sole bar webs. The outer patch shall cover the flange width also. Where both the inner and outer patches cannot be fitted due to the existence of other fittings on the sole bar, either inner or outer patch shall be provided and in such cases the thickness of patch plate shall not be less than 14 mm for BG wagons. In case only outer patch is to be provided, it should be

ensured that crack on the flange, if any, should be welded first with the provision of arrestor hole.

- (b) The outer patch shall cover the full depth of web and full width of cracked flange, top or bottom.
- (c) The inner patch shall cover full depth of the channel and shall of the same length as the outer patch to the extent possible.
- (d) Existing rivet holes shall be utilized for patch rivets.
- (e) Additional rivets shall be of diameter not less than 16 mm at a pitch not more than 90 mm.
- (f) Sole bar cracked through flange not more than 25 mm shall be patched by provision of inner patch plate only or outer patch plate covering the full width of flange with at least two rivets on either side of the crack.

2.20.2.4.2

Repair of cracks by welding: - Wherever possible, the welded patch shall conform to the following: -

- a) Welded patch is necessary if any crack in web or flange or both extends beyond 25 mm in length. Before providing the patch, the crack shall be welded as per the procedure given in clause 2.20.2.4.3. For cracks not extending

beyond 25 mm in length, weld the crack with provision of arrestor hole/holes without providing a patch plate.

- b) Thickness of patch plate shall not be less than 10 mm for BG wagons.
- c) If the crack/cracks is /are only in the web portion and not extending the flange portion, provide the patch on the outer side of sole bar covering maximum possible depth of the sole bar. In case this is not possible, provide the patch plate on inside of the sole bar.
- d) If the crack/cracks cover both flange and web, provide patch plate on inner side of sole bar covering maximum possible depth of the sole bar. (The patch plate may be contoured to suit the profile of sole bar to obtain a snug fit). In case this is not possible then provide two patch plates, one on top/bottom flange and the other on the outer side of the sole bar.
- e) Length of the patch plate shall be at least 100 mm beyond the extremities of the crack on either side.
- f) Ensure full contact and proper alignments of the patch plate with the sole bar by clamps or fixtures.
- g) Depending upon the location and the length covered by patch plate, weld the patch plate with sole bar by 13 mm plug welds or 40 mm diameter slot welds evenly, to cover the area of

patch plate. The pitching of the plug welds and slot welds should not exceed 90 mm and 130 mm respectively.

2.20.2.4.3

Procedure for welding crack in sole bar:

- 1) Strip sole bar fittings in the vicinity of crack on sole bar.
- 2) Drill arrestor hole of 8-mm dia approximately 10 mm ahead in the progressive direction of the crack.
- 3) Gouge sole bar crack upto the arrestor hole to 'V' groove (included angle for 'V' groove should be 60° to 70° .
- 4) Ensure that root gap after gouging is not more than 3 mm
- 5) Oxy-cut edges should be free from slag and irregularities, and should be dressed smooth.
- 6) The surface to be welded and the surrounding material for a distance of at least 12 mm should be free from scale, dirt, grease, paint, rust or other surface deposits.
- 7) Ensure proper alignment of the sole bar.
- 8) If the crack is more than 150 mm long, apply 30 to 40 mm-full size tack welds at convenient intervals.
- 9) Complete the welding of the gouged portion not covered by tack welds.

- 10) Ensure that main weld fuses properly with tack welds.
- 11) Gouge opposite of sole bar weld to expose sound weld metal and lay a sealing run.
- 12) Dress the weld re-enforcement smooth in level with the sole bar surface.

NOTE: - (i) The electrodes approved for use on Indian Railways under class "B2" should be used, Voltage and current (and polarity if direct current is used) should be set as recommended by the manufacturers of electrodes being used.

(ii) Gouging should be done either by gouging electrodes or by oxy-cutting.

- | | |
|----------|--|
| 2.20.2.5 | Patches on the body and underframe should be painted with primer and finish coats as per G.72 Rev.III. |
| 2.20.2.6 | Repair practice for stainless steel types wagons (refer maintenance manual for wagons Dec-2015). |

2.21 **LOW PLATFORM BOGIE CONTAINER FLAT WAGONS:**

BLCA/BLCB/BLCAM/BLCBM/BLLA/BLLB

- Height of slack less draw is 845 mm (max. in tare condition) however the minimum permissible drop to 770 mm is allowed.

- Follow G-100 for inspection and maintenance of automatic twist lock.
- Follow G-103 for repair and strengthening of BLL wagon.
- Containers shall be loaded on wagons as per following speed certificate
 1. MC.CONTR.ISO.BG-Flat dated 15.09.1997 (BLC with single stack container).
 2. MW/CONTR/DOUBLE STACK Dated 26.01.2006(BLC with double stack container).
 3. MW/SPD/BG/CONTR/DOUBLE STACK/22.0T Dated 12.11.2007 (BLCM wagons without any container and wagon with empty/loaded container in double stack.)
- As per ISO guidelines, maximum gross load (self weight of container+ pay load) of a 20'/40' container is 30.48t.

2.21.1

Guidelines for Container Wagon:

A. ATL

1. It should be ensured that ATL's at all locations (8 for BLC/BLCM wagons & 10 for BLL wagons are working properly and no part is missing/damaged.

2. If the twist head easily turns more than **15 degree** by hand then the torsion spring (rubber/steel) or locator pin need replacement.
3. It shall be ensured that container corner casting/post is not resting on ATL base plate (top face). Normally there shall be a gap of 6.5 mm between them.
4. Inspection and maintenance of ATL shall be done as per guidelines of RDSO document no. G-100.
5. It is recommended that all ATL loading/unloading points/ICDs (Inland container depots) handling BLC/BLCM/BLL wagons should strictly use only dedicated reach stacker/ gantry trucks/cranes for container handling.

B. Slack less Draw Bar

1. It shall be ensured that there is not biased wear (on any mating surface/part). Similarly it shall be checked that there is no crack is present on SDB or draft gear of slack less draw bar assembly.

2. For SDB arrangement with 485-4A draft gear, periodically, gravity drop wedge height should be inspected to assure that the system is maintaining the proper slack less connection. For new applications, 25 mm minimum wedge height should be maintained. During periodic in-service inspections, 6 mm minimum wedge height is acceptable.
3. For SDB arrangement with 495-4A draft gear, periodically, inspect to assure that the quick draw gear and AAR Y46 follower are tight in the gear pocket. Inspect interface between quick –draw gear and rear stop and between AAR Y46 follower and front surface. No gap should be present at these interfaces.

C. Container Wagon (General)

1. Only ISO containers shall be loaded on wagons.
2. Generally wagon shall be subjected to any inspection/maintenance in empty

condition (i.e. without any container).

3. Loading of containers (especially for double stack operation) on flat wagons shall be done as per guidelines of speed certificates for respective wagons.

2.22

ANTI - PILFERAGE DEVICE;

Following anti-pilferage device shall be adopted on all wagons during POH, ROH and repairs in depots.

2.22.1

BG Bogie Wagons: -

- (a) The securing pins shall be provided with split cotter, open end of which shall be split to a minimum angle of 45° and shall be welded to washer for securing the following brake gear components: -
 - i) Brake beams hanger to bogie column and brake block to brake beam. (See plate 43).
 - ii) Push rod, support link, brake connecting link and swing link with brake equalizing lever. (See plate 44).
 - iii) Hand brake lever, pull rod and short connecting link with brake shaft arm arrangement. (See plate 45).

- iv) Brake pull rod, connecting link, push rod support link with brake equalizing lever (See plate 46).
 - v) Hand brake bell crank, hand brake bell crank bracket and pull rod. (See plate 47).
- (b) For securing hand brake wheels to spindle: -
The spindle shall be provided with split pin open end of which shall be split to a minimum angle of 45° and tack welded. (See plate 48).
- (c) Anti pilferage measures for APM (See plate- 51)
The hand brake wheel shall be secured to the spindle by a nut as specified in the drawing and after fully tightening the nut, the spindle end shall be rivetted over in position or the nut shall be welded all-round to spindle end (See plate 49).
- 2.22.2 2.22.2.1 **Safety Valve:** The nuts of the three securing studs shall be tack welded to the flange and all the three securing bolts shall be sealed with sealing wire as shown in Fig.1 of plate 50.(applicable for BTPN & BTFLN wagon)
- 2.22.2.2 **Man-hole and fittings:** - The nuts of the three securing studs for man-hole cover seating shall be tack welded to the man-hole cover seating, three securing studs for man-hole cover seating shall be sealed with seating wire, two nuts each of vapour extractor and filling pipe/shall be tack welded to the vapour extractor base/filling pipe flange as shown in

Fig.2 of plate 51.(applicable for BTPN & BTFLN wagon)

2.22.2.3

Blank flange of bottom discharge valve: The blank flange of bottom discharge valve shall be secured to centre longitude by a chain as shown in Fig.3 of plate 51.(applicable for BTPN & BTFLN wagon)

2.22.2.4

Twin Pipe System on Air brake Trains.

Earlier it was decided that all air brake freight trains shall run with single pipe, unless specified otherwise. Necessary modifications in air brake freight stock for running train with single pipe were issued separately. However, recently it has been again decided to gradually introduce twin pipe air brake system in BOXNHL/BCNHL/BVZI wagons. General guidelines for operation and examination of twin pipe air brake system of complete train to be done as per G-97 (amendment No.3 of Jan-2010 or latest).

CHAPTER – III

- 3.0 Procedure for Train Examination and Interchange shall be as laid down in these rules.**
- 3.1 All originating, terminating and through passing goods trains offered by traffic shall be examined by the train examining staff at a station nominated by the Railways. The C&W Supervisor shall be responsible for ensuring that the train/line on which examination is being conducted is protected at both ends in prescribed manner so that adequate protection is afforded to the staff for carrying out examination and repairs. For list of Broad Gauge train examining stations, workshops and their codes, see Appendices C.**
- 3.1.1 Pattern of Freight Train Examination:** Comprehensive instructions regarding the pattern of freight train examination and issue of Brake Power Certificate have been issued by Railway Board in the form of Joint Procedure Order vide Railway Board's letter No.94/M (N)/951/57/Vol.II/Pt. dated 25.10.2004 amended vide Railway Board's letter of 2005/M (N)/951/13, dated 8.2.2006. Any revision/modification in the same shall be approved by Railway Board (Mechanical Directorate) only.
- Regardless of type of wagons for traffic use/ departmental use all existing and future generation wagons shall require fitness certification from train examining supervisors from mechanical department before being inducted for regular operations and would also

require regular brake power certification by the train examining supervisors of mechanical department for their day to day operation. The same norms would be applicable for all existing and future generation departmental wagons and other departmental rolling stock such as Tower wagons, etc. also.

3.2

Examination of Originating Trains:

3.2.1

- i. Originating trains shall be examined by the train examining staff before dispatch to ensure that all the stock is in fit condition to run and the rejectable defects have been attended to.
- ii. It is the responsibility of the Station Master/Yard Master (Traffic department) to offer originating trains for examination to C&W supervisor.
- iii. A certificate of such fitness shall be given to the Station Master/Yard Master by the concerned C & W Supervisor after carrying out the examination.
- iv. Station Master/Yard Master shall not dispatch the train unless this certificate is received by him.

3.2.2

C&W Supervisor shall ensure that no due / overdue POH/ROH wagons in terms of rejection rules- **4.7.1 & 4.7.2** are allowed in intensively examined trains.

3.2.3

Notification of Examination Points:

- i. All goods trains must invariably be given Intensive Examination for repairs.

- ii. Railways should notify nodal points authorized to issue intensive brake power certificates for running of air brake trains on End-to-End basis and in Close Circuits.
- iii. These nodal points should have adequate facilities like cemented pathways, welding points, proper lighting etc. for proper examination of trains.

3.2.4

Frequency of intensive examination for different stock:

- i. As a rule, all freight trains should be subjected to intensive examination in empty condition at originating stations.
- ii. In exceptional cases the back-loaded freight trains can be examined at the first examination point.
- iii. All freight trains shall be re-examined by C & W supervisor if stabled for more than 24 hours in train examination yard or enroute.

All wagons undergoing tippling operations shall be examined by C&W staff where number of tipplings is three or more rakes per day and by driver and Guard where these are less than three rakes per day.

Remarks: As per Rly. Bd's instruction vide letter No. No. 98/M(N)/951/12/Pt.I dtd. 17.05.2007, after tippling, rake should be subjected to post tippling check either by TXR staff or by Guard-Loco Pilot in case of non- provision of TXR staff in the siding. On recommendations of CME & COM, GMs may decide whether the post-tippling check on a particular point will be entrusted to TXR staff or Guard & Loco pilot.

- 3.2.5 **Stock running on end-to-end pattern, the intensive BPC shall remain valid provided:**
- a) The destination is mentioned on the BPC of the loaded train.
 - b) The composition of the rake is not changed by 4 or more wagons
 - c) The rake is not stabled for more than 24 hours in train examination yard.
- 3.2.5.1 **End to End Examination**
The rake should normally be intensively examined in empty condition except when back loading of rake has to be done at stations/sidings. After such intensive examination, the empty rake should be moved to the loading station as per the requirement of traffic.
- (i) The BPC of empty rake may have no destination mentioned. However, after loading the empty rake, the operating staff (commercial staff, if operating staff is not posted at that station) will ensure that the destination of the loaded train is clearly mentioned on the BPC and the same BPC will then become valid up to such destination.
 - (ii) No Loco pilot should move the loaded train from the loading point unless the destination is clearly mentioned on the BPC. BPC of the loaded train without destination will be considered as invalid.
 - (iii) At the destination, after unloading, the rake must be examined once again in the empty condition and the above cycle repeats. In the absence of freight train examination facilities at the unloading point, the empty rake/back loaded rake must be examined at the first freight train examination point in the direction of movement.
 - (iv) The movement of empty rake/back loaded rake from the unloading point to the first freight train examination point will be permitted on Loco pilot and Guard's certificate.

The End-to-End BPC shall remain valid provided:

The destination is mentioned on the BPC of the loaded train.

Rake Integrity is not disturbed by more than 04 wagons (in case of BLCA/BLCB, the maximum limit of wagons which can be detached/replaced during run are 05, i.e. 01 unit = 05 wagons) and intensively examined wagons given fitness by train examining staff may be attached as replacement.

BACK LOADING OF TRAINS:

When back loading is done at a station where freight train examination facilities exist, the loaded rake should be examined at that station only and BPC issued. In cases where back loading is done at a non-TXR station, such trains can be:

Either checked by flying squad, if operationally feasible.

Or, if it is not possible, permitted to run on a Guard & Loco pilot's memo.

Running of trains on Loco pilot's and Guard's memo, will be permitted only up to the first freight train examination point in the direction of train movement.

3.2.5.2

Premium Examination: -

The BPC of premium rakes shall have a validity of 12 days with 3 days additional grace period to facilitate examination in unloaded condition. The following stamp shall be provided on the BPC of Premium rakes:

**This BPC is valid up to (Mention date)
After this date NO FRESH LOADING IS PERMITTED
(3 days grace period after this date is allowed for rakes loaded up to above date)**

The following conditions have been prescribed for Premium rakes

- (a) Premium end to end rakes will be intensively examined in empty condition and certified by examination points nominated by CME & COM. Such premium examination points should either be 'A' category or upgraded to 'A' Category examination point.
- (b) If any of the conditions, i.e. examination in empty condition or examination at nominated points is not satisfied; rake will not be certified as premium rake and will operate as normal end to end rake.
- (c) Brake Power Certificate issued for such premium end to end rakes will be valid for 12 days from the date of issue. During this 12 day period, the rakes will be allowed for multiple loading / unloading.
- (d) After each loading / unloading, the rake will be examined by Guard and Loco pilot before commencement of journey and observations will be recorded under the relevant columns of the Brake Power Certificate. In case of mechanized loading/ unloading, examination by TXR is desirable.
- (e) The rakes will be turned out with minimum 95% Brake Power.
- (f) After the completion of 12 days, the rakes should be offered for next intensive examination at the first examination point in the direction of movement. To avoid examination in loaded condition, a grace period of 3 days shall be permitted. However, after expiry of the grace period, i.e. after completion of 15 days after the

date of issue of BPC, even a loaded premium rake shall be offered for examination at the first TXR point in the direction of movement. Further, in no case, Premium rakes shall be offered for loading through bypass routes or through yards which are not nominated for examination. After examination, the rake will be certified as premium rake subject to fulfillment of above mentioned conditions, otherwise as conventional end to end rake.

(g) Movement of Premium rakes will be monitored thorough FOIS by Traffic and Mechanical departments.

3.2.5.3

Close Circuit Rakes Examination:-

Railway must ensure that the infrastructural facilities at all the CC examination points are upgraded to 'A' category.

(a) As far as possible, the close circuit air brake rakes should be formed from off-ROH and off-POH wagons.

(b) The complete history of wagon and its components, i. e. Bogie, Draft gear, Coupler, AB System, Wheel & CTRB, etc. should be maintained by the Base Depot.

(c) **The Originating Brake Power** for air braked goods trains running in **close circuit**, shall be **100 %** with adequate brake block thickness

Further, Zonal Railways shall maintain detailed record w.r.t. enroute detachments, brake power and detachments during examination of these rakes.

(d) The BPC of CC rakes shall be valid for 6000/7500 kms or 30 days + 5 days, whichever is earlier. Grace period of 5 days is allowed if **the**

rake is moving towards the base depot. The following stamp shall be provided on the BPC of CC rakes:

This BPC is valid up to (Mention date)

After this date NO FRESH LOADING IS PERMITTED

(5 days grace period after this date is allowed if the rake is moving towards the base depot)

(e) The BPC of CC Rake issued at the nodal point shall remain valid provided:

- The kilometrage have been logged in correctly and continuously (if not, the BPC will be deemed to be valid for 20 days only from the date of issue). It is the responsibility of the crew to check that entries regarding distance are clearly and continuously recorded.
- The rake integrity is not changed and only the listed wagons are included.
- The rake is running in the predefined circuit only as mentioned on the BPC.
- (Breaking the rake into parts and reforming the same parts will not be deemed to have broken the rake integrity).

No intermediate examination of the Close Circuit rake is required. It would be the responsibility of the Loco pilot and Guard to check the unloaded CC rake at the unloading point and ensure brake continuity before starting.

(f) Normally, all Close Circuit freight trains should be given intensive examination during day light

hours. However, if Close Circuit freight trains are examined during night hours, minimum illumination level of 100 to 150 Lux is required for under gear examination as well as repair work of rake.

(g) BPC issued after thorough freight examination in empty condition must be revalidated after loading. Revalidation includes conducting brake continuity test, ensuring completeness/securing of brake gears and endorsing on intensive BPC. No wagons shall be detached from the rake unless safety is affected.

CC rakes shall be subject to the following conditions:

- CC Rakes should be maintained in the examination yards which have No line of OHE Passing over the maintenance lines.
- CC rakes shall be monitored closely through FOIS by all Sr. DOMs to ensure that these rakes are worked to their respective base depots before completion of stipulated KMs/ days. Rakes with invalid BPC shall normally not to be permitted to run in service.
- All the cases of violation of this limit shall be analyzed by the concerned Division / Zone where such rake gets detected, either on run or during subsequent examination, for adequate corrective and/ or preventive action (if necessary).
- In case Km / Days limit is breached due to lack of monitoring or otherwise, and the rake is in empty condition, it shall be pushed to nearest TXR point for Revalidation and

- endorsement on BPC by TXR that the train is safe to run up to the base depot.
- Such potentially unsafe rakes mentioned under (g) above, when detected in loaded condition, shall be subjected to GDR check and pushed to destination. After unloading, the empty rake shall be offered to the nearest TXR point for Revalidation and endorsement on BPC by TXR that the train is safe to run in empty condition up to its nominated base depot.
 - The potentially unsafe rakes from the point of detection to the nearest TXR point will move on GDR check.
- 3.2.5.3 It would be the responsibility of the Driver and Guard to check the unloaded CC rake at the unloading point and ensure brake continuity before starting.
- 3.2.5.3.1 All close circuit freight trains will be given intensive examination preferably during day light hours.
- 3.2.6 **Issue of intensive brake power certificate:**
- 3.2.6.1 All freight trains after being subjected to intensive examination will be issued a Brake Power Certificate by C & W Supervisor of Mechanical Department.
- 3.2.6.2 To distinguish the brake power certificates, Standardization of brake power certificate over IR should be as under:
- (i) **CC Rakes examination- (Yellow-Colour)**
 - (ii) **End to end air brake- (White- Colour)**
 - (iii) **Premium end to end rake examination (Green Colour)**

- 3.2.6.3 The minimum originating brake power for air braked goods trains, running on end-to-end pattern of examination, shall be 90% except wherever local instructions have specified higher level of brake power to meet specific requirement. Exception shall only be made after prior approval of Chief Mechanical Engineer has been obtained for each individual case.
- 3.2.6.4 The originating brake power for air braked goods trains, running in close circuits shall be 100 % and 90% at any time during the run.
- 3.2.6.5 No fresh Brake Power Certificate is required during revalidation.
- 3.2.6.6 Whenever brake power certificate become invalid, and there is no C&W Supervisor available at that point, Guard & Driver will check the train and take the train up to the next train examination point after their joint check. See rule 3.6.2
- 3.2.6.7 Brake pipe pressure required in the air-braked train with locomotive should be as follows:

Length of train	Brake pipe pressure in Train (kg/cm ²)		Feed pipe pressure in Train (kg/cm ²)	
	Locomotive	Brake Van	Locomotive	Brake Van
Up to 58 Air brake wagon	5.0	4.8	6.0	5.8
Beyond 58 Air brake wagon	5.0	4.7	6.0	5.7

- 3.2.6.8 C&W Supervisor will mention the individual numbers of wagons with in-operative cylinders/piped wagons at the back of the Brake Power Certificates. Such wagon shall be attached after two wagons from engine and 4 wagons before brake van.
- 3.2.6.9 At Stations where only the crew is changed, incoming crew will hand over the same brake power certificate to the outgoing crew of that train.
- 3.2.6.10 In case of Air Braked stock, the Guard shall not start a Train without brake pipe pressure gauge. The Driver & Guard both ensure the continuity of rake before starting.
- 3.2.6.11 ***The following procedure shall be followed to issue the BPC after attachment of the locomotive:***
- All BP hoses/ hosepipes on the train should be coupled up. The angle cocks in case of air brake stock at both ends of the wagon in brake pipe should be open. The angle cock at the end of air brake van must be in closed position.
 - Attach front wagon BP hose/ hosepipe to BP hose/ hosepipe of the locomotive.
 - Ensure firmness and tightness of hoses with palm ends/universal coupling and clips.
 - Ensure that all the cut off angle cocks on brake pipes are in open position in case of air brake stock, except the last angle cock of rear brake van.
 - Attend to all leaks by replacing MU washer/IR washers, leaky hoses and angle

- cock assembly, if requisite BP pressure is not coming in the last vehicle.
 - Inoperative or defective brake cylinders should be isolated but this is not allowed in case of 'CC' (Air Brake) rakes at originating point and 100% Brake power should be ensured.
 - Not more than 4 wagons shall be marshaled in one hook having IOP wagons.
- 3.2.6.12 BPC issued after intensive examination in empty condition must be revalidated after loading. Revalidation includes conducting brake continuity test, ensuring completeness/securing of brake gears only and endorsing on intensive BPC. No detachments, unless safety affected.
- The BPC of an empty rake having destination marked after unloading will be treated as invalid.
 - It is the responsibility of the driver and guard of the train to check the BPC validity while starting the train from originating train or at the crew changing point. Irregularities noticed, if any, in the BPC must be brought to the notice of C & W Controller.
- 3.2.6.13 **Steps of intensive examination:**
- Rolling-in-examination including axle box feeling.
 - Intensive examination of originating trains including repairs, detachment of damaged/sick wagons, brake testing etc.
 - Issue of Intensive Brake Power Certificate after ensuring brake continuity of the formed train.

- 3.2.6.14 For trains requiring sorting and/or having different terminating and originating yards/locations, the steps for issuing intensive BPC will be as follows:
- (a) Rolling-in-examination including axle box feeling
 - (b) Terminating examination including detachment of damaged/sick wagons.
 - (c) Intensive examination of originating trains including repairs, brake testing etc.
 - (d) Issue of Intensive Brake Power Certificate after ensuring brake continuity of the formed train.

Man Hours for examination:

As per Maintenance Manual for wagons (revised in 2015) Para 313, Man hours for various type of stock are given below:

Type of Stock/Examination	Man hours required
Air Brake (End to end running)	56
Air Brake (Close Circuit)	100
Premium end to end	

3.2.7 **Details of intensive examination:**

Rolling-in-examination including axle box feeling:

All terminating trains should be given rolling in examination while entering a station/ yard having a train examination depot. C&W Supervisor should be informed of all incoming trains well in advance by the Station Master/Yard Master. To carry out this examination, the C&W Supervisor and his staff should take up positions on both sides of the lines

short of the normal halting place on which the train is to be received

The following inspection should be carried out during the rolling in examination:

- In motion inspection and observation of under gear of wagons for any loose or dangling components and flat tyre/wheels.
- Immediately after the train has come to a halt, all CTRBs/Adapter should be felt and those, which are found running at high temperature, should be marked for opening/checking at the time of examination and attention, if necessary. Also, CTRB shall be visually inspected as per RDSO technical pamphlet No. G-81 **CTRBS's running temperature** immediately after the wagon has halted: to verify that the BPC belongs to the correct train and check the Driver's remarks.

Axle box/Adapter temperature	State of bearing operating conditions	Action to be taken
Up to 38°C above ambient	Normal	Wagon allowed as OK
Temperature of bearing above 90°C.	Excessively warm/hot	Wagon to be detached and bearing should be removed from service for further examination.

- Examination of any abnormal behavior of any of the wagons or any other observation,

which may relate to unsafe working condition.

- The rolling in examination must be conducted to detect any defect in the brake system or faulty manipulation by the driver, which may cause skidding of wheels.
- Incoming BPC should be collected

3.2.7.1

Intensive examination of trains:

Once the train has been offered for examination by Traffic Department, the rake should be protected at both the ends before undertaking the following examination and repair activities.

- I. Inspection and repairs of running gear fittings.
- II. Inspection and repairs of brake gear and spring gears.
- III. Inspection and repairs of draw and buffering gear.
- IV. Checking and making good the deficiency of safety fittings, safety brackets, safety loops, etc.
- V. Replacement of brake blocks:
 - Cast iron brake blocks/Composite brake blocks should be used as per RDSO specification.
 - To ensure correct fitment of brake block, only spring steel key to RDSO Drg. No. W/BG-6150 should be used.
 - After fitment of brake block and key on brake head fitment of split pin should be ensured.

3.2.7.2

Correct fitment of washers, bulb cotters and all brake gear pins particularly on CASNUB bogies.

3.2.7.3

Correct functioning and positioning of empty load device. (Manual/ automatic)

- 3.2.7.4 Roller bearing stock found running at high temperature may be taken in sick lines for further attention.
- 3.2.7.5 Checking for proper securing of doors of wagons.
- 3.2.7.6 Look for abnormal and /or unequal CBC height, wear plate, knuckle, etc. to the extent it is possible to detect by visual examination. In case of doubt, the CBC height should be measured.
- 3.2.7.7 Meticulous check of brake cylinders, distributor valves, auxiliary reservoir, control reservoir and other pipe joints should be carried out to ensure that these are in proper working order. Isolating cocks and angle cocks to be checked for proper position. Brake cylinder should be released and checked for piston stroke as per Para 2.12.2.1 for empty and loaded position.
- 3.2.7.8 After brakes are released, the wheel profile should be examined visually. If any defect is noticed, it should be checked with tyre defect gauge and wagon marked sick for wheel changing, if required. Wheel gauging, where bent axle is suspected, must be done.
- 3.2.7.9 The bogies, complete side frames and bolsters to be visually examined for cracks, abnormal change in geometry and missing parts. Bolster springs, snubbers, spigots, center pivots fastening, constant contact pads, side bearer spring etc. to be checked for defects.
- 3.2.7.10 Examine brake rigging components with special attention to brake beam deformation and wear on integral brake shoe bracket. Check intactness of the pull and push rods with pins,

washers, split pins and cotters, etc. Hand brakes must be checked for smooth and effective operation.

3.2.7.11 Visual examination of under frame members, body, door mechanism, CBC wear or deficiency of parts to be marked and their operation to be checked.

3.2.7.12 For Air braked stock brake power should be tested as per Rule 3.2.10.

3.2.8 Examination at Traction changing points:

All trains will be subjected to axle box feeling at yards nominated for this purpose by the CME of the Railways.

3.2.9 It shall be ensured by the Guard that all the doors of the covered & open wagons are properly closed or secured in open condition in case of perishable/lime stone consignments.

3.2.10 AIR BRAKE TESTING:

A rake consisting of air brake wagons can be tested with rake test rig. This rig may be used for testing the train in yard before attaching the engine. The rake test rig has air supply and a mobile test rig. The mobile test rig is having a cubical structure and is mounted on wheels.

PROCEDURE:

- i. Attach the locomotive/compressor through the test rig to the train & couple brake pipes. Ensure correct coupling with pipes so that there is no leakage of air from coupled joints
- ii. The coupling should be done with angle cocks in closed position.
- iii. Open the angle cocks of loco after coupling brake pipe.
- iv. Open the angle cock of the brake pipe on all the wagons. Check for continuity of brake

- pipe by reducing and rebuilding brake pipe pressure. The verification should invariably be carried out through the pressure gauge provided in Guard's Brake Van.
- v. After the brake pipe pressure has stabilized in the test rig and rearmost vehicle to the level indicated in Table under Rule No.3.2.6.7. Move the driver's automatic brake valve handle to application position to reduce the brake pipe pressure from 5 kg/cm² to 4-kg/ cm².
 - vi. After the brake pipe pressure has been stabilized, close the brake pipe isolating cocks provided between additional C2 relay valve and brake pipe of the locomotive/test rig.
 - vii. Wait for 60 seconds for temperature and gauge settlement. Then note the drop in pressure in the brake pipe gauge in the locomotive/test rig for five minutes.
 - viii. The drop in brake pipe pressure gauge shall not be more than 0.25 kg/cm² per minute.
 - ix. Examine for leaky components, malfunctioning of distributor valves, brake cylinders, control and auxiliary reservoirs, angle cocks, and BP hoses.
 - x. If the leakage rate is more than 0.25 kg/cm² per minute, check for excessive leakage on individual wagon as indicated below:
 - Look for hissing sound which indicates leakage.
 - Once the hissing sound is heard from a particular area, pin point the location of leakage by applying soap water solution.
 - Use permitted material viz. Teflon tape for arresting the leakage.

- In case leakage is heavy and cannot be arrested, the wagon should be isolated/detached.
- In case where leakage can be arrested temporarily by tape and the nature of leakage is such that it requires attention at primary depot, clear marking on the wagon must be made to draw attention of primary depot for adequate attention.
- In case the leakage is from the distributor valve and cannot be arrested, close the distributor valve isolating cock. In such a condition, clear marking should be provided on the wagon to indicate this defect to primary depot. Do not close brake pipe angle cocks under any circumstances either for isolation of wagons or for any other purpose whatsoever except for carrying out shunting operation after which the angle cocks should again be opened to ensure continuity of brake pipe.

3.3

Examination of terminating goods trains:

3.3.1

Rolling in Examination including axle box feeling should be carried out as per Para [3.2.7](#)

3.3.2

Air brake equipment shall be tested as per Appendix- D.

3.3.3

Ensure functioning of load/empty device and correct position of handle.

- Positioning of empty load device should be done by the commercial/operating staff at the point of unloading/loading and to be ensured by Guard/Driver.

- ii. To be ensured by C&W Supervisor during intensive/revalidation examination.
- 3.3.4 Wheels shall be tapped.
- 3.3.5 Wheels shall be checked for all defects shown in Rules 4.19 (Plates 52 to 58)
- 3.3.6 Broken / defective springs and suspension gear should be checked.
- 3.3.7 Other items to be checked in case of air brake stock as mentioned below:
 - i. Meticulous check of brake cylinders, distributor valves, auxiliary reservoir, control reservoir and other pipe joints should be carried out to ensure that these are in proper working order.
 - ii. Isolating cocks and angle cocks to be checked for proper position of handle/functioning.
 - iii. Brake cylinder should be released and checked for piston stroke as per Para D.1.3.2.6 for empty and loaded positions.
 - iv. During terminating examination, special care should be exercised for any deficiencies, damages, leaky components, malfunctioning of distributor valves, brake cylinders, control and auxiliary reservoirs, angle cocks, and BP hoses and defects rectified.
- 3.3.8 In case of terminating loaded trains to be sent to tippler for unloading, the Brake power available on train should be recorded and deficiencies noticed should be chalk marked so that after unloading/Tippler operation, deficiencies can be attended to during outgoing examination.
- 3.4 Where a rejectable defect cannot be attended to on the train, the wagon shall be damage labeled for attention in the sick line.

- 3.5 **Procedure for damaged stock**
- 3.5.1 Should it be necessary to detach rolling stock, it must be damage-labeled and advice sent to the Station Master or appropriate Authority. (See Plate 59 for Standard Form)
- 3.5.2 The stock, which has been damage-labeled by C&W Supervisor shall not be allowed to proceed on any train unless the damage-label is removed and a fit certificate issued by the C&W Supervisor subsequently (See Plate 60)
- 3.5.3 Rolling stock damage-labeled for defects which make it unsafe to move shall be shunted for placement in sick lines only after taking proper precautions as directed by the C&W Supervisor.
- 3.5.4 A wagon which has been derailed or involved in an accident shall be thoroughly examined and when possible, it shall be placed in sick line for examination. It shall be moved only after it has been certified fit to move at restricted speed if necessary by the C & W Supervisor of Mechanical Department.
- 3.6 **Departmental wagon:**
- 3.6.1 **Periodic Examination & Safety Certification of Departmental Rolling Stock.**
- (Ref: Railway Board's letter No. 2004/M ((Safety)/Deptt. Stock dated May 20, 2004). Examination and certification of the safety of wheels, under gear and structure of Brake Down crane is the responsibility of the Mechanical supervisor (SSE Loco/SSE (Diesel) SSE(C&W)), who is the custodian of the crane. The safety certification shall be carried out at a periodicity of 30 days. Similarly, self propelled

ART/ARMEs are also to be examined and certified for the safety of structure and under gear at a periodicity of 30 days by the nominated Mechanical Supervisor (C & W Supervisor /SSE (Diesel) /SSE (Loco).

- i. All the departmental wagon stock which may run with goods trains, like camping, mobile training cars, OHE wiring trains etc. shall be allotted a C & W depot for Primary maintenance nominated by Chief Mechanical Engineer (or by nominated Mechanical Officer). The allotted depot shall be painted on the stock end wall. Wheels, under gear and structure of the stock shall be examined for safety and certified by the Mechanical Supervisor at the nominated C & W depot. This certificate shall be valid for a maximum period of 30 days from the date of issue.
- ii. Rolling stock, which cannot be dispatched to the nominated depot for primary maintenance shall be offered to the C & W Supervisor at the nearest Train Examination point for inspection and certification of wheels, under gear and structural safety. This certification shall be valid for 30 days from the date of issue.
- iii. All departmental wagons in material trains/ballast trains/PQRS trains etc. shall be examined in terms of IRCA Pt.III 3.2.1. A detailed joint circular shall be issued by a Committee consisting of CME, CE & COM of the zonal railway or their nominated officers, which inter alia should include

- detailed guidelines for examination by C & W Supervisor for running of departmental trains/PQRS rake.
- iv. Tower wagons shall be inspected for safety in terms of Para 20317(2) of AC Traction manual by the Mechanical Supervisor (C & W Supervisor) of the nominated C & W depot nearest to the TRD depot where the Tower wagon is based. The base depot of the Tower wagon shall be painted on its end wall. For this purpose, C & W depot shall be nominated by Sr.DME/DME of the division in consultation with concerned Sr.DEE/TRDs. The certification shall be valid for a maximum period of 30 days/4500 kms, whichever is earlier. Thereafter, the Tower wagon shall be offered to the nominated C & W Supervisor for examination and safety certification again. In case, the Tower wagon is operating in a division away from the nominated depot, the same shall be offered to the nearest Train examining point for C & W examination as soon as the validity of the certificate expires.
 - vi. Track machines shall also be subjected to wheel, under gear and structural safety examination and certification by the Mechanical Supervisor at periodic intervals as decided by concerned Zonal Railways.
 - vii. Notwithstanding the above periodic inspection by the nominated C & W Supervisor/Mechanical Supervisor, the Supervisor in charge/custodian of the

rolling stock in question shall carryout inspection of the rolling stock before starting the operation. In case he notices/suspects any abnormality in the rolling stock regarding structural and under gear safety, he shall immediately arrange to offer the rolling stock for C & W examination afresh.

The Station Master shall not give permission to start the departmental train/any departmental rolling stock unless the supervisor in charge produces the valid safety certificate issued by the nominated Mechanical Supervisor in terms of GR 4.31 and GR 4.35.

3.6.2

Guard Driver Check

3.6.2.1

- i. GDR check should be done for post loading / back loading of a rake.
- ii. After tippling, the rake will be subjected to post tippling examination and check may be carried out by guard and loco pilot.
- iii. If BPC has become invalid then GDR check should be done before taking the rake to the nearest train examination point in the direction of movement.
- iv. In case of the attachment/detachment of the wagon, or reversal of loco at non TXR point, continuity of the brake pipe pressure must be ensured by loco pilot and guard.

3.6.2.2

Items to be observed by guard and driver are detailed and these are to be duly recorded in prescribed Proforma. Trains are to be checked for the following points:

- i. All CBCs are coupled and it should be ensured that CBCs are locked and the operating handle properly set in the slot.

- ii. All Air hoses are properly coupled and secured.
- iii. Air hose at the end of train is properly placed on Air hose carrier.
- iv. All the Angle cocks are in open condition and the angle cock at the end of train is in closed condition.
- v. Empty/Load device handles are kept in correct position on loaded/empty rakes.
- vi. Number of dummy/inoperative cylinders is not exceeding the limits prescribed.
- vii. There are no loose fittings/hanging parts like pull rod, Brake beam, Safety brackets and Brake blocks etc., which endanger safe running of the train.
- viii. All hand brake levers/wheels are released.
- ix. It shall be ensured by the Guard that all the doors of the covered & open wagons are properly closed or secured in open condition in case of perishable/lime stone consignments.
- x. Any other abnormalities noticed are to be recorded in the BPC. Guard & Driver shall prepare a memo jointly on a plain sheet in triplicate indicating the brake power and deficiency, if any, and shall append their signatures and both of them shall retain a copy of the same.
- xi. Guard should obtain SM/YM's endorsement on two copies of joint memo and hand over the third for SM/YM's record.
- xii. SM/YM will inform the section control after making the endorsement on the joint memo and obtain clearance for the train to move.
- xiii. Continuity of the Train pipe air is confirmed through VHF/walkie-talkie set/Whistle code before starting the train.

- xiv. Fitment of Air Brake Gauge is mandatory by Guard of the train.
- xv. Ensure that the rake is cleared with twin pipe brake system if BPC has endorsement as twin pipe, subject to a compatible loco being attached to the train.

3.6.3

Post Loading/Post Tippling Examination

- i. Post loading examination by TXR staff is discontinued; this has been replaced by GDR Check. Post loading check will be carried out by Guard and Driver. After tippling, the rake will be subjected to post tippling examination. In case less than 3 rakes tipped per day, the check may be carried out by Guard and driver as per proforma issued by Railway Board's letter No. 2005/M(N)/951/13 dated Feb.8, 2006.
- ii. As per instruction of Railway Board's letter No. 2005/M(N)/951/13 Pt. dated November 5, 2007, para-2, "*Post loading check of all trains that are loaded with steel consignment should be carried out by TXR staff. In case the loading point is not a TXR point, necessary C&W staff should be deputed for checking and certifying proper lashing/securing of steel consignments.*

3.6.4

Revalidation/Safe to Run Examination

As per instruction contained in para (i) of Railway Board's letter Dated 08.02.2006, safe to run examination by TXR have been discontinued. After every loading/unloading safe to run examination should be carried out by Guard and Driver as per Performa issued by

Railway Board's letter No. 2005/M(N)/951/13 dated Feb.8, 2006.

However, Revalidation/Safe to run examination after loading of Containers shall be carried out by TXR staff as per para 2.5 of Railway Board letter No. 2007/M(N)/951/67 Dated 19/20.11.2008 which is as under-

- “All rakes examined on CC pattern shall be subjected to safe to run examination by TXR (at TXR point) or by Guard & Driver (at other points) after every loading/unloading. Such safe to run examination will be followed by endorsement or revalidation of original BPC. In such safe to run examination only brake power, hanging parts and other defects, which can be noticed visually on wagon loaded with containers, shall be checked and given proper attention.”

3.7

Re-examination of originating trains:

Whenever wagons are detached/attached on trains already released, the Transportation staff shall advise the C&W Supervisor, who shall examine such wagons and issue a fresh certificate for the train.

3.8

Examination of Tank Wagons:

Whenever tank wagons containing Petrol or other inflammable fluid are examined, only special safety torches (battery torches) spark less tools, etc. provided for the purpose shall be used.

3.8.2

Before any repairs are commenced on such stock due precautions shall be taken to remove all such petroleum and other inflammable liquids

- as required under IRCA Red Tariff and special instructions issued by railways.
- 3.8.3 These precautions shall also be observed on empty tank wagons and no staff will be allowed to enter in the tank or to bring naked light or matches near it till the tank has been steam cleaned or cleaned by any other acceptable (RDSO approved) method and is free of vapors as per tests prescribed by the railways.
- 3.8.4 Similar precautions shall also be taken on other wagons containing inflammable material or explosives.
- 3.9 **Examination of Loaded Stock:**
- 3.9.1 Wagons unevenly loaded, overloaded or with shifted loads shall be damage-labeled by the C&W Supervisor for attention by the Commercial staff. The wagon shall be released to the traffic after attention and issue of a fit memo by the C&W Supervisor (Plate 60).
- 3.9.2 Loading of wheels by Shops and maintenance depots should be done as per Plate 61.
- 3.9.3 Subject to the maximum permissible axle loads shown in track restriction maps not being exceeded to, loading in excess of the marked carrying capacity shall be allowed in accordance with rules given below.
- 3.9.3.1 **The following tolerance over the marked carrying capacity is allowed purely for any error in loading –**

Gauge	Four Wheelers (in tonnes)	Bogie Wagons (in tonnes)
Broad Gauge	1	2

- 3.9.3.2 Subject to conditions laid down in Rule 3.9.3.3 below, goods stock loaded with coal, iron ore and general merchandise is allowed to be loaded in excess of their marked carrying capacity, inclusive of the loading tolerance permitted above shown below.

Gauge	Four Wheelers (in tonnes)	Bogie Wagons (in tonnes)
Broad Gauge	2	4

Note:

No overloading is permitted on tank wagons.

Over loading of bogie wagons may not be permitted if the load is not evenly distributed.

In case of container flat wagons, gross wt. of containers refers to wt. of empty container plus wt. of goods which can be loaded.

- 3.9.3.3 The overloading as permitted in Rule 3.9.3.2 shall be subjected to the following condition:-

The load on wagons shall be evenly distributed. Wagons which cannot be overloaded owing to their journal diameters being below the limits prescribed or for any other reasons should bear a four pointed white star 125 mm across the points alongside the figure of carrying capacity on both side of the wagons.

- 3.9.3.4 Any consignment loaded on two or more wagons must have side and bottom clearances as prescribed by the railways to permit free movement of the wagon on curves.

- 3.9.3.5 It should also be ensured that no part of a wagon or consignment is infringing the maximum moving dimensions plates 62, unless special permission for over dimensioned consignment has been obtained for movement covering the whole journey, over home and/or other railways.

Following instructions should be observed by all.

1. Station master of the originating loading station of such rake will give a memo to the Loco pilot & Guard of the train of follow this speed restriction till destination.
2. At crew changing points Loco pilot/Guard to hand over this memo to the outgoing Loco pilot/guard.
3. In addition, divisional control office will also advise to the concerned lobby and to the other divisional control office in case of inter divisional movement.

3.9.3.6 Classification of O.D.C. & Speed limits

Class	Minimum clearance from fixed structure including 3" lurching & bouncing	Maximum speed kmph		Passing fixed structure	Journey	Staff to accompany
		Enroute	Yard, turn out stations			
A	225 mm	Maximum sectional speed of goods train with four Wheeler stock.	8	Dead slow	Day & night	-
B	150 to 225 mm	40	8	Stop dead & dead slow	Day & night	C&W Supervisor & T.I.
C	100 to 150 mm	25	8	Stop dead & dead slow	Day only	C&W Supervisor, T.I & PWI

Note: In case of electrified sections necessary precautions as advised in ACTM volume-I 1994 Para 10436 for vertical clearance visa-vis contact wire should also be taken.

3.10 **Reporting of thefts:** Deficiencies or damages suspected to have been caused by theft, must be reported immediately by the C&W Supervisor to the Railway Protection Force and the Station Master/Guard (Plate 63)

3.11 **Procedure for Warranty Inspection.**

3.11.1 All newly built wagons, when put on line, shall be stenciled in 40 mm. lettering in white paint with the following legend on body panels of each wagon builder so that warranty inspection can be done. These legends shall be obliterated at the time of first POH of the wagons:
Contract No./Railway Board's letter No.

.....

Date of

Commissioning.....

Commissioned

by.....

Inspection due

on.....

Inspection done

by.....

Date of

inspection.....

3.11.2 The inspection of such wagons shall be undertaken by the Train Examining staff during

warranty period, as marked on the legend in order to locate the defects attributable to the manufacturers. The C&W Supervisor shall appropriately stencil the last two columns of the warranty legend and send the inspection reports as per performa at Plate 64 direct to: -

- (a) The wagon builders in the case of wagon defect.
- (b) The roller bearing manufacturers in the case of roller bearing defects.
- (c) Secretary (Wagon Production), Railway Board.
- (d) Chief Mechanical Engineer of the Inspecting Railway.
- (e) Chief Mechanical Engineer of the Owning Railway
- (f) Divisional Railway Manager (Mechanical) of the Division.
- (g) ED/wagon/RDSO/Lucknow
- (h) ED/QA (Mech)/ RDSO/Lucknow

- 3.11.3 In case the rolling stock or portion of the rolling stock are built by the Railway Workshops, the Train Examining staff should undertake the inspection and send detailed report as per proforma shown in Plate 64 direct to: -
- (a) The Workshop, which manufactured the wagon.
 - (b) Secretary (Wagon Production), Railway Board.
 - (c) Chief Mechanical Engineer of the Manufacturing Railway Workshops.
 - (d) Chief Mechanical Engineer of the Inspecting Railway.
 - (e) Chief Mechanical Engineer of the Owning Railway
 - (f) Divisional Railway Manager (Mechanical) of the Division.
 - (g) ED/wagon/RDSO/Lucknow
 - (h) ED/QA (Mech)/ RDSO/Lucknow

- 3.11.4 A 'Nil' report should be sent if there are no defects attributable to the manufacturer.
- 3.12 **Procedure for disposal of damaged wagons:**

 - 3.12.1 A wagon unless irreparably damaged, must be repaired by the railway on which the damage has occurred. However, seriously damaged wagons requiring shop repairs should be sent to the nearest Workshop with intimation to the owning railways.
 - 3.12.2 When goods stock of other than the owning railway is irreparably damaged on any railway, notice in general terms stating how and when the damage took place and the nature of it shall be sent within one month by the damaging railway to the owning railway, a copy of this notice being forwarded by the damaging railway to the General Secretary, I.R.C.A.

- 3.13 **Procedure for disposal of overdue POH wagons:**

 - 3.13.1 Wagon shall be considered due overhaul from the last date of the month as shown on the Return Date and should be booked to the nearest nominated Workshop for POH.
 - 3.13.2 A C&W Supervisor discovering a time expired wagon must attach labels bearing the words "Due Periodical Overhaul" and the wagon should be booked to the nearest Workshop and may be loaded in the same direction.
 - 3.13.3 Whenever wagon belonging to any zonal Railway is booked to another zonal Railway workshop for nominated repairs and the wagon is within 6 months of its due date for periodical overhaul it must be given a periodical overhaul by the

- repairing railway in addition to any other repairs that may be necessary.
- 3.13.4 The owning railways should be sent a monthly list of wagons dealt with in accordance with Rule 3.13.3 above.
 - 3.13.5 When one railway's wagon is overhauled in another Railway's Workshop, the owning railway will be debited on the basis of the average unit cost of POH repairs of the repairing railway.
 - 3.13.6 No repairs other than those required for safe running, should be carried out on wagons booked to nearest workshop for periodical overhaul. Wagons must be billed as usual.
Where a rejectable defect cannot be attended to on the train in the yard, the wagon shall be damaged-labeled for attention in the sick line as per Plate No. 59.
- 3.14 Procedure for Interchange of goods stock:**
- 3.14.1 All goods stock on being received in interchange shall pass into the custody of the receiving railway, which shall be responsible for its maintenance, and for every contingency arising from the use of such goods stock so long as it remains on that railway. For the list of Interchange junctions see Appendix J.
 - 3.14.2 The system of interchange between Zonal Railways has been dispensed with. However, the wagons going into and coming out of private sidings such as Port Trust, Steel Plants, Thermal Plants, etc. are deemed to undergo interchange for the purpose of assessing the cost of damages/deficiencies suffered inside the sidings. Recovery from siding owner should be done as per Rly.Bd's guidelines vide letter No.

98/M(N)/951/12 dated 27.11.2002 or latest instructions.

- 3.14.3 The charges for the damages suffered by the wagons inside private sidings shall be raised on a monthly basis, duly indicating the damages/deficiencies in each wagon.
- Remarks: Recovery from siding owner should be done on average method as per Rly.Bd's guidelines vide letter No. 98/M(N)/951/12 dtd. 27.11.2002 or latest instructions.
- 3.14.4 A wagon which sustains headstock and/or under frame repairs shall be worked to the nearest major sickliness or workshop for repairs, provided it is fit to run in that condition.

CHAPTER – IV

REJECTIONS

4.0 REJECTION RULES FOR BROAD GAUGE GOODS STOCK

- 4.1 From Workshops, stock must not be allowed with any rejectable or other defects. The stock must be turned out after complete repairs, in accordance with the rules laid down in Chapter-II and Chapter-III. The permissible wear and clearances on different components shall conform to limits and tolerances specified for workshops.
- 4.2 From sick lines, stock must not be allowed with rejectable defects. Rules laid down in Chapter II and III shall be followed.
- 4.3 Notwithstanding any provision in the Rules, rolling stock must not be allowed to run, if in the opinion of C&W Supervisor, it is in such a condition as to cause an accident.
- 4.4 Broad Gauge goods stock with any of the defects listed below shall not be allowed in service. Such of the clauses which have direct bearing on safe running of trains have been prefixed with the letter 'S' for the guidance of the staff concerned.

4.5 Infringement of standard moving dimensions:

- 'S'4.5.1 Any part of a wagon or load infringing the maximum moving dimensions, (Plate 62) except when special permission covering the whole journey whether over home and/or other railway has been obtained.
- 'S' 4.5.2 Infringement of Rule 2.13.1

4.6 IRREGULAR LOADING

- 4.6.1 Loaded in excess of the marked carrying capacity.

NOTE: Overloading tolerance as indicated in Rule 3.9.3.1, 3.9.3.2 shall be permitted.
- 'S' 4.6.2 Difference of height from rail level more than 64 mm between any two buffers measured at the head stock on a wagon (in case of buffers provided in the wagon).
- 'S' 4.6.3 Load insufficiently secured.
- 4.6.4 Bogie Rail Truck not equipped with at least 5 bolster & 6 stanchions (BRHN & BRN).
- 'S' 4.6.5 A load carried on more than one wagon in such a manner as to prevent free movement of any wagon round a curve.
- 'S' 4.6.6 Any lashing chain not secured against trailing from a wagon.
- 'S' 4.6.7 Load un-evenly distributed.

4.7 OVER DUE OVERHAUL

- 4.7.1 Any wagon overdue overhaul unless moving towards the nearest workshop or owning railway for POH. - See 3.13.1 & 3.13.2.
- 4.7.2 Overdue ROH/IOH (BVZI) - See 2.4.3.3, 2.4.3.4 & 2.4.3.6.

4.8. OVER DUE WARRANTY INSPECTION

- 4.8.1 Newly built wagons overdue warranty inspection after being put on line.
- 4.8.2 Newly built wagons without warranty details stenciled on the body panels.

4.9 BODY WORK DEFECTS

- 4.9.1 Plain roof of an empty wagon torn, broken, cut or corroded to such an extent that there is an opening more than 50 mm long.
- 4.9.2 Door missing except on: -
 - (a) A wagon moving towards shops for POH.
 - (b) Open wagon with a load requiring a crane for its transshipment.
- 'S' 4.9.2.1 Defects causing opening of flap door during run.
- 4.9.3 Flap doors rivets of covered wagons if found deficient.

- 4.9.4 Door, or man-hole cover of an empty wagon, which is not closed and properly secured by full complement of fastenings except when permanently closed by riveting.
- 'S'4.9.5 Hand rail or foot board deficient, damaged or insecurely fastened in door way of a goods brake-van

4.10 UNDER-FRAME DEFECTS

- 'S' 4.10.1 A crack extending into the web and visible on both sides of an under frame member. A loose patch on an under frame member, or a patched member showing signs of crippling.
- 'S' 4.10.2 Head-stock of Broad Gauge wagon bent so that the centre of CBC face is displaced in any direction more than 35 mm from its normal position.

NOTE: No packing is permissible except on wagons booked for repairs.

- 'S' 4.10.3 Truss rod brackets deficient or fractured.
- 4.10.4 Three or more adjacent body brackets broken or deficient.
- 4.10.5 Floor boards of an empty wagon deficient or defective.
- 4.10.6 Centre sill worn out, broken/crack, gusset plate broken/crack.

4.11 AXLE GUARD DEFECTS

- 'S'4. 11.1 Axle guard worn or expanded sufficiently to permit either leg to work clear of its groove in the axle box.
 - 'S'4. 11.2 Any portion of the axle guard horn cheek broken or deficient.
 - 'S'4. 11.3 Axle guard so bent as to prevent free movement of axle box.
 - 'S'4.11.4 Pressed steel axle guard cracked unless repaired.
 - 'S'4. 11.5 One or more rivets deficient or broken or of wrong size.
 - 4.11.6 Axle guard fitted with one or more bolts.
 - 'S'4. 11.7 Any axle guard leg shaking due to slack rivets.
 - 4.11.8 One or more rivets broken or deficient in horn cheek.
 - 'S'4. 11.9 Bridle broken or deficient.
 - 4.11.10 Bridle for 4-wheeled brake van, without jaws or turned ends.
 - 4.11.11 Bridle of a section less than 4 Sq. Cm. or thickness less than 13 mm.
 - 4.11.12 Bridle of wagon not secured by rivets or with a rivet deficient or broken.
- 4.12 TANK WAGONS DEFECTS**
- 'S'4.12.1 Leak permitting the contents to escape in steady drip.
 - 4.12.2 Manhole covers deficient on empty wagons or kept in open condition.
 - 'S' 4.12.3 Cradle or support bracket for tank barrel broken or with more than three rivets broken or deficient.

- 4.12.4 Any longitudinal or diagonal tie rods and/or fastening bands, lashing straps or stay rods for barrels slack, broken or cracked.
- 4.12.5 Twin buckle for barrel strap cracked or broken.
- 'S' 4.12.6 Bottom discharge valve deficient or defective and not secured by blank flange and full complement of bolts and nuts.
- 'S' 4.12.7 Master valve deficient/defective on tank wagons other than heavy oil, LSHS, Bitumen, coal tar and molasses.
- 'S' 4.12.8 Safety valve deficient on wagons with provision for safety valve.
- 'S' 4.12.9 Pressure release valve deficient on wagons with provision for pressure release valve.
- 'S' 4.12.10 If non-metallic sealing wires do not materialize, the Oil companies/ loading parties shall ensure that the metallic sealing wires are wound taut and the loose/uncut length of the sealing wires does not project more than 1 inch (25 mm) vertically from the centre of the hole provided in eye bolts for sealing. Loose winding of sealing wires all around the Dome Cover is strictly prohibited.
Used sealing wires shall be removed completely from the Dome Cover and shall not be left on the wagon Body/ Barrel.

4.13 BOGIE DEFECTS

4.13.1 Bogie frame defects

- 'S' Side frame cracked/broken.
- 4.13.1.1
- 4.13.1.2 Bogie side frame column liner deficient/weld given up.
- 4.13.1.3 Side frame key with bolt/retainer bolt missing or improper fitment.
- 'S' Trolley frame out of square or damaged
- 4.13.1.4
- 'S' Any member of trolley frame cracked or welding failed.
- 4.13.1.5 This shall include knee plates, gusset plates and diagonal bars with their rivets broken or deficient.
- 4.13.2 Bolster defects**
- 'S' Bolster cracked / broken
- 4.13.2.1
- 4.13.2.2 Bolster liner deficient/weld given up.
- 'S' Bolster safety brackets broken or improperly secured.
- 4.13.2.3
- 4.13.3 Centre pivot defects**
- 'S' Top/bottom centre pivot cracked/broken.
- 4.13.3.1
- 4.13.3.2 Top/Bottom centre pivot huck bolts/rivets loose/deficient
- 4.13.3.3 Pivot pin, shackle lock/lock pin deficient.
Pivot plate casting or pin broken cotter and/or rivet deficient.
- 4.13.4 Spring plank defects**
- 'S' Spring plank broken. Spring plank rivets, fit bolts loose / deficient.
- 4.13.4.1

4.13.4.2 Any spring spigot on the plank stripped out.

4.13.5 Side bearer defects

'S' Any side bearer housing cracked/broken

4.13.5.1

4.13.5.2 Side bearer housing securing bolts/rivets worked out or improperly secured.

4.13.5.3 Side bearer non metallic spring pad/metallic spring deficient/damaged.

4.13.6 Elastomeric pads perished/damaged.

4.13.7 Bogie suspension defects

'S' Any coiled bearing spring cracked or broken/shifted.

4.13.7.1

'S' Wedge cracked/broken.

4.13.7.2

4.13.7.3 Any plate of a laminated bearing spring or any coiled bearing spring cracked or broken

4.13.7.4 Bearing spring buckle loose, broken, cracked and/or packing plate loose or deficient.

4.13.7.5 Any plate or buckle displaced from its central position by 13 mm or more.

4.13.7.6 Bearing spring buckle not sitting square in the axle box housing or crown packing where fitted.

- 4.13.7.7 Incorrect type of bearing spring for the particular design of wagon.
- 4.13.7.8 Scroll iron fractured, deficient of a rivet or fitted with a loose or wrong size rivet.
- 4.13.7.9 Scroll iron fitted with one or more bolts.
- 4.13.7.10 Shackle or pin cracked, deficient or of wrong size.
- 4.13.7.11 Bearing spring hanger cracked or broken or nut or jib cotter deficient or defective.
- 4.13.7.12 Bearing spring shackle pin not fitted with a split cotter.
- 4.13.7.13 Bearing spring eye or shackle plate touching the sole bar.
- ‘S’ Bearing spring suspension link cracked or broken.
- 4.13.7.14
- ‘S’ Stone shackle for spring suspension link cracked or broken.
- ‘S’ Any part of spring hanger bracket on trolley frame cracked, broken or welding failed.
- 4.13.7.16
- 4.13.7.17 Bearing spring shackle not freely articulated and binding at corner.

4.14 BRAKE RIGGING DEFECTS

- ‘S’ 4.14.1 Infringement of Rule 3.2.6.3 & 3.2.6.4.
- ‘S’ 4.14.2 Brake block deficient, broken at the eye, not secured properly with the fastening of nut or cotter or worn so thin

so that the flange of the wheel is 6 mm or less from the brake beam collar on brake application. The shoe type renewable brake block when the thickness is reduced to 10 mm.

'S' 4..14.3 Any defect in brake rigging preventing application or release of brakes.

'S' 4..14.4 Any safety strap/bracket/hanger pull rod or brake beam not in accordance with rule 2.12.1.2.

'S' 4..14.5 Any pin deficient or broken or any split pin or cotter deficient or free to work out in the brake gear.

'S' 4..14.6 Brake blocks key missing or improper fitment.

'S' 4..14.7 Van valve adapter 'B' deficient (Plate 65).

4..14.8 Brake not applying on dropping the hand brake lever by its own weight, or brake screw or nut inoperative.

4..14.9 Hand brake wheel/assembly deficient/defective, Hand brake lever collar not secured by rivet to the brake shaft.

NOTE: As alternative to rivet, a 10 mm diameter rod with both ends bent over close to the collar, each bent end being not less than 25 mm, may be permitted.

Hand brake spindle rod sleeve not secured by rivets or non fitment of washer away from 100 mm of sole bar inside.

- 4..14.10 Brake gear slack adjuster or any part of assembly deficient.
- 4..14.11 Brake gear empty/load box defective or handle not operating.
- 4..14.12 Brake shoe deficient, broken, out of alignment due to wear on brake head or thickness of brake shoe less than 13 mm.
- 'S'4.14.13 Welding of brake beam hanger bracket failed.
- 4.14/.14 Brake gear floating lever cutting the axle.

4.15 AIR BRAKE SYSTEM DEFECTS

- 'S' 4.15.1 Stock without air brake connection from coupling to coupling.
- 'S' 4.15.2 Stock with deficient/damaged or inoperative distributor valve or its parts, common pipe bracket with control reservoir, cut off angle cocks, dirt collector, brake cylinder, auxiliary reservoir check valve and hose coupling assembly for BP and FP.
- 'S' 4.15.3 Stock having excessive leakage from the system.
- 'S' 4.15.4 Stock with damaged pipes and pipe fittings.
- 'S' 4.15.5 Brake van quick coupling deficient/defective.

'S' 4.15.6 Auxiliary reservoir band not secured properly with nut or stud not covered by welding minimum to a length of 50 mm.

4.16 BUFFING AND DRAW GEAR DEFECTS

'S' 4.16.1 Buffer deficient or drooping (if provided on the wagon)

'S' 4.16.2 Any buffer dead (if buffers provided on the wagon)

4.16.3 Buffer plunger/ casing cracked over a length more than 100 mm or casing bolt deficient. (if buffers provided on the wagon)

'S' 4.16.4 Buffer spindle broken or nut deficient. (if buffers provided on the wagon)

4.16.5 Buffer height beyond specified limit. (if buffers provided on the wagon)

'S' 4.16.6 More than three rivets or countersunk bolts missing from a buffer plunger

'S' 4.16.7 Draw bar, draw hook or draw link broken or cracked.

4.16.8 Shoulder of draw bar hook projecting more than 32 mm beyond the headstock faceplate.

'S' 4.16.9 Draw bar spring deficient or broken in more than two pieces.

'S' 4.16.10 Draw bar worn more than 13 mm through any section.

4.16.10

'S' 4.16.11 Draw bar, nut deficient or of incorrect size.

4.16.11

- 'S' Draw bar nut not secured with a split cotter of the correct size.
- 4.16.12
- 'S' Draw bar shackle pin free to work out.
- 4.16.13
- 'S' Draft key or any pin free to work out in twin draw bars.
- 4.16.14
- 'S' Draw bar rubbing block cracked/broken/missing.
- 4.16.15
- 'S' Draw bar which can be turned upside down.
- 4.16.16
- 'S' Draw bar cradle, yoke or support bracket broken or missing.
- 4.16.17
- 'S' Screw coupling missing.
- 4.16.18
- 4.16.19 Any part of screw coupling or shackle assembly including suspension hook deficient, broken or of incorrect size.
- 4.17 CENTRE BUFFER COUPLER (CBC) DEFECTS**
- 'S' 4.17.1 Centre Buffer Coupler knuckle pin broken, bent or incorrect size and its improper fastening arrangement.
- 'S' 4.17.2 Centre Buffer Coupler body visibly cracked or with any part broken off and/ or missing.

- 4.17.3 Coupler body shank or housing worn by 10 mm.
- 4.17.4 Coupler body with cracked/bent guard arm.
- 4.17.5 Striker casting cracked more than 25 mm at any location.
- 4.17.6.1 Striker casting wear plate deficient, cracked or worn out up to 5 mm.
- 4.17.6.2 Striker casting stud deficient.
- 'S' 4.17.7 Centre Buffer Coupler yoke pin support plate missing, broken or its wear plate worn out.
- 'S' 4.17.8 Centre Buffer Coupler shank cracked or bent or out of alignment.
- 4.17.9 CBC shank wear plate missing where originally fitted.
- 'S' 4.17.10 Centre Buffer Coupler lock lift assembly so defective that the CBC cannot be coupled/ uncoupled.
- 'S' 4.17.11 CBC with defective/deficient components.
- 4.17.12
- 'S' 4.17.13 Full knuckle throw, locking not obtained due to defective components, anti creep arrangement not functioning.
- 'S' 4.17.14 Interference in the normal movement of coupler due to improper clearances.

- 'S' Cracks in the knuckle side wall.
- 4.17.15
- 4.17.16 Distance between the nose of the knuckle and guard arm exceeds limit due to wear in the components and distorted guard arm.
- 4.17.17 Centre Buffer height not in accordance to Rule 2.13.1
- 'S' Knuckle thrower and lock lift assembly excessively worn, broken, bent or otherwise distorted so that CBC cannot be uncoupled.
- 'S' Excessive wear on lock.
- 4.17.19
- 4.17.20 Coupler knuckle nose wear beyond permissible limit.
- 'S' Knuckle pivot pin having steps, cracks, bent or with dia less than 40 mm at any point.
- 4.17.21
- 4.17.22 Knuckle pin APD deficient.
- 4.17.23. Knuckle hub wear exceeds permissible limit.
- 4.17.24 Excessive wear on lock engagement surface of knuckle.
- 4.17.25 Knuckle pulling lug and pin protector wear excessive.
- 4.17.26 Yoke strap bent, broken, cracked or worn more than 4 mm.

4.17.27 Yoke pin bent or having steps or cracks or diameter less than 86 mm at any point.

4.17.28 Yoke pinhole wear exceeds 2 mm.

4.17.29 Coupler body with parts broken off and or missing.

4.18 DRAFT GEAR DEFECTS

4.18.1 Free slack in the draft gear exceeds 25 mm.

4.18.2 Draft gear housing with cracks or excessive wear.

4.18.3 Front follower wear exceeds 3mm.

4.19 WHEEL, AXLE AND TYRE DEFECTS.

'S' 4.19.1 Any prescribed defect (Plates 31 & 52 to 58).

'S' 4.19.2 Flat tyre limit for BG Freight stock is 60 mm.

19.1(a)

'S' 4.19.3 Loose, cracked or broken.

'S' 4.19.4 Wheel shifted on axle.

'S' 4.19.5 Thermal defects viz. Spread rim, Shattered rim, shelled tread, thermal crack

'S' 4.19.6 Flange of any wheel within 25 mm of the bottom of a wagon.

4.20 CARTRIDGE ROLLER BEARINGS DEFECTS

- 'S' 4.20.1 Bearing running hot.
- 'S' 4.20.2 Bearing jammed/giving abnormal sound of broken cage or roller.
- 4.20.3 Outer cup broken or cracked.
- 'S' 4.20.4 Excessively front/rear seal leakage due to seal damaged, seal loose.
- 'S' 4.20.5 End cap screw loose or locking plate missing or tabs of locking plate not properly bent against the face of cap screw head.
- 4.20.6 CTRB over due

4.21 ADAPTER DEFECTS

- 'S' 4.22.1 Worn/Cracked/distorted adapter.

4.22 AXLE BOXES DEFECTS

- 'S' 4.22.1 Hot Box.
- 'S' 4.22.2 Axle box broken.

'S'- Indicates safety item. However, it should be primarily understood that service wear limits mentioned in this book are not safety limits. Service wear limits are far more restrictive when compared with wear limits for safety. Hence, any variation from service wear limits as stipulated should, under no circumstances be considered unsafe for running of wagons on trains.

APPENDIX

A to O

APPENDIX – A

See Rule 2.4.1 (b)

CONVERSION FACTOR AND AIR SPACE TO BE PROVIDED IN THE TANK WAGONS CARRYING DIFFERENT FLUIDS

Sl. No.	FLUID	Air Space Percentage	τ Liter per Tonne
1.	Acid Sludge	5	715
2.	Ammonia (liquid)	5	1793.6
3.	Aromex	2 ½	1117
4.	Aviation Sprit	4	1405
5.	Aviation Turbine Fuel	2 ½	1276
6.	Axle/Lub.Oil	2 ½	1113
7.	Black Oil	2 ½	1160
8.	Castor Oil	2 ½	1045
9.	Country Sprit	4	1130
10.	Creosote	2 ½	970
11.	Earth Oil	2 ½	1021
12.	Furnace Oil	2 ½	1081
13.	High Speed Diesel Oil	2 ½	1198
14.	Hydrochloric Acid	5	850
15.	Inferior Kerosene Oil (yellow)	2 ½	1250
16.	Iomex Denatured	2 ½	1148
17.	Iomex Pure	2 ½	1166

18.	J.P. – 4	4	1338
Sl. No.	FLUID	Air Space Percentage	τ Liter per Tonne
19.	Jute Batching Oil	2 ½	1174
20.	Light Diesel Oil	2 ½	1162
21.	Liquid Caustic Soda	5	662
22.	Malaria Oil	2 ½	1133
23.	Mineral Turpentine HAWS (High speed Aromatic White Spirit)	2 ½	1288
24.	Mineral Turpentine LAWS (Low speed Aromatic White Sprit)	2 ½	1276
25.	Molasses	2 ½	769
26.	Motor Sprit	4	1414
27	Naphtha produced by Barauni Refinery	4	1730
28.	Naphtha produced by Koyali Cochin, Madras , Visakhapatnam and BPCL Refineries,	4	1959
29.	Naphtha Straight run	2 ½	1351
30.	Petrol	4	1417
31.	Petroleum gas (Liquid)	5	2008
32.	Phosphoric Acid	5	616
33.	Powerine	2 ½	1239
34.	Power Alcohol (Rectified Sprit)	4	1260
35.	Sleeper Oil	2 ½	1090

36.	Solar Oil	4	1096
37.	Solvent Oil	4	1465
SI. No.	FLUID	Air Space Percentage	τ Liter per Tonne
38.	Spindle Oil	2 ½	1086
39.	Sulphuric Acid	5	572
40.	Superior Kerosene Oil	2 ½	1262
41.	Tea Drier Oil	2 ½	1081
42.	Turpentine Oil (light)	2 ½	1140
43.	Vaporizing Oil	2 ½	1254
44.	Vegetable Oil	2 ½	1109
45.	Wash Oil	2 ½	1122
τ Rounded off to nearest whole number.			
Note: - The conversion factors quoted in this Appendix are based on average densities and will not apply for Commercial purposes to products of various sources, which may have different densities.			

APPENDIX-B

(See Rule 2.4.4)

TRANSPORTATION AND MECHANICAL CODES

Transportation codes and Mechanical codes for different types of BG wagons are as under :

Description of the wagon	Transportation Code	Mechanical Code
OPEN WAGONS		
Hopper with top and 4 row controlled bottom discharge with Casnub bogies with transition couplings with air brake	BOBYN	BOBYN
Hopper wagon with casnub bogies bottom automatic discharge system wagon	BOBR	BOBR
Hopper wagon with casnub bogies automatic discharge system wagon (revised)	BOBRN	BOBRN
Hopper wagon with casnub bogies	BOBSN	BOBSN
Hopper wagon with casnub bogies, high axle load and automatic discharge system wagon	BOBRNEL	BOBRNEL
Bogie open wagon fitted with CASNUB bogies and air brakes.	BOXN	BOXN
Bogie open wagon with CASNUB bogies, air brakes and stainless steel body	BOXNCR	BOXNCR
Bogie open wagon with CASNUB 22HS bogies, air brake	BOXNHS	BOXNHS

Bogie open wagon with IRF-108 HS bogies, air brake	BOXNHA	BOXNHA
Description of the wagon	Transportation Code	Mechanical Code
Bogie open wagon with CASNUB bogies, air brakes and high axle load	BOXNEL	BOXNEL
Bogie open wagon with CASNUB HS bogies, air brake for loading steel sections	BOST	BOST
Bogie open wagon with CASNUB 22HS bogies (modified for 22.9t axle load), air brake	BOXNHL	BOXNHL
COVERED WAGONS		
BG Covered Hopper for grains	BCBG	BCBG
Bogie covered wagon fitted with CASNUB bogies & air brakes	BCN	BCN
Bogie covered wagon with CASNUB bogies & air brakes for loading Auto cars	BCCN	BCCN
Bogie covered wagon with CASNUB bogies & air brakes. All welded Broad gauge covered wagon	BCNA	BCNA
Bogie cement wagon fitted with CASNUB bogies & air brakes	BCW,BCCW	BCW
Bogie Covered wagon with CASNUB 22 HS bogies & air brakes.	BCNAHS	BCNAHS
Bogie Covered wagon with CASNUB 22HS bogies (modified for 22.9t axle load), air brake	BCNHL	BCNHL

Bogie Covered wagon with CASNUB bogies, air brakes and high axle load.	BCNEL	BCNEL
Description of the wagon	Transportation Code	Mechanical Code
TANK WAGONS		
Tank wagon phosphoric acid	-	BTPH
Bogie tank wagon with CASNUB bogies and air brake for loading Caustic soda	-	BTCS
Bogie tank wagon for LPG with CASNUB bogies and air brake	BTPGLN	BTPGLN
Tank wagon Ammonia with Air Brake & CBC	BTF	BTALN
Tank wagon, Alumina.	BTAP	BTAP
Tank wagon, Heavy oil like LSHS, RFO	BTOH	BTOH
Tank wagon for petroleum product	BTPN	BTPN
Tank wagon for petroleum product	BTFLN	BTFLN
Tank wagon ammonia with CASNUB bogie, air brake & CBC	BTALNM	BTALNM
FLATS, CONTAINER AND WELL WAGONS		
Bogie Rail Truck with CASNUB bogies and Air Brake.	BRN / BRNA	BRN / BRNA
Bogie Flat wagon with CASNUB bogies and Air Brake.	BFNS	BFNS
Bogie Flat wagon with CASNUB HS bogies	BRNAHS	BRNAHS
Bogie Flat wagon with CASNUB bogies for Engg. Dept.	BRHNEHS	BRHNEHS

Bogie Flat wagon with CASNUB 22.9 t bogies	BRN 22.9	BRN22.9
Bogie Rail Wagon for heavy vehicles	BRSTN	BRSTN
CONTAINER WAGONS:		
Bogie Low platform container flat wagon (A-Car & B-Car) with LCCF 20 (C) type Cast Steel Bogies with Graduated release compressed Air Brake system with LSD	BLCA BLCB BLLA BLLB BLCAM BLCBM	BLCA BLCB BLLA BLLB BLCAM BLCBM
Container flat wagon with std. floor height	BFKN	BFKN
Bogie covered auto car modified wagon	BCACM	BCACM
Bogie covered auto car carrier wagon	BCACBM	BCACBM
WELL WAGONS		
Bogie open Military wagons for Defence Equipments	BOMN	BOMN
Bogie Well wagon (well height 1055 mm)	BWTB	BWTB
Bogie open Military wagons for Ministry of Defense	D/BKM	BOM

Description of the wagon	Transportation Code	Mechanical Code
BRAKE VANS		
Covered Brake Van with ICF bogie and air brake.	BVZI	BVZI
Covered brake van with Non- transition CBC and Air brake	BVZC	BVZC
Covered Brake Van with CASNUB bogie and air brake.	BVCM	BVCM

APPENDIX –C

LIST OF BROAD GAUGE WORKSHOPS WITH THEIR CODES

CODE	FULL NAME	DIVISION	RAILWAY
ADAW	Adra Wagon Shops	AWM/Adra	SER
AIIW	Ajmer Carriage Workshop	CWM/Ajmer	NWR
ADLW	Ajmer Loco Workshop	CWM/Ajmer	NWR
AMVM	Alambagh Workshops	CWM/Alambagh	NR
ASRW	Amritsar Workshops	CWM/Amritsar	NR
BKNW	Bikaner Workshop	CWM/Bikaner	NWR
BVPW	Bhavnagar Workshop	CWM/Bhavnagar	WR
CRWS	Coach Rehabilitation Work Shop	CWM/Bhopal	WCR
DBWS	Dibrugarh Workshop	CWM/Dibrugarh	NFR
DHDW	Dahod Workshop	CWM/Dahod	WR
GKPW	Gorakhpur Workshop	CWM/Gorakhpur	NER
GOC	Golden Rock Workshop	CWM/Golden Rock	SR
HRT	Harnaut Workshop	CWM/Harnaut	ECR
IZNS	Izatnagar Workshop	CWM/Izatnagar	NER
CMLR JHS	JHS Coach Rehabilitation Work Shop	CWM/Jhansi	NCR
JHSW	Jhansi Workshop	CWM/Jhansi	NCR
JMPW	Jamalpur Workshop	CWM/Jamalpur	ER
JUDW	Jagadhri Workshop	CWM/Jagadhri	NR
JUWS	Jodhpur Workshop	CWM/Jodhpur	NWR

JND	Junagarh Workshop	WM/Junagarh	WR
CODE	FULL NAME	DIVISION	RAILWAY
KGPW	Kharagpur Workshop	CWM/Kharagpur	SER
KW	Kalka Workshop	WM/Kalka	NR
KPAW	Kanchrapara Workshop	CWM/Kanchrapara	ER
KTW	Kota Workshop	CWM/Kota	WCR
KWV	Kurudwadi Work Shop	WM/Kurudwadi	CR
LGD	Lallaguda Workshop	CWM/Lallaguda	SCR
LLHM	Lilluah Workshop	CWM/Lilluah	ER
MCSW	Mancheswar Workshop	CWM/Mancheswar	ECoR
MIB	Motibag Workshop	CWM/Motibag/NGP	SECR
MTNS	Matunga Workshop	CWM/Matunga	CRI
MYSS	Mysore Workshop	Dy.CME/Mysore	SWR
NBQS	New Bongaigaon Workshop	CWM/New Bongaigaon	NFR
PL	Lower parel Workshop	CWM/Lower Parel	WR
PR	Parel Workshop	CWM/Parel	CR
PRTN	Pratap Nagar Workshop	CWM/Pratapnagar	WR
PWP	Perambur Carriage & Wagon Workshop	CWM/Perambur	SR
PWP/L	Perambur Loco Workshops	CWM/Perambur (LOCO)	SR
RWS	Raipur Workshops	CWM/Raipur	SECR
RYPS	Guntupalli (Rayanapadu) Workshops	CWM/Rayanapadu	SCR
SPJS	Samastipur Workshops	CWM/Samastipur	ECR

TDH	Tindharia Workshop	CWM/Tindharia	NFR
CODE	FULL NAME	DIVISION	RAILWAY
TPYS	Tirupati Workshops	Dy.CME/Tirupati	SCR
TWS CLA	Tank Wagon Shops Kurla	CWM/Matunga	CR
UBLS	Hubli Workshops	CWM/Hubli	SWR

CATEGORISATION OF FREIGHT TRAIN EXAMINATION POINTS INCLUDING YARDS, SICK LINES AND ROH DEPOTS										
S	Railway	Division	NAME OF POINTS	Station Code	Prem. Points	CC Points	Exam. Yards	Sick Lines	R.O.H depots	
1	C R	BB	VADALA ROAD	VDL R			D	B		
		BB	KALYAN	KYN	Pr .		C	A		
		BB	TROMBEY	TMB Y			D	B		
		BS L	BHUSAVAL	BSL	Pr .	CC	A	E	A	
		NG P	AJNI	AQ (ICD)	Pr .	CC	A	A	C	
		PA	MIRAJ	MRJ			C	E		
		SU R	WADI	WA DI	Pr .	CC	A	B		
		SU R	DAUND	DD	Pr .		A	A	A	

		TOTAL			5	3	8	8	3
2	E R	AS N	ANDAL-UP YARD	UDL -Up	Pr .	CC	B	A	A
		AS N	DURGAPUR STEEL EXCHANGE	DSE Y	Pr .		C	E	
		AS N	ANDAL EMP-YARD	UDL (Em p-Yd)	Pr .		C		
		AS N	SITA RAMPUR	STN			F	F	
		AS N	ANDAL DN YARD	UDL (Dn Yd)	Pr .		C	B	
		H W H	PAKUR	PKR	Pr .	CC	C	A	
		ML DT	JAMALPUR	JMP			F	F	
		ML DT	MALDA TOWN	MLD T	Pr .		A	A	
		SD AH	NAIHATI	NH	Pr .	CC	A	A	A
		SD AH	BUGBUG	BGB			F	F	
		SD AH	CHITPUR	CP	Pr .	CC	A	A	
		SD AH	MAJERHAT	MJT (ICD)/(K oPT)		CC	A	F	
TOTAL					8	5	1 2	1 1	2
3	E C R	DH N	BARVADIH	BR WD		CC	A	A	A
		DH N	PATHER DIH	PEH	Pr .	CC	D	C	

		DH N	OBRA	OB R	Pr .	CC	C	B	
		DH N	PATRATU	PTR U	Pr .		E	F	
		M GS	MUGALSARAI	MG S (DR Y)	Pr	CC	A	B	A
		M GS	MUGALSARAI	MG S (DD Y)			F		
		M GS	MUGALSARAI	MG S (UD Y)	Pr .		D		
		SE E	NARAYANPUR ANANT	NRP A	Pr .		C	B	
		SE E	GHARHRA	GHZ	Pr .		E	F	
		TOTAL			7	4	9	7	2
4	E Co R	KU R	CUTTC	CTC	Pr .		D	B	
		KU R	PARADEEP	PRD P			D	F	A
		SB P	KATABHANJI	KBJ			D	F	
		W AT	VISAKHAPAT NAM-ORE EXCHANGE	VSK P- OE C	Pr .	CC	A	A	A
		W AT	VISAKHAPAT NAM-RAW MAT YARD	VSP S- RM UY	Pr .	CC	A	A	A
		W AT	VISAKHAPAT NAM- RECEPTION YARD	VSK P-R Yd	Pr .	CC	A		

		W AT	VISAKHAPAT NAM	VSK P- CSL				A	A
		W AT	VISAKHAPAT NAM	VSP S- FPY	Pr .		B		
		W AT	RAIGADA	RG DA			F		
		TOTAL			5	3	8	6	4
5	N R	DL I	TUGLKABAD	TKD	Pr .	CC	A	A	A
		DL I	GHAZIABAD	GZB	Pr .		B	A	
		DL I	SAKURBASTI	SSB			B	B	
		FZ R	LUDHIANA	LDH	Pr .	CC	A	A	
		FZ R	AMRITSAR	ASR			D	A	
		FZ R	JULANDHAR	JUC	Pr .		C	F	
		FZ R	JAMMU TAVI	JAT			F	A	
		LKO	LUCKNOW	LKO			B	A	
		MB	MORADABAD	MB					A
		U MB	AMBALA	UM B	Pr .	CC	A	A	A
		U MB	KHANAALAM PURA	KJG Y	Pr .	CC	A	A	A
		U MB	BHATINDA	BTI	Pr .		A	A	
				PTK			F		
		U MB		RTP			F		
TOTAL					7	4	1 3	1 1	4
6		AG C	BAD	BAD	Pr .		A	A	C

		AL D	KANPUR	GM C (ICD)/CP C	Pr .	CC	C	A	A	
N C R	N C R	AL D	KLPL(ICD)/Pan ki	Pan ki			A			
		AL D	DADRI	DER (ICD)		CC	A			
		AL D	ARIL(ICD)/Kh urja	KRJ			A			
		JH S	JHANSI	JHS	Pr .		A	F	C	
		TOTAL			3	2	6	3	3	
		LJ N	GONDA	GO NDA	Pr .		A	F		
7	N F R	TOTAL			1	0	1	1	0	
8		KI R	NEW JALPAIGUDI	NJP	Pr .	CC	A	A	A	
		LM G	NEW GUHATI	NG C	Pr .		A	A	A	
		RN Y	NEW BOGAIGAON	NB Q	Pr .		A	A		
		TS K	NEW TINSUKHIA	NTS K	Pr .		A	A	B	
		TOTAL			4	1	4	4	3	
9	N W R	AI	MADAR	MD	Pr .	CC	A	A	B	
		JP	PALI (ICD KRIBHCO)	PAL I		CC	D			
		TOTAL			1	2	2	1	1	
10	S R	MA S	JOLARPET	JTJ	Pr .	CC	A	A	A	
		MA S	TONDIYARPE T	TNP M	Pr .	CC	A	A	B	

			(ICD)					
MA S	MADRAS HARBAR	HO M			F	F		
MA S	ARRAKORAM /MELPAKKAM	AJJ/ MLP M		CC(BLC)	D			
MA S	PATTAVIRAM SIDING	PTM S			F			
M DU	MEILAVATTAN	MV N	Pr .		B	A		
SA	ERODE	ED	Pr .		D	A		
TP G	TRICHCHIRAPALLI GOODS YARD	TPG Y	Pr .		A	F		
TP G	UDAGAMAND ALAM	UM G		CC(BO BR N)	F			
TV C	EARNAKULAM MARSHLING YARD	ER MG	Pr .	CC	B	A		
TV C	IRUMPANAM	IPN	Pr .	CC (BT PN)	B	A		
TOTAL				7	6	1 1	8	2
1 1	S C R	BZ A	VIZAYVADA	BZA	Pr .	CC	A	A
		BZ A	KAKINADA PORT	CO A	Pr .		E	A

		GT L	GOOTY	GY	Pr .	CC	D	A	A
		HY B	NIZAMABAD	NZB					
		NA ND ED	PURNA	PAU	Pr .		D	F	
		SC	SANATNAGA R	SNF (SN AG) (ICD)	Pr .	CC	A	E	
		SC	KAZIPET	KZJ			E	B	
		SC	RAMAGUNDAM	RD M	Pr .	CC	D	E	A
		SC	BELLAMPALLI	BPA	Pr .	CC	D	E	
TOTAL					7	5	8	8	3
1 2	SE R	AD A	BOKARO STEEL CITY EMP YARD	BKS C (Em pYd)	Pr .	CC			A
		AD A	BOKARO STEEL CITY OUT YARD	BKS C (Out Yd)	Pr .		B	F	
		CK P	BANDAMUND A EX YARD	BND M Ex Yd	Pr .	CC	A		
		CK P	BANDAMUND A DEP- YARD	BND M Dep Yd	Pr .		C		
		CK P	BANDAMUND A MED SICK LINE	BND M MSL				A	

	1 3	CK P	BANDAMUND A CENTRAL SICK LINE	BND M CSL				A	A	
		CK P	DONGAPOSI	DPS	Pr .	CC	D	F		
		CK P	TATA	TAT A	Pr .	CC	D	A	A	
		CK P	ADITYPUR	ADT P	Pr .	CC	B	A	A	
		KG P	NIMPURA	NM P	Pr .	CC	B	A	A	
		KG P	BHOJUDIH	BJE	Pr .		D	A		
		KG P	HALDIA	HLZ	Pr .		F	F		
		TOTAL			10	6	9	9	5	
		BS P	BILASPUR	BSP	Pr .	CC	A	F	A	
		BS P	LIPTON SIDING/AKAL TARA	LIL- AKT			C			
		BS P	KORBA	KRB A	Pr .		C	F		
		NG P	DONGAR GARH	DG G	Pr .		A	F		
		R	BHILAI MARSHLING YARD	BM Y (Re p Yd)	Pr .	CC	B	A		

		R	BHILAI EXCHANGE YARD	BIA (Ex Yd)	Pr .		B	B	
		RA IP UR	BHILAI PP YARD	BIA (PP Yd)	Pr .	CC	A	A	A
		RA IP UR	DALLI RAJHRA	DRZ		CC	E	F	
		TOTAL			6	4	8	7	2
1 4	S W R	MY S	HARIHAR	HR R		CC	A	A	
		MY S	MYSORE NEW GOODS TERMINAL	MN GT			C	A	B
		SB C	SETELITE GOODS TERMINAL	SGT	Pr .	CC	A	A	
		SB C	WHILD FIELD	WF D (ICD)		CC	A		
		UB L	HOSEPET	HPT		CC	B	C	B
		UB L	JSWT(Pvt.Sidi ng)				A		
		UB L	NAVALUR	NVU			B	A	
		TOTAL			1	4	7	5	2
1 5	W R	AD I	GANDHI DHAM	GIM	Pr .	CC	A	A	B
		AD I	SABARMATI	SBI (ICD)	Pr .	CC	A	A	A
		AD I	VATVA	VTA					A

	1 6	BR C	BARODA YARD	BRC Y	Pr .	CC	A	A	B
		BR C	KARCHIA	KRC A	Pr .	CC	A	A	B
		RJ T	HAPA	HXP	Pr .		A	A	B
		RT M	RATLAM	RT M					B
		RT M	SAMBHUPUR A	SM P	Pr .	CC	A	A	
		TOTAL			6	5	6	6	7
W C R	1 6	JB P	NEW KATNI	NKJ New	Pr .	CC	D	A	
		JB P	NEW KATNI- DEP YARD	NKJ Dep Yd	Pr .	CC	A		A
		JB P	NEW KATNI- OLD YARD	NKJ Old				A	
		BP L	GASS AUTHORTY LTD Vijaipur	GAI L Sidi ng			B		
		KT T	SAKTPURA siding of kota therma power	SKT			D		
		JB P	ETARSI	ET	Pr .		D	A	B
		KT T	KOTA	KT	Pr .		D	A	C
		JB P	SATNA	STA	Pr .	CC	D	A	A
		TOTAL			5	3	7	5	4
IR - GRAND TOTAL					83	57	1 1 9	1 0 0	47

APPENDIX – D

REPAIR AND TESTING OF BRAKE SYSTEM

- D-1 **Air Brake System:**
- D-1.1 **Salient features of air brake system:**
- The brake system provided on the freight stock is Single pipe/ Twin pipe graduated release system and its operating principle is discussed below:
- D.1.1.1 Brake system on BOXN, BOXNHS, BOXNHA, BOSTHS, BOXNHL, BOXNEL, BOXNR, BCN, BCNA, BCNAHS, BCNHL, BRN, BRNA, BRNAHS, BRHNEHS, BTPN, BTPGLN, BOY, BOBR, BOBRN, BOBSN, BOBYN, BOXNHA, BOXNCR, BFKN, BLCA/BLCB, BTAP, BTCS, BVZI, BVCM types of wagon.
- a. Schematic layout of Single pipe/ Twin pipe graduated release air brake system provided on above wagons is shown in Plate 66 and 67. Brake pipe (9) & Feed pipe (10) runs through the length of wagon. Brake pipe on consecutive wagons in a train are coupled to one another by means of air hose coupling (1) to form a continuous air passage from the locomotive to the rear end of the train. Similarly Feed pipe (10) is also coupled by means of FP coupling (11). Brake pipe is charged to 5.0 Kg/cm² & Feed pipe charged to 6.0 Kg/cm² through the compressor of the locomotive.
- In single pipe system AR (4) is charged to 5.0 Kg/cm² through the compressor of the locomotive & in twin pipe system AR (4) is charged to 6.0 Kg/cm² through the compressor of locomotive.
- b. **For application of brake**, air pressure in the brake pipe (9) is reduced by venting it to atmosphere from driver's brake valve in the locomotive. The reduction of the brake pipe pressure positions the distributor valve (7) in such a way that the auxiliary reservoir (4) is connected to the brake

cylinder (5) thereby applying the brake. The magnitude of brake cylinder pressure is proportional to the reduction of pressure in the brake pipe during the application.

During full service brake application, which amounts to a reduction of 1.3 to 1.6 Kg /cm² maximum brake cylinder pressure of 3.8 Kg /cm², is developed. Any further reduction of brake pipe pressure has no effect on the brake cylinder pressure. However, during emergency brake application, the brake pipe pressure is vented to atmosphere very quickly. As a result the distributor valve assumes the full application position also at a faster rate. This result in quicker build up of brake cylinder pressure but the maximum brake cylinder pressure will be the same as that obtained during a full service brake application.

c. **During release**, the brake pipe is recharged and the brake pipe pressure positions the distributor valve in such a way that the brake cylinder is connected to exhaust for releasing the brakes. The extent of buildup of brake pipe pressure causes a corresponding pressure reduction in the brake cylinder. The Auxiliary Reservoir gets charged up to 6.0 Kg/cm² continuously through the Feed pipe.

D.1.1.2

Brake system on BVZC brake van

Schematic layout of single pipe/ Twin pipe graduated release air brake system is provided on BVZC brake van is shown in Plate – 68 & 69. These brake vans are provided with additional item of guard's emergency brake valve (Plate 85) so that the guard can make brake application by operating this valve. These brake vans are also provided with quick coupling (Plate 90) for attaching pressure gauge to check the brake pipe pressure in the brake vans (See plate 86 & 88). And check the feed pipe pressure (see plate 87 & 89)

D.1.1.3

Brake system on BOBR / BOBRN type of wagons.

Schematic layout of single pipe/ Twin pipe graduated release air brake system is provided on BOBR/BOBRN wagon is shown in Plate – 70 & 71. These wagons are provided with automatic two-stage empty load device to cater for higher brake power in loaded condition instead of the conventional manual empty load device. With the provision of this, brake cylinder pressure of 2.2 Kg/cm² is obtained in empty condition and 3.8 Kg/cm² is obtained in loaded condition. For this a change over mechanism called “Load Sensing Device” (LSD) is interposed between the bogie bolster and spring plank. The mechanism gets actuated at a pre-determined change over weight and the distributor valve, which has the additional feature, controls the brake cylinder pressure.

Two piece LSD have been replaced by single piece. New wagons are being fitted with single piece LSD from April.2003

D.1.1.4

Salient Features of Air Brake System with BMBS

The brake system provided on the wagons is single pipe/twin pipe graduated release system with automatic two stage braking. Its operating principle is as follows:-

Schematic layout of single pipe/ twin pipe graduated release air brake system as provided on the wagons is shown in plate 91 & 92. Brake pipe runs through the length of wagon. Brake pipe on consecutive wagons in a train are coupled to one another by means of hose coupling to form a continuous air passage from the locomotive to the rear end of the train. Brake pipe is charged to 5.0 kg/cm² and Feed pipe charged 6.0 kg/cm² through the compressor of the locomotive.

The wagons are provided with Automatic brake cylinder pressure modification device (APM) valve to cater for higher brake power in loaded condition instead of the conventional manual empty load device. With the provision

of this, brake cylinder pressure of $2.2 \pm 0.25 \text{ kg/cm}^2$ is obtained in empty condition and $3.8 \pm 0.1 \text{ kg/cm}^2$ is obtained in the loaded condition. To obtain this, a changeover mechanism, APM valve is interposed between the under-frame and side frame of the bogie. The mechanism gets actuated at a pre-determined change over weight of the wagon and changes the pressure going to the brake cylinder from $2.2 \pm 0.25 \text{ kg/cm}^2$ to $3.8 \pm 0.1 \text{ kg/cm}^2$ in case of changeover from empty to loaded and vice-versa.

For application of brakes, air pressure in the brake pipe is reduced by venting it to the atmosphere from drivers brake valve in the locomotive. The reduction of the brake pipe pressure, positions the distributor valve in such a way that the auxiliary reservoir is connected to the brake cylinder through the APM valve and there by applying the brake. The distributor valve gives an output pressure of 3.8 kg/cm^2 for the brake cylinder which is routed through the APM valve. Based on the position of sensor arm of APM valve, it gives an output of $2.2 \pm 0.25 \text{ kg/cm}^2$ for empty position braking and an output of $3.8 \pm 0.1 \text{ kg/cm}^2$ for loaded position braking in the wagon. During full service brake application, a reduction of 1.3 to 1.6 kg/cm^2 takes, a maximum brake cylinder pressure of $3.8 \pm 0.1 \text{ kg/cm}^2$ in loaded condition and 2.2 ± 0.25 in empty condition is achieved. Any further reduction of brake pipe pressure has no effect on the brake cylinder pressure. During emergency brake application, the brake pipe is vented to atmosphere very quickly; as a result the distributor valve acquires the full application position also at a faster rate. This result in quicker built up of brake cylinder pressure but the maximum brake cylinder pressure will be same as the obtained during a full service brake application.

For release of brakes, air pressure in the brake pipe is increased through driver's brake valve. The increase in the brake pipe pressure results in exhausting the brake cylinder pressure through the distributor valve. The decrease in the brake cylinder pressure corresponds to the increase in brake pipe pressure. When the brake pipe pressure reaches 5.0 kg/cm², the brake cylinder pressure exhausts completely and the brakes are completely released.

D-1.2

Description of Equipment

D.1.2.1

Distributor valve with common pipe bracket and control reservoir

The distributor valve assembly consists of distributor valve, a pipe bracket, an adapter, control reservoir and Gasket. All pipe connections to distributor valve are given through the pipe bracket. The pipe bracket Plate 83 remains on the wagon when the distributor valve is removed for overhaul and maintenance without disturbing the pipe connections. The control reservoir of 6 litres volume is directly mounted to the pipe bracket. An isolating cock is provided either on the distributor valve or on the adapter to isolate the distributor valve when found defective.

The handle of the isolating cock will be in vertical position when the distributor valve is in open position and horizontal when the distributor valve in closed position. A manual release handle is provided at the bottom of the distributor valve by which the brakes in a particular wagon can be released manually by pulling the handle.

A casting tab has been provided on DVs to be broken at the time of fitment to avoid recycling.

D.1.2.2

Brake Cylinder:

The brake cylinder receives pneumatic pressure from auxiliary reservoir after being regulated by the distributor valve and develops mechanical brake power by outward movement of its piston assembly. The push rod of the piston assembly is connected to the brake shoes through a system of levers to amplify and transmit the brake power. The compression spring provided in the brake cylinder brings back the rigging to its original position when brake is released. Plate 73 and 74 may be referred for outline and installation dimensions.

D.1.2.3

Auxiliary Reservoir:

An Auxiliary Reservoir is provided on each wagon to store compressed air and is charged to 5 Kg/cm² pressure through distributor valve in case single pipe & charged to 6.0 Kg/cm² in case of Twin pipe air brake system. The Auxiliary Reservoir is made out of sheet metals on both the ends, flanges are provided for pipe connection. One end of the reservoir is kept blanked for operation with single pipe system. A drain plug is provided at the bottom for draining the condensate. Plates 75 and 76 may be referred for outline and installation dimensions.

D.1.2.4

Cut-Off angle cock:

Cut-Off angle cocks are provided at the end of brake pipe / Feed pipe on each wagon. These cocks are closed at the time of uncoupling of wagons. The vent provided in the cock facilitates easy uncoupling of hose coupling by venting the air trapped in the hose coupling when the cock is closed. The handle of angle cock is of self-locking type to avoid any inadvertent movement from open to close position or vice versa. When the handle is parallel to the pipe the cock is in open position and when at right angles to the pipe it is in closed position. Plate 77 may be referred for outline and installation dimensions

D.1.2.5

Air hose coupling for Brake Pipe & Feed pipe:

The Air hose couplings are provided to connect brake pipe /Feed pipe line throughout the train. General arrangement of hose coupling is shown in Plate 78 & 79. The rubber hose is connected to the coupling head and hose nipple by 'Band it' type clamps. Rubber gasket is used in the coupling head to make the joint leak proof after coupling. The coupling heads of the feed pipe coupling hoses are of opposite head to those of the brake pipe coupling hoses. The brake pipe coupling heads & Feed pipes coupling heads are identified with BP & FP marking respectively. To further distinguish BP & FP coupling, they are painted green and white respectively.

D.1.2.6

Dirt Collector:

Dirt Collectors are provided at the junction of the main pipe and branch pipe. This is meant for removing dust from the air prior to entering the distributor valve. This is achieved by centrifugal action. Plate 82 may be referred for outline and installation dimensions. The dirt collector has been provided with an additional filter element at the outlet on the branch pipe side to provide dust proof air to distributor valve / auxiliary reservoir after arresting fine dust particles. The dust particles accumulated in the dirt chamber are removed by opening the drain plug. Rubber gasket has been provided between cover and housing to prevent leakages. Similarly leather washer has been provided between housing and drain plug to prevent leakages.

D.1.2.7

Pipes:

It should be as per Spec. No. 04 ABR- 2002 amendment 7 or latest. The plates 83 & 84 may be referred for details.

D.1.2.8

Pipe fittings:

It should be as per Spec. No. 04 ABR- 2002 amendment 7 or latest. The plates 83 & 84 may be referred for details.

D.1.2.9

Guard's emergency brake valve

The valve is provided in the brake van for use by the guard for application of brakes during emergency. Plate 85 may be referred for outline and installation dimensions.

D.1.2.10

Quick Coupling:

The Quick Coupling consists of a plug (1) and socket consisting of item 2 to 14 of Plate 90. The plug (1) shall be a part of pressure gauge and will be kept as Guard's property. It works on single push and pull principle. The plug when pushed into socket is securely held by the self-locking arrangement resulting in a positive and leak proof connection. This connection simultaneously opens the valve and airflow starts. To disconnect, pull back the locking ring of the socket, the plug ejects out and valve shuts off automatically.

D.1.2.11

Isolating Cock:

Isolating cock is provided in the pipeline leading to quick coupling of brake van. This is provided to facilitate closing of brake pipe in case the Quick coupling is found defective. (Plate No 81)

D.1.2.12

Load Sensing Device (LSD):

Load sensing device is interposed between bogie bolster and spring plank of Casnub bogie of wagons fitted with automatic two stage empty load device. This equipment consists of an operating valve fitted on bogie bolster and a spring buffer fitted on the spring plank. The mechanism gets actuated at a predetermined change over weight and the Distributor valve which has the additional feature will control the brake cylinder pressure (Plate No 80).

For details of single pipe /Twin pipe Graduated release air brake system refers RDSO's Maintenance Manual No. G-97.

D.1.2.13

Automatic brake cylinder pressure modification device (APM)

APM device is interposed between bogie side frame of Casnub bogie and the under frame of wagons. It is fitted on one of the bogies of the wagon. It is fitted achieving 2 – stage load braking with automatic changeover of brake power. It restricts the brake cylinder pressure coming from the Distributor valve to 2.2 ± 0.25 Kg/cm² in empty condition of the wagon and allows the brake cylinder pressure of 3.8 ± 0.1 Kg/cm² in loaded condition of the wagon. APM should sense the gap only at the time of air brake application. During remaining time it should not be in contact with the bogie side frame.

D.1.2.14 Brake cylinder with built in Double acting Slack Adjuster

The brake cylinder receives pneumatic pressure from auxiliary reservoir after being regulated through the distributor valve and APM valve. Brake cylinders develop mechanical brake power by outward movement of its piston and ram assembly.

The piston rod assembly is connected to the brake shoes a system of rigging levers to amplify and transmit the brake power. The compression spring provided in the brake cylinder brings back the ram thus the rigging is also brought to its original position when brake is released.

The built-in slack adjuster compensates for the brake blocks during the brake application through equivalent pay-out. For pay-in the, a pry bar is applied between the brake shoe and wheel and the rigging is pushed in.

D-1.3 GENERAL GUIDELINES FOR MAINTENANCE OF WAGONS OTHER THAN BOBR / BOBRN as per G-97.

D-1.3.1 At Originating station: The following checks shall be carried out on a train prior to departure. Rake test Rig

(plate-93) for Single pipe air brake system & (plate no.94) for twin pipe air brake system explained in G-97(Latest version) may be used for conducting various tests in the absence of locomotive.

- D-1.3.1.1 Ensure that Hand brakes of all wagons are fully released.
- D-1.3.1.2 Ensure that operating handle of Empty Load Box is in correct position i.e., in 'Empty' position when wagon is empty or lightly loaded and in 'Loaded' position when wagon is loaded beyond the specified value.
- D-1.3.1.3 Ensure that all worn out brake blocks are changed.
- D-1.3.1.4 Ensure that all brake rigging pins are intact and of correct size and frictional points are lubricated.
- D-1.3.1.5 Ensure that dimension 'A' of Brake Regulator is adjusted to the specified value. (70 +2 -0 mm for BOXN, BOXNHA, BCN, BRN, BOY, BTPN & BTPGLN wagons, 50 +2/-0 mm for BCXC-III wagons and 27+2-0 mm for BOBRN/BOBRNHS etc.)
- D-1.3.1.6 Ensure that Empty Tie Rod adjustment is correct.
- D-1.3.1.7 Ensure that hose coupling for brake pipe (BP) and hose coupling for feed pipe (FP) on consecutive wagons are coupled to one another to form a continuous air pressure from the locomotive to the rear end of the train. For proper identification BP coupling heads are marked with 'BP' & painted in green and FP coupling heads are marked with 'FP' & painted in white (Refer Maintenance Manual G-97 for procedure for brake continuity test)
- D-1.3.1.8 Ensure that all the cut off angle cocks of brake pipe/Feed pipe except those at the rear end of the train are kept open. The handle of the cock shall be parallel to the pipe when the cock is in the open position and will at right angles when at closed position.
- D-1.3.1.9 Ensure that cut off angle cocks of brake pipe/ Feed pipe at the rear end of the train is kept closed and the brake pipe hose coupling is placed on the hose coupling support.

- D-1.3.1.10 Ensure that the isolating cock on distributor valves of all the wagons are in open position.
- D-1.3.1.11 Ensure proper working of quick coupling provided in the brake van.
- D-1.3.1.12 Ensure that the gauges in the guard's compartment show pressures not less than 4.8 kg/cm² in BP & 5.7 kg/cm² in FP after the system is fully charged for train with 58 wagons. And for trains having more than 58 wagons, the pressure shall not be less than 4.7 kg/cm².
- D-1.3.1.13 Ensure that the gauges in the locomotive show a pressure of 5.0 kg/cm² in the brake pipe after the system is fully charged.
- D-1.3.1.14 Ensure that the leakage in the system not more than 0.25 kg/cm² /min. (Refer RDSO Tech. Pamphlet No. G-97 for procedure of checking leakage in the train). If the leakage has been found to be excess the leakage shall be arrested.
- D-1.3.1.15 Apply service brake to ensure that: -
- i) The piston stroke in empty and loaded condition are within the limits specified.
 - ii) The brake blocks of each wagon are mating the wheels.
- D-1.3.1.16 Release the brake to ensure that: -
- The piston of brake cylinder is fully inside. (Distance between centres of brake cylinder fulcrum bracket and piston rod eye shall be 782 +/- 5 mm and 814 +/- 5 mm for 355 mm and 300 mm dia cylinders respectively).
- Brake blocks are away from the wheels.
- D-1.3.1.17 Ensure that percentages of operating brake cylinders are within the prescribed limit. Wagon with brake cylinder found inoperative shall be marked sick and detached. Refer G-97 for procedure for detaching a wagon.
- D-1.3.1.18 Ensure that the Guard's emergency brake valve provided on the brake van is working properly by operating this valve.

- D-1.3.1.19 (a) Ensure that the brake gear is manually adjusted to correspond to the wheel dia. This can be done by shortening the bogie push rod and bogie pull rod.
(b) Ensure the following for BOBR/BOBRN wagons.
Load sensing device fitted on the bogie is working properly and the clearances between operating valve and spring buffer is within the specified limit of $8 + 2$ mm / - 0 mm.
Bolts and nuts of load sensing device have been tack welded.
Piston stroke in empty and loaded condition are 100 ± 10 mm and 110 ± 10 mm respectively.
Ensure that dimension 'A' of brake regulator on BOBRN wagon is adjusted to the specified value of $27 + 2$ mm / - 0 mm.
In case of BOBR wagons, where slack adjuster is not provided, to obtain correct piston stroke, necessary adjustment in the pull rod shall be carried out.
- D-1.3.2 **At Terminal Station:** The following checks shall be carried out on a train at the terminating station: -
- D-1.3.2.1 Check the percentage operative cylinders. Wagon with inoperative brake cylinders should be marked sick.
- D-1.3.2.2 Check the leakage rate. If found excessive than the prescribed, the source of leakage shall be found out and remedial measures taken.
- D-1.3.2.3 Check the brake blocks after full release. The brake blocks should be away from the wheel. Brake blocks should be in good condition.
- D-1.3.2.4 Check all the air brake equipments for any visual damages. Sick mark the wagon if found necessary.
- D-1.3.2.5 Carry out brake continuity test if any vehicle is attached or detached from the train or any rectification has been done which could affect the continuity of the brake system.
- D-1.3.2.6 Piston stroke in empty and loaded condition are within the specified limit.

- D-1.3.2.7 Load sensing device fitted on the bogie are in good condition (BOBR, BOBRN, BLCA/BLCB, BTAP, BTCS, BTPH) and the clearance between the spring buffer and operating valve of LSD is as specified.
- D-1.3.2.8 Guards emergency valve is in good condition and quick coupling is available and in good working condition (BVZC, BVZI & BVCM only)

D-1.4 Maintenance

D-1.4.1 Sick Line Maintenance

Besides rectifying the defects for which a wagon has been marked sick, attention should also be paid to ensure that the air brake equipment is working properly. Every time the wagon is marked sick, auxiliary reservoir, control reservoir and dirt collector to be drained out. After the work is carried out the wagon should be tested with the single wagon test rig. (Refer G-97 "Procedure for single wagon test").

D-1.4.2 Routine Overhaul (ROH)

D-1.4.2.1 During ROH of the wagon the air brake equipment shall be given attention / checks in accordance with the procedure given in the Maintenance Manual G-97.

D-1.4.2.2 After carrying out above mentioned works, the wagon shall be tested with single wagon test rig to check proper functioning of air brake system.

D-1.4.3 Periodic Overhaul (POH)

D-1.4.4.3.1 During POH of wagon the air brake equipment shall be given attention / checks in accordance with the procedure given in the Maintenance Manual No. G-97 of RDSO.

D-1.4.3.2 After the air brake equipment is fitted, the wagon shall be tested with single wagon test rig to check proper functioning of air brake system.

D-2 Brake rigging arrangement on BOXN wagons

- D.2.1 The brake rigging arrangement on BOXN wagon is shown in plate 95 It has following features: -
Empty load box to give two different leverage ratios for empty and loaded wagons.
Brake regulator for automatic adjustment of pre-determined slack between brake blocks and wheels so as to restrict the travel of the piston to the minimum.
Side operative hand brake arrangement with 610 mm dia wheel and footstep, which can be operated from either side of the wagon.
Single Air Brake Cylinder operates the brake rigging of both the bogies through the horizontal levers.
The brake blocks for the BOXN type bogie are of the Composition type and are interchangeable with that of UIC Bogie Type Cast Iron Brake Blocks.

- D.22 **Empty Load Box – Plate 96**
- D.2.2.1 SAB empty load box type LCF-4 (or Indian Railway empty load device type IR-ELD-10) is provided in the brake rigging, by means of which lower leverage ratio for tare condition and higher leverage ratio for loaded condition of the wagon can be obtained by a simple manual operation of a handle, provided on both sides of the wagon. In the empty load box, horizontal levers, two tie rods, viz., tare tie-rod and loaded tie-rod are provided. The former, when brought into operation provides a lower leverage ratio corresponding to a wagon having a gross load not exceeding 42.5 t and the later a higher leverage ratio, corresponding to wagon exceeding 42.5 t gross load.
- D.2.2.2 For efficient performance of this equipment the following instructions must be followed rigidly: -
Ensure that empty load box operating handle is set in 'empty' position when a wagon is either empty or partially loaded up to a gross load not exceeding 42.5 t and a loaded

position when the weight of the wagon exceeds 42.5 t. It should also be ensured that the operating handle is set in the 'empty' position before commencing unloading of the wagon.

For convenience of Operating Staff, the sign plate is painted yellow to indicate 'empty' position and black to indicate 'loaded' position to which the operating handle is to be set.

c) Do not tamper with tare tie-rod adjustment. Interference with the coupling nut may either increase or decrease dimension 'Sx', which would result in the horizontal levers pivoting around load tie-rod pins and thus brake power for tare condition of the wagon will not be obtained. This dimension 'Sx' for efficient functioning of the empty load box is 10 mm.

D.2.2.3 In case, tare tie-rod needs replacement the following procedure should be followed to ensure its correct adjustment:

Ensure that the brake cylinder piston rod is restored to its original 'brake release' position by checking the distance between centres of brake cylinder fulcrum bracket and the piston rod eye which shall be 782 +/- 5 mm.

Move change over handle to "loaded position".

Unscrew both lock nuts to the extreme ends of tie-rod threads and rotate coupling nut to shorten the tie-rod as far as it will go.

Now lengthen the tare tie-rod by rotating coupling nut in the other direction, so that pins of both tare and load tie-rod reach their end-positions in their respective slots. Stop rotating the coupling nut as soon as the 'live' horizontal floating lever just starts to move.

Note: If both the pins are not at the ends of slots when 'live' horizontal lever starts to move, this indicates faulty

condition requiring attention (e.g. brakes not fully released or "dead" horizontal floating lever jammed).

Lock the coupling nut in this position by tightening lock nuts on either side, and bend the washer over sleeve nut and check nut in Z form. In addition, one bridge plate is to be tack-welded over the coupling nut in securing two pieces of tare tie-rod.

To check correctness of tare tie-rod adjustment, apply and release brakes fully two or three times at correct air pressure with empty load box operating handle in 'empty' position and measure piston strokes. Also check that tare tie-rod is tight and loaded tie-rod is loose by tapping pins of both rods with a hammer.

Move operating handle from 'empty' to 'loaded' position, apply and release brakes two or three times as above and measure piston strokes. Also check that the load tie-rod is tight and tare tie-rod loose in the manner indicated above. This tapping test would indicate whether the empty load box is functioning correctly or not.

The piston stroke obtained under the above tests should be as laid down for different types of wagons.

Attention: Once the tare tie rod is set correctly, it should never be altered while the wagon is in service.

Ensure that empty-load box links and link-pins connecting empty load box arm to the operating handle are intact. In case of missing link or pin, the empty-load box becomes ineffective i.e., the braking ratio cannot be changed.

Ensure that the hand brake is in fully released position in the formation of a train.

Ensure that the horizontal floating levers are free in their brackets.

D.2.3 Brake Regulator

D.2.3.1 SAB brake regulator (Slack adjuster), type IRS - 600 & IRS - 750 have been provided in the main pull rod. It is a

device for automatic adjustment of slack between brake blocks and wheels thereby restricting travel of the piston to the minimum.

D.2.3.2 The brake regulator is double acting, i.e., it automatically takes up and pays out slack, as such, and manual adjustment of brake gear is not required.

D.2.3.3 For efficient performance of the brake regulator, the following instructions should be followed: -

Ensure that control dimension 'A' between the control-rod-head and brake regulator barrel is 70 mm for wagons fitted with Casnub bogies, which corresponds exactly to the total amount of slack in the brake rigging (between brake blocks and wheels). Tolerance permitted on this dimension is +2 -0 mm. In order to check this dimension 'A', it is essential that the horizontal floating levers of the empty load box are in normal 'brake release' position with the hand brake fully 'off' and the correct position of the piston rod is ensured (Refer Para D.2.2.3). If these levers are not in their normal 'brake release' position due to restoring spring not functioning properly or excessive frictional resistance coming into play between horizontal levers and bracket a wrong reading of the dimension 'A' will be measured. In such case, therefore, the horizontal floating lever should be brought to the normal position by pushing the control rod head as far away as possible from the barrel with the help of a wooden scotch block to ensure correct measurement of the dimension 'A'.

Attention: Once dimension 'A' is set correctly it should never be altered while the wagon is in service.

To avoid unauthorized interference with dimension 'A', ensure that M 20 anchor pin nut is secured by welding to the pin

Replace brake blocks, when worn out to a thickness of 10 mm. For fitting new brake blocks, rotate brake regulator

barrel by hand, clock-wise, the facing towards horizontal levers to pay out necessary clearances. No further action is required as the brake regulator automatically corrects the clearances, when brakes are applied two or three times.

Ensure that the brake gear is manually adjusted to correspond to the wheel diameter, whenever wheel set is changed at major sick lines/shops. This can be done by shortening bogie push rod and bogie pull rod. This is essential as the capacity available for adjustment by brake regulator, which is represented by dimension 'e' is between 555 and 575 mm for IRS 600 and for IRS 750 is between 560 ± 25 mm when all the brake blocks, pins and bushes are new and manual adjustment of brake gear corresponds to wheel diameter.

The brake regulator will normally function efficiently over extended period without any need for servicing.

For the air brake equipment and function of complete air brake equipment fitted on wagons, the maintenance manual supplied by the different air brake equipment manufacturers shall be referred.

D-2-4 COMMON PROBLEMS IN BRAKE SYSTEM AND REMEDIES:

D.2.4.1 Jammed Brakes:

Taking the following precautions can prevent jamming of brakes:

Both the hand brakes on a loaded wagon should be fully released before commencement of unloading.

Adjustment of brake regulator and empty tie rod should not be tampered with.

Despite the above precaution, if the brakes jam, the following steps should be taken: -

D.2.4.1.1 Try to rotate brake regulator barrel by hand or with spanner on the hexagon flat or with a Tommy bar in the slot provided

at the end. DO NOT HAMMER OR USE EXCESSIVE FORCE.

- D.2.4.1.2 If this fails, then apply and release the brakes fully two or three times either with air brake or hand brake. When using the hand brake, make sure of full application and full release. If jamming is not severe, this will make brake regulator operate automatically to create enough slack, by paying out, to release the brakes.
- D.2.4.1.3 If this also fails, then it means the brakes are severely jammed, also jamming the brake regulator. In this case knock out the shaft crank pin but not the pin securing the brake regulator in any case. Then rotate brake regulator barrel until pull rod pinholes align and the pin can be replaced easily. Always replace the pin, which had been withdrawn to release brakes, with its washer and split cotter, and tack weld the washer with pin.

D.2.4.2 Piston stroke too short:

If the piston strokes are not within the limits the brake equipment should be thoroughly examined. Probable causes for too short piston strokes are given below: -

- D.2.4.2.1 One brake cylinder out of action, or one or both cylinders defective.
- D.2.4.2.2 Brake shaft or piston jammed/seized.
- D.2.4.2.3 Brake rigging jammed e.g. pull rod pin or hanger partly out of its hole and fouling vertical levers in the bogie brake rigging or end of bogie pull rod striking transverse trimmer. In both cases there may be no application of brakes at the outer wheels.
- D.2.4.2.4 Adjustment of pinholes in bogie brake rigging not responding to wheel diameter.
- D.2.4.2.5 Some parts of the brake rigging distorted or non-standard.
- D.2.4.2.6 New brake blocks just fitted and brakes not applied and released at least twice before checking piston strokes.
- D.2.4.2.7 Hand brakes partly "ON".

- D.2.4.2.8 Brake regulator or empty load box maladjusted or damaged causing either insufficient “slack” or empty braking at all times (This is a serious defect and should be attended to immediately)
- D.2.4.2.9 Fully loaded wagon just emptied but brakes not applied and released at least twice before checking piston strokes.
Note: If slightly short piston strokes are not caused by any of the defects mentioned above, they are not harmful.
- D.2.4.3 **Piston stroke too long:**
If the piston strokes exceed the maximum limits prescribed, examine the equipment thoroughly. Probable causes for too long piston strokes are given below.
- D.2.4.3.1 Parts of brake gear defective, broken, worn out, missing or non-standard e.g. pull rod pins missing or under size pin fitted.
- D.2.4.3.2 Wearing parts beyond condemning size i.e. wheels, brake blocks and pin/hole joints.
- D.2.4.3.3 New brake blocks just fitted and brakes not applied and released at least twice before checking piston strokes.
- D.2.4.3.4 Empty wagon just loaded and brakes not applied and released at least twice before checking piston strokes.
- D.2.4.3.5 Adjustment of pin/holes in the brake rigging not corresponding to wheel diameter
- D.2.4.3.6 Brake regulator or empty load box maladjusted or damaged causing either excessive slack or load braking at all times.
- D.2.4.3.7 Brake regulator control rod assembly damaged, detached or missing. (This is a serious defect and should be attended to immediately)

APPENDIX – E

(See Rules 2.16 to 2.19)

INSTRUCTIONS FOR MAINTENANCE OF WAGONS

INSTRUCTIONS FOR MAINTENANCE OF WAGONS	
E-1	<u>Examination on trains.</u>
E.1.1	The Carriage and wagon staff shall watch the approaching train before it stops so as to locate skidded wheels and then the axle boxes shall be felt immediately the train comes to a stop so that excessively warm axle boxes could be detected.
E.1.1.1	While examining the brake gear it shall be ensured that the hand brakes are fully released, empty load box operating handle is in correct position, empty tie rod adjustment is correct, worn out brake blocks are renewed, all brake rigging pins of correct size are properly fitted and the setting of brake regulator control rod is correct.
E.1.1.2	The CBC unlocking levers and knuckle pin should be properly secured.
E.1.1.3	Transition coupler where fitted should have the clevis and screw properly fitted and in working order.
E.1.1.4	Transition coupler where fitted should have the clevis and screw properly fitted and in working order.
E.1.1.5	Horn gap bridle bolts/rivets and roller bearing axle box cover bolts should be properly fitted.
E.1.1.6	The laminated bearing springs, shackles, stones and pins should be in proper condition and wheels should not have any one of the prescribed defects. The trolley frame should not have any cracks or welding failures.
E.1.1.7	The body side doors should be properly closed and effectively secured.

E.1.2	ROUTINE OVERHAUL- (ROH): All wagons should be given routine overhaul at prescribed interval (Rule 2.4.3.3) at nominated ROH depots where proper facilities are provided. During this routine overhaul the following schedule of work shall be followed.
E.1.2.1	Lift body, keep it on trestles and run out bogies.
E.1.2.2	Strip brake gear levers and rods for examination of worn out / damaged parts. Lower vacuum brake cylinders, overhaul and test. Stencil station code initials and date.
E.1.2.3	Strip springs and spring suspension gear, check springs for free camber and other defects and replace where required. Lubricate pins and stones, and refit.
E.1.2.4	Examine bogie pivot and frame for any welding defects/failures on the lines indicated in RDSO Pamphlet No.R-7 and check bogie frame alignment and examine side bearers, pivot pins, clean and lubricate.
E.1.2.5	Clean brake shaft bearings and lubricate. Refit brake gear levers and rods, lubricate pins and other equipment and apply graphite to horizontal levers of empty / load box. Secure pull rods and levers and fit modified pull rod and equalizing lever where not already provided.
E.1.2.6	Replace worn out brake blocks.
E.1.2.7	Run in bogies and lower body and secure horn gap tie bars by hot riveting.
E.1.2.8	Check dimension 'A' of Brake Regulator, secure anchor pin to the nut by welding, if not already done. Check adjustment of Tare Tie Rod of Empty Load Box.
E.1.2.9	Examine draft and buffering gear and attend to defective/worn out parts. Examine CBC unlocking levers and attend to bent/damaged levers. Ensure correct functioning of the un-locking lever by actual manipulation.
E.1.2.9.1	<u>DURING ROH IN SICK LINE:</u>

	<i>Examine CBC components:</i>
E.1.2.9.1.1	Knuckle with all gauges.
E.1.2.9.1.2	Draft gear and its parts, defective/inoperative unlocking mechanism should not be permitted on a wagon leaving out of sick line.
E.1.2.9.1.3	Yoke, follower, pins to be ensured intact and correct condition.
E.1.2	Examine CBC coupler casing and knuckle with Contour Gauge.
E.1.2	CBC operating handle/anti creep arrangement
E.1.2.9.1.6	Ensure correct riveting and YSP, PSP to be homed with centre sill.
E.1.2.9.1.7	CBC striker casting and shank wear plate to be removed without fail.
E.1.2.9.1.8	Proper welding procedure to be followed.
E.1.2.9.1.9	All modification to be carried out.
E.1.2.10	Check doors and door operating gear and lubricate
E.1.2.11	Attend to special modifications as ordered from time to time where practicable with nominated ROH depot facilities.
E.1.2.12	Examine floor, roof, side and end panels thoroughly and replace corroded panels in a manner and to an extent that the wagon does not require corrosion repairs till next ROH/POH.
E.1.2.13	Stencil station code initials and date on either side of each bogie in 25 mm letters. This should also be done either side of sole bar on PR plate.
E.1.3	<p><u>SPECIAL PRECAUTIONS FOR RECTIFICATION OF DEFECTS BY WELDING.</u></p> <p>The instructions issued by the RDSO in Pamphlet No. R-7 for precautions during welding and the method of examination / repairs of the UIC type trolleys shall be observed in workshops and sick lines. Wherever</p>

	modifications are introduced from time to time for rectifying defects, these shall also be undertaken in workshops and sick lines especially nominated by the Railways for this purpose. Special attention shall be paid to follow the instructions given below during any repairs involving welding.
E.1.3.1	Bogie frame should be completely stripped for purpose of welding and should be so placed that proper down hand welding is possible.
E.1.3	Before putting on the sealing run, welding from the other side should be chipped to ensure that the sealing run is on clean metal. Stitch welds should not be welded over. Proper fusion between stitch and final welds should be ensured.
E.1.3	For welding repairs, extra ductile electrodes should be used to ensure that welding strains are well accommodated by the weld metal itself.
E.1.3.4	Properly trained welders under qualified supervision must do welding.
E.1.3.5	If welding at any of the locations is not cracked, but defects indicated below are noticed, these should be attended in the manner described.
E.1.3.6	Welding should be done under cover in wet weather and dry storage of electrodes should be ensured. Weld discontinuities should be made good. Porous welding should be chipped out and re-welded. Under size welding if sound, should be re-enforced. Weld irregularities, under cuts and craters should be rectified and dressed up as far as practicable. Reinforcements as prescribed in R-7 for the various locations shall be fitted if not already provided.

E.1.3.7	<p>The locations where welding and other defects are likely to occur, are indicated below and these must be examined properly: -</p> <p>Cracks in sole plate, horn gap stiffener, bearing spring hanger bracket/bush at the headstock and centre.</p> <p>Welding failure at trimmer, tie bar and cantilever arms or trimmer, brake block hanger bracket and transom.</p> <p>Loose horn cheek or horn cheek packing piece rivets.</p> <p>Loose bridle bar rivets.</p>
E.1.3.8	<p>After examination and repairs involving welding it shall be ensured that the bogie alignments at the following locations are checked by proper type of gauges before fitting the trolley under the wagon: -</p> <p>Distortion of spring bracket in vertical direction.</p> <p>Distortion of spring bracket outer faces in horizontal direction.</p> <p>Distance of spring bracket centres from wheel centre.</p> <p>Distance of wheelbase.</p> <p>Distance of spring centre diagonally from centre pivot.</p> <p>Distance of spring centre from side bearer centre.</p> <p>Distance between centerline of horn cheek and centerline of spring (Longitudinal).</p> <p>Perpendicularity of horn cheeks inner faces.</p> <p>Perpendicularity of horn cheeks outer faces.</p> <p>Distance between horn cheeks longitudinally.</p> <p>Distance between horn cheeks transversely (Outer faces).</p> <p>Distance between horn cheeks outer faces and spring bracket outer face.</p> <p>Distance of side bearer top faces and centre pivot top face (transversely and coplanarily) of side bearer top faces (transversely).</p> <p>Distances between centre of centre pivot and centre of side bearer.</p>

E.1.4	INSPECTION AND REPAIRS OF DRAFT GEAR AND CENTRE BUFFER COUPLERS.
E.1.4.1	<p>During POH, instructions issued by the RDSO in their Inspection and Maintenance manual No. G-80 shall be followed to ensure that the draft pads and other components of the assembly are in good condition. The centre buffer coupler components shall be checked by the use of the gauges prescribed for this purpose.</p>
E.1.4.2	<p>Whenever wagons with centre buffer couplers are placed in the sick lines, care shall be exercised to check and repair the components in accordance with RDSO's instructions in their Inspection and Maintenance manual No. G-76. The dimensions of the coupler components shall be checked by the use of three gauges prescribed for this purpose.</p>
E.1.4.3	<p>While reclaiming or examining coupler body, conditions laid down below shall be observed: -</p> <p>A coupler body with parts broken off and/or missing shall be scrapped.</p> <p>Building up of worn surfaces inside the coupler head such as pulling lugs, buffing shoulders, lock wall, etc. is prohibited.</p> <p>Shank length and depth can be corrected by welding followed by normalizing.</p> <p>Shank wear of 3 mm but not in excess of 10 mm depth into the bottom wall of shank be built up by welding and then normalized.</p> <p>Building up of yoke pin hole is prohibited but the coupler may be used until the yoke pin hole diameter reaches 98 mm.</p> <p>Shanks found bent shall be straightened under a press after heating to 452 degree C, and then allowed to cool in still air. Before use, the coupler body shall be carefully</p>

	<p>examined for cracks that may have developed as a result of straightening.</p> <p>Cracks on the coupler body shall be repaired by welding followed by normalizing. Cracks in the guard arm or front face shall be welded, provided they do not extend through the full thickness of the front face.</p> <p>Coupler body with distorted guard arm shall be restored either in a press or with light hammer blows, after heating, care being taken to heat only a small area to prevent distortion of the opening in the front face of the coupler. After rectification, the coupler body shall be normalized and checked by guard arm distortion gauge.</p>
E.1.4.4	<p>While examining the knuckle or its components the following conditions shall be observed: -</p> <p>Knuckles exceeding the limits for nose wear and stretch and those having splits, cracks or complete fracture shall be condemned. Building up of nose wear of knuckle is prohibited.</p> <p>Worn hub, pulling lug and pin protector of the knuckles shall be built up by welding followed by normalizing and tempering. Lock engagement surface wear of the knuckle shall be built up by welding without any normalizing or tempering later on.</p> <p>Worn surface on the knuckle lock, which comes in contact with the knuckle or coupler body only, shall be built up by welding followed by normalizing and quenching/tempering.</p> <p>Knuckle pivot pins having steps or cracks, which have a diameter less than 40 mm at any point, shall be condemned. Bent pins shall be reclaimed by heating and straightening and then allowed to cool in still air and heat-treated to a hardness of 250 – 305 Brinell.</p>

	<p>Knuckle thrower and lock lift assembly when excessively worn, broken, bent or otherwise distorted shall be condemned and not built by welding.</p> <p>Clevis when worn more than 3 mm shall be condemned and not built up by welding. Clevis pins having steps or cracks or which have a diameter less than 37 mm at any point shall be condemned. Bent pins shall be reclaimed by heating and straightening followed by cooling in still air and heat treated to give a hardness of 250 – 305 Brinell.</p>
E.1.4.5	<u>GENERAL INSTRUCTIONS:</u>
E.1.4.5.1	Inspection and maintenance of CBC of both standard and high tensile CBCs and draft gears during intensive examination, examination in sick line, ROH and during POH should be in accordance with the instructions issued from time to time.
E.1.4.5.2	None of the coupler components should either be painted or lubricated.
E.1.4.5.3	The repair practices for coupler body with shank, knuckles and draft gears to be followed in workshops and maintenance depots shall be according to instructions issued by RDSO in Technical Pamphlet No. G-80 and G-76 respectively. The instructions contained in Technical Pamphlet No. G-80 and G-76 are applicable for high tensile couplers also except for reclamation of coupler body, yoke, knuckle, lock, knuckle pin and yoke pin for which the reclamation procedure is different due to use of higher grade of material and the draft gears which are friction type different from the standard rubber draft gear type HR-40-I. A maintenance manual for high tensile couplers has been issued by M/s. Bhartia which should be followed for the high tensile CBC and draft gear Cardwell Westinghouse design model Mark 50.

	Similar maintenance manual issued by M/s. Burn Standard Co. for their high tensile couplers and draft gear Miner design model RF 361 to be followed. There is no difference between HT CBC manufactured by M/s. Bhartia and M/s. Burn. The only difference is in use of high capacity friction draft gears, which are of different makes.
E.1.4.5.4	Reclamation of worn out nose portion of knuckle shall be prohibited.
E.1.4.5.5	HR-40 draft gear needs to be replaced by high capacity draft gears during POH in workshops. The non-high tensile couplers are not required to be replaced by high tensile couplers during POH unless they are damaged and warrant replacement. (Ref. RB L. No. 84/M (N)/172/3/Vol.I Dt. 5.7.90)
E.1.4.5.6	High capacity draft gears Cardwell Westinghouse Mark 50 and Minar RF 361 can be exchanged on high tensile CBCs as complete assemblies. The followers of the two draft gears are also interchangeable.
E.1.4.5.7	The maximum, drop in the CBC height that can be expected due to spring deflection under gross load, wheel wear, bogie centre pivot wear and wear on the pedestal crown is about 87 mm. To restore CBC height and to bring it with permissible limits on wagons with worn wheels, it would be necessary to interpose height-adjusting packings to RDSO's Maintenance manual G-95, Clause No.5.12.
E.1.4.5.8	RDSO has standardized the CBC operating handle for each type and stock. This should be implemented during ROH/POH. (Ref. RDSO L.No. MW/BOXN/MAINT, Dt. 16-18/10/2000)

E.1.4.5.9	Detailed instructions for maintenance for Mark 50 and RF – 361 draft gears are also available in G-80 and are required to be followed during POH.
E.1.4.6	Additional Instructions
E.1.4.6.1	<p><u>INTENSIVE EXAMINATION:</u></p> <p>Check and ensure that the knuckles are not worn beyond permissible limits and knuckle pins are properly secured.</p> <p>Check and ensure CBC, yoke and draft gear housing are free from crack/welding failure.</p> <p>Check and ensure that locking mechanism is proper. The gap between bottom of CBC and lock lift is maintained at 25 mm.</p> <p>Check and ensure CBC is not drooping and striker casting wear plate is intact.</p> <p>Check and ensure that operating handle is proper with bearing piece and its safety bracket.</p> <p>Check and ensure that draft gear is not weak.</p> <p>Check and ensure that yoke support plate and back stopper plate rivets have not failed.</p>
E.1.4.6.2	<p><u>TERMINATING EXAMINATION:</u></p> <p>Check knuckle for excessive wear.</p> <p>CBC, yoke, draft gear housing for cracks and weak draft gear to be marked sick.</p> <p>Check locking/unlocking arrangement and drooping CBC and damage where necessary.</p> <p>YSP/PSP rivets for failure or damaged. (Rivet failure upto two to be bolted).</p>
E.1.4.7	INSPECTION AND REPAIRS OF DRAFT GEAR TO RDSO SPECIFICATION NO. WD-66-BD-06
E.1.4.7.1	Draft gears to RDSO specification no. WD-66-BD-06 is to be dropped in first and every POH cycle.

E.1.4.7.2	After dropping, each draft gear should be inspected as per car inspection procedures issued by concerned OEM and to be overhauled/ reconditioned only in case of noticing any defect as listed in AAR field manual Rule no. 21.
E-2	INSTRUCTIONS FOR MAINTENANCE OF BOXN WAGONS AND OTHER STOCK FITTED WITH CASNUB BOGIES AND CBCs.
E.2.1	BOXN wagons and other stock fitted with Casnub 22 (W) and Casnub 22 W (M) bogies and high tensile centre buffer coupler have special design features and the instructions issued by RDSO in their publication No. G-95, G-70 and G-81, for examination and maintenance of all such stock shall be observed. Important instructions as laid down in this Appendix shall also be followed: -
E.2.2	Examination of trains.
E.2.2.1	<p><u>At Originating stations.</u></p> <ul style="list-style-type: none"> a.) Hand brake to be fully released. b.) Empty load box operating handle to be in correct position in 'empty' position when wagon is empty or lightly loaded and in 'loaded' position when wagon is loaded beyond 42.5 t. gross. c.) Worn out brake blocks to be changed. d.) All brake rigging pins to be intact and correct. e.) Dimension 'A' of brake regulator to be correct. f.) Empty Tie-rod adjustment to be correct. g.) Ensure that the hose coupling for brake pipe (BP) on consecutive wagons are coupled to one another to form a continuous air passage from the locomotive to the rear end of the train. For proper identification BP coupling heads are marked with 'BP' and painted in green.

	<p>h.) All the cut-off angle cocks of brake pipe except those at the rear end of the train shall be open. The handle shall be parallel to the pipe when cock is in the open position and will be at right angle when at close position.</p> <p>i.) Ensure that cut-off angle cocks of brake pipe at the rear end of train is kept closed.</p>
	<p>j.) The BP hose coupling at the rear end of the train should be placed on its respective hose coupling support.</p> <p>k.) Ensure that the isolating cocks on the distributor valve of all wagons are in open position.</p> <p>l.) Ensure that pressure gauge of BP is provided in the brake van.</p> <p>m.) Ensure that the gauge in Guard's Compartment show prescribed pressure.</p> <p>n.) If the leakage is found to be in excess of prescribed limit, the leakage shall be rectified.</p> <p>o.) If there is visible damage to the hosepipe then change them with new one.</p> <p>p.) Apply service brake and ensure following</p> <ul style="list-style-type: none"> a) The piston stroke should be 85 +/- 10 mm under empty and 130 +/- 10 mm under load. ii) The brake blocks of each wagon are mating the wheels. <p>q) Release the brake and ensure the following:</p> <ul style="list-style-type: none"> i) Piston of brake cylinder is in fully retraced position. ii) Brake blocks are away from the wheels. <p>r) Ensure that brake cylinders are operative as prescribed.</p> <p>s) Guard should ensure that the Emergency Brake Valve provided on the brake van is working properly by operating this valve.</p>

	<ul style="list-style-type: none"> t) Driver, Guard and Supervisor (C&W) should check the details given in the brake certificate and ensure its compliance. u) Centre Buffer coupler unlocking levers to be in perfect working order. v) Knuckle and knuckle pin to be intact. w) Cartridge Bearing Cap bolts shall be intact and properly secured
	<ul style="list-style-type: none"> x) Coil springs shall be in order as per Clause 5.6 of Technical Pamphlet No. G-95. <ul style="list-style-type: none"> i) Adapters are intact and are properly seated on bearing units. ii) Wheels to be examined as per rule 3.3.5. iii) All side doors to be properly and effectively secured in closed position.
E.2.2.2	<p><u>At terminating stations:</u></p> <ul style="list-style-type: none"> a) Immediately on arrival of a train cartridge taper Roller bearing axle boxes to be felt on both sides and wagons with excessively warm/hot boxes to be detached for detailed investigations as per RDSO Tech. Pamphlet No. G-81 (Item 6). Note: Investigations into the probable cause of cartridge taper roller bearing failure should only be carried out in Mechanical workshops and detailed report submitted to RDSO on proper form. b) Wheels to be examined for flat places or other defects. Skidded wheels can easily be detected on an approaching train before it comes to a stop. c) Brake Rigging Pins to be inspected for correct size and for proper securing. d) Check the percentage of operative cylinders.

	<ul style="list-style-type: none"> e) The wagon with brake cylinders found in operative or sticky should be marked sick. f) Check for excess leakage. g) Air brakes to be released fully by pulling the manual release hook/linkage provided on the distributor valve. At full release brake blocks should leave the wheels. h) Damaged angle cocks and air hoses should be attended and sick mark the wagon if necessary. i) Check the piston stroke, which should be within the limits
E.2.3	ROUTINE OVERHAUL (ROH)
E.2.3.1	BOXN, BOXNHS, BOXNHA, BOSTHS, BOXNHL, BOXNEL, BOXNR, BCN, BCNA, BCNAHS, BCNHL, BRN, BRNA, BRNAHS, BRHNEHS, BTPN, BTPGLN, BOY, BOBR, BOBRN, BOBYN, BOXNHA, BOXNCR, BFKN, BLCA/BLCB, BTAP, BTCS, and other stock fitted with Casnub Bogie should be given Routine Overhaul as mentioned in para 2.4.3.3 at nominated ROH depot/ workshops where proper facilities are available.
E.2.3.2	The Routine Overhaul should be worked to the following schedule where applicable:
E.2.4 E.2.4.1	<p><u>Lifting and Lowering.</u></p> <p>Disconnect both the Bogies Pull Rods, connecting brake gear of the bogies to the horizontal levers and also the hand brake pull rod. The most suitable place for lifting is in the transverse plane of the wagon containing the bogie centre pivots. In this plane jacks can be applied directly under the side sills. If lifting is</p>

	<p>to be done by the crane, it would be necessary to provide proper lifting beam with tackle that would avoid damage to wagon sides in the process of lifting.</p>
E.2.4.2	<p>a) Lift body, keep it on trestles and run out bogies.</p> <p>b) Strip Bogie components for examination and repair as below:-</p> <ul style="list-style-type: none"> i) Strip spring and spring suspension arrangement including snubbing device. Check springs for free height and other defects and replace where required. ii) Ensure bogie frame and check frame alignment as per instructions contained in RDSO Tech. Pamphlet No G-95. (Plate 113) iii) Examine pivots for welding defects/ cracks abnormal depth due to wear. Replace where necessary and lubricate with graphite flakes to IS: 495- dry condition. iv) Examine side bearers as per details mentioned in relevant drawing and in RDSO Tech. Pamphlet No. G-95/ other relevant maintenance instructions issued by RDSO or manufacturers (Plate 106 & 107). <p>c) Strip brake gear levers and rods for examination of worn out/ damaged parts.</p> <p>d) The Air brake equipment shall be given the following attention/checks in accordance with the Maintenance Manual issued by different Air Brake Manufacturers:</p> <ul style="list-style-type: none"> i) Cleaning of Filter/Strainers. ii) Lubrication of brake cylinders/cleaning of its strainer. iii) Check for easy operation of Isolating Cock for distributor valve, cut-off angle cock, manual quick release valve and isolating cock.

	<ul style="list-style-type: none"> iv) Draining of auxiliary Reservoir and control reservoirs. v) Checking of Hose coupling for serviceability. vi) Cleaning of Strainer and Choke of Check Valve. vii) Dirt Collectors to be cleaned. viii) Leakage in pipes and joints to be checked. ix) After carrying out above mentioned items of work the wagon shall be tested for proper functioning of air brake system with single wagon test rig (Plate 108) in accordance with the procedure given in G-97. e) Clean horizontal lever, hand brake, gears and lubricate. f) Examine Headstock for damage, bent/cracks. g) Refit brake gear levers and rods, lubricate pins and other equipment and apply graphite to horizontal levers of empty load box. h) Replace worn out brake blocks. i) Inspection of adapter should be done as per procedure given in RDSO Pamphlet No. G-81. j) Inspection of CBC should be done as per procedure given in RDSO Pamphlet No. G-70. k) Visual inspection of cartridge bearings should be done as per procedure given in RDSO Tech. Pamphlet No. G-81. l) The Cartridge Taper Roller Bearings used on Indian Railways are of 'No Field Lubrication' (NFL) type. These bearings require no maintenance between POH to POH. The bearings, therefore, should not be opened in the sick line/ ROH depots. m) During ROH of BLC wagons, all wheel sets are to be machined to new tread profile. n) During train examination, the bearings should be examined for

	<p>Abnormal noise Running temperature.</p> <p>o) Running temperature up to 38 °C above ambient may be expected under normal operating conditions. Warmer bearings than other bearings on the wagon should be removed from service for further examination.</p> <p>p) When wagons pass through sick lines for some repairs for tyre turning, the bearings should be subjected to external examination. q) If the bogie is lifted for any reason, the bearing should be rotated by hand and checked for any unusual sound due to raceway damage. Bearings giving unusual sound should be removed from service.</p> <p>r) Before tyre turning, open out the axle end cap and replaced it with a dummy cover. The dummy cover can be made as per RDSO Drg. No. WDIIA-8514/S-I.</p> <p>s) After tyre turning, clean the axle end thoroughly, taking special care to see that no grit or swarf is left. Also check axle end cap screw holes for any grit/ swarf mount the axle end cap and locking plate. Tighten the axle cap screws with torque wrench. The torque specified is 40 kg-m. Bend the tabs of locking plate and finally rotate the bearings, and check the condition of bearing seals and adopter.</p>
E.2.4.3	Additional items required to be done (BTPN Wagons):
E.2.4.3.1	<p><u>Barrel fittings:</u></p> <p>Safety Valves: The safety valve shall be subjected to pneumatic test after wagon repairs. The valve adjustment should not be interfered with unless repairs to the valve becomes necessary. In such cases it must be repaired correctly, adjusted and re-</p>

tested at pressure 1.12 kg/cm² for vapour tightness and 1.4 kg/cm² for set pressure. All gasket/ packing should be changed.

Master Valve:

The master valve should be checked for smooth operation and leakage.

All damaged / worn out parts, particularly valve seat shall be changed.

All packing / gaskets shall be changed.

Whenever repairs to master valve and its seating are undertaken, the valve should be tested in position under air pressure of 0.35 to 0.56 kg/cm² (5 to 8 PSI), the tank wagon being filled with water to a minimum height of 150 cm. The hydraulic test should be carried out, keeping the bottom discharge valve and dummy flanges over discharge pipe open.

Bottom discharge Valve: Maintenance of the valve should be done as per recommendations of the manufacturers.

Blank Flange: Gasket below the cover should be changed. The blank flange should be tested in the same manner as the Master valve, ensuring that gasket of specified material has been fitted.

Locking devices: Ensure that all the locking devices have provision of spring washers, under the nut, tack welding of nut and welding of split pin has been provided.

Large nos. of cases of crack has been noticed on the Anchoring Tee joint and these have been gradually

	progressing in the barrel. These should be attended as per procedure laid down. (Ref. RDSO's L. No. MW/BTPN, dt. 24.8.98)
E.2.4.3.2	BTCS (Bogie Caustic Soda Tank Wagons)
E.2.4.3.2.1	<p><u>Barrel and Barrel fittings:</u> The followings works shall be done during ROH. Touching of paint and lettering wherever required. Visual examination of cradle.</p> <p><u>Dome Fittings:</u> Removal of safety valve, air control valve, vacuum relief valve and liquid control valve from the barrel and replacement of these fittings by new/overhauled and duly certified fittings. The old fittings shall be sent for examination and repairs. Alternatively the same fittings can be overhauled and fitted back on the wagon. During overhauling each fitting shall be de-assembled, the parts cleaned, seating matched and the gaskets/seals replaced followed by testing of the fittings.</p>
E.2.4.3.3	BTPGL/BTPGLN (Bogie Liquefied Petroleum Gas Tank Wagons)
E.2.4.3.3.1	<p><u>Tank Barrels and dome fittings:</u> Tank Barrel and dome fittings of BTPGL and BTPGLN wagon shall be given Routine Overhaul (ROH) in accordance with the stipulation of para 7.3 of Tech. Pamphlet No. G-86 (Maintenance manual to 8 wheeler BTPGL/BTPGLN wagon with latest modification)</p>
E.2.4.3.3.2	<p><u>Under frame and Bogie:</u> ROH of under frame and Bogies of BTPGLN shall be in accordance in para 11.4 of Tech. Pamphlet No. G-70.</p>

E.2.4.3.3.3	ROH of under frame and bogie of BTPGL wagon shall be in accordance with para 12.4 of Tech. Pamphlet No. G-86 (Revised).
E.2.5	<p>Periodic Overhaul (POH):</p> <p><u>Tank barrel and dome fittings:</u></p> <p>Tank barrel and dome fittings of BTPGL / BTPGLN shall be given POH, testing and repair in accordance with the stipulation at para 7.4 of Tech. Pamphlet No. G-86 with latest amendments.</p>
E.2.6	<p>BOBR / BOBRN:</p> <p>In addition to the normal items required to be attended for air brake system, the following are also required to be ensured.</p>
E.2.6.1	Ensure that wagons fitted with C3W2 DVs are provided with LSD type VN5 & swiveling adapter and KEODV with operative valve B1 and spring buffer F1. (To attach plates as per Tech. Pamphlet No. G-96).
E.2.6.2	Ensure that nuts have been provided between lever of VN5 valve and Swiveling adapter and between Swiveling adapter and fixing bracket on spring plank.
E.2.6.3	Check proper functioning of load sensing device fitted on the bogie. For checking the proper working of LSD in loaded condition press the piston of operating valve by inserting a bar in case of equipment of M/s. Escorts & M/s. Greysham with EST 3 F DV. In case of equipment supplied by M/s. RPIL & M/s. Greysham with C 3 W 2 valves, the swiveling adapter may be disconnected from the spring plank and operate the valve manually to stimulate loaded condition of wagons & observe higher brake cylinder pressure.
E.2.6.4	Ensure that tack welding of nut with bolt have been done for the load sensing device after the fitment

E.2.6.5	Ensure that all modifications circulated by RDSO from time to time have been carried out in the brake system.
E.2.6.6	After carried out above mentioned works, the wagon shall be tested with single wagon test rig to check proper functioning of air brake system as per proforma.
E.2.7	<p>POH: (BOBR/BOBRN & other stock fitted with air brake system):</p> <p>During POH of the wagon, air brake equipment shall be given the following attention / checks in accordance with the procedure given in the maintenance manual issued by different air brake manufacturers.</p>
E.2.7.1	Remove DV along with pipe bracket, brake cylinder, cut off angle cock, dirt collector, auxiliary reservoir, control reservoir and load sensing device from wagons and overhaul
E.2.7.2	All items recommended to be procured in the form of Pan Kit circulated by RDSO shall be replaced.
E.2.7.3	After overhauling, the DV shall be tested on the DV test bench, other components shall also be tested in accordance with the supplied recommendation.
E.2.7.4	Check hose coupling assembly and flexible hose for damages and replace the hose and test.
E.2.7.5	Replace gasket of hose coupling (MU Washer)
E.2.7.6	Strip the pipes and pipe fittings and replace damaged pipes
E.2.7.7	Replace all the gaskets of pipe fittings.
E.2.7.8	<p>Carry out all modification in the brake system circulated by RDSO from time to time.</p> <p>After the air brake equipment is fitted, the wagon should be tested with single wagon test rig to check proper functioning of air brake system as per proforma.</p>
E-3	INSTRUCTIONS FOR MAINTENANCE OF TANK WAGONS (NON PRESSURE VESSELS)

E.3.1	Routine overhaul schedules (ROH) should be given to the tank wagons fitted with roller bearings after prescribed interval at properly equipped major sick lines to the following schedule: -
E.3.1.1	All brake gear levers, pull rods be dropped and checked. Repair/replacements required be carried out.
E.3.1.2	Lower vacuum cylinders, overhaul and test.
E.3.1.3	Examine brake rigging, clean and lubricate.
E.3.1.4	Check springs for free camber and for other defects.
E.3.1.5	Examine shackle plates for wear and replace where required.
E.3.1.6	Examine scroll iron and attend to its loose/ missing rivets.
E.3.1.7	Check axle guards and its alignments.
E.3.1.8	Check horn cheeks and its rivets.
E.3.1.9	Examine Centre Buffer Coupler, Draft and Buffing gears and attend to defective / worn out parts as indicated in Technical Pamphlet No. G-80 or G-76 issued by RDSO whichever is applicable.
E.3.1.10	Examine CBC uncoupling lever for its proper functioning by actual manipulations.
E.3.1.11	Ensure that wagon is equipped with all the manhole fittings, master valve, bottom discharge valve and safety valve (if provided). The deficient fitting shall be made good and correct functioning of these fittings ensured.
E.3.1.12	Touch up paints and lettering where necessary.
E.3.1.13	Stencil ROH station code, date in 25 mm letters on either side of body side at sole bar level.
E-4	INSTRUCTION FOR MAINTENANCE OF TANK WAGONS PRESSURE VESSELS.
E.4.1	LPG Tank wagon type BTPGL/BTPGLN as per RDSO Maintenance manual No.G-86 (Rev.1).

E.4.1.1	<p>Sick marking of Tank wagon by Train Examination staff:</p> <p>The wagons shall be marked sick in case of the following: -</p>
E.4.1.1.1	<p>The under frame, brake gear, running gear, draft and buffering gear, etc. not in compliance with the requirements detailed in Chapter – II and Chapter – IV.</p>
E.4.1.1.2	<p>The barrel is corroded, dented / damaged and the paint having lost its reflective characteristics, where the condition so warrants.</p>
E.4.1.1.3	<p>Wagons overdue POH/ROH.</p>
E.4.1.1.4	<p>Diaphragm plate studs/bolts loose or deficient.</p>
E.4.1.1.5	<p>Any sign of leakage from dome fittings.</p>
E.4.1.1.6	<p>Damage to barrel fittings i.e., platform, ladder, cradle, dome cover etc.</p>
E.4.1.2	<p>Procedure for Loading:</p> <p>Before loading operation, an authorized representative of the loading company shall issue certificate to the Terminal Authority after necessary check-up in respect of the following: -</p> <p>The wagon shall be visually examined by the representative of the loading company to ensure that:</p> <p>POH/ROH of the wagons are not overdue.</p> <p>There is no physical damage to the barrel.</p> <p>The liquid and vapour education valves, sampling valve, magnetic gauging device are complete in fittings and are in perfect working order and that there is no evidence of leakage.</p> <p>There is no physical damage to the safety valve and thermometer well.</p>

E.4.1.3	<p>C & W Examination before offering the wagons for loading:</p> <p>Before offering the wagon for loading, C & W Supervisor shall examine the wagons particularly in respect of the items enumerated in para F.4.1.1. Only the wagons that are found fit shall be offered for loading.</p>
E.4.1.4 E.4.1.4.1	<p>OVERHAULING AND TESTING:</p> <p>LPG tank wagon such as BTPGL/BTPGLN shall be periodically overhauled as per the prescribed maintenance schedules.</p>
E.4.1.4.2	<p>The ROH shall be carried out in the nominated maintenance depots while the POH shall be carried out in mechanical workshops fully equipped for undertaking repairs of Class-I pressure vessels.</p>
E.4.1.5	<p>ROUTINE OVERHAUL (ROH):</p> <p>The ROH shall consist of the following examination, repairs / replacements and tests:</p>
E.4.1.5.1	Surface cleaning and repainting of barrel.
E.4.1.5.2	Visual examination of cradle.
E.4.1.5.3	<p><u>Dome fittings.</u></p> <p>Removal of safety valve, eduction valves, sampling valve from tank wagons and replacement of these fittings by new/repaired or fully certified fittings. The fittings taken out shall be sent for examination and repair as detailed in relevant paragraphs.</p> <p>Dismantling, cleaning and examination of excess flow check valve and its replacement if necessary. The working of the valve shall thereafter be checked.</p> <p>All dome fittings after repair shall be certified by an Independent agency / Third party.</p>
E.4.1.5.4	<u>Under frame and Boqie:</u>

E.4.1.5.4.1	ROH of Under frame and Bogie of BTPGL wagons shall be in accordance with Technical Pamphlet No.G-86 latest version.
E.4.1.5.4.2	ROH of Under frame and Bogie of BTPGLN wagons shall be in accordance with Technical Pamphlet No.G-70.
E.4.1.6	PERIODICAL OVERHAUL (POH) (BTPGL/BTPGLN): In addition to the attention required during ROH, the POH shall consist of following examination and test with repairs wherever necessary.
E.4.1.6.1	<p>Barrel:</p> <p>Removal of sludge.</p> <p>Cleaning of inside plate of barrel.</p> <p>Inspection of cracks and damage etc., of the barrel.</p> <p>Measurement of barrel thickness.</p> <p>Repair of barrel as considered necessary followed by heat treatment and radiography.</p> <p>Hydraulic testing and the certification by an independent agency / third party.</p>
E.4.1.6.2	Cleaning and sound test of cradle rivets at the time of hydraulic testing.
E.4.1.6.3	Examination of under frame members, bogies, buffing and draw gear and vacuum brake/ air brake etc. as per standard practice in vogue for bogie wagons such as BOX & BOXN, etc.
E.4.1.6.4	Painting of barrel and under frame.
E.4.1.6.5	<p>Dome Fittings: -</p> <p>Body test of the eduction valves.</p> <p>Removal of float from guide tube of magnetic level gauge and change of synthetic fittings of float and body.</p>
E.4.1.7	CLEANING, EXAMINATION, REPAIR AND TESTING / INSPECTION OF TANK BARREL:
E.4.1.7.1	CLEANING AND EXAMINATION:

	<p>No person shall be allowed to enter the tank barrel for internal examination / repairs till it is ensured that the barrel is free from LPG fumes and necessary facilities of light and fresh air is provided.</p> <p>All fire hazard precautions should be taken around the premises where these tanks are being examined.</p> <p>Lighted lanterns and lighted matches should not be used for interior examination.</p> <p>Smoking in and around the area should be strictly prohibited.</p> <p>Any metal tool, which is liable to create sparks, should be avoided.</p> <p>Note: Non Sparking Hand Tools are fabricated from alloys of Beryllium-copper, Aluminum-Bronze and Brass. The use of Non-sparking Tools should never be made a Pretext for neglecting to remove a flammable atmosphere before the work is carried out. Hand Tools made out of Non Metallic Materials e.g. Wood are likely to be safer than Tools made from Metals.</p> <p>To ensure that all LPG has been emptied, open the sampling cock and let the entire gas residue leak out. Thereafter all the three eduction valves should be opened.</p> <p>Remove the manhole cover along with fittings and leave the tank exposed for at least 24 hours. The fittings should be stored in a clean and safe place.</p>
E.4.1.7.2	<p><u>METHOD OF DE-GASSING.</u></p> <p>Before undertaking the overhauling and repair to the LPG wagons, the barrel shall be made completely free from LPG gas. For degassing the barrel, following sequence shall be followed:</p> <p>(i) Sampling valve should be opened and vapours allowed to escape fully.</p>

	<p>(ii) The Plugs of liquid and vapor eduction valves be un-screwed and then valve opened.</p> <p>(iii) The following method be adopted to make the barrel free from LPG.</p> <p>Fill the barrel completely with water and allow to overflow for an hour. Pump out the water after 24 hours.</p> <p>(iv) The following alternate method by stem process be adopted to make the barrel free from LPG</p> <p>(a) Depressurize the barrel by venting to atmosphere.</p> <p>(b) Connect the steam hose to liquid eduction valve and steam is charged into the barrel at 3.2 kg/cm² and 145 ° C temperatures with one vapour eduction valve open.</p> <p>(c) Steam is charged for 12 hours and venting of steam is done alternatively from each vapour eduction valve for 6 hours by swapping the hose connection.</p> <p>(d) After 12 hours of steam purging, steam induction to the barrel is stopped and both vapour eduction valve are opened and tank barrel allowed to cool.</p> <p>(e) For about 12 hours cooling, sample is collected from barrel through sampling valve for analysis of hydrocarbon and oxygen.</p> <p>(f) If the hydrocarbon % is NIL and oxygen % is minimum 19.5%, the wagon is declared degassed.</p> <p>(g) If the laboratory result shows hydrocarbon % and oxygen % not within limit, the</p>
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	<p>process of steam purging is continued until the result is within limit.</p> <p>(h) Now, % of hydrocarbon and % of oxygen shall be recorded as per proforma shown below for the last cycle only. Ensure complete absence of hydrocarbon on inside of the barrel by means of Explosimeter.</p> <p>(i) The safety standards stipulated in OSID standard 112 on "Safe handling Air Hydrocarbon mixtures and Pyrophoric substances" shall be ensured.</p> <p>(v) Remove the manhole cover; in no case the heating of studs/bolts shall be adopted to open them. If necessary, rust remover solution may be used.</p> <p>(vi) Ensure the complete absence of vapour inside the barrel.</p>
E.4.1.7.3	<p><u>Water removal after hydraulic test.</u></p> <p>After hydraulic test of the barrel, the dome assembly shall be taken out from the barrel. The water collected inside shall be taken out by syphoning or suction. The remaining quantity of water, if any, shall be removed manually. The traces of water are removed by means of clean cloth or cotton waste and surface is allowed to dry out completely.</p> <p>The diaphragm with dome fittings shall then be reassembled.</p> <p>Outside and inside barrel surfaces shall then be examined for any sign of injury. The extent of corrosion shall be checked by measuring the thickness of the barrel at the various locations. Barrels having thickness</p>

	<p>of 12.5 mm or less for cylindrical portions and 14mm or less for dished ends at any location shall be withdrawn from service for BTPGL/BTPGLN wagons. This should be done by competent authority for inspection of pressure vessels.</p> <p>All the piping arrangement and valves below the manhole cover plate be also cleaned and examined for any damage or excessive corrosion. Any excessively corroded pipe / component may be replaced.</p> <p>In case, Lamination defects is noticed during normal examination being conducted during POH/ROH, the same shall be permitted if found within acceptance limit specified in ASTMA 435/ ASTMA 578 level-I after complete plate has been scanned as per either of the above referred ASTM standards. Such locations shall be checked for thickness from both sides of the plate and the total thickness shall be within limit as specified in para F.4.1.7.3 (iii). Such locations shall be indicated by red colour paint for future reference and should be checked during every POH/ROH.</p>
E.4.1.7.4	<p>REPAIR OF TANK BARREL: Refer Maintenance Manual for BTPGL/BTPGLN Tank wagons G-86 (Rev.I).</p>
E.4.1.7.5	<p>TESTING AND INSPECTION OF BARREL. Refer Maintenance Manual for BTPGL/BTPGLN Tank wagons G-86 (Rev.I).</p>
E.4.1.8	<p>MAINTENANCE AND OPERATION OF VALVES AND GAUGES.</p>
E.4.1.8.1	<p>The valves and gauges used in BTPGL/BTPGLN wagons have been imported from M/s. Midland Manufacturing Corporation USA. RDSO has also</p>

	provisionally approved M/s Chandra Engineering & Mechanical Pvt Ltd Mumbai and M/s Arieckal Industries Mumbai for supply of dome fittings of LPG Tank wagons. These fittings should be replaced preferably by RDSO approved indigenous brand or by original brand.
E.4.1.8.2	A brief description of the valves and gauges are given in the following paragraphs:
E.4.1.9	Maintenance and Operation of Safety Valve.
E.4.1.9.1	The Safety Valve has the following characteristics: - (Plate No. 97) Pressure setting. 15.85 Kg/Cm2. Discharge Capacity 10.3 Cum/sec 21800 CFM (Air) The diagram and list of components is shown in Plate 97.
E.4.1.9.2	For proper maintenance of the valve, the following instructions should be followed: At the time of ROH of the barrel, i.e. after every Two Years the following instructions shall be followed: Remove the complete safety valve from the manhole cover plate and dismantle the components. Remove all the rust and dirt from the components and inspect them for any damage/excessive corrosion, damage/ excessively worn out components shall be replaced. The seats of 'O' rings as also the mating surfaces of the stem and body shall be cleaned thoroughly. Replace the components made out of rubber by new ones and re-assemble. Set the valve to the specified pressure and test with air or gas as indicated in para E 4.1.9.3 below.

	While assembling/dismantling, it is advisable to bring pressure to bear on the follower item No. 6 of Plate 97 further compressing the spring to relieve pressure on the nuts and hold the square portion of the stem. This will avoid galling the stem and nuts. While setting the springs, do not permit the stem to rotate as this may cause the seat to be scored.
E.4.1.9.3	<p><u>Post attention Testing after POH/ROH</u></p> <p>The safety valve must be tested with air or gas and should meet the following requirements: -</p>
	<p>Start to discharge pressure at = 15.85 kg/cm² (225 p.s.i) Tolerance allowed = 0.5 kg/cm² (6.75 p.s.i) (Start to discharge pressure: is the pressure measured at the valve inlet, at which there is a measurable lift or at which discharge becomes continuous as determined by seeing, feeling or hearing)</p>
	<p>And after closing should be vapour tight at 12.7 kg/cm² (180 p.s.i) (Vapour tight: is the pressure measured at the valve inlet after closing and no further fluid flow is detected at the downstream side of the seat)</p> <p>Complete the assembly by providing the retainer with 'O' rings/washer, and top guide. Operate the valve to check the proper functioning and then provide the seals bearing station code.</p>
E.4.1.10	<u>Maintenance and operation of Liquid and Gas Eduction Valves.</u>
E.4.1.10.1.	Three such valves are used in each tank car. Two are for liquid loading and unloading and one for gas/ vapour. As these valves are extensively used, maximum

	<p>attention should be paid to their maintenance and upkeep. The following attention shall be given.</p> <p>At the time of 'ROH' i.e. after two years:</p> <p>Every Two Years i.e. on each ROH Valve taken out as unit may be dismantled, all the Components thoroughly examined, Rubber fittings and Teflon Items are replaced by New ones and refitted. Acme threads in the Stem & Valve Body and Valve Seat require special attention. Conduct seat test at a pressure of 15.85 Kg/cm² (225 PSI).</p> <p>At the time of POH i.e. after Four Years:</p> <p>Apart from the attention required during ROH the valve is required to be hydraulically tested along with the barrel i.e. after every four years. Hydraulic pressure be applied once with valve closed and next with valve open but plug in position. These two conditions stimulate both the seat and body test for the valve.</p>
E.4.1.11.	Maintenance of Excess Flow check valves.
E.4.1.11.1	<p>During ROH i.e. after two years.</p> <ul style="list-style-type: none"> (i) Open the plug (item 5 of Plate 98) (ii) Take out the float (item 1 of Plate 98) (iii) Clean the plug and float to remove rust and dust. (iv) Clean the pressure balancing narrow hole / slot at the top of the shank of the float, taking care that dimensions of the hole / slot do not get changed. (v) Examine the mating surfaces of the float and plug and color match them. (vi) Replace the respective components if: Excessive corrosion to plug or float is noticed.

	Thread or mating surfaces of plug and float are damaged.
E.4.1.11.2	<p>During POH i.e. after four years.</p> <p>Carry out instructions as given from (i) to (vi) under ROH.</p> <p>Replace the float if its weight is found less than 1750 gm as the reduction in weight may lead to frequent closure of the valve.</p> <p>The clearance between float and body shall be checked. If the clearance exceeds 3 mm, the components shall be suitably replaced so as to restore the required clearance.</p>
E.4.1.12	Maintenance and Operation of Magnetic Level Gauge (Plate 99)
E.4.1.12.1	<p>The purpose of this gauge is to indicate the level of liquid inside the barrel. This is to facilitate the loading / unloading of liquid so as to avoid over / under loading. The level indicated is image (i.e. level from the bottom of tank).</p> <p>The general construction of the gauge and list of components is shown at Plate 99. It consists of a stainless steel float which slides over a stainless steel tube welded to the inside of manhole cover plate. If there is no liquid, the float will sit at the bottom position by its own weight and when the liquid is filled, due to buoyance the float will rise with the liquid level. A permanent magnet in the float (item 15) engages with another permanent magnet (item 14) which is fixed to gauge rod (item 2). As both the magnets have opposite poles, they attract each other and with the movement of the float upward or downward the gauging rod will also</p>

	<p>slide up and down. As the rod is graduated it will directly show the level of the liquid in the barrel inside. The following is the method of operation while emptying / loading the barrel.</p>
E.4.1.12.2	<p><u>Loading (See Plate 99).</u></p> <p>Unscrew the nut (cover) (item 1) Lift the gauge rod (item 2). If the magnets are engaged it will require some force to lift and this means it is in working order. The marking on the gauge should be calibrated from the bottom. When the level inside the barrel rises the rod will lift up. The level from the bottom of tank is indicated on the rod and can be read directly. When the tank is filled to its capacity, the item 2, the gauging rod is pushed down and the item 1 the cover is screwed to its position as shown in Plate 99.</p>
E.4.1.12.3	<p><u>Emptying (see Plate 99)</u></p> <p>Unscrew the nut (cover) (item 1) Lift the gauge rod (Item 2) till its magnet engages with float magnet. Hold the rod in that position and read the level on the rod. It is the top most level of the liquid inside the barrel. When the liquid is being emptied the float will slide down along with the rod, the level can be noted on the rod.</p>
	<p>If there is leakage from any part of the gauge that means damage to float guide pipe (Item 6) or to its attachment with manhole cover. If there is leakage from the joint between the gauge and manhole cover tighten the nuts, this may stop the leakage and if it still continues, the gasket might have been damaged, it should be changed.</p>

	<p>Care should be taken that plastic rod is not unduly bent otherwise it will not properly slide down or up.</p>
E.4.1.12.4	<p><u>Inspection and maintenance.</u></p> <p>At the time of POH i.e. after four years the device shall be inspected and attended as given below: -</p> <p>Spherical Float (Item 3 of Plate 99) if damaged/punctured shall be repaired or replaced.</p> <p>Gauging rod (Item 2 of Plate 99) shall be repaired / replaced if: -</p> <p>Permanent magnet on it is not active.</p>
	<p>It is bent or its markings have become illegible.</p> <p>The tube (Item 6) if not square to diaphragm plate shall be re-welded to it, it shall be replaced if found nicked or damaged.</p> <p>The top and bottom springs if found broken shall be replaced.</p> <p>As a final check the float should be moved up and down on the gauge tube with gauge rod inserted in the tube and sees that magnet is working and is free to travel the maximum distance without coming into contact with any structural elements.</p> <p>The Welded Joint between the Float Guide Tube and the Diaphragm Plate should be checked for surface cracks using Dye Penetrant Test in case of crack it should be re-welded.</p>
	<p><u>Precautions.</u></p> <p>The lowering or taking out of the manhole cover plate alongwith fittings shall be done with great care under</p>

	<p>proper supervision to make sure that the float does not get hit and damaged.</p> <p>The magnet in the rod and the float sphere shall be properly protected when the device is taken out for repair so that the metal fittings etc. do not get attached to the magnets.</p>
E.4.1.13	Maintenance and Operating of Sampler Valve (Plate 100)
E.4.1.13.1	<p>The purposes of this valve is as follows: -</p> <p>To facilitate obtaining a sample of the liquid to evaluate its quality, and</p> <p>To find out if there is still any liquid left in the tank.</p>
E.4.1.13.2	For taking a sample, remove the plug (Item 3 of Plate 100) and screw in the test tube in its place. Open the valve by operating the handle (Item 6 of Plate 100)
E.4.1.13.3	For finding if there is any liquid left in tank, open the valve, if there is any liquid it will ooze out from the opening, otherwise only gas will come out.
E.4.1.13.4	<p>Maintenance: During ROH i.e. after 2 years valve removed from tank wagons as unit shall be dismantled. The 'O' rings on stem (Item 5 of Plate 100) and Teflon seat (Item 7 & 8 of Plate 100) shall be replaced. If threads on stem / body are damaged, the components shall be replaced.</p>
E.4.1.13.5	<p>Flow Check Valve for Sampler Valve (Plate 101)</p> <p>This is a safety appliance to check any excess flow from sampler valve. If valve is found inoperative it shall be replaced during POH.</p>
E.4.1.14	<p>Facilities required for ROH/POH.</p> <p>Covered shed. The area should be isolated, fire free zone and fitted with spark-free special electric lights.</p> <p>Adequate water storage and pumping arrangement.</p>

	<p>Pneumatic testing arrangement at 15.85 kg/cm² (225 PSI) for LPG and hydraulic testing arrangement at 23.77 kg.cm² (337 PSI).</p> <p>Adequate stands for attending to diaphragm plate fitted with pipes and dome fittings.</p> <p>Wooden bench for repair of valves with adequate wooden stands for the valves.</p> <p>Gantry for attending to dome fittings, with 1 tonne overhead hoist.</p> <p>Valve test rig.</p>
E.4.1.15	Stencil the ROH station code, and date in 25-mm letters on either side of body at sole bar level.
E.4.2	<p>SICK MARKING OF TANK WAGON BY TRAIN EXAMINATION STAFF:</p> <p>As laid down in rule E.4.1.1</p>
E.4.2.1.	PROCEDURE OF LOADING:
E.4.2.1.1	JE (C&W) Examination before offering the wagons for loading.
E.4.2.1.2	<p>Visual Examination of wagons.</p> <p>Before loading, the wagons shall be visually examined by the representative of the Fertilizer Company concerned to ensure that: -</p> <p>POH and ROH of under frame and / or barrel and yearly examination of gasket and rings of dome fittings are not over due.</p> <p>There is no physical damage to the barrel and that the surface is free from rust and deep pitting.</p> <p>The paint on the barrel is in good condition and has not lost its reflecting characteristics.</p>
E.4.2.1.3	The tank wagons to be loaded shall not be located under or near any electrical wire and the wagons shall be suitably earthen before commencement of loading.

E.4.2.1.4	The tank to be loaded shall be placed in position, preferably under shade and secured properly against any movement. The hand brake must be put on and hand brake lever secured in 'On' position.
E.4.2.1.5	The points leading to the track/line on which the tank is to be loaded shall be set and pad locked so as to isolate it from other track/lines.
E.4.2.1.6	If loading is to be done at the end of a long siding, the site must be protected properly by a scotch block etc. to prevent any wagon dashing against the tank wagons. It must also be ensured that shunting is not permitted on that line when loading is done.
E.4.2.1.7	Caution signs must also be exhibited at a suitable distance away from tanks on the approach end or both ends as applicable.
E.4.2.1.8	The tank shall be loaded under supervision of a responsible person of the concerned Fertilizer Plant and all precautions shall be taken by him to see that the persons engaged in filling are properly protected against ammonia contaminated atmosphere. A list of precautionary measures required to be taken by the staff shall be exhibited at a conspicuous place near the loading site. Further the tanks must be continuously attended by the operators throughout the entire period of filling operations.
E.4.2.1.9	Before starting the loading operation an authorized representative of the Fertilizer Company shall issue a certificate to the Terminal Authority after necessary check-up in respect of the following: - The requirements under sub-para 4.2.1.2 have been complied with.

	<p>The liquid and vapour eduction valves, sampling valve & magnetic gauging device are complete in fittings and are in perfect working order and that there is no evidence of leakage.</p> <p>That there is no physical damage to the safety valve and thermometer well.</p>
E.4.2.1.10	The loading connections must be securely attached to the pipelines before the eduction valves are opened.
E.4.2.1.11	The loading of the tank wagons shall be done through the liquid eduction valves, which have pipes leading to the bottom of the tank. The vapor eduction valve is connected to the storage stem of Ammonia Plant. Good operating condition of these valves should be ensured before commencement of loading operation.
E.4.2.1.12	Loading shall be done preferably by using both the liquid eduction valves, as use of only one valve may lead to an increased rate of flow of liquid necessitating frequent closing of excess flow check valves provided between the manhole cover plate and the liquid eduction pipe.
E.4.2.1.13	Before opening the eduction valves for loading, it is to be ensured that the connections to the pipelines are securely attached.
E.4.2.1.14	If due to some reasons, it is necessary to discontinue the loading operation, all the loading connections and all the valves should be tightly closed.
E.4.2.1.15	For checking the leakage through manhole fittings and their joints, the wagon should be loaded with about one tonne of liquid ammonia. Further loading should only be continued if no evidence of leakage is noticed.

E.4.2.1.16	At the time of sealing the dome cover it should be finally ensured that there is no sign of any leakage and the outlet plugs of the eduction valves are screwed in position.
E.4.2.1.17	The caution signs may then be removed and pad locks on the points opened to enable to tank wagons to be taken out for attaching to the train.
E.4.2.1.18	<p>The Terminal Authority of the Fertilizer Plant should issue necessary certificate to the Railways {JE (C&W)} before offering the loaded wagons for movement in respect of following: -</p> <p>The requirements laid down in sub-para 4.2.1.2 have been met with.</p> <p>There is no evidence of leakage at any location.</p> <p>The eduction and sampler valves are fully closed and outlets plugged. The covers of magnetic gauging device and thermometer well are properly screwed.</p>
E.4.2.1.19	The C&W supervisor shall examine the loaded wagons to ensure that the requirements laid down in para No.E.4.2.1 have been complied with.
E.4.2.1.20	Procedure of unloading shall be follow as laid down in G-79.
E.4.2.2	PRECAUTIONS DURING LOADING AND UNLOADING
E.4.2.2.1	The loading/unloading shall be done in well-protected place away from any source of spark, naked light etc.
E.4.2.2.2	No person shall smoke or take a naked light, matches or other articles of inflammable/explosive nature near empty or loaded tank wagon.

E.4.2.2.3	These tank wagons shall not be used for loading any other liquefied gas or commodity.
E.4.2.2.4	Care must be taken to avoid spillage of Ammonia over the tank as this also causes sudden chilling.
E.4.2.2.5	The tank shall not be loaded beyond its marked carrying capacity under any circumstances. The filling valves should be closed as soon as the magnetic liquid gauge shows the requisite level or weighbridge shows the limiting load.
E.4.2.2	If the valves are hard to operate, undue force should not be used to open them.
E.4.2.2	Tank barrel must not be heated under any circumstances.
E.4.2.2.8	There shall be adequate water stored at convenient place at loading/unloading point and arrangement of spraying shall be provided.
E.4.2.3	<p>OVERHAULING AND TESTING</p> <p>BTAL/BTALN shall be periodically overhauled as per following maintenance schedules.</p> <ol style="list-style-type: none"> 1. Trip examination 2. Yearly schedule 3. ROH as prescribed in chapter-II of IRCA Pt.III. 4. POH as prescribed in chapter-II of IRCA Pt.III <p>The yearly schedule and ROH shall be carried out in the nominated maintenance depots while POH shall be carried out in mechanical workshop fully equipped for undertaking repairs of CL.1 special vessels.</p>
E.4.2.4	ROUTINE OVERHAUL (ROH): BTAL/BTALN:

	During ROH the following examination/repairs/replacements and tests should be carried out.
E.4.2.4.1	<p>Barrels: -</p> <p>Surface cleaning and repainting of barrel. Visual examination of cradle. Dome fittings. Removal of safety valve, eduction valves, sampling valve from tank wagons and replacement of these fittings by new/ repaired and duly certified fittings. The fittings taken out shall be sent for examination and repair as detailed in relevant paragraphs of G-79.</p> <p>Dismantling cleaning and examination of excess flow check valve and its replacement if necessary. The working of the valve shall thereafter be checked.</p> <p>Attend to special modifications as ordered from time to time where practicable with sick line facilities.</p> <p>Touch up paint and lettering where necessary.</p>
E.4.2.4.2	<p>Under frame & Bogies:</p> <p>Lifting and lowering of under frame and bogies shall be carried out in accordance with procedure laid down in Rule E 1.3.</p>
E.4.2.5	<p>PERIODICAL OVER HAULING</p> <p>As laid down in rule E.4.1.6</p>
E.4.2.6	<p>CLEANING, EXAMINATION, REPAIR AND TESTING/ INSPECTION OF TANK BARREL.</p>
E.4.2.6.1	<p>Cleaning and Examination</p>

E.4.2.6.1.1	No person shall be allowed to operate valves of an empty tank or enter the tank barrel for internal examination /repairs, till it is ensured that the barrel is free from ammonia fumes and necessary facilities of light and fresh air are provided.
E.4.2.6.1.2	Ammonia is poisonous and irritating to the mucous membrane of the respiratory system. Therefore, before internal inspection of the barrel is allowed, it must be steam cleaned to make sure that ammonia gas fumes are not present in the barrel.
E.4.2.6.1.3	Tanks requiring steam cleaning shall be placed as near the steam supply line as possible and protected against any movement. The berthing siding should be completely isolated from all other traffic.
E.4.2.6.1.4	The steam cleaning of tank barrel shall be carried out in the following order: -
E.4.2.6.1.4.1	Open gas valve gradually to allow ammonia gas to escape to atmosphere. When barrel is free from ammonia gas, which will be indicated by the pressure gauge, remove manhole cover together with manhole housing, valves, dip pipes etc., and leave the tank exposed for 24 hours. The person(s) employed for this job shall be suitably equipped with gas mask(s) for protection against inhalation of poisonous gas.
E.4.2.6.1.4.2	Entry of staff in the tank barrel shall be strictly prohibited and signs with suitable legends displayed at a reasonable distance away from the tank(s) to be steam-cleaned.
E.4.2.6.1.4.3	Insert steam pipe through the manhole and steam interior of the barrel for 12 hours. In order that the tank barrel is thoroughly steamed from inside, steam pipe

	may be provided with a T connection at its lower end and so adjusted as to blow steam towards both ends.
E.4.2.6.1.4. 4	Remove condensed steam collected in the tank barrel and keep it exposed for 24 hours.
E.4.2.6.1.4. 5	Fill tank barrel with water and take specimen of the same in a clean glass bottle. Since ammonia is readily soluble in water specimen of water taken out should be tested for any trace of ammonia, with indicator or red litmus paper. Any trace of ammonia in water would turn red litmus blue. Another very sensitive method known as Nessler's test may be applied to find out if the specimen of water contains any traces of ammonia. In this test a reagent used is a solution of potassium mercuric iodide with potassium hydroxide. This reagent given a brown colouration when mixed with the specimen of water containing even a minute trace of ammonia. In case of dilution empty out tank barrel and refill with fresh water. This process may be repeated till the tank barrel is free from ammonia traces completely.
E.4.2.6.1. 4.6	After ascertaining that there is no trace of ammonia in the barrel, water should be discharged and also ensure that barrel is completely dry.
E.4.2.6.1.4. 7	When a person enters tank barrel for inspection or repairs, compressed air may be blown inside the barrel by lowering a hose through the manhole.
E.4.2.6	Outside and inside barrel surface shall then be examined for any sign of injury. The extent of corrosion shall be checked by measuring the thickness of barrel at various locations. Barrels having thickness of 20mm or less for cylindrical portion and 22 mm or less for dished ends at any location shall be withdrawn from service.

	This should be done by an authority competent for inspection of pressure vessels.
E.4.2.6.1	All the piping arrangement and valves below the manhole cover plate be also cleaned and examined for any damage or excessive corrosion. Any excessively corroded/damaged pipe or components shall be replaced.
E.4.2.6.2	Repair of the Tank Barrel (BTAL/BTALN)
E.4.2.6.2.1	If after examination some damages to the barrel are detected, these are required to be repaired in a fully equipped Mechanical workshop having facilities for manufacture of Class I Pressure Vessels. Following points be followed while repairing the vessel:
E.4.2.6.2.1.1	The material for repairs must comply with the material specification of the original tank material or equivalent. Materials of Barrels: Fine grain steel having low temperature impact. Properties at (-) 50 deg. centigrade to BS: 1501-224 Gr.32A LT 50 or ASTM A-516 Gr.70
E.4.2.6.2.1.2	The fractures may be repaired by one of the following methods: - By preparation and welding of fractures. An exterior or interior patch may be applied over repaired area, if considered necessary. By removal of the defective area and application of a welded insert. When fractures are to be welded each end of the crack must be drilled and chipped out. Diameter of drilled hole should be at least half of the plate thickness. If fracture is not drilled, chipped groove shall continue at least 25mm beyond each end of crack and must be tapered towards the plate surface to

	provide sound weld metal and homogeneous base metal. The metal must be chipped/flame gauged along the fracture on one side of tank to form a welding groove and welded. After welding groove must be back chipped or flame gauged from the opposite side to form a groove deep enough to complete weld metal penetration into the weld of the first side. Finished welds be ground flush on both sides. Prior to welding, the surfaces must be cleaned of all oil, grease, scale, rust or any other foreign material.
E.4.2.6.2.1.3	A fracture not exceeding 75mm in length may be repaired by fusion welding without any post weld heat treatment except when the fracture is in the knuckle radius of a head, in which case it must be post weld heat-treated.
E.4.2.6.2.1.4	Reinforcements may be applied to areas where fractures have occurred. However, fracture must first be repaired by welding, must be radio graphed and then reinforcement applied by welding to the interior or exterior of the tank. Such re-enforcement must be of a thickness at least equal to the original tank plate. The area may be locally post weld heat-treated.
E.4.2.6.2.1.5	Random pits when detected may be chipped or ground to sound metal and welded then ground flush to original shell thickness. Post weld heat treatment or radiography is not required. Where pits are closely grouped and are deep enough to affect the strength of metal, the affected area must preferably be removed and an insert applied and locally post weld heat-treated.
E.4.2.6.2.1.6	Scores not exceeding 5mm in depth and 10mm wide may be repaired by fusion welding and surface ground flush. For such scores, post weld heat treatment is not

	required provided the length of score does not exceed 600mm and the scores are separated by at least 6 times the thickness of shell. Scores in excess of the above limitations may be repaired by fusion welding by post weld heat treatment must be applied.
E.4.2.6.2.1. 7	Insert whenever applied must have a double welded butt joint with 25mm minimum corner radius. Entire length of butt weld should be radiographed to ascertain the soundness of the butt joint.
E.4.2.6.2.1. 8	In the repair of barrel involving welding, the procedure of welding, welding qualifications and welder's performance qualifications as given in IS: 2825 shall generally be followed as applicable.
E.4.2.6.2.1. 9	Butt welds in the repair of barrel if any, shall be examined throughout their length by radiography. The standard followed shall be same as for welds of new manufacture.
E.4.2.6.2.1. 10	The post weld heat treatment after repair welding shall be in accordance with the stipulation of IS: 2825.
E.4.2.6.2.1. 11	Local post weld heat treatment by manually held gas torch method or any alternative method approved by Engineers may be employed for welds limited in length upto 915mm or insert welds not exceeding 1525mm in perimeter. The temperature must be controlled so as to provide protection to adjacent metal to prevent a harmful temperature gradient.
E.4.2.6.2.1. 12	There is no need of post weld heat treatment if: - a) Weld length does not exceed 75mm.

	b) Intermittent fillet welds not exceeding 75mm in length and 6mm in throat thickness and total length per attachment not exceeding 300mm.
E.4.2.6.2.1.13	All the repairs to the barrel must meet the requirements of IS: 2825 and should be done under the guidance of a reputed Inspecting Agency.
E.4.2.6.3	Testing and Inspection of Barrel
E.4.2.6.3.1	<p>Hydrostatic Testing of barrel should be carried out.</p> <p>a) After any repair to the barrel.</p> <p>b) At the time of POH.</p> <p>The details of testing are as follows: -</p> <p>The test shall be carried out with all fittings except safety valve in position.</p>
E.4.2.6.3.2	The safety valve opening in the manhole cover be blocked by a dummy flange.
E.4.2.6.3.3	The tank barrel and manhole orifice shall than be filled <i>completely</i> with water at ambient temperature.
E.4.2.6.3.4	The barrel shall be vented to prevent formation of air pockets while it is being filled with water.
E.4.2.6.3.5	The tank barrel shall be tested using a power driven hydraulic pump, which shall enable a gentle and steady increase of pressure to be obtained in the tank barrel. A test pressure of 33.25 kg/sq.cm (475psi) shall be applied and maintained for a period of 30 minutes.
E.4.2.6.3.6	A thorough examination of barrel be done to see if there is any leakage or evidence of distress. The pressure gauge fitted over the dummy flange should also be watched for any fall in the pressure.

E.4.2.6.3.7	The test shall be repeated twice i.e. once with all the three eduction valve fully closed and outlet plugs off and once with valves open and outlet plugs in position.
E.4.2.6.3.8	During the application of pressure, the welded seams of the barrel shall be given a hammer test by striking the plates on both sides adjacent to the weld. The hammer test shall be repeated every 150mm of the whole length of all main welds. The edges of hammer be rounded off so as to prevent any denting of barrel plate. The weight of hammer shall not exceed 3 kgs. Caulking of welds to stop leakage is prohibited.
E.4.2.6.3.9	The tank barrel shall remain secured to the underframe during this test. The cradle weld with the barrel and its rivets shall be thoroughly examined for any defects.
E.4.2.6.3.10	This test shall be done in the presence of independent inspecting agency appointed by the owners of the barrel. The Inspector shall issue a clear fitness certificate.
E.4.2.6.4	Examination/Repair of Insulation
E.4.2.6.4.1	Glass/Mineral wool blanket 100mm thick has been provided as insulation around the tank barrel and manhole joints. This has been suitably protected by lagging sheets.
E.4.2.7	Examination of under frame, bogies, buffers, draw gears, vacuum brake / air brake as per standard practice and proper attention.
E.4.3	Bogie Ammonia tank wagons type BTALN fitted with UIC trolley, Air Brake and CBC should be maintained as per RDSO Tech. Pamphlet G-79 and G-70.

E.4.3.1	Sick marking of tank by Train examining staff as laid down in rule E.4.1.1
E.4.3.2	Routine overhaul.
E.4.3.2.1	<p>Under frame and Bogies:</p> <p>The following procedure shall be followed where applicable: -</p> <p>Lift the barrel along with cradle, keep it on the trestles and run out bogies.</p> <p>For attention to Bogies and under frame follow the Rule E 4.2.4.2.</p> <p>Strip brake gear levers and rods for examination of worn out/damaged parts.</p> <p>The Air Brake equipments shall be given attention/checks as per para D.1.4.2.</p> <p>Clean horizontal levers, hand brake, and gears and lubricate.</p> <p>Examine Headstock for damage, bent/cracks.</p> <p>Replace worn out brake blocks.</p> <p>Attend Roller Bearing Axle boxes as per instructions given in Technical Pamphlet No.WT-77-1.</p> <p>Run in bogies and lower barrel along with cradle.</p> <p>Attend to special modifications, as ordered from time to time, in the nominated depots.</p> <p>Touch up paint and lettering, where necessary.</p> <p>Stencil station codes, initials and date on either side of each bogie in 25mm letters</p>
E.4.3.2.2	Lifting under frame bogies are to be attended as done with UIC Bogies.
E.4.3.3	POH should be given at an interval of 54 months and repairs should be carried out as per instruction given in G-79.

E.4.4	INSTRUCTIONS FOR OPERATION AND MAINTENANCE OF BOGIE PHOSPHORIC ACID TANK WAGON.
E.4.4.1	Procedure of loading.
E.4.4.1.1	Before starting loading operation it should be ensured that all necessary safety precautions including those given in para 5 of G.71 manual are clearly understood and followed
E.4.4.1.2	<p>The wagons are provided with a valve which functions as acid inlet valve during loading and as acid outlet valve during unloading. In subsequent discussions this valve is called ' loading/unloading valve'. The following sequence of operation should be followed for loading the wagon: -</p> <p style="padding-left: 40px;">Remove the cover from the adapter of loading-unloading valve</p> <p style="padding-left: 40px;">Connect the inlet hose to the adapter of loading/unloading valve.</p> <p style="padding-left: 40px;">Open the loading/unloading valve.</p> <p style="padding-left: 40px;">Open the air vent valve and remove the cap from the air vent valve pipe.</p> <p style="padding-left: 40px;">Check the air inlet valve and close the same if not already so.</p> <p style="padding-left: 40px;">Remove the cover of the magnetic level indicator.</p> <p style="padding-left: 40px;">Check to ensure proper connection/securing of acid inlet hose to avoid possibility of its working out under the force of acid flow.</p> <p style="padding-left: 40px;">Open the valve on acid pipeline to start loading.</p> <p style="padding-left: 40px;">Keep an eye on magnetic level indicator and close the valve on acid pipeline as soon as desired level is reached.</p> <p style="padding-left: 40px;">Disconnect acid inlet hose.</p>

	<p>Close the loading-unloading valve.</p> <p>Replace the cover on loading-unloading valve adapter and seal it.</p> <p>Push the magnetic level indicator rod down and replace the cover on it.</p> <p>Close the air vent valve and replace its cap.</p> <p>Check the bottom washout plug and barrel surface for any leakage of acid. In case of any leakage, notify the persons responsible for maintenance and the wagons shall then be sent for repairs.</p>
E.4.4.1.3	Procedure for unloading" should be follow as given in para 4 of G-71.
E.4.4.2	Precautions to be taken during loading/unloading.
E.4.4.2.1	Phosphoric acid is a corrosive and hazardous commodity and has therefore to be handled with care. Whereas there is no substitute for an alert Operator fully trained in relevant safety precautions and use of safety equipments, following are some of the important precautions listed for guidance: -
	<p>The wagons should be loaded or unloaded under the supervision of a person suitably trained for this purpose. Operators should be aware of the nature of the commodity they are handling and the relevant safety precautions to be followed.</p> <p>Loading-unloading premises should be kept well ventilated.</p> <p>Protective clothing's like goggles, acid resistant apron, gloves and rubber gumboots etc. should be used. In the event of any acid spillage on the protective clothing's, these should be washed with plenty of water before re-use.</p>

	<p>An adequate supply of water must always be available near the site of loading-unloading.</p>
	<p>Existence of flame and smoking should be prohibited in the loading-unloading premises.</p> <p>Caution sign boards reading "Acid under loading, keep away" or "Acid under unloading, keep away" as the case may be should be exhibited at a suitable distance from the wagons at all approaches to the loading-unloading premises.</p>
E.4.4.2.2	<p>Following safety checks should be done on the wagons:</p> <p>Before loading, all the barrel fittings including valves and the bottom washout plug should be checked to ensure that they are in satisfactory working conditions.</p> <p>Before loading, the barrel, under frame and the running gear should be checked for any signs of physical damage.</p> <p>The dates, on which the periodic overhauling and routine overhauling of the wagon are due, are marked on the wagon. These should be checked to ensure that no wagons overdue maintenance attention are loaded.</p> <p>Before starting loading or unloading, the wagons should be properly pinned down either by welding the wheels against movement, or by putting hand brakes at 'ON' position. Wedges should be removed or hand brakes put at 'OFF' position only after the loading unloading has been completed not only on that wagon but also on all other wagons on that line.</p> <p>While loading the wagons, an air space of not less than 5% of the capacity of the barrel is to be left. Marking of</p>

	the desired level on magnetic level-gauge must be done according and it must be ensured that loading of wagon is stopped by closing the valve on the acid pipeline as soon as the mark on the magnetic level gauge is visible.
E.4.4.3	Overhauling and testing.
E.4.4.3.1	Maintenance Schedules
	<p>In order to keep the wagon in good fettle; the following schedules of maintenance are recommended. These are in addition to the normal Trip Examinations at the Originating and Terminating stations:</p> <p>Routine Overhaul (ROH) at interval prescribed in rule 2.4.3.3 (Two ROH schedules between successive POHs).</p> <p>Periodical overhaul (POH) at an interval as prescribed in rule 2.4.3.1, while ROH can be carried out in Maintenance Depots, the POH shall be carried out in Mechanical Workshops fully equipped for this purpose.</p>
E.4.4.3.2	Routine Overhaul (ROH)
E.4.4.3.2.1	Barrel.
	<p>The following work shall be done on the barrel during ROH:</p> <ol style="list-style-type: none"> Change the gaskets at the seat of safety vent, loading-unloading valve, air inlet valve, vent valve and magnetic level gauge. Change the rupture disc of safety vent. Change all the four seals of washout plug.

	On completion of ROH and before turning out the wagon to traffic, the month and year of ROH should be marked on the wagon at the location shown in the Marking Diagram of the wagon.
E.4.4.3.2.2	Under frame, Couplers and Bogies.
	For ROH of under frame couplers and bogies, instructions given in para 203 of Maintenance Manual for Wagons-Dec-2015 should be followed in so far as they apply to the equipment provided on the wagon.
E.4.4.3.2.3	<p>Brakes</p> <p>The brake equipments shall be given the following attention:</p> <ul style="list-style-type: none"> i) Clean the strainer discs of the distributor valve. ii) Lubricate the brake cylinder and clean its strainer. iii) Check for easy operation of isolating cock of distributor valve, cut-off angle cock, manual quick release valve and isolating cock of feed pipe. iv) Drain out the auxiliary control reservoir. v) Check all hose couplings for serviceability. vi) Clean strainer and choke of check valve. vii) Clean dirt collectors. viii) Leakage in pipes and joint to be checked. ix) After carrying out above mentioned items of work the wagon shall be tested for proper functioning of air brake system with single wagon test rig in accordance with the procedure laid down in G – 97.
E.4.4.3.2.4	<u>Examination on Tank Cradles</u>

	<p>The barrel is anchored to the underframe by means of tight fitted bolts and nuts. These nuts shall be tapped to check that they are not slack. In case of slackness, these shall be tightened.</p>
E.4.4.3.3	Periodic Overhaul (POH)
E.4.4.3.3.1	<p>Barrel</p> <p>The following work shall be done on the barrel during POH as per details given in subsequent paragraphs.</p> <p>Cleaning of barrel for inspection Internal and external examination of barrels. Repairs of barrel hydrostatic test of barrel. Maintenance of barrel fittings Pneumatic test of barrel Examination of cradles Marking of barrel</p>
E.4.4.3.3.1.1	<p>Cleaning of Barrel for Inspection</p> <p>Open all fittings and manhole cover and wash them clean of acid.</p> <p>Dispatch all fittings for maintenance.</p> <p>Clean the empty barrel free of acid and acid vapors before internal inspection. The following procedure shall be followed for internal cleaning of barrel:</p> <p>Wash the barrel with jet of fresh water injected from manhole. In order to clean the barrel thoroughly, end of the pipe shall be provided with TEE connection and so held inside the barrel that water jets out towards both ends.</p>

	<p>While jet washing has been done for sufficient period, check the water coming out of the barrel for acidity. Test the water with blue litmus paper. If the litmus paper turns red, continue washing till blue litmus paper shows no change of color.</p> <p>Close the wash out plug and fill the barrel with water. Draw sample of water from the barrel and again test it with blue litmus paper. Drain out the water when tested water is neutral.</p> <p>Keep the barrel exposed for 12 hours.</p> <p>Clean the outer surface of the barrel free of dirt and paint markings.</p> <p>The barrel is now ready for internal and external examination.</p>
E.4.4.3.3.1. 2	<p><u>Internal and External Examination of Barrel</u></p> <p>The following procedure shall be followed during the examination:</p> <p>No one shall be allowed to enter into the barrel for internal examination until a work permit has been signed by an authorized supervisor indicating that the barrel has been washed and found to be safe.</p> <p>Make arrangement to illuminate the internal surface of barrel.</p>
	<p>Examine the internal surface of barrel for any sign of pitting and injury. Lower part of barrel, weld seams and pipe junctions should be paid special attention.</p> <p>Mark the defective area by chalk for repairs.</p>

	<p>Examine the outer surface for any damage or crack. The portion of barrel in contact with cradle as also junctions of anchoring 'TEE' with dished ends and barrel should be paid special attention.</p> <p>Mark the defective area by chalk for repairs.</p>
E.4.4.3.3. 1.3	<p>Repair of Barrel</p> <p>The barrel has been fabricated from Austenitic Stainless steel to ASTM Specification A-240 type 316 d. The stainless steel, because of particular alloy content and specialized properties, requires special care in their repairs by welding depending upon the nature of defects indicated below:</p> <ul style="list-style-type: none"> i) Pitting ii) Cracks <p>In the case of pitting, the defective area may be chipped off to sound metal and then chipped off portion shall be filled up by welding. Only Tungsten Inert Gas (TIG) welding method should be adopted and an approved brand of electrodes should be used. The welded location should then be ground flush to original barrel thickness. No radiography is required.</p> <p>When pits are closely grouped and are deep enough to effect the strength of the metal, the affected area must be removed and an insert applied and then radio graphed.</p> <p>In case of cracks, each end of the crack shall be drilled. The diameter of the drill shall be 6 mm. The metal shall be chipped off along the crack on one side of the barrel to form a welding groove. Then the groove shall be</p>

	<p>welded. The opposite side of the weld shall be gouged to sound metal and then welding shall be completed penetrating into the weld of the first side. Finished welds shall be ground flush on both sides. Inserts whenever applied must have a double welded butt joint, with 25mm minimum corner radius.</p> <p>Entire length of butt welds should be radio graphed to ascertain the soundness of the butt joint. It must be ensured that insert is of same material and thickness as the parent metal.</p> <p>In the repair of barrel involving welding, the procedure of welding, and welder's performance qualifications as given in ARE: 2825 shall generally be followed.</p> <p>Butt welds in repairs of barrel shall be examined throughout their length by radiography. After repairs the barrel should be sent for hydrostatic test.</p>
<p>E.4.4.3.3.1.</p> <p>4</p>	<p><u>Hydrostatic Test of Barrel.</u></p> <p>Hydrostatic test of barrel shall be carried out after its repairs. In case no repairs have been carried out on the barrel the hydrostatic test is not required.</p> <p>The following procedure shall be followed during hydrostatic test:</p> <p>Close all nozzles for fittings by means of dummy flanges except that of Air vent valve.</p> <p>Connect a water pump through a hose to the dummy flange on loading/unloading valve nozzle.</p> <p>Fill the barrel with water at ambient temperature till the water comes out through the nozzles for Air vent valve.</p>

	<p>Stop the water pump and close the nozzle for Air vent valve with dummy flange, which has a provision for a pressure gauge connection.</p> <p>Connect a pressure gauge, which can read at least 6.0 kg/sq.cm gauge pressure.</p> <p>Pump in more water in the barrel till the gauge shows a pressure of 5.9 kg/sq.cm (gauge). As soon as this pressure is reached, disconnect the pump while maintaining the pressure.</p> <p>Pressure shall be maintained for a period of at least 30 minutes so that thorough examination of repaired zones and weld seams can be carried out to see if there is any leakage/drop of pressure indicated on the pressure gauge.</p> <p>The test shall be carried out in presence of Inspecting Agency who will issue a clear fitness certificate.</p> <p>Drain out the water from barrel and expose the barrel to atmosphere till dry.</p>
<p>E.4.4.3.3.1.</p> <p>5</p>	<p>Maintenance of Barrel Fittings</p> <p>Barrel fittings are necessary for safe working loading, unloading and measuring acid in the barrel. A brief description of each fitting is given below: -</p> <p>(i) Safety vent: It consists of a rupture disc, which bursts at a specified pressure. It is an additional safety fitting as a safeguard against the failure of the safety valve installed in the air inlet pipeline at unloading terminal. If the safety valve installed in the air inlet pipeline fails or if its setting is high, the rupture disc will burst when the pressure inside the barrel exceeds 5-kg/sq.cm gauge and release the</p>

	<p>pressure. The general construction of the safety vent and list of components is shown in plate 102.</p>
	<p>The following procedures shall be followed for removal of safety vent from wagon for maintenance:</p> <ol style="list-style-type: none"> Clean the stud threads and unscrew the nuts holding the safety vent on the wagon. Take out the safety, vent and throw away the gasket and cover the opening on the wagon. Send the safety vent to Maintenance Department. The safety vent shall be overhauled as per instructions issued by the manufacturer. <p>ii) Loading-Unloading Valves: It is a 76 mm (3") angle valve used for loading unloading of wagon at terminals. The valve is opened and closed by means of hand wheel. The general construction of the valve and list of components is shown in plate 103. When closing the valve hand tight, it seals completely. No handle extension should be issued for closing the valve. If it does not seal when closing the valve hand tight, it should be sent to the Maintenance Department for maintenance. The following procedures shall be followed for removal of the valve from wagon:</p> <ol style="list-style-type: none"> Clean the stud threads and unscrew the nuts holding the valve on the wagon. Demount the valve and take out and throw away the gasket. The valve shall be overhauled as per instructions issued by the manufacturer. <p>iii) Air Inlet Valve and Vent Valve: These valves are similar to the loading-unloading valve with exception that these are smaller in size. The size of these valves is</p>

	<p>50mm(2"). The function of the Air inlet valve is to let compressed air in the barrel during unloading of the wagon. The valve remains closed during loading, stabiling and movement of the wagon. Similarly, function of the vent valve is to vent the air during loading. The valve remains closed during unloading, stabiling and movement of the wagon.</p> <p>The construction of these valves is shown in plate 103. These valves shall be overhauled as per instructions issued by the manufacturer.</p> <p>iv) <u>Magnetic Level Gauges:</u> The function of this gauge is to indicate the level of acid inside the barrel. This is to facilitate the loading unloading of acid so as to avoid over/under loading. It consists of a stainless steel float which slides over a stainless steel tube welded to barrel. If there is no acid the float will set at the bottom position by its own weight and when the acid is filled, due to buoyancy the float will rise with the acid level. A permanent magnet in the float (Item 15) engages with another permanent magnet (Item 14) which is fixed to the gauge rod (Item 2). As the magnets have opposite poles, they attract each other and with the movement of the float upward or downward, the gauging rod will also slide up and down. As the rod is graduated, it will directly show the level of the acid in the barrel.</p>
	<p>For the maintenance of the gauge, follow the instructions issued by the manufacturer.</p> <p>v) <u>Washout Plug:</u> The washout plug is fitted at the bottom of the barrel for draining out the barrel after cleaning. A typical washout plug is shown in plate 104</p>

	<p>For overhauling the washout plug remove the plug from the wagon, clean all parts and change four seals and fit it again to the wagon. For details refer the instructions issued by the manufacturer.</p>
	<p>Pneumatic Test of Barrel.</p> <p>The following procedure shall be followed for pneumatic test of the barrel.</p> <ol style="list-style-type: none"> i. Mount all barrel fittings. ii. Close loading-unloading valve, vent valve and washout plug. iii. Take the barrel in an area having adequate blast protection arrangement. iv. Connect compressed air line to the air inlet valve. The air inlet line should be provided with a pressure gauge and in isolating cock. v. Charge the barrel with compressed air gradually to a pressure not more than 3 kg/sq.cm (gauge). vi. Thereafter increase the pressure in steps of 0.5 kg/sq.cm (gauge). vii. When a pressure of 4 kg/sq.cm (gauge) is reached, maintain the pressure for sufficient length of time to permit thorough examination to be made against leakage. viii. Check that there is no drop of pressure in the gauge. ix. Thereafter increase the pressure in steps of 0.2 kg/sq.cm (gauge) till it reaches to 4.8 kg/sq.cm (gauge).

	<ul style="list-style-type: none"> x. Maintain this pressure and examine the barrel and fittings against leakage. xi. Release the pressure slowly through air vent valve. xii. Disconnect hose connection to air inlet valve. xiii. Close air inlet valve and vent valve.
	<p>ROH Schedule for 4 wheeled BVZC wagons.</p> <p>Four-wheeled BVZC converted by providing 20.3 t roller bearing axles, boxes and wheel sets in place of 16.3 t plain bearing/roller bearing axles and wheel sets will be given ROH at the interval of 12 months i.e. in between 2 successive POH of 24 months and item to be attended are indicated below: -</p>
	<ul style="list-style-type: none"> i. All brake gear levers, pull rods are to be examined. Repair/replacement required to be carried out.
	<ul style="list-style-type: none"> ii. Examine brake rigging, clean and lubricate.
	<ul style="list-style-type: none"> iii. Check springs for free camber and other defects and examines shackle plates for wear and replace where required.
	<ul style="list-style-type: none"> iv. Examine scroll iron and attend to its loose/missing rivets. Check Axle guard and horn cheeks for their alignment & riveting etc.
	<ul style="list-style-type: none"> v. Visually examine the roller bearing axle boxes for: - <ul style="list-style-type: none"> 1) Grease leaking out of axle box, telltale marks of grease on axle box body and wheel. 2) Visible signs of damage on axle box body and front cover.

	<p>3) Wear on lugs of axle box body.</p> <p>vi. In case of only suspected seized roller bearings, the axle box shall be examined as per Clause 4.2 of RDSO Technical pamphlet no WT-77-1. The above clause to be followed also in case of wheel turning requiring opening of axle box covers.</p>
	<p>vii. Examine and attend to draft and buffing gear components, screw couplings/side buffers or CBC's whichever are fitted thereon as per normal practice.</p>
	<p>viii. Ensure correct functioning of door, anti-bleeding device etc. in case of covered/open 4-wheeled wagons, manhole fittings, master valves, bottom discharge valves, safety valves etc. in case of Tank wagons.</p>
	<p>ix. Attend all modification in force. The lateral clearance between axle box and horn cheek has been increased from 5mm to 10mm in new condition and the condemning limit from 10mm to 20mm. The modifications should be done during conversion of tank wagons from plain bearing to roller bearing. This is also required to be carried out on wagons already converted to 20.32 t roller bearings whenever they are undergoing POH.</p>
	<p>x. Touch up the lettering where necessary.</p>
	<p>xi. Stencil the ROH Station Code and date in 25mm letters on either side of the body at Sole bar level.</p>
	<p>IOH schedule for 8-wheeled BVZI wagons: 8-wheeled BVZI brake van fitted with ICF bogie will be given IOH at the interval of 12 months i.e. in-between two successive POH of 24 months in workshop and items to be attended are indicated below-</p>

	<ul style="list-style-type: none"> i. Lift the body, keep it on trestle and run out the bogie.
	<ul style="list-style-type: none"> ii. All brake gear levers, pull rod to be examined. Repair/ replacement required to be carried out
	<ul style="list-style-type: none"> iii. Examine brake rigging, clean and lubricate.
	<ul style="list-style-type: none"> iv. Check axle box springs for damage/breakage, & send for spring grouping.
	<ul style="list-style-type: none"> v. Check and attend axle guide assembly for any defect & repair as required.
	<ul style="list-style-type: none"> vi. Examine and attend bolster lower spring beam, BSS hanger, hanger block, BSS springs, equalizing stay rods and pins, anchor links, safety loops, shock absorbers & repair / replace if necessary.
	<ul style="list-style-type: none"> vii. Examine and attend CBC as per procedure given by RDSO.
	<ul style="list-style-type: none"> viii. Visual examine the spherical roller bearing and axle boxes for -
	<ul style="list-style-type: none"> ix. Free rotation without noise, breakage in any part of bearing and play must be checked.
	<ul style="list-style-type: none"> x. Visible signs of damage on axle box body and axle box wing.
	<ul style="list-style-type: none"> xi. Wheel should be inspected for rejectable defects in accordance with the RDSO instructions. Axle must be ultrasonically tested as per procedure.
	<ul style="list-style-type: none"> xii. Examine and attend body, floor, roof, doors, interior fittings, foot-steps, hand rail, hand brake wheels and quick coupling for its proper functioning.
	<ul style="list-style-type: none"> xiii. Attend all modifications in force.
	<ul style="list-style-type: none"> xiv. Touch up the lettering where necessary.
	<ul style="list-style-type: none"> xv. Stencil the IOH station, code and date in 25 mm letters on either side of the body at sole bar level.

APPENDIX – F

RULES FOR EXAMINATION OF STOCK IN WORKSHOP, ROH DEPOT & SICKLINE, FLYING SQUAD AND IN STEEL PLANT BY NEUTRAL CONTROL STAFF

- F- WORKING AT WORKSHOP:** Neutral Control staff are deployed in workshops where POH and Other repairs of wagons are undertaken to ensure the quality of Repairs. The workshop authorities shall offer POHed/Repaired stock complete in all respects for preliminary examination by the Neutral Control staff by 10 hours and for final examination only after completion of repairs. After thorough examination of POHed/repaired stock in all respects, the shortfall in attention during repairs if any shall be recorded jointly with workshop supervisors. After proper attention of the recorded items the stock shall be offered for final examination by Neutral Control staff for issue of NC certification. In case any stock found with defects shall be detained for further attention. As per Railway Board Directive, the workshop shall ensure that no stock is turned out without NC certification.

- F- **WORKING AT ROH DEPOTS & MAJOR SICKLINES:** Every 2 day, the due ROH wagons placed in sicklines of ROH depots are pre-examined and the defects are chalked marked on the wagons. These wagons shall be offered for final Neutral Control examination only after attention of the defects and schedules.

The Neutral Control staff conducts preliminary examination of wagons placed in Major sick line in forenoon, chalk mark all reject able defects and record the same. After completion of the repairs by C & W staff, final examination of these wagons shall be done and fit memo shall be issued to SSE/C&W and Traffic authorities for those wagons found without reject able defects. Wagons found with defects shall be rejected for further attention.

F- FLYING SQUAD: Flying Squads are deployed at IRCA Head Quarters, New Delhi, ANCO/Mumbai, Tondiarpet (Southern Railway), Khanalampura (Northern Railway), New Katni Jn. (West Central Railway) & Chitpur (Eastern Railway). These squads are deputed for check the percentage of brake power of goods trains every month on few selected yards nominated by Railway Board. These squads are also deployed to conduct sample surveys to ascertain percentage of wagons running Over due for POH/ROH in the system. Apart from these, these squads conduct special brake power percentage checks and surveys as and when advised by the Railway Board.

STEEL PLANT CHECK: There are three Flying squads each one at ANCO/Kolkata, Bhilai marshalling yard (South East Central Railway) and Andal (Eastern Railway) exclusively for checking of stocks interchanged between Railways and steel plants.

APPENDIX-G
(See rule 2.16.8)

NUMBER OF SUSPENSION SPRINGS

Wagon	Bogie	Number of Springs	Axle Load(t)
BOXN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BOXNM1	Modified Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.32
			22.82
BOXNEL	Casnub 22 NLC	Outer-14, Inner-14, Snubber -4	25.0
BOXNHS	Casnub 22 HS	Outer-14, Inner-12, Snubber -4	20.32
BOXNHSM1	Modified Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.32
			22.82
BOXNHA	IRF 108 HS	Outer-14, Inner-14, Snubber -4	22.1
			22.82
BOXNHL	Modified Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.9
BOXNLWM1	Modified Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.32 & 22.82
BOY	Modified Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.9
BOYEL	Casnub 22 NLC	Outer-14, Inner-14, Snubber -4	25.0
BOBYN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BCN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BCNM1	Modified Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.32
			22.82
BCNA	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	22.32
BCNAM1	Modified Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.32
			22.82

BCNAHS	Casnub 22 HS	Outer-14, Inner-12, Snubber -4	20.32
BCNAHSM1	Modified Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.32
			22.82
BCNHL	Modified Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.9
BOST	Casnub 22 HS	Outer-14, Inner-12, Snubber -4	20.32
BOSTM1	Modified Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.32
BOSTHS	Casnub 22 HS (Mod-1)	Outer-12, Inner-12, Snubber -4	20.32
BOSTHSM1	Modified Casnub 22 HS (Mod-I)	Outer-14, Inner-14, Snubber -4	22.32
BOSTHSM2	Modified Casnub 22 HS (Mod-II)	Outer-12, Inner-12, Snubber -4	22.32
BOBSA	Modified Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.9
BOBSNM1	Casnub 22 NLC	Outer-14, Inner-14, Snubber -4	25.0
BOBR	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BOBRM1	Modified Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.32
BOBRN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BOBRNM1	Modified Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.32
BOBRNHSM1	Modified Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.32
			22.32
BOBRNALHSM1			
BOBRNEL	Casnub 22 NLC	Outer-14, Inner-14, Snubber -4	25.0
BRN	Casnub 22 NLB	Outer-14, Inner-12, Snubber -4	20.32
BRNA			

BRNAHS	Casnub 22 HS	Outer-14, Inner-12, Snubber -4	20.32
BFNS			
BTPN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BTPGLN			20.32
BLCA/BLCB & BLLA/BLLB	LCCF 20 (c)	Outer-14, Inner-12, Snubber -4	20.32
BLCA/BLCB Double stack			20.32
BLCAM/BLC BM Double stack	Modified LCCF 20 (c)	Outer-14, Inner-14, Snubber -4	22.0
BCACM Auto car wagon	LCCF 20 (c)	Outer-14, Inner-12, Snubber -4	20.32
BRHNEHS	Casnub 22 HS	Outer-14, Inner-12, Snubber -4	20.32
BOMN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	16.4
BRSTN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BWTB	Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.9
BCACBM	LCCF 20(C)	Outer-14, Inner-12, Snubber -4	20.32
BRN22.9	Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.9
BOBRNHS	Casnub 22 HS	Outer-14, Inner-12, Snubber -4	20.32
BOBYN	Casnub 22 NLB	Outer-12, Inner-8, Snubber -4	20.32
BOBYN22.9	Casnub 22 HS	Outer-14, Inner-14, Snubber -4	22.9
BOBSN	Casnub 22 NLB	Outer-14, Inner-10, Snubber -4	22.9

Grouping of Springs

A. Group Band (Coloured) for in service springs (Maintenance group)

All versions (except for CASNUB 22 HS)

No. of Bands	Outer	inner	Snubber
I	260-257	262-259	294-291
II	257-254	259-256	291-288
III	254-251	256-253	288-285
IV	251-248	253-250	285-282
V	248-245	250-247	282-279

CASNUR 22 HS

Group	Outer	inner	Snubber
I	260-257	243-240	293-290
II	257-254	240-237	290-287
III	254-251	237-234	287-284
IV	251-248	234-231	284-281
V	248-245	231-228	281-278

CASNUR 22 HS (Mod-1)

Group	Outer	Inner	Snubber
I	253-250	225-222	304-301
II	250-247	222-219	301-298
III	247-244	219-216	298-295
IV	244-241	216-213	295-92
V	241-238	213-210	292-289

CASNUB LCCF 20 (C)

Group	Outer	Inner	Snubber
II	260-257	243-240	288-285
II	257-254	240-237	285-282
III	254-251	237-234	282-279
IV	251-248	234-231	279-276
V	248-245	231-228	276-273

B. Group Band (Coloured) of NEW Springs

All versions (except for CASNUB-22 HS) Ref: DRG

No.WD-83069-S/1

No. of Bands	Outer	Inner	Snubber
I	263-261	265-263	297-295
II	261-259	263-261	295-293
III	259-257	261-259	293-291

CASNUB- 22 HS

Ref: DRG. No.WD-

92058-S-5

Group	Outer	Inner	Snubber
I	263-261	243-241	293-291
II	261-259	241-239	291-289
III	259-257	239-237	289-287

CASNUB -22HS (Mod-1) BOSTHS

Ref: DRG No. WD-

04017-S/4

Group	Outer	Inner	Snubber
I	256-254	228-226	307-305
II	254-252	226-224	305-303
III	252-250	224-222	303-301

APPENDIX – H

IMPORTANT RULES GOVERNING THE INTERCHANGE OF WAGONS BETWEEN INDIA – PAKISTAN AND INDIA – BANGLADESH RAILWAYS.

- H-1 Rolling Stock suitable for interchange between India – Pakistan and India –Bangladesh Railways
- H-1.1 Wagons suitable for interchange shall be described as “Standard” wagons. These will include all IRS type 4-wheeler wagons fitted with screw coupling and plain bearing and such other wagons as are mutually accepted for interchange from time to time.
- H-1.2 Special type of stock such as tank wagons, bogie rail trucks, bogie timber trucks, well wagons, end falling trucks, etc. which are specially built for the transport of specific commodities shall be marked N.P. in a circle.
- H-1.3 All interchangeable wagons shall be marked as per Plate 10, 15 and 16 and special type of wagons referred to in Para 1.2 above, shall in addition have the mark N.P.
- H-1.4 For standard wagons see Rule H-6 of this Appendix.
- H-1.5 ***Special type wagons not conforming to the definition of wagons suitable for interchange may be interchanged under special arrangements.***
- H-2 Rolling stock not suitable for interchange:
 - The following shall not be treated as suitable for the purpose of interchange: -
- H-2.1 Broad Gauge and Meter Gauge wagons with a carrying capacity of less than 15.7 tonnes & 7.8 tonnes respectively.
- H-2.2 Wagons fitted with non-standard wheels & axles.
- H-2.3 Wagons marked “For local traffic only”.

- H-2.4 Goods stock fitted with roller bearings.
- H-2.5 Stock having experimental or trial fittings.
- H-2.6 Goods Brake Vans.
- H-2.6.1 Goods brake-vans shall be interchanged examined and billed like other goods stock. These transactions shall also be included in all Interchange returns. The receiving railway shall not, however, work a brake-van belonging to the tendering railway beyond its station of interchange with the owning railway.
- H-2.6.2 A Goods brake van shall be returned to the owning Railway within 2 calendar days of its receipt. If the receiving railway detains a brake van beyond this period, it shall pay the penalty as prescribed.
- H-2.6.3 A brake van belonging to the tendering railway when irreparably damaged while in the custody of the receiving railway, shall be replaced by a brake van of the same type and year of built acceptable to the owning railway. Penalty charges mentioned in clause H-2.6.2 will continue to be levied till the brake van, accepted in replacement, is made over to the owning country.
- H-3 Damaged rolling stock unfit for return to the owning Railway
- H-3.1 If a vehicle or a wagon belonging to one country is irreparably damaged while in the other, the railway responsible shall pay compensation in cash in accordance with the formula laid down in **Appendix – I**. Alternatively, in the case of wagons, however, the compensation may be by replacement of the irreparably damaged wagon by a wagon of the same type and year of build provided the replacement is acceptable to the Owning Railway.

- H-3.2 The fact of a vehicle belonging to the other country being irreparably damaged, shall be notified by registered letter acknowledgement due by the railway on which such damage, takes place to the Owning Railway giving the vehicle number, transportation code and the date on which it was declared irreparably damaged. Hire shall cease from the date on which the advice of damage is communicated to the Owning Railway.
- H-3.3 The fact of a wagon belonging to the other country being irreparably damaged, shall be notified by registered letter acknowledgement due by the Director in the country of the railway on which the wagon is damaged to the Director in the country of the Owning Railway, giving the Owning Railway, the wagon number, the transportation code and date on which it was declared irreparably damaged. If compensation is paid in accordance with the formula laid down in Appendix – I, hire shall cease from the date on which the advice of damage is communicated to the Director of the Owning Railway. If, however, the compensation is by replacement of a like asset, hire will be payable as if the wagon has not been damaged.
- H-4 Unless otherwise specifically stated, any exemption granted by the General Secretary, IRCA under Rule 4.10.1 of Chapter IV, does not apply to wagons offered in interchange between India and Pakistan or India-Bangladesh. Such wagons are, therefore, rejectable for being overdue POH as per marked return dates.
- H-5 Restrictions listed below shall also be observed for interchange of stock.

H-5.1 No wagon due or overdue periodical overhaul may be loaded except to, or in the direction of the Owning Railway.

Note: - Subject to the exemptions specified below, wagons loaded on the expiry of the month shown in the return date and not moving towards the Owning Railway should be accepted and the penalty levied.

EXEMPTIONS:

- a) Standard wagons including non-pooled, loaded prior to the expiry of the return date they bear, should be accepted in interchange.
- b) Standard wagons including non-pooled, loaded with coal, coke, manganese ore, live-stock, perishable goods, explosives and dangerous goods and such articles as cannot be transshipped without a crane, should be accepted in interchange provided the wagons were loaded not later than a month from the date of expiry of the "Return date" or booked to the parent line.

H-6 Types of standard wagons acceptable in interchange between India and Pakistan or India-Bangladesh are as follows:

- a) IRS type 4-wheeler wagon fitted with screw coupling /Transition coupling & plain bearings/Roller bearings.
- b) PRS type 4-wheeler wagon fitted with screw coupling & plain bearings.
- c) BRS type 4-wheeler wagon fitted with screw coupling & plain bearings.

NOTE: The above are important interchange rules have been picked up from the set of interchange rules in vogue between ER & NFR with Bangladesh Railway and NR with Pakistan Railway. Therefore, in case of any doubt, the current set of Interchange rules in vogue between ER&NFR with BDR and NR with PR may be referred to.

APPENDIX – I

(See Appendix – H)

Formula for assessing the value of Freight stock

I.1 **Codal life of Rolling Stock** - The Codal life of Rolling Stock for the purpose of calculating depreciation shall be taken to be as follows:

BG	S N	Type of wagon stock	Codal Life
	01	Bogie open wagon with air brake and CASNUB bogie	30 years
	02	Bogie Tank wagon with air brake and CASNUB bogie	40 years
	03	All other type of bogie wagons with air brake and CASNUB bogie	35 years
M G	i)	Wagons	35 years
	ii)	Tank Wagons	45 years

I.2 The value of any vehicle or wagon shall be at any time not less than 25 % of its 'Original cost' as determinable by these rules.

I.3 Formula for depreciation – The depreciation shall be calculated according to the following formula, which provides for a sliding scale basis.

I.4 **Formula – When –**

- a- The sum of the year a wagon has run; six months or less to be ignored and more than six months to count as one year.
- b- The sum of the years of its Codal life; and
- c- Original cost of the vehicle or wagon;

Then –

Present value of the vehicle or wagon= $c - a/b \times 75c/100$

I.5 “Original cost” for the purpose of the above formula will be as follows: -

Wagons –

The price of the wagons to be determined from PINK BOOK.

APPENDIX-J

List of Single Control and Interchange Junctions (Indicating the working and using Railway)

Sl. No.	BROAD GAUGE	CODE	Working Railway	Using Railway
1	GEDE	GEDE	ER	BR
2	PETRAPOL	PTPL	ER	BR
3	SINGHABAD	SQB	NF	BR
4	BALHARSHAH	BPQ	CR	CR
5	HOTGI Jn.	HG	CR	CR
6	ITARSI	ET	CR	CR
7	JALGAON Jn.	JL	CR	CR
8	KHANDAWA Jn.	KNW	CR	CR
9	MANMAD	MMR	CR	CR
10	MIRAJ Jn.	MRJ	CR	CR
11	RAULI Jn.	RUL	CR	CR
12	NAGPUR	NGP	CR	CR
13	ROHA	ROHA	CR	CR
14	VASAI ROAD	BSR	WR	CR
15	WADI Jn.	WADI	CR	CR
16	WANI	WANI	CR	CR
17	BARKA KHANA Jn.	BRKA	EC	EC
18	CHHAPRA KACHERI	CIF	NE	EC
19	CHOPAN Jn.	CPU	EC	EC
20	NETAJI SUBHASH CHANDRA BOSE GOMOH Jn.	GMO	EC	EC
21	JAMUNAITANR	JNNA	SE	EC
22	JHAJHA	JAJ	EC	EC
23	KATIHAR Jn.	KIR	NF	EC
24	KIUL Jn.	KIUL	EC	EC
25	MAHADIYA	MHDA	EC	EC
26	MUGHALSARAI Jn.	MGS	EC	EC
27	PANIYAHAWA	PNYA	NE	EC
28	PATHARDIH Jn.	PEH	EC	EC
29	PRADHAN KHUNTA	PKA	EC	EC

SI. No.	BROAD GAUGE	CODE	Working Railway	Using Railwa y
30	RAJABERA	RJB	EC	EC
31	BHADRAKH	BHC	ECo	ECo
32	DUVVADA	DVD	ECo	ECo
33	JHARSUGADA Jn.	JSG	SE	ECo
34	RAIPUR BLOCK HUT	RVH	SEC	ECo
35	ASANSOL Jn.	ASN	ER	ER
36	BHATTANAGAR	BTNG	SER	ER
37	GEDE	GEDE	ER	ER
38	JHAJHA	JAJ	EC	ER
39	KALIPAHARI	KPK	SE	ER
40	KIUL Jn.	KIUL	EC	ER
41	MALDA TOWN	MLDT	ER	ER
42	PETRAPOL	PTPL	ER	ER
43	PRADHAN KHUNTA	PKA	ECR	ER
44	SHALIMAR	SHM	SER	ER
45	TIKIAPARA	TPKR	ER	ER
46	MADGAON	MAO	KR	KR
47	MAJORDA Jn.	MJO	KR	KR
48	ROHA	ROHA	CR	KR
49	THOKUR	TOK	KR	KR
50	ALLAHABAD	ALD	NCR	NCR
51	ALLAHABAD CITY	ALY	NCR	NCR
52	ALWAR	AWR	NWR	NCR
53	BAYANA Jn.	BXN	WCR	NCR
54	BINA JN	BINA	WCR	NCR
55	CHOPAN Jn.	CPU	ECR	NCR
56	GHAZIABAD Jn.	GZB	NR	NCR
57	GWALIOR Jn.	GWL	NCR	NCR
58	HARDUAGANJ	HGJ	NCR	NCR
59	KANPUR CENTRAL Jn.	CNB	NCR	NCR
60	KHURJA Jn.	KRJ	NCR	NCR
61	MAHADEV KHERI	MDVK	WCR	NCR
62	MANIKPUR	MKP	NCR	NCR
63	MUGHALSARAI Jn.	MGS	ECR	NCR

SI. No.	BROAD GAUGE	CODE	Working Railway	Using Railwa y
64	OHAN	OHAN	NCR	NCR
65	PALWAL	PWL	NR	NCR
66	VYASANGAR	VYN	NR	NCR
67	ALLAHABAD CITY	ALY	NER	NER
68	BARABANKI Jn.	BBK	NR	NER
69	CHHAPRA KACHERI(MG)	CIF	NER	NER
70	MORADABAD Jn.	MB	NR	NER
71	PANIYAHAWA	PNYA	NER	NER
72	RAMPUR Jn.	RMU	NR	NER
73	SHAHGANJ Jn.	SHAJ	NR	NER
74	SITAPUR CANTT	SCC	NR	NER
75	VARANASI Jn.	BSB	NR	NER
76	KATIHAR Jn.	KIR	NFR	NFR
77	MALDA TOWN	MLDT	NFR	NFR
78	SINGHABAD	SQB	NFR	NFR
79	ALLAHABAD	ALD	NCR	NR
80	ATARI	ATT	NR	NR
81	BARABANKI Jn.	BBK	NR	NR
82	BHATINDA Jn.	BTI	NR	NR
83	GAZIABAD Jn.	GZB	NR	NR
84	HARDUAGANJ	HGJ	NCR	NR
85	HISAR Jn.	HSR	NWR	NR
86	KANPUR CENTRAL Jn.	CNB	NCR	NR
87	KATAR SINGH WALA	KZW	NR	NR
88	KHURJA Jn.	KRJ	NCR	NR
89	MORADABAD Jn.	MB	NR	NR
90	MUGHALSARAI Jn.	MGS	ECR	NR
91	PALWAL	PWL	NR	NR
92	RAMPUR Jn.	RMU	NR	NR
93	REWARI Jn.	RE	NWR	NR
94	ROHTAK Jn.	RUK	NR	NR
95	SATRODD	STD	NR	NR
96	SHAHGANJ Jn.	SHG	NR	NR
97	SITAPUR CANTT	SCC	NR	NR

SI. No.	BROAD GAUGE	CODE	Working Railway	Using Railwa y
98	SRI GANGA NAGAR Jn.	SGNR	NWR	NR
99	VARANASI Jn.	BSB	NR	NR
100	VYASANGAR	VYN	NR	NR
101	ALWAR	AWR	NWR	NWR
102	BHATINDA Jn.	BTI	NR	NWR
103	BHILDI Jn.	BHLD	WR	NWR
104	HISAR Jn.	HSR	NWR	NWR
105	KATAR SINGH WALA	KZW	NR	NWR
106	PALANPUR Jn.	PNU	WR	NWR
107	REWARI Jn.	RE	NWR	NWR
108	ROHTAK Jn.	RUK	NR	NWR
109	SATROADD	STD	NR	NWR
110	SAWAI MADHOPUR Jn.	SWM	WCR	NWR
111	SRI GANGA NAGAR Jn.	SIGN	NWR	NWR
112	ATARI	ATT	NR	PR
113	BALHARSHAH	BPQ	CR	SCR
114	BALLARI Jn.	BAY	SWR	SCR
115	DHARMAVARAM Jn.	DMM	SCR	SCR
116	DUVVADA	DVD	ECoR	SCR
117	GUDUR Jn.	GDR	SCR	SCR
118	MANMAD	MMR	CR	SCR
119	RENIGUNTA Jn.	RU	SCR	SCR
120	WADI Jn.	WADI	CR	SCR
121	WANI	WANI	CR	SCR
122	ASANSOL Jn.	ASN	ER	SER
123	BARKA KHANA Jn.	BRKA	ECR	SER
124	BHADRAK	BHC	ECoR	SER
125	BHATTANAGAR	BTNG	ER	SER
126	NETAJI SUBHASH CHANDRA BOSE GOMOH Jn.	GMO	ECR	SER
127	JAMUNAITANR	JNND	SER	SER
128	JHARSUGADA Jn.	JSG	SER	SER
129	KALIPAHARI	KPK	ER	SER
130	PATHARDIH Jn.	PEH	ECR	SER

SI. No.	BROAD GAUGE	CODE	Working Railway	Using Railwa y
131	RAJABERA	RJB	ECR	SER
132	SHALIMAR	SHM	SER	SER
133	TIKIAPARA	TPKR	ER	SER
134	BALHARSHAH	BPQ	CR	SECR
135	JHARSUGADA Jn.	JGG	SER	SECR
136	KATNI MURWARA	KMZ	WCR	SECR
137	NAGPUR	NGP	CR	SECR
138	RAIPUR BLOCK HUT	RVH	SECR	SECR
139	GUDUR Jn.	GDR	SCR	SR
140	JOLARPETTAI Jn.	JTJ	SR	SR
141	OMALUR Jn.	OML	SR	SR
142	RENIGUNTA Jn.	RU	SCR	SR
143	THOKUR	TOK	KR	SR
144	BALLARI	BAY	SWR	SWR
145	DHARAMAVARAM Jn.	DMM	SCR	SWR
146	HOTGI Jn.	HG	CR	SWR
147	JOLARPETTAI Jn.	JTJ	SR	SWR
148	MADGAON	MAO	KR	SWR
149	MAJORDA Jn.	MJO	KR	SWR
150	MIRAJ Jn.	MRJ	CR	SWR
151	OMALUR Jn.	OML	SR	SWR
152	BAYANA Jn.	BXN	WCR	WCR
153	BHOPAL Jn.	BPL	WCR	WCR
154	BINA Jn.	BINA	WCR	WCR
155	CHANDERIYA	CNA	WR	WCR
156	GWALIOR Jn.	GWL	NCR	WCR
157	ITARSI	ET	CR	WCR
158	KATNI MURWARA	KMZ	WCR	WCR
159	KHANDWA Jn.	KNW	CR	WCR
160	MAHADEV KHERI	MDVK	WCR	WCR
161	MAHADIYA	MHDA	ECR	WCR
162	MAKSI Jn.	MKC	WR	WCR
163	MANIKPUR	MKP	NCR	WCR
164	NAGDA Jn.	NAD	WR	WCR

SI. No.	BROAD GAUGE	CODE	Working Railway	Using Railwa y
165	OHAN	OHAN	NCR	WCR
166	SAWAI MADHOPUR Jn.	SWM	WCR	WCR
167	BHILDI Jn.	BHLD	WR	WR
168	BHOPAL Jn.	BPL	WCR	WR
169	CHANDERIYA	CNA	WR	WR
170	JALGAON Jn.	JL	CR	WR
171	MAKSI Jn.	MKC	WR	WR
172	NAGDA Jn.	NAD	WR	WR
173	PALANPUR Jn.	PNU	WR	WR
174	RAULI Jn.	RUL	CR	WR
175	VASAI ROAD	BSR	WR	WR

APPENDIX – K

List of NC Points

SL. NO.	WORKSHOPS	CODE	RAILWAY
1	Ajmer (Loco)	ADLW	NWR
2	Ajmer (Carriage)	AIIW	NWR
3	Alambagh	AMVM	NR
4	Amritsar	ASRW	NR
5	Bhopal	CRWS BPL	WCR
6	Bikaner	BKNS	NWR
7	Dahod	DHDW	WR
8	Dibrugarh	DBWS	NFR
9	Golden Rock	GOC	SR
10	Gorakhpur	GKPS	NER
11	Guntupalli	RYPS	SCR
12	Hubballi	UBLS	SWR
13	Izatnagar	IZNS	NER
14	Jagadhari	JUDW	NR
15	Jamalpur	JMPW	ER
16	Jhansi	JHSW	NCR
17	Jhansi MLR	JHS (MLR)	NCR
18	Jodhpur	JUWS	NWR
19	Harnaut	HRT	ECR
20	Kanchrapara	KPAW	ER
21	Kharagpur (Coaching & goods))	KGPW	SER
22	Kota	KTTW	WCR

SL. NO.	WORKSHOPS	CODE	RAILWAY
23	Lallaguda	LGD	SCR
24	Liluah	LLHM	ER
25	Lower Parel	PL	WR
26	Mancheshwar	MCSW	Eco.R
27	Matunga	MTNS	CR
28	Motibag (NAGPUR)	MIB	SECR
29	Mysore South	MYSS	SWR
30	New Bongaigaon	NBQS	NFR
31	Perambur (Loco)	PWP(L)	SR
32	Parel	PR	CR
33	Perambur(C&W)	PWP	SR
34	Pratap Nagar	PRTN	WR
35	Raipur	RWS	SECR
36	Samastipur	SPJS	ECR
37	Tirupati	TPTY	SCR

ROH DEPOTS / WAGON CARE CENTRES

S.N.	ROH Depot	Code	Rly
1	Ajni (Nagpur)	AQ	CR
2	Ambala	UMB	NR
3	Andal (DN/UP/BOXN)	UDL	ER
4	Baad	BAD	NCR
6	Barwadih	BRWD	ECR
7	Bhilai (PP.Yd./MSL)	PP BIA	SECR
8	Bhusawal (UP/DN)	BSL	CR

S.N.	ROH Depot	Code	Rly
9	Bilaspur	BSP	SECR
10	Bokaro Steel City	BKSC	SER
11	Bondamunda (Medium)	BNDM	SER
	Bondamunda (Central)	BNDM	SER
12	Gooty	GY	SCR
13	Itarsi	ET	WCR
14	Jhansi	JHS	NCR
15	Jolarpettai	JTJ	SR
16	Kanpur (GMC)	GMC	NCR
17	Khanalampura	KJGY	NR
18	Moradabad	MB	NR
19	Mughalsarai (DN)	MGS	ECR
20	Naihati	NH	ER
21	New Guwahati	NGC	NFR
22	New Jalpaiguri (Genl./ROH)	NJP	NFR
23	New Katni (Old/New)	NKJ	WCR
24	Nimpura	NMP	SER
25	Paradeep	PRDP	ECOR
26	Ramagundam	RDM	SCR
27	Ratlam	RTM	WR
28	Sabarmati (BG)	SBI	WR
29	Satna	STA	WCR
30	Tata Nagar	TATA	SER
31	Tondiarpettai	TNPM	SR
32	Tuglakabad (DN)	TKD	NR

S.N.	ROH Depot	Code	Rly
33	Vadodara	BRCY	WR
34	Vatva	VTA	WR
35	Vijayawada	BZA	SCR
36	Visakhapatnam (OEC/CSL)	VSKP	E.CoR
37	Vizag Steel Plant	VSPS	E.Co.R

APPENDIX – L

(See Rule 1.7)

Rules for making goods stock fit to run by Passenger train

Rule No.	Description
L.1	Goods wagons may be attached to a passenger train provided the maximum speed of the train does not exceed the maximum permissible speed of the wagon as given in para L.7.
L.2	They are fully fitted with operative Air brake cylinders.
L.3	Brake gear should have closed type of safety brackets.
L.4	The wagons should not be over loaded or unevenly loaded.
L.5	Wagons should not be over due POH/ROH
L.6	Minimum wheel base: BG: 4575 mm
L.7	<u>PARTICULARS OF MAXIMUM PERMISSIBLE SPEEDS OF GOODS STOCK.</u>
L.7.1	BROAD GAUGE:

SN	TYPE OF WAGON	MAX PERMISSIBLE SPEED OF OPERATION	
		EMPTY (kmph)	LOADED (kmph)
1	BOXNHS,BOXNLW,BOSTHS,B CNAHS,BCNHL,BFNS,BOBRN HS,BRNAH S,BVZI	100	100
2	BOSTHSM2	100	60
3	BOXNHAM,BOXNHL	100	75
4	BOXN,BOST,BOXNCR,BOXNH A,BCN,BCNA,BTPN,BTPGLN,B OMN,BRN,BRNA,BRSTN,BVZ C	80	75
5	BOBRM1,BOBRN,	80	75
6	BOBRNM1,	80	70
7	BOBRN 22.9,BOBRNHSM1,	65	60
8	BRHNEHS,BWTB,BCFC,BOBY N22.9,BOBRNEL	65	65
9	BOXNEL,BOYEL	60+5	45+5
10	BCBFG	75	75
11	BOBSNM1	55+5	45+5

APPENDIX – M

TECHNICAL DATA OF WAGON STOCK				
SN	DESCRIPTION	BOXN(LW)	BOXNEL	BOY
1	Length over coupler faces	10713 mm	10713 mm	11929 mm
2	Length over headstocks	9784 mm	9784 mm	11000 mm
3	Bogie centre	6524 mm	6524 mm	7330 mm
4	Wheelbase	2000 mm	2000 mm	2000 mm
5	Bogie	Casnub 22 HS	Casnub 22 HS	Casnub 22 NLB
6	Length inside	9784 mm	9784 mm	10990 mm
7	Width inside / overall	3022/3250 mm	2950/3200 mm	2924 / 3134 mm
8	Height inside / height from rl	2066/3341 mm	1950/3233 mm	1175 / 2450 mm
9	Journal length / dia./ bearing	144x278 RB	144x278 RB	144.5 mm dia. RB
10	Journal centre	2260 mm	2260 mm	2260 mm
11	Wheel dia.on tread New/cond.	1000/906 mm	1000/906 mm	1000/906 mm
12	Nominal max. Axle load	20.32 t	25.0 t	22.9 tonnes
13	Tare	18.26 t	23.1 t	20.71 tonnes
14	Pay load	63.02 t	76.9 t	70.89 tonnes
15	Floor area	29.57 Sq.M	28.87 Sq.M	32.13 Sq.mts
16	Cubic capacity	61.09 Cu.M	56.39 Cu.m	37.8 Cub. mts
17	Brake/coupler	AIR/CBC	AIR/CBC	Air/CBC

SN	DESCRIPTION	BCXN	BFNS	BTALN
1	Length over coupler faces	15782 mm	14645 mm	17529 mm
2	Length over headstocks	14500 mm	13716 mm	16600mm
3	Bogie centre	10000 mm	9144 mm	11570 mm
4	Wheelbase	2000 mm	2000 mm	2000mm
5	Bogie	Casnub 22 NLB	Casnub 22 HS	UIC
6	Length inside	14494 mm	-	16325 mm (Barrel)
7	Width inside / overall	2944 / 3100 mm	2845 mm Over Sole bar 3045 mm Over Stanchion Bkts.	(Barrel dia. I: 2200 /O: 2449 mm)
8	Height inside / height from rl	2446 / 3792 mm	Ht from RL top of Bulk head: 2650	Height from RL to top of dome: 4265 mm
9	Journal length / dia./ bearing	144.5 mm dia. RB	144.5 mm dia. RB.	130 mm dia. RB
10	Journal centre	2260 mm	2260 mm	2240 mm
11	Wheel dia.on tread New/cond.	1000/906 mm	1000/906 mm	1000/906 mm
12	Nominal max. Axle load	20.32 tonnes	20.32 tonnes	20.32 tonnes
13	Tare	26.014 tonnes	26.71 tonnes	49.130 tonnes
14	Pay load	55.266 tonnes	54.57 tonnes	32.13 tonnes

SN	DESCRIPTION	BCXN	BFNS	BTALN
15	Floor area	42.67 sq.mts	-	-
16	Cubic capacity	104 cub.mts	-	60.660 Cub.mts
17	Brake/coupler	AIR/CBC	AIR/CBC	AIR/CBC

SN	DESCRIPTION	BVZC	BVZI
1	Length over coupler faces	9469 mm	14469 mm
2	Length over headstocks	8540 mm	13540 mm
3	Bogie centre	4 wheeler	9026 mm
4	Wheelbase	5400 mm	2896 mm
5	Bogie	4 wheeler	ICF STD (13 t) Bogie
6	Length inside	2642 mm	----
7	Width inside / overall	2612 / 3200 mm	----/3200 mm
8	Height inside / height from rl	Height from RL to top of wagon: 3894 mm	2448/3894 mm
9	Journal length / dia./ bearing	130 mm dia. RB	-----
10	Journal centre	2240 mm	-----
11	Wheel dia.on tread New/cond.	1000/906 mm	915/813 mm
12	Nominal max. Axle load	20.32 tonnes	5.875 t

13	Tare	13.803 tonnes	23.5 t
14	Pay load	-	---56.68 t
15	Floor area	-	-----
16	Cubic capacity	-	-----
17	Brake/coupler	AIR/CBC	Air/CBC

SN	DESCRIPTION	BLCA	BLCB	BFKN
1	Length over coupler faces	14566 mm	13165 mm	14682
2	Length over headstocks	13625 mm	12212 mm	13716
3	Bogie centre	9675 mm	8812 mm	9000
4	Wheelbase	2000 mm	2000 mm	2000
5	Bogie	LCCF 20 (C)	LCCF 20 (C)	Casnub
6	Length inside	-----	-----	-----
7	Width inside / overall	2100/2200 mm	2100/2200 mm	-----
8	Height inside / height from rl	1269/1009 mm	---/1009 mm	---/1269
9	Journal length / dia./ bearing	144x278 RB	144x278 RB	144x278 RB
10	Journal centre	2260 mm	2260 mm	2260

11	Wheel dia.on tread new/cond.	840/780 mm	840/780 mm	1000/906
12	Nominal max. Axle load	20.32 t	20.32 t	20.32
13	Tare	19.1 t	18.0 t	20.5
14	Pay load	61.0 t	61.0 t	60.5
15	Floor area	-----	-----	-----
16	Cubic capacity	-----	----	-----
17	Brake/coupler	Air/CBC/SDB	Air/SDB	Air/CBC

SN	Description	BLLA	BLLB	BCNHL
1	Length over coupler faces	16161	14763	10963
2	Length over headstocks	15220	13810	10034
3	Bogie centre	10700	9810	7153
4	Wheelbase	2000	2000	2000
5	Bogie	Lccf 20 (c)	Lccf 20 (c)	Casnub 22 hs
6	Length inside	-----	-----	1 0 0 3 4
7	Width inside / overall	2100/220	2100/220	3345/3450
8	Height inside / height from rl	-----/1008	--1008	3024/4305
9	Journal length / dia./ bearing	144 x 278 r.b	144 x 278 r.b	144x278
10	Journal centre	2260	2260	2260
11	Wheel dia.on tread New/cond.	840/780	840/780	000/906

12	Nominal max. Axe load	20.32	20.32	22.9
13	Tare	19.8	19.0	20.8
14	Pay load	61.0	61.0	70.8
15	Floor area(sq.m)	----	---	33.56
16	Cubic capacity(cu.m)	---	---	92.54
17	Brake/coupler	Air/cbc/sdb	Air/cbc/sdb	Air/cbc

SN	Description of wagon	BOST (20.32 t.)	BOSTHSM1 (CC+6t.+2t.)	BOSTHSM2 (CC+6t.+2t.)
1	Length over Hd. Stock	12800 mm	12800 mm	12800 mm
2	Length over buffer/couplers	13729 mm	13729mm	13729mm
3	Length inside	12800 mm	12800 mm	12800 mm
4	Width inside/overall	2850/3100 mm	2850/3100 mm	2850/3100 mm
5	Height inside/from rail	1805/3078 mm	1805/3080 mm	1805/3078 mm
6	Bogie centres	8800 mm	8800 mm	8800 mm
7	Journal centres	2260 mm	2260 mm	2260 mm
8	Wheel dia. On tread	1000 mm	1000 mm	1000 mm
9	Nominal max. axle load	20.32 t.	22.32 t.	22.32 t.
10	Tare	25.5 t.	25.5 t.	25.5 t.
11	Pay load	55.78 t.	63.78 t.	63.78 t.
12	Ratio pay load /tare	2.19	2.5	2.5
13	Gross load	81.28 t.	89.28 t.	89.28 t.
14	No. of wagons per rake	45	45	45
15	Throughput per rake	2510 t.	2870.1 t.	2870.1 t.
16	Loading density	5.92 t/m	6.50 t/m	6.50 t/m
17	Cubic capacity	65.79 m3	65.79 m3	65.79 m3
18	Type of coupler	CBC	CBC	CBC

19	Type of bearing	CTR B	CTR B	CTR B	CTR B
SN	Description of wagon	BCNHL-DESIGN-D	BCN	BCN A	BVZI
1	Length over Hd. Stock	10034 mm	14500 mm	1352 1mm	13540 mm
2	Length over buffer/coupler s	10963 mm	15429 mm	1445 0 mm	14469 mm
3	Length inside	10034 mm	14494 mm	1351 5 mm	-
4	Width inside/overall	3345/ 3450 mm	2944/ 3100 mm	2944 / 3200 mm	-/3200 mm
5	Height inside/from rail	3024/430 5mm	2446/3 788 mm	2677 /401 7mm	/3894 mm
6	Bogie centres	7153 mm	10000 mm	9500 mm	9026 mm
7	Journal centres	2260mm	2260 mm	2600 mm	2159mm
8	Wheel dia. On tread	1000mm	1000 mm	1000 mm	915 mm
9	Nominal max. axle load	22.9 t.	20.32 t.	20.3 2 t.	5.875 t
10	Tare	20.8t.	27.2 t.	24.6 t.	23.5 t
11	Pay load	70.8t.	54.08 t.	56.7 3 t.	-
12	Ratio pay load /tare	3.4	1.99	2.31	-
13	Gross load	91.6 t.	81.28 t.	81.2 8 t.	23.5 t.

14	No. of wagons per rake	58	41	44	
15	Throughput per rake	4106 t.	2217	2496	0
SN	Description of wagon	BCNHL-DESIGN-D	BCN	BCN A	BVZI
16	Loading density	8.35 t./m	5.268t./m	5.625 t./m	-
17	Cubic capacity	92.54 m ³	104 m ³	103.4 m ³	-
18	Type of coupler	CBC	CBC	CBC	CBC
19	Type of bearing	CTRB	CTRB	CTR B	CTRB

SN	Description of wagon	BOXNH L (MBS)	BOXNR	BOXNH A	BOXN(LW)
1	Length over Hd. Stock	10034 mm	9784 mm	9784 mm	9784 mm
2	Length over buffer/couplers	10963 mm	10713 mm	10713 mm	10713 mm
3	Length inside	10034 mm	9784 mm	9784 mm	9784 mm
4	Width inside/overall	3022/3250 mm	2954/3176 mm	2950/3200 mm	3022/3250 mm
5	Height inside/from rail	2028/3301 mm	2127/3408 mm	2175/3450 mm	1990/3263 mm
6	Bogie centres	6690 mm	6524 mm	6524 mm	6524 mm
7	Journal centres	2260 mm.	2260 mm	2260 mm	2260 mm
8	Wheel dia. On tread	1000 mm	1000 mm	1000 mm	1000 mm
9	Nominal max. axle load	22.9 t.	22.9 t.	22.1 t.	20.32 t.
10	Tare	20.52 t.	21.2 t.	23.17 t.	20.41 t.
11	Pay load	71.08 t.	70.40 t.	65.23t.	60.87 t.
12	Ratio pay load /tare	3.46	3.32	2.81	2.98
13	Gross load	91.6 t.	5313 t.	88.4t.	81.28 t.
14	No. of wagons per rake	58	58	58	58
15	Throughput per rake	4123 t.	4083.2 t.	3783 t.	3533 t.

SN	Description of wagon	BOXNHL (MBS)	BOXNR	BOXNHA	BOXN(LW)
16	Loading density	8.35 t./m	8.55 t./m	8.25 t./m	7.59 t/m
17	Cubic capacity	61.50 m ³	61.47 m ³	62.8 m ³	58.84 m ³
18	Type of coupler	CBC	CBC	CBC	CBC
19	Type of bearing	CTRB	CTRB	CTRB	CTRB

SN	Description of wagon	BOXNAL	BOXNHAM	BOXN/ BOXNHS
1	Length over Hd. Stock	9784 mm	9784 mm	9784 mm
2	Length over buffer/couplers	10713 mm	10713 mm	10713 mm
3	Length inside	9784mm	9784 mm	9784 mm
4	Width inside/overall	3022/3250 mm	2950/3200 mm	2950/3200 mm
5	Height inside/from rail	2066/3341 mm	1950/3233 mm	1950/3233 mm
6	Bogie centres	6524mm	6524 mm	6524 mm
7	Journal centres	2260 mm	2260 mm.	2260 mm.
8	Wheel dia. On tread	1000 mm	1000/906 mm	1000 mm
9	Nominal max. axle load	20.32 t.	22.82 t.	20.32 t.
10	Tare	18.26 t.	23.1 t.	23.1 t.
11	Pay load	63.02 t.	68.18 t.	58.18 t.
12	Ratio pay load /tare	3.45	2.95	2.52
13	Gross load	81.28 t.	91.28 t.	81.28 t.
14	No. of wagons per rake	58	58	58
15	Throughput per rake	3655t.	3954 t.	3374 t.
16	Loading density	7.59t./m	8.52 t/m	7.59 t./m
17	Cubic capacity	61.09 m ³	56.29 m ³	56.29 m ³
18	Type of coupler	CBC	CBC	CBC
19	Type of bearing	CTRB	CTRB	CTRB

SN	Description of wagon	BTFLN	BCFC		BCBFG
		Pol Tank wagon	FLY ASY	CEMENT	Food Grain
1	Length over Hd.Stock	11491 mm	9784 mm	9784 mm	11861 mm
2	Length over buffer/couplers	12420 mm	10713 mm	10713 mm	12790 mm
3	Length inside	11522 (inside Barrel Length)	10084.7 mm	10084.7 mm	11770 mm
4	Width inside/overall	2950(inside Dia. Of Barrel)	3128.7/3 245 mm	3128.7/3 245 mm	3140 mm
5	Height inside/from rail	4358 (over all Ht.)	4165 mm	4165 mm	4260 mm
6	Bogie centres	8391mm	6684 mm	6684 mm	8661 mm
7	Journal centres	2260 mm	2260 mm	2260 mm	2260 mm
8	Wheel dia. On tread	1000mm	1000 mm	1000 mm	1000 mm
9	Nominal max. axle load	20.32 t.	17.75 t.	22.32 t.	21.82 t.
10	Tare	23.33 t.	22 t.	22 t.	26.44 t.
11	Pay load	57.95	49 t.	67.3 t.	60.84 t.

SN	Description of wagon	BTFLN	BCFC		BCBFG
		Pol Tank wagon	FLY ASY	CEMENT	Food Grain
12	Ratio pay load /tare	2.48	2.22	3.06	2.3
13	Gross load	81.28 t.	71 t.	89.3 t.	87.28 t.
14	No. of wagons per rake	51 *	58	58	49
15	Throughput per rake	2955.45 t.	2842 t.	3904 t.	2981 t.
16	Loading density	6.54 t./m	6.62 t./m	8.335 t./m	6.82 t./m
17	Cubic capacity	76 m ³	72.8 m ³	72.8 m ³	81.76 m ³
18	Type of coupler	CBC	CBC	CBC	CBC
19	Type of bearing	CTRB	CTRB	CTRB	CTRB

SN	Description of wagon	WD-04004-S-52 BRHNEHS	WD-96021-S-02 (DESIGN-A BOBYN/ BOBYNHS
1	Length over Hd. Stock	13716 mm	10718 mm
2	Length over buffer/couplers	14998/14986 mm	11647 mm
3	Length inside	12716 mm	9000 mm
4	Width inside/overall	2845/3049 mm	2863/3189 mm
5	Height inside/from rail	1264 mm	2018/3287 mm
6	Bogie centres	9144 mm	7470mm
7	Journal centres	2260 mm	2260 mm
8	Wheel dia. On tread	1000 Dia.	1000 Dia.
9	Nominal max.axle load	20.32 t.	22.9 t.
10	Tare	22.6 t.	25.2 t.
11	Pay load	58.68 t.	66.4 t.
12	Ratio pay load /tare	2.596	2.6
13	Gross load	81.28 t.	91.6 t.
14	No. of wagons per rake	41	50
15	Throughput per rake	2406 t.	3320 t.
16	Loading density	5.419 t/m	7.86 t/m
17	Cubic capacity	Flat Wagon	46.1 m3
18	Type of coupler	Transition type CBC	NT. CBC
19	Type of bearing	CTR B (6X11) E-Class	CTR B (6X11) E-class

SN	Description of wagon	WD-09090-S-02 (DESIGN-B)BOBYB-229	BTPGLN
1	Length over Hd. Stock	10718 mm	18000 mm
2	Length over buffer/couplers	11647 mm	18929 mm
3	Length inside	9000 mm	17960 mm (Inside barrel Length)
4	Width inside/overall	2863/3189 mm	2400 mm Inside Dia.
5	Height inside/from rail level	2024/3293 mm	4285 mm
6	Bogie centres	7470 mm	12970 mm
7	Journal centres	2260 mm	2260 mm
8	Wheel dia. On tread	1000 Dia.	1000 mm
9	Nominal max.axle load	22.9 t.	20.32 t.
10	Tare	25.3 t.	41.6 t.
11	Pay load	66.3 t.	37.6
12	Ratio pay load /tare	2.6	0.9
13	Gross load	91.6 t.	79.2
14	No. of wagons per rake	50	33 *
15	Throughput per rake	3315 t.	1240.8
16	Loading density	7.86 t/m	4.19 (Gross)
17	Cubic capacity	46.16 m ³	79.48 m ³
18	Type of coupler	NT. CBC	CBC
19	Type of bearing	CTRB (6X11) E-class	CTRB

* = In 636 Mtrs Loop length without safety wagon.

S N	Description of wagon	BTPN	BRN	BRNA
1	Length over Hd.Stock	11491 mm	13716 mm	13716 mm
2	Length over buffer/couplers	12420mm	14645 mm	13716 mm
3	Length inside	11434mm (inside barrel Length)	13716 mm	14645 mm
4	Width inside/overall	2850mm (inside Barrel dia)	2845 mm	2845 mm
5	Height inside/from rail	4265 mm Ht.	2544 mm	2544 mm from R.L
6	Bogie centres	8391mm	9144 mm	9144 mm
7	Jo17urnal centres	2260 mm	2260 mm	2260 mm
8	Whe18el dia. On tread19	1000mm	1000 mm	1000 mm
9	Nominal max. axle load	20.32 t.	20.32 t.	20.32 t.
10	Tare	27 t.	24.393 t.	23.543 mm
11	Pay load	54.28	56.887 t.	57.737 t.
12	Ratio pay load /tare	2.01	2.33	2.452
13	Gross load	81.28 t.	81.28 t.	81.28 t.
14	No. of wagons per rake	51 *	42	42
15	Throughput per rake	2768.28 t.	2389 t.	2425 t.
16	Loading density	6.54 t./m	5.55 t/m	5.55 t./m
17	Cubic capacity	70.4 m ³	FLAT WAGON	FLAT WAGON

18	Type of coupler	CBC	CBC	CBC
19	Type of bearing	CTR伯	CTR伯	CTR伯

* = In 636 Mtrs Loop length without safety wagon.

SN	Description of wagon	BOBR (20.32t)	BOBRM1 (22.32t)	BOBRN (20.32t.)
1	Length over Hd. Stock	10671mm.	10671mm.	9671mm
2	Length over buffer/couplers	11600 mm	11600 mm	10600 mm
3	Length inside	8732 mm	8732 mm	9327 mm
4	Width inside/overall	3340/3500 mm	3340/3500 mm	3340/3500 mm
5	Height inside/from rail	2461/3735 mm	2461/3735 mm	2466/3735 mm
6	Bogie centres	7571mm	7571mm	6790 mm
7	Journal centres	2260 mm	2260 mm	2260 mm
8	Wheel dia. On tread	1000 mm	1000 mm	1000 mm
9	Nominal max. axle load	20.32 t.	22.32 t.	20.32 t.
10	Tare	26.40 t.	26.40 t.	25.61 t.
11	Pay load	54.88 t.	62.88 t.	55.67 t.
12	Ratio pay load /tare	2.08 t.	2.38	2.17
13	Gross load	81.28 t.	89.28 t.	81.28 t.
14	No. of wagons per rake	53	53	58
15	Throughput per rake	2908.64 t.	3333 t.	3228.86 t.

16	Loading density	7.006 t/m	7.69 t/m	7.67 t/m
17	Cubic capacity	57.20 m3	57.20 m3	56.78 m3
18	Type of coupler	CBC	CBC	CBC
19	Type of bearing	CTR8	CTR8	CTR8

SN	Description of wagon	BOBRNM1 (22.32t)	BOBRNHS	BOBRN(22.32t)
1	Length over Hd. Stock	9671mm	9671mm	9671mm
2	Length over buffer/couplers	10600 mm	10600 mm	10600 mm
3	Length inside	9327 mm	9327 mm	9327 mm
4	Width inside/overall	3340/3500 mm	3340/3500 mm	3340/3500 mm
5	Height inside/from rail	2466/3735 mm	2466/3735 mm	2466/3735 mm
6	Bogie centres	6790 mm	6790 mm	6790 mm
7	Journal centres	2260 mm	2260 mm	2260 mm
8	Wheel dia. On tread	1000 mm	1000 mm	1000 mm
9	Nominal max. axle load	22.32 t.	20.32 t.	22.32 t.
10	Tare	25.61 t.	25.61 t.	25.61 t.
11	Pay load	63.67 t.	55.67 t.	63.67 t.
12	Ratio pay load /tare	2.48	2.17	2.48
13	Gross load	89.28 t.	81.28 t.	89.28 t.
14	No. of wagons per rake	58	58	58
15	Throughput per rake	3692.86 t.	3228.86 t.	3692.86 t.

16	Loading density	8.421 t/m	7.67 t/m.	8.421 t/m
17	Cubic capacity	56.78 m3	56.78 m3	56.78 m3
18	Type of coupler	CBC	CBC	CBC
19	Type of bearing	CTR伯	CTR伯	CTR伯

S.N	Description of wagon	BOBSN (22.9t.)	BOBSNM1	BRN-22.9
1	Length over Hd. Stock	10668 mm	10668 mm	13716 mm
2	Length over buffer/couplers	11597 mm	11597 mm	14645 mm
3	Length inside	9296 mm	9296 mm	13716 mm
4	Width inside/overall	2743 mm	2743 mm	2930 mm Inside
5	Height inside/from rail	2032/3301 mm	2032/3301 mm	2555 mm from
6	Bogie centres	7112 mm	7112 mm	9144 mm
7	Journal centres	2260 mm	2260 mm	2260 mm
8	Wheel dia. On tread	1000 mm	1000 mm	1000 mm
9	Nominal max. axle load	22.9 T.	25.00t.	22.9 t.
10	Tare	30.0 t.	30.0 t.	23.3 t.
11	Pay load	61.6 t.	70.0 t.	68.292 t.
12	Ratio pay load /tare	2.05	2.33 t.	2.93
13	Gross load	91.6 t.	100.00 t.	91.6 t.
14	No. of wagons per rake	-	-	42

15	Throughput per rake	-	-	2868
16	Loading density	7.89 t/m.	8.62 t/m.	6.25 t/m.
17	Cubic capacity	34.0m3	34.0m3	FLAT WAGON
18	Type of coupler	CBC	CBC	CBC
19	Type of bearing	CTRIB	CTRIB	CTRIB

S.N	Description of wagon	BOMN	BRSTN	BWTB
1	Length over Hd. Stock	18460 mm	13716 mm	15510 mm.
2	Length over buffer/couplers	19742 mm	14968 mm	16792 mm.
3	Length inside	18460 mm	13716 mm	15510 mm.
4	Width inside/overall	3100/3200 mm	3200 mm	3048 mm.
5	Height inside/from rail	1275 mm	1264 mm	1306 mm (1055 mm in well Area)
6	Bogie centres	13890 mm	9144 mm	11850 mm.
7	Journal centres	2260 mm	2260 mm	2260 mm.
8	Wheel dia. On tread	1000 mm	1000 mm	1000 mm.
9	Nominal max. Axle load	16.41 T.	20.32 t.	22.9 t.
10	Tare	29.776 t.	25.01 t.	31.210 t.
11	Pay load	35.850 t	56.27 t.	60.390 t.

12	Ratio pay load /tare	1.2	2.25	1.93
13	Gross load	65.626 t.	81.28 t.	91.6 t.
14	No. of wagons per rake	Military special Wagons		
15	Throughput per rake	Used for transportation of special consignment of Defense		
16	Loading density	3.324 t/m.	5.419 t/m.	5.45 t/m.
17	Cubic capacity	Flat wagon	Flat wagon	Well wagon
18	Type of coupler	Transition CBC	Transition CBC	Transition CBC
S.N	Description of wagon	BOMN	BRSTN	BWTB
19	Type of bearing	CTR B (6X11) E-CLASS	CTR B (6X11) E-CLASS	CTR B (6X11) E-CLASS
20	Type of BOGIE	CASNUB-22NLB	CASNUB-22NLB	CASNUB-22NLB
S.N	Description of wagon	BCACM-A	BCACM-B	
1	Length over Hd. Stock	13625 mm	12212 mm	
2	Length over couplers	14569 mm	13171 mm	
3	Length inside	13625 mm	122212 mm	
4	Width overall	2600 mm	2600 mm	
5	Height of floor from rail level	999 mm	999 mm	
6	Bogie centres	9675 mm	8812 mm	
7	Journal centres	2260 mm	2260 mm	
8	Wheel dia. On tread	810-780 mm	810-780 mm	
9	Nominal max.	8.28 t	7.9 t.	

	Axle load		
10	Tare	26.3 t.	24.8 t.
11	Pay load	6.825 t	6.825 t.
12	Ratio pay load /tare	0.26	0.28
13	Gross load	33.125 t	31.625 t
14	No. of wagon per Rake (45 wagons)	18	27
15	Loading density	2.27 t/m	2.40 t/m
16	Cubic Capacity	Auto car wagon	
17	Type of coupler	Non-transition CBC in one end and SDB in other end	SDB both ends
18	Type of Bearing	CTR B (6X11) E-CLASS	CTR B (6X11) E-CLASS
19	Type of BOGIE	LCCF-20 (C)	

S.N.	Description of wagon	BCACBM-A	BCACBM-B
1	Length over Hd. Stock	22626 mm	22626 mm
2	Length over couplers	23555 mm	23555 mm
3	Length inside	22626 mm	22626 mm
4	Width inside/overall	2896/2900 mm	2896/2900 mm
5	Height of floor from rail level	1182/938 mm	938 mm
6	Bogie centres	14345 mm	14345 mm
7	Journal centres	2260 mm	2260 mm
8	Wheel dia. On tread	840 mm	840 mm
9	Nominal max. Axle load	12.23 t	12.16 t.
10	Tare	35.86 t.	35.77 t.
11	Pay load	15 t	15 t.
12	Ratio pay load /tare	0.42	0.42
13	Gross load	50.86 t	50.77 t
14	No. of wagon per Rake	6	21
15	Loading density	2.16 t/m	2.16 t/m
16	Total Number of cars per Rake	Maximum 318 Small cars	
17	Type of coupler	Non-Transition	Non-Transition
18	Type of Bearing	CTR B (6X11) E-CLASS	CTR B (6X11) E-CLASS
19	Type of BOGIE	LCCF-20 (C)	

S.N	Description of wagon	BOBYN (Design-C)
1	Length over Hd.Stock	10718 mm
2	Length over buffer/couplers	11647 mm
3	Length inside	9000 mm
4	Width inside/overall	2863/3189 mm
5	Height inside/from rail	2024/3239 mm
6	Bogie centres	7470 mm
7	Journal centres	2260 mm
8	Wheel dia. On tread	1000 Dia.
9	Nominal max. axle load	22.9 t.
10	Tare	25.0 t.
11	Pay load	66.6 t.
12	Ratio pay load /tare	2.664
13	Gross load	91.6 t.
14	No. of wagons per rake	50
15	Throughput per rake	3330 t.
16	Loading density	7.86 t/m
17	Cubic capacity	46.1 m ³
18	Type of coupler	NT. CBC
19	Type of bearing	CTRB (6X11) E-class

Appendix N

LIST OF MUST CHANGE ITEMS DURING POH and ROH

ITEMS TO BE REPLACED DURING ROH

S.N.	Description of Item	Justification for Replacement
A CASNUB BOGIE		
A-1	SF Key nut bolt with washer	During dismantling of wheel from bogie, it is necessary to cut the bolt since it is tack welded with nut. Therefore the committee recommends 100% replacement of this item during ROH.
A-2	Split Pin 12 x 110 mm	The split pins of Brake Shoe key are being changed 100% in some depots as they are getting distorted /damaged while taking out the brake blocks. Hence 100% replacement is recommended during ROH.
A-3	CTRBL Locking plate	The Locking plates are being changed on 100% basis. While carrying out the UST of Wheel sets, the locking plates are to be removed and while doing so, tabs are getting damaged or broken. Hence 100 % replacement is recommended during ROH.
B CBC		
B-1	Striker casting Wear Plate	This item is subjected to wear in service as it comes in contact with CBC Shank. Wear Plate. Some ROH depots are replacing the item to the extent of 100 %. The worn out component will have serious impact on uncoupling of CBCs and it will also damage CBC shank; it will cause ovality on the top

		portion of Yoke Pin hole. Therefore the committee recommends 100% replacement of this item during ROH.
C Air Brake System		
C-1	Dirt Collector Filter	This is basically a non-metallic strainer and of a small value. At present depots are changing on condition basis and there is an apprehension that dirt collectors are not at all opened in depots during ROH. There are many cases of DV malfunctioning and subsequent brake bindings in service and the filter is playing a major role. Therefore the committee recommends 100% replacement of this item during ROH so that it will be compulsory on the part of the depot to open the Dirt Collector.
C-2	Dirt Collector Washer ('O' Ring)	These are the small value rubber items perishable in nature and getting damaged while opening the assemblies. Therefore the committee recommends 100% replacement of this item during ROH.
C-3	Rubber gaskets	
C-4	MU washers	
C-5	AR Drain Plug leather washer	These items are perishable in nature getting damaged while opening the assemblies. Therefore the committee recommends 100% replacement of this item during ROH
C-6	BC Drain Plug leather washer	
D Tank wagons		
D-1	Filling Pipe Joint Ring	

	(BTPN)	These are the rubber items perishable in nature and getting damaged while opening the assemblies. Therefore the committee recommends 100% replacement of this item during POH.
D-2	Man Hole Cover Sealing Ring.	

ITEMS TO BE REPLACED DURING POH

S.N.	Description of Item	Justification for Replacement
A CASNUB BOGIE		
A-1 Side Frame		
1	Pedestal Jaw Liners	These items are subjected to wear in service as they are continuously in contact with adaptor and not expected to last beyond one POH. The liners of suitable thickness are Required to be welded. Therefore the committee recommends 100% replacement of these items during POH. Committee also recommends that no weld metal deposit should be done on the pedestal jaw surfaces to maintain the clearances as no machining is done after welding. RDSO may explore the possibility of liners in original design. The smoothness of the surface is primarily important.
2	SF Key nut bolt with washer	During dismantling of wheel from bogie, it is necessary to cut the bolt since it is tack welded with nut. Therefore the committee recommends 100% replacement of this item during POH.
A-2 Bolster		
1	Land surface liner	These items are subjected to wear in service as they are continuously in contact with

2	Pocket slope liner	adaptor and expected to last from POH to POH. The liners of suitable thickness are required to be welded. Therefore the committee recommends 100% replacement of this item during POH.
3	Rotation stop lug liner	
A-3 Bogie Brake Gear		
	Split Pin 12 x 110 mm	The split pins of Brake Shoe key are being changed 100% in some depots as they are getting distorted/ damaged while taking out the brake blocks. Hence 100% replacement is recommended during POH.
A-4	CTRBLock plate	The Locking plates are being changed on 100% basis. While carrying out UST of the Wheel sets, the locking plates are to be removed and while doing so, tabs are getting damaged or broken. Hence 100 % replacement is recommended during POH.
A-5	Elastomeric pads	It has been observed that many workshops are replacing this item to the extent of 100%. Being a rubber component, committee recommends 100% replacement of this item during POH. However, the serviceable EM Pads shall be given to divisions for replacement during the course of train examination.
B Draw and Buffing Gear Assembly		
B-1	Knuckle	Knuckle is subjected to wear on Nose, Pulling lug area. Some workshops are changing on 100% basis and released serviceable material is given to divisions. Knuckles are playing very important role in coupling gear. In the present spurt of train parting / uncoupling cases Knuckles might be playing a vital role.

		Upgraded couplers are being developed by RDSO as per WD70BD-10. The committee therefore recommends one time replacement of indigenous knuckles with the upgraded knuckles as per WD- 70-BD-10. However, serviceable knuckles shall be given to divisions for replacement during train examination.
B-2	CBC Lock	Lock is subjected to wear on contact area corresponding to Knuckle pulling lug and curved surface. Committee has observed that majority of the uncoupling cases are on account of worn out Locks. Upgraded couplers are being developed by RDSO as per WD-70-BD-10. The committee therefore recommends one time replacement of indigenous CBC locks with the upgraded CBC locks as per WD-70-BD-10. However, serviceable locks shall be given to divisions for replacement during train examination.
B-3	Rotary Lock Lift Assembly	Mostly, the Anti-Creep Lug of Lock Lifter Assembly is found in worn condition. Moreover, the alignment is disturbed due to riveting became loose in service Upgraded couplers are being developed by RDSO as per WD-70-BD-10. The committee therefore recommends one time replacement of indigenous lock lift assembly with the upgraded lock lift assembly as per WD-70:BD10. However, serviceable assemblies shall be given to divisions for replacement during train examination.

B-4	Bearing Piece	The committee observed that consumption of this item between workshops to workshop varies from 3% to 33%. The item is subjected to wear in service; the slot (17.5 mm x 17.5 mm) of bearing piece becomes worn out in service and not holding the Operating Handle in position. As a result the operating handle along with Rotary Lock Lift Assembly gets displaced from its position thereby causing uncoupling of CBC. The item is not expected to last beyond one POH. The committee therefore recommends 100% replacement of this item. However, serviceable bearing pieces shall be given to divisions for replacement during train examination.
B-5	Yoke Pin support plate liner	This item is subjected to wear particularly due to interaction of Yoke Pin's vertical movement. The pin makes a dent mark on the liner which is dangerous which restricts the movement of the yoke pin resulting in the breakage of Support plate rivets. The item is not expected to last beyond one POH cycle. The committee therefore recommends 100% replacement of this item.
B-6	Shank Wear Plate	This item is subjected to wear in service as it comes in contact with CBC Shank Wear Plate. Some workshops are replacing the item to the extent of 70%. The worn out component will have serious impact on uncoupling of CBCs and it will also damage CBC shank. The life of the component is not expected beyond one POH cycle. Therefore the committee

		recommends 100% replacement of this item during POH.
B-7	Striker Casting Wear Plate	This item is subjected to wear in service as it comes in contact with CBC Shank. Some workshops are already replacing the item to the extent of 100%. The worn out component will have serious impact on uncoupling of CBCs. The life of the component is not expected beyond one POH cycle. Therefore the committee recommends 100% replacement of this item during POH.
C Air Brake System		
C-1	Dirt Collector Filter	This is basically a non-metallic strainer and of a small value item. At present workshops are changing on condition basis. There are many cases of DV malfunctioning in service and the filter is playing a major role. The life of the component is not expected beyond one POH cycle. Therefore the committee recommends 100% replacement of this item during POH.
C-2	Dirt Collector Rubber Washer ('O' Ring)	These are the rubber items perishable in nature and getting damaged while opening the assemblies. The life of the items is not expected beyond one POH cycle. Therefore the committee recommends 100% replacement of this item during POH.
C-3	Rubber gaskets	
C-4	Rubber Seals of Cut off Angle Cocks.	

C-5	MU washers	
C-6	Grip seals / Rubber washers	
C-7	AR Drain Plug leather washer	These are items perishable in nature and Getting damaged while opening the assemblies. Therefore the committee recommends 100% replacement of this item during POH.
C-8	BC Drain Plug leather washer	
C-9	BP Air Hose	This item is generally tested during POH for leakage and bulging at 10 Kg/cm ² pressure and about 50% rejection is there. Moreover, there are large numbers of service failures. Some workshops are changing 100%. Being a Rubber item; it is not expected to last beyond one POH cycle. Therefore the committee recommends 100% replacement of this item during POH. However, serviceable hoses shall be given to divisions for replacement during train examination.
D Tank wagons		
D-1	Filling Pipe Joint Ring (BTPN)	These are the rubber items perishable in nature and getting damaged while opening the assemblies. Therefore the committee recommended 100% replacement of this item during POH.
D-2	Man Hole Cover Sealing Ring.	

Note: Zonal railways may review the consumption of items and further rationalize the AAC of the items at their ends.

Appendix O

LIST OF IMPORTANT MODIFICATIONS TO BE CARRIED OUT ON FREIGHT STOCK

(IRCA letter no. M/129/Policy/W dated 12.4.99 &
Rly. Bd. L. No. 98/M (N)/951/11 dt.6.4.99)

I. WHEELS, AXLES, BEARINGS

SN	Item Description	RDSO's Reference	To be done in			
			Sick line	ROH	POH	New built
1	Adoption of worn wheel profile for all BG wheels	MW/CWSC/58 dt.18.3.92	Yes	Yes	Yes	Yes
2	Additional Intermediate Profile for wagon wheel.	RDSO letter no. MW/WA/GENL. Dated 13/15.01.2010	--	Yes	Yes	--
3	Stamping of Overhauling date of CTRB on Backing Ring	RDSO letter no MW/WA/GENL Dated 26.04.2012	--	--	Yes	--

4	Non Use of Seal Wears Rings with vent holes	1. RDSO letter no. MW.RB.GENL. Dated 15/18.06.2012 2. RDSO letter no. MW/RB/BOXN Dated 08/12.08.2002	--	--	Yes	--
5	Non Use of Backing Rings with Vent holes	1. RDSO letter no. MW/RB/BOXN Dated 20.12.1993 2. RDSO letter no. MW/RB/BOXN Dated 02.06.1995	--	--	Yes	--
6	Phasing out of wheels having Sprag, Holes from freight stock.	Railway Board's letter no. 2000/M(N)/960/1/Pt Dated 03.09.2008	--	--	Yes	--

II. WAGON SUPER STRUCTURE AND BRAKE RIGGING

1	Strengthening of horizontal lever support (large on BOXN/BCNA wagons)	MW/BOXN/MAINT/dt.24.1.94	No	Yes	Yes	Yes
2	Provision of anti rotation lug on empty tie rod coupling nut of BOXN/BCN wagons	MW/BOXN/MAINT/dt.15.1.94	Yes	Yes	Yes	Yes

S N	Item Description	RDSO's Reference	To be done in			
			Sick line	ROH	POH	New built
5	Provision of side bracket with link on BRH/BRN wagons to facilitate securing of steel plant consignment to wagon body	MW/ACT/B G dt. 27.5.94	NO	Yes	Yes	Yes
6	Modification to empty/load spindle bracket	MW/BTPN dt. 1.11.94	NO	NO	Yes	Yes
7	Provision of extra roller type		NO	Yes	Yes	NO

	pulls rod supports as per drg. WD-90016-S/1 Alt 12					
8	Under frame strengthening of all welded BRN wagons	MW/BRN dt 12.12.98	NO	NO	Yes	Not under manufacturer
9	Modification of existing door hold stiffener of BOBRN	MW/DOM/BOBR dt. 14.6.90	NO	Yes	Yes	Yes
10	Modification to anchoring tee joint on BTPN wagons	MW/BTPN dt.24/26.8.98	NO	NO	Yes	NA

III. COUPLER & DRAFT GEARS

1	Fitment of modified striker casting wear plate in CBC	MW/CPL/BG/ HT dt.6.1.88	NO	NO	Yes	Yes
---	---	-------------------------	----	----	-----	-----

IV. AIR BRAKE SYSTEM

1	Standardization of isolating handle cock on DV	MW/APB/TP/ M dt.27.9.88	NO	Yes	Yes	Yes
2	Modification to filtering arrangement of C3W DV of SCL	MW/APB/TP/ M dt.24.11.88	NO	Yes	Yes	Yes
3	Provision of additional APD to DV	MW/APB/TP/ M dt.1/6-5-92	NO	Yes	Yes	Yes
4	Modification to quick release	MW/APB/TP/ M	NO	Yes	Yes	Yes

	valve of DV of Escorts make	dt.3/9-7-92				
5	Strengthening of APD for DV	MW/APB/TP/ M dt.15.7.92	NO	NO	Yes	Yes
6	Modification to the piping of BVZC wagon for fitment of quick coupling and detachable pressure gauge	MW/APB/TP/ M dt.3/6-12-93	NO	Yes	Yes	Yes
7	Modification to hose coupling support	MW/APB 8/10-4-94	NO	Yes	Yes	Yes
8	Modification to the locking arrangement of barrel with leader nut casing of DRV2- 600	MW/SLA dt. 20/21-7- 88	NO	Yes	Yes	Yes

**LIST OF
PLATES
For
CONFERENCE
RULES**

PART-III

MARKING OF THE COVERED WAGON

See Rule - 2.4

PLATE 1

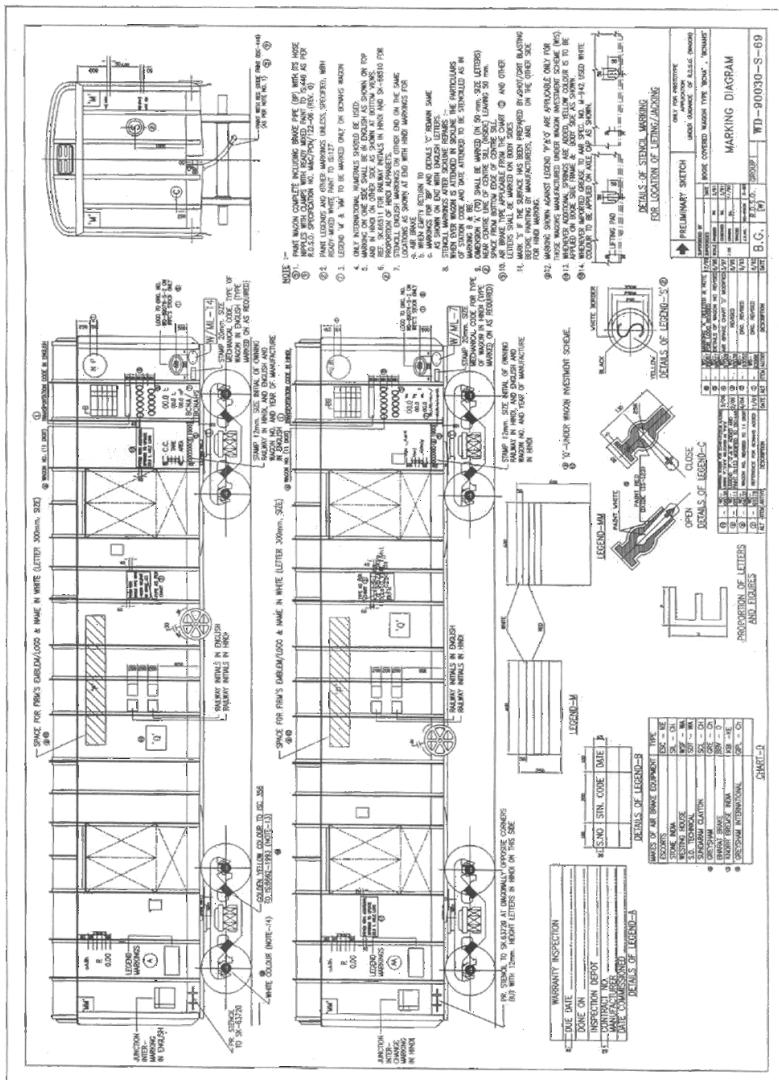


PLATE 2

MARKING OF GOODS BRAKE VAN

See Rule 2.4

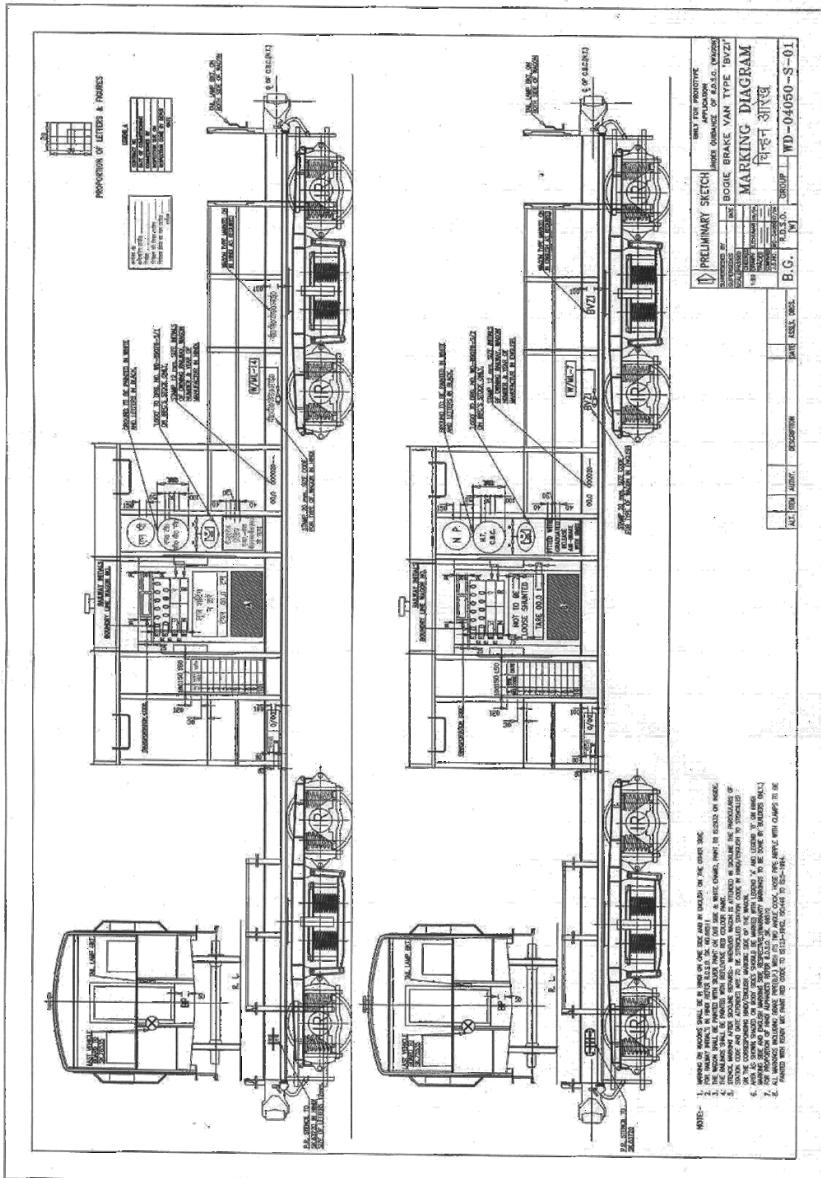
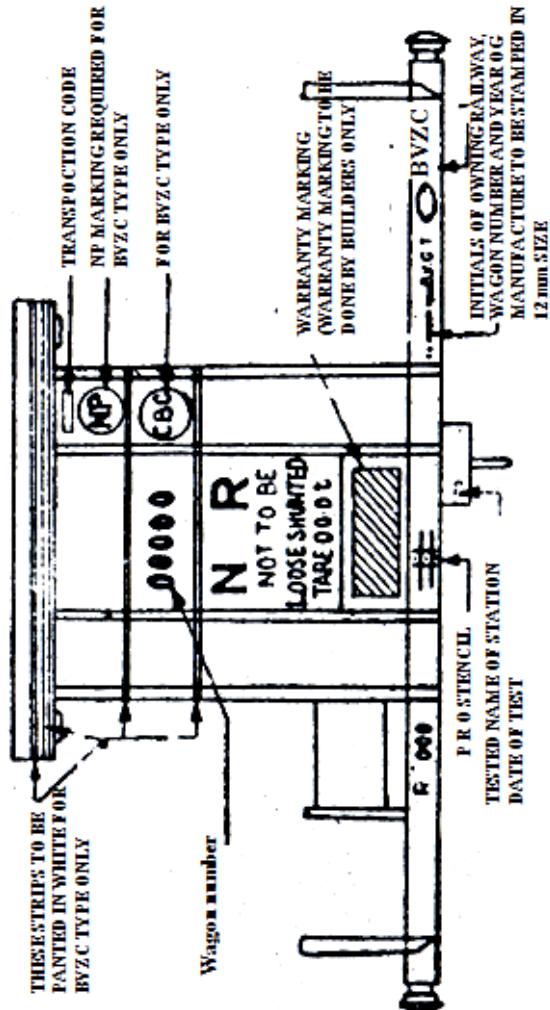


PLATE 3

MARKING OF GOODS BRAKE VAN (BVZC)

See Rule 2.4



NOTE: (1) **Size of letters**:- Railways initials - 200 mm; Wagon number - 175 mm; NP - 150 mm; Return date codes CBC and - 100 mm.; Tare and net loose shunted - 75 mm.; Warranty marking - 40 mm.; Vacuum cylinder test - 25 mm.

(2) All dimensions are in mm.

MARKING OF OPEN WAGON

See Rule 2.4

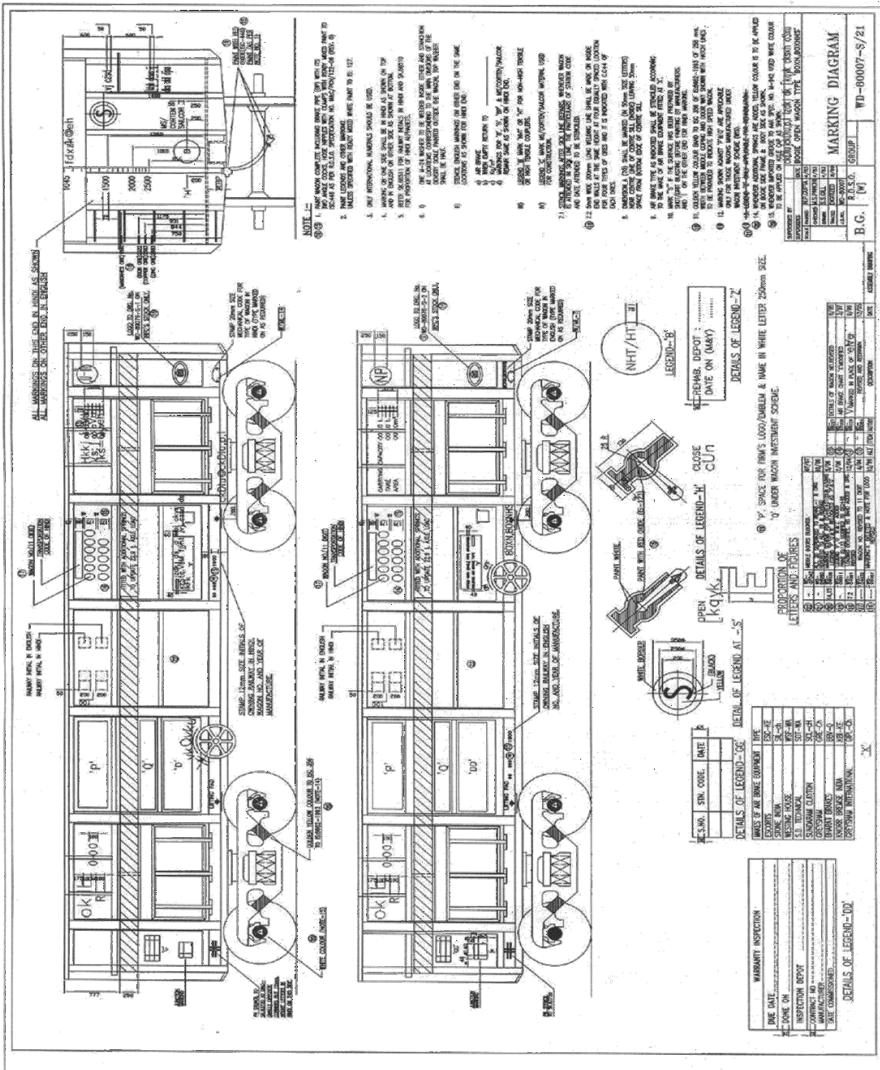


PLATE 5

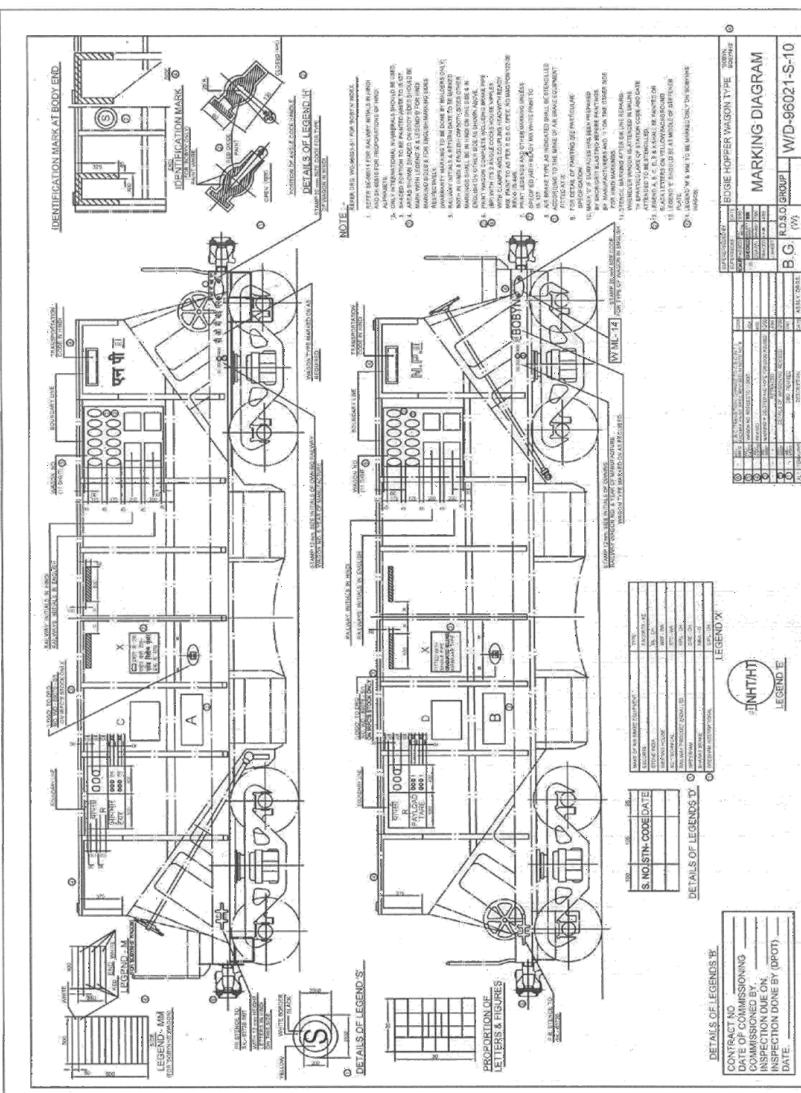
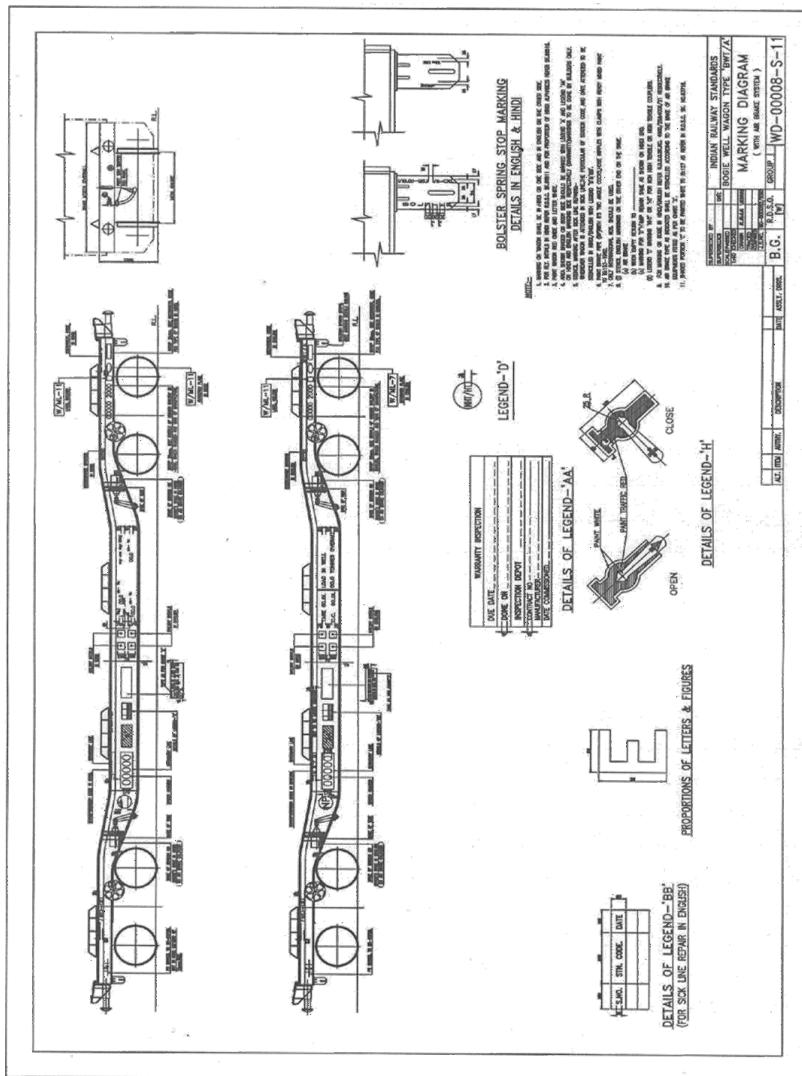


PLATE 6



MARKING OF WELL WAGON

See Rule 2.4

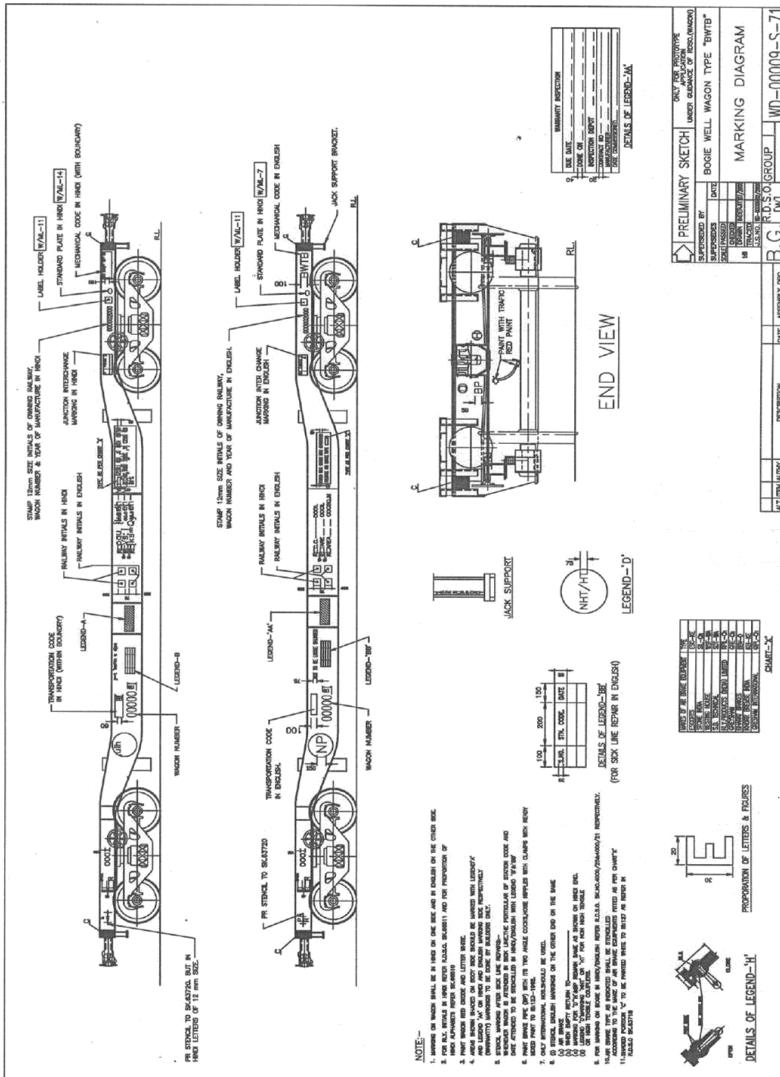


PLATE 8

MARKING OF RAIL WAGON

See Rule 2.4

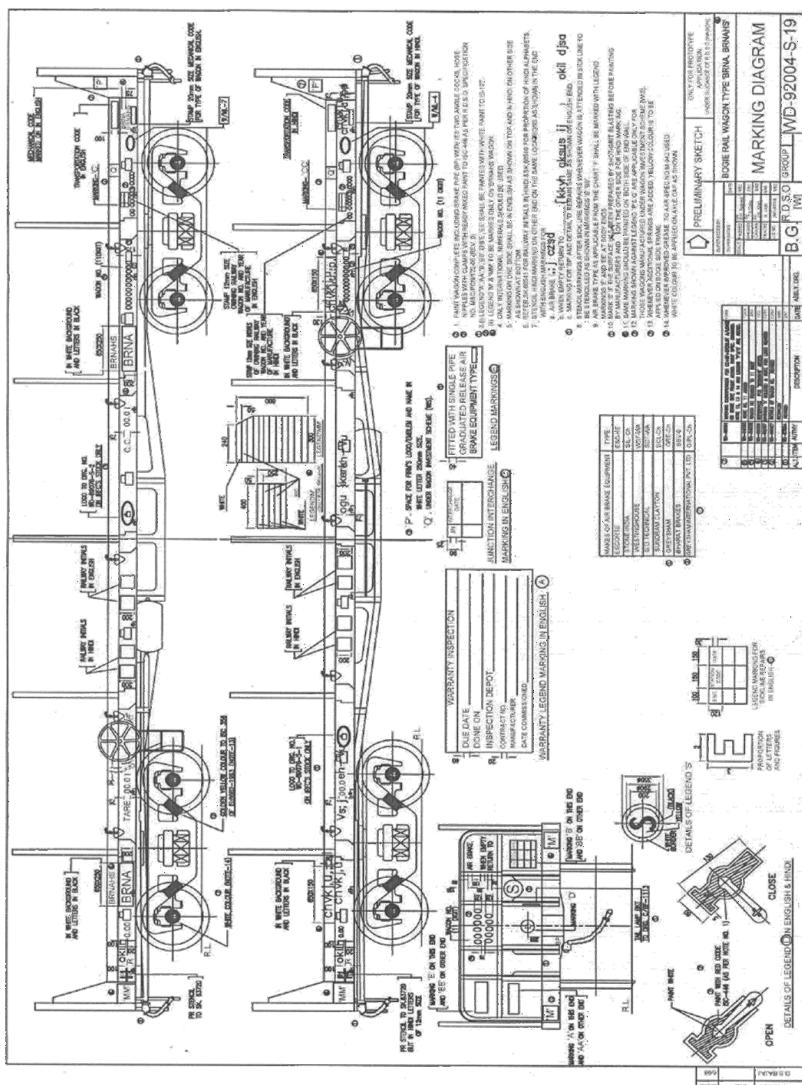


PLATE 9

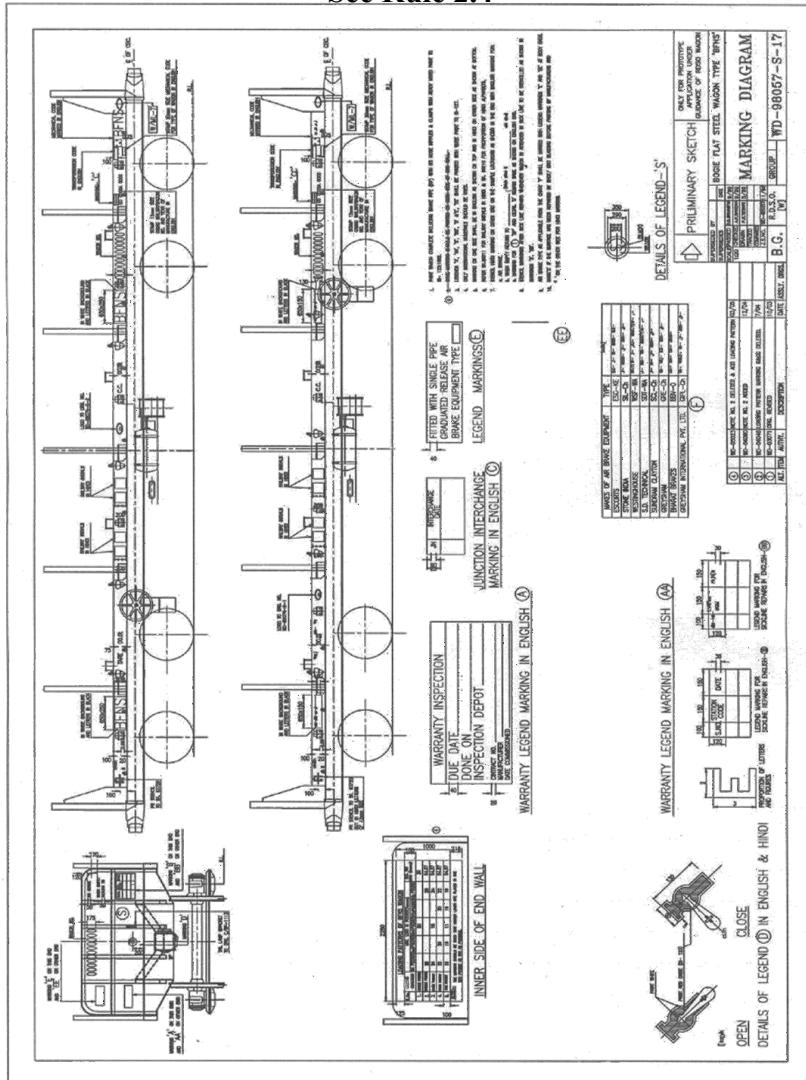
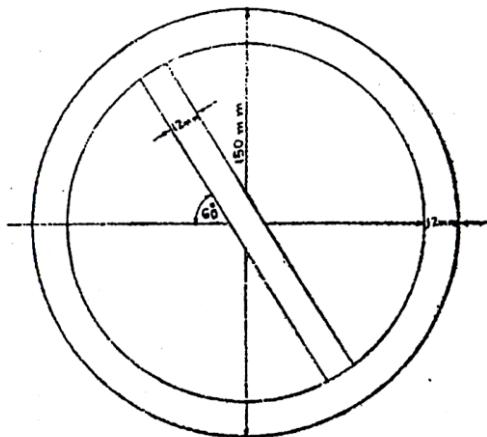


PLATE 10

**MARKING OF STANDARD WAGONS FOR
INTERCHANGE
BETWEEN PAKISTAN AND INDIA
SEE RULE H.1.3**

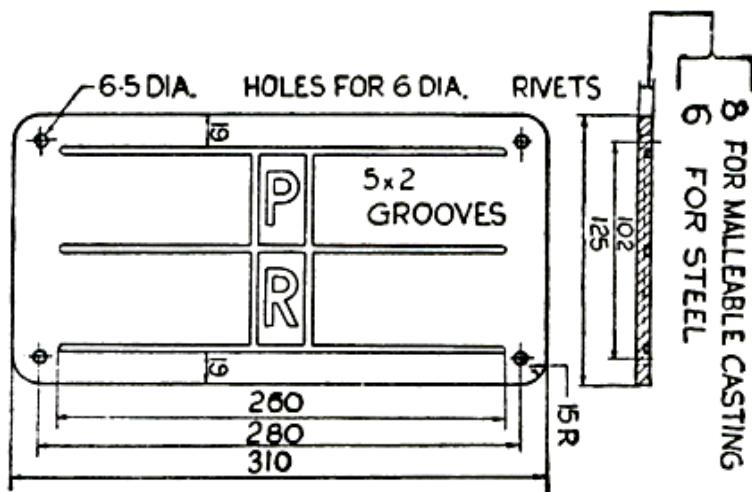


NOTE:

**THE MARK SHOULD BE STENCILED BELOW THE
RETURN DATE WITH WHITE PAINT**

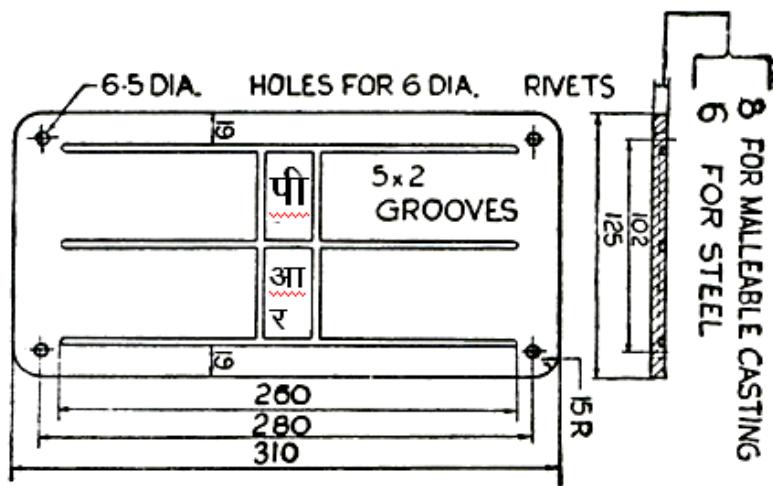
NOTE: To be stencilled immediately below the return date. All dimensions are in millimetres. Inch dimensions are shown in brackets.

PLATE 11
PR PLATE FOR STOCK WITH ROLLER
BEARING AXLE BOXES
SEE RULE 2.4.5



Note.—All dimensions are in millimetres.

PLATE 12
PR PLATE FOR STOCK WITH ROLLER
BEARING AXLE BOXES
SEE RULE 2.4.5

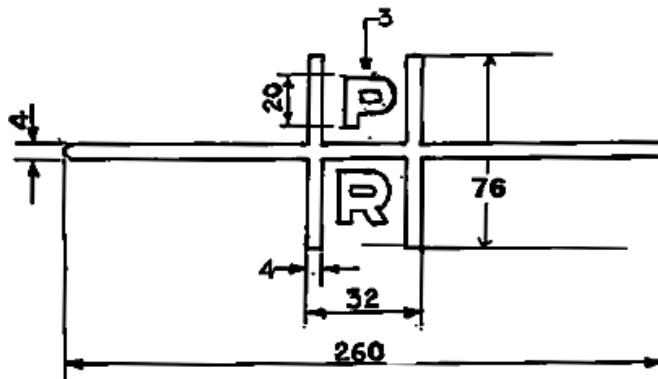


Note.—All dimensions are in millimetres.

PLATE 13

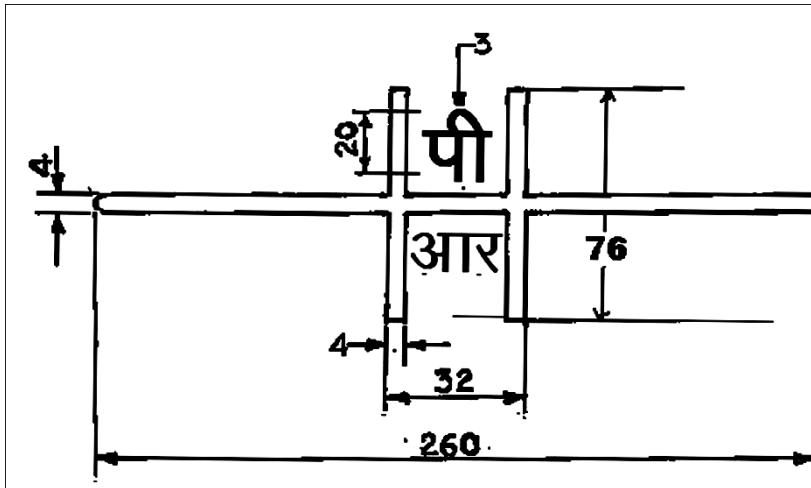
**PR STENCIL FOR STOCK WITH ROLLER
BEARING AXLE BOXES**

SEE RULE 2.4.5



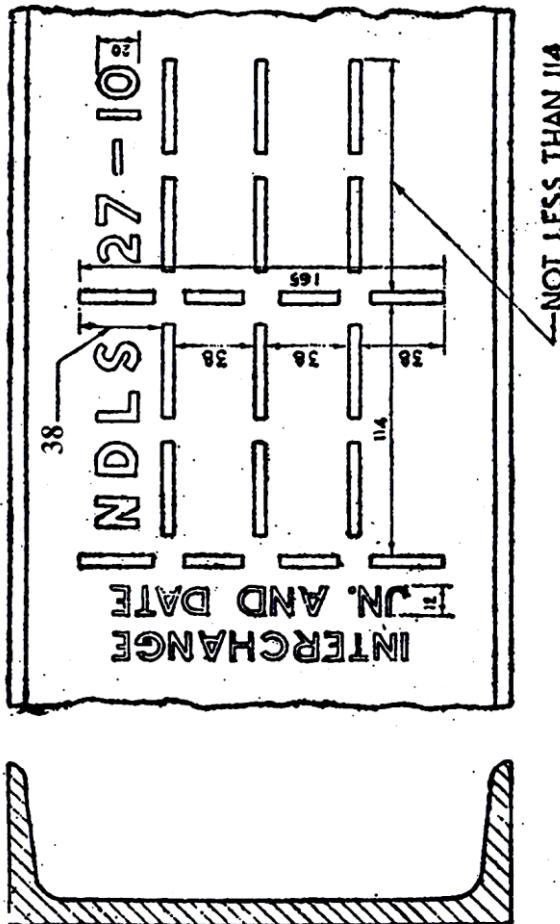
NOTE: (1) To be stenciled with white paint.
(2) All dimensions are in millimeters

PLATE 14
PR STENCIL FOR STOCK FITTED WITH
ROLLER BEARING AXLE BOXES
See Rule 2.4.5



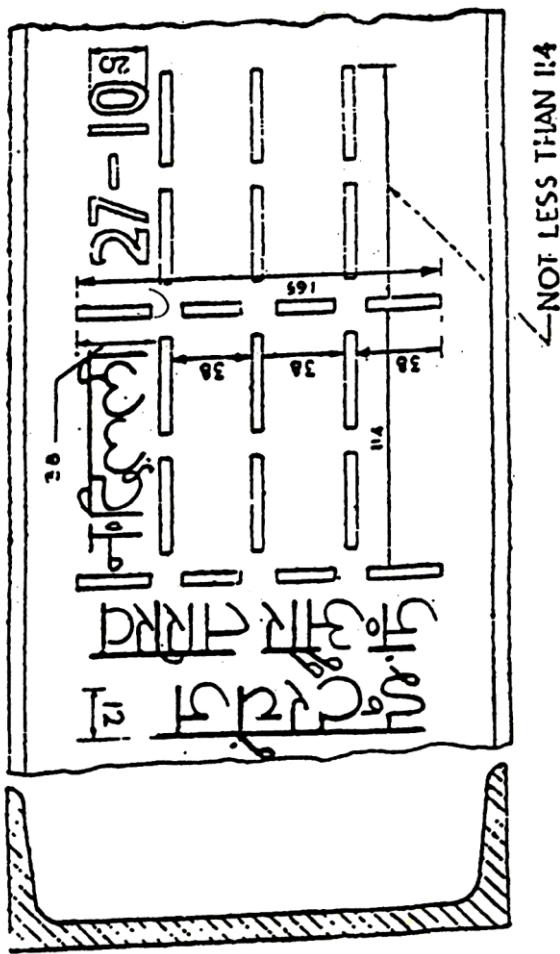
NOTE: (1) to be stencilled with white paint.
(2) All dimensions are in millimetres

PLATE 15
STANDARD PLATE FOR INTERCHANGE
JUCTION AND DATE ON NP WAGONS
See Rule 2.4.6



Note: All dimensions are in millimetres.

PLATE 16
STANDARD PLATE FOR INTERCHANGE
JUCTION
AND DATE ON NP WAGONS (IN HINDI)
See Rule 2.4.6

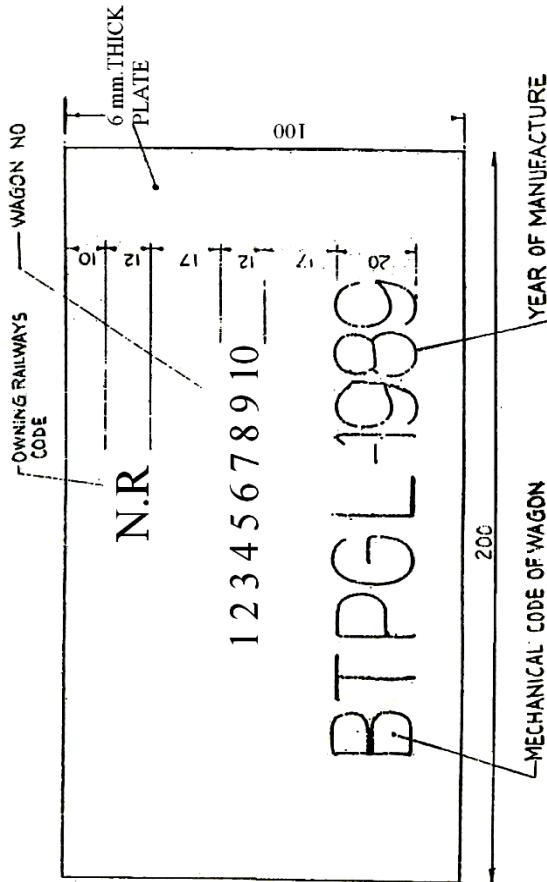


Note: All dimensions are in millimetres

PLATE 17

STEEL PLATE WITH ENGRAVED MARKING
FOR WAGONS

See Rule 2.5.1 & 2.5.2



**Note: 1) Depth of engraving of letter 2 mm.
2) All dimensions are in mm.**

PLATE 18
STANDARD AXLE-BROAD GAUGE WITH CTRB
(22.9 T)
See Rule 2.8.1

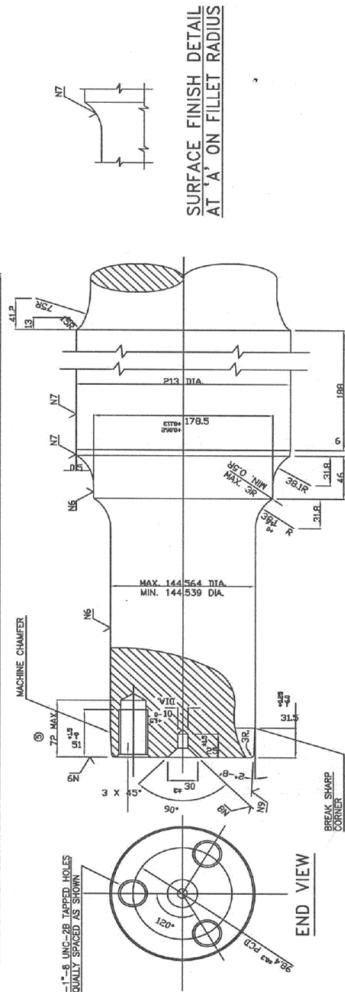
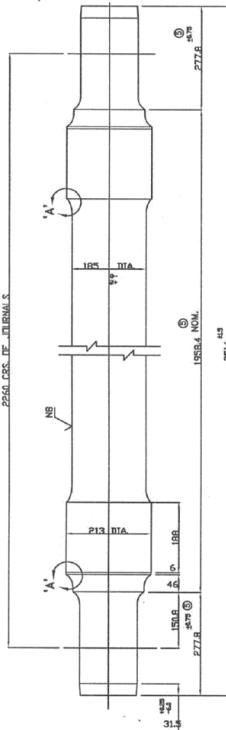


PLATE 19

SOLID WHEEL (FORGED OR ROLLED STEEL)

1000 mm DIAMETER

See Rule 2.8.1

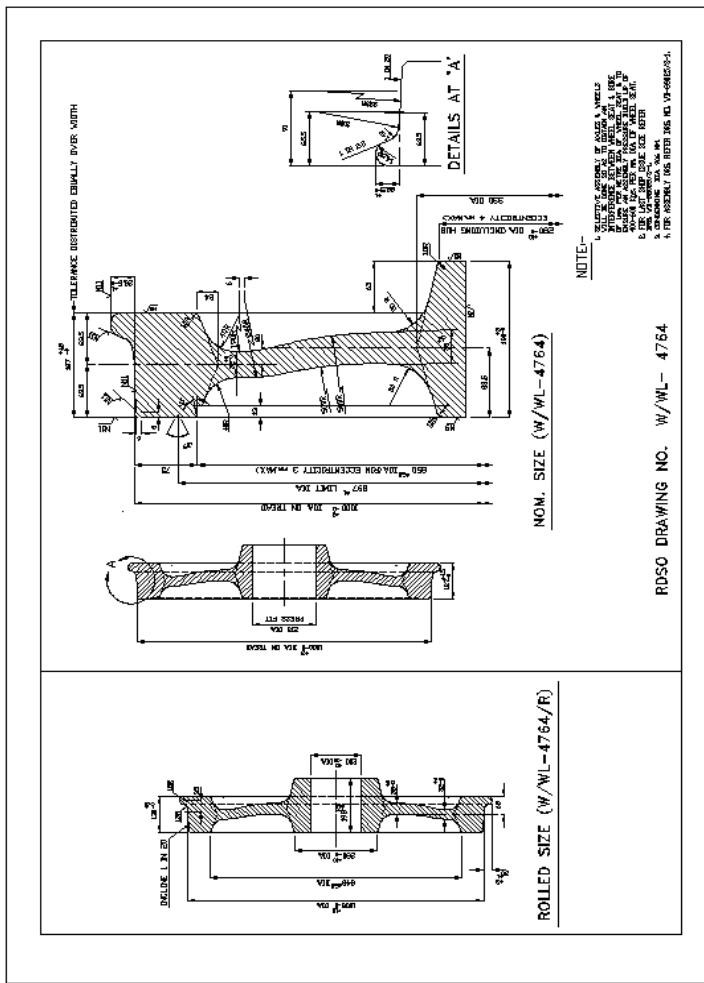
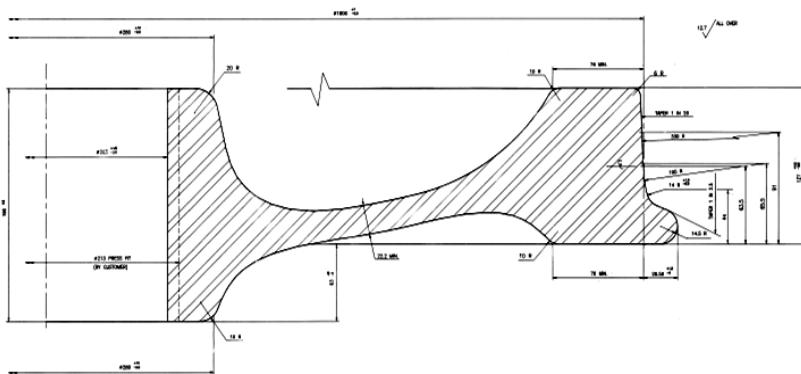


Plate 20



EST. BOURBON WEIGHT: 405. Kgs.

DO NOT SCALE DRAWING.

MRP/RM/RM-1		MANUFACTURED WITH EXY STEEL BODIES	
ASSORTMENT NO.		MATERIAL USED	
INDIAN RAILWAYS		SUPPLEMENTED BY	
#1000 mm CAST WHEEL		SUPPLEMENTED BY	
FOR 2041/2042 V/2043/2044		SUPPLEMENTED BY	
TBS 1000 mm CAST WHEEL		SUPPLEMENTED BY	
WHEEL AND AXLE PLANT		SUPPLEMENTED BY	
MANUFACTURED		SUPPLEMENTED BY	
BY WAPSIKIN-153		SUPPLEMENTED BY	
MANUFACTURED		SUPPLEMENTED BY	
BY WAPSIKIN-153		SUPPLEMENTED BY	

Plate 21
840 mm DIAMETER CAST WHEEL
(See rule 2.8.1)

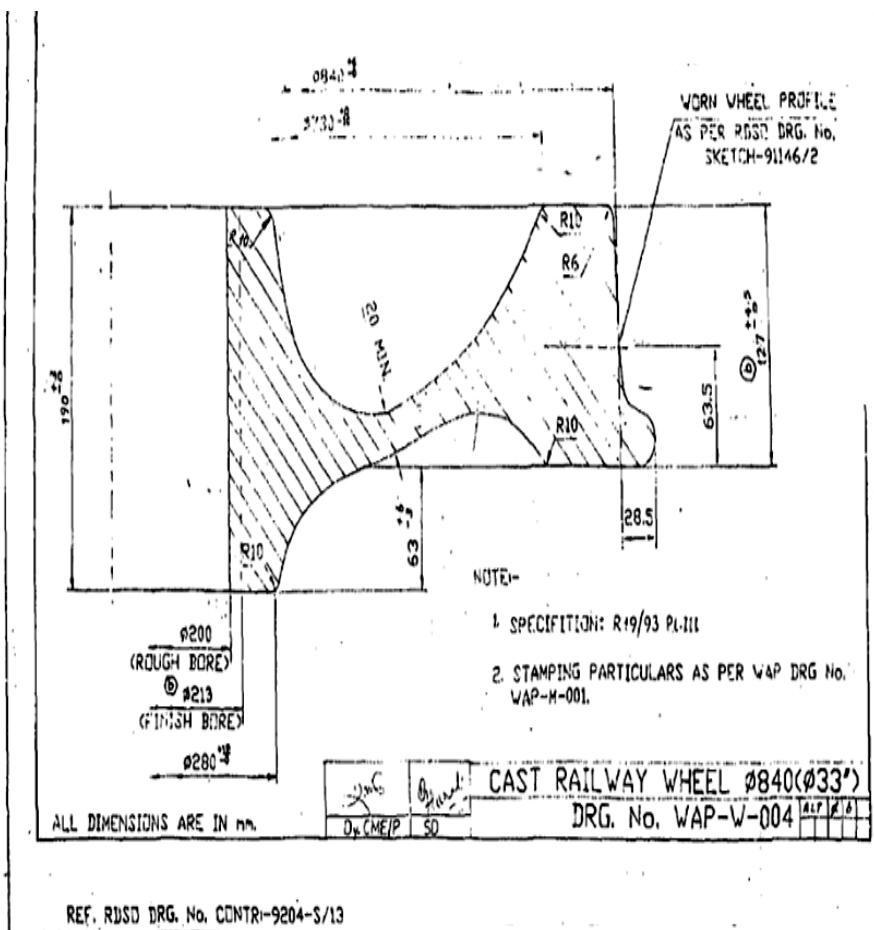


PLATE: 22

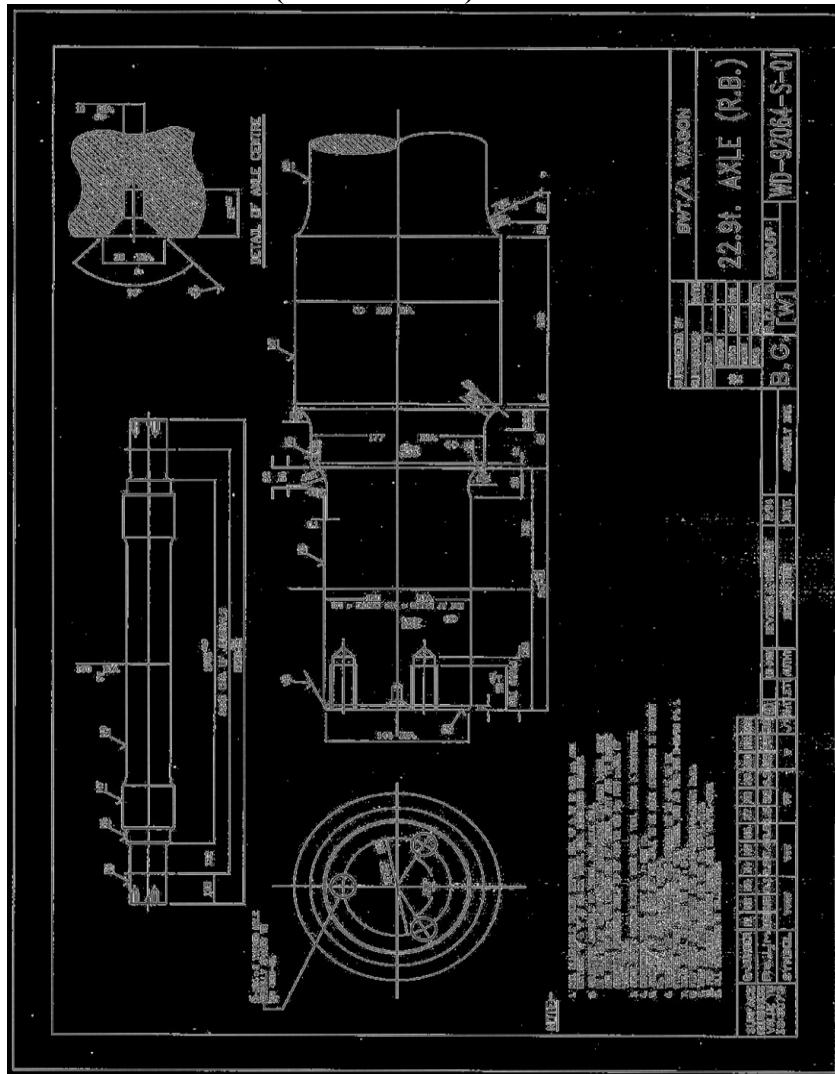


PLATE: 23

**WHEEL AND AXLE ASSEMBLY FOR CASNUB
TYPE BOGIES**
(See rule 2.8.1)

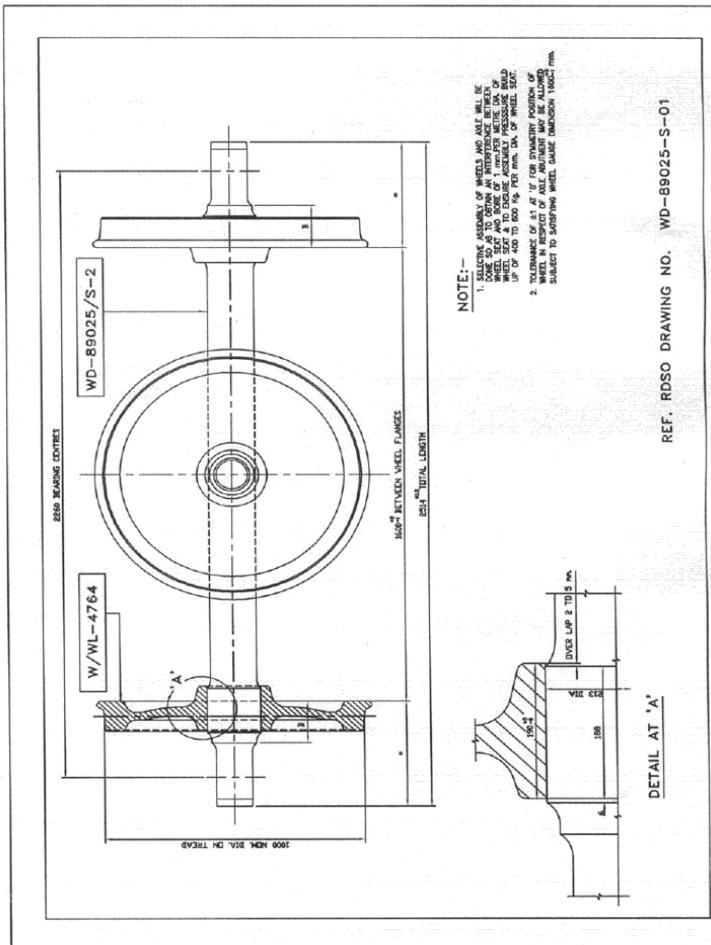


PLATE: 24

WHEEL AND AXLE ASSEMBLY FOR CASNUB
TYPE BOGIES
(See rule 2.8.1)

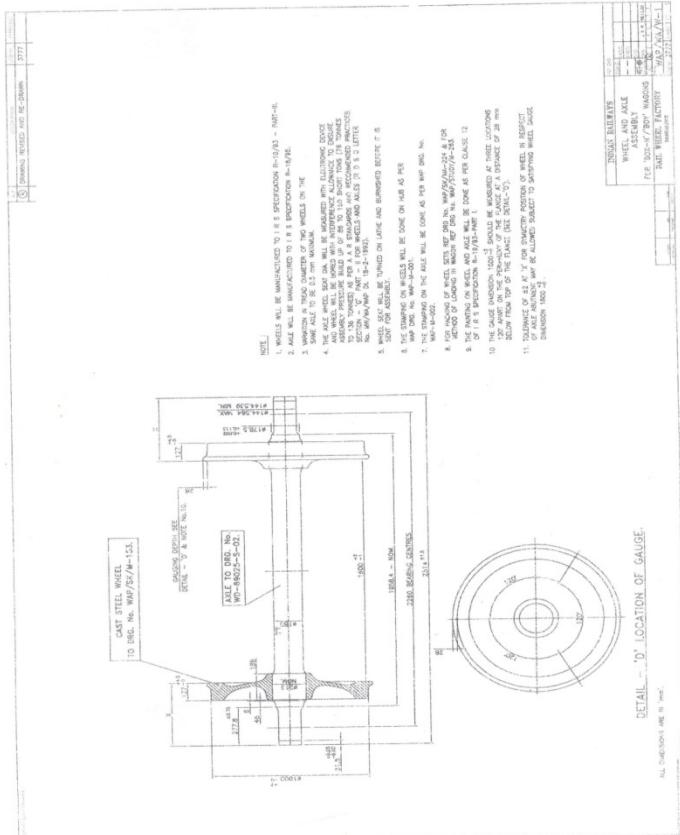


PLATE: 25

**WHEEL & AXLE ASSEMBLY FOR CONTAINER
FLAT WAGONS**
(See rule 2.8.1)

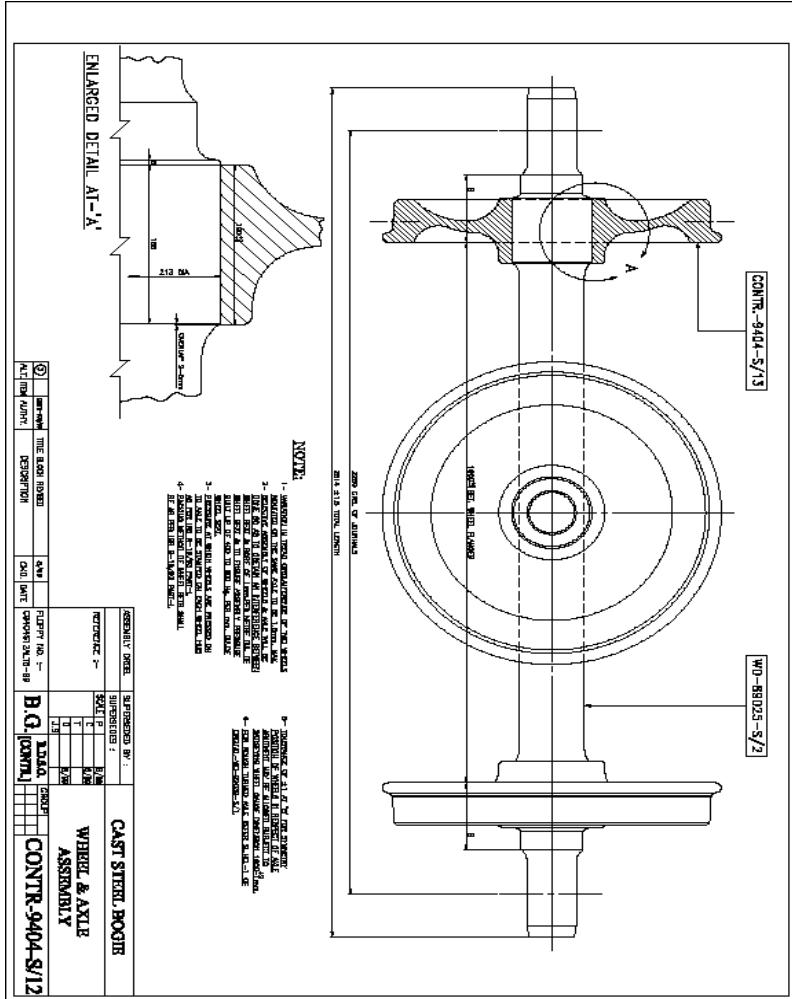


PLATE: 26
Ø840 mm WHEEL SET FOR CONTAINER FLAT
WAGONS
See rule 2.8.1

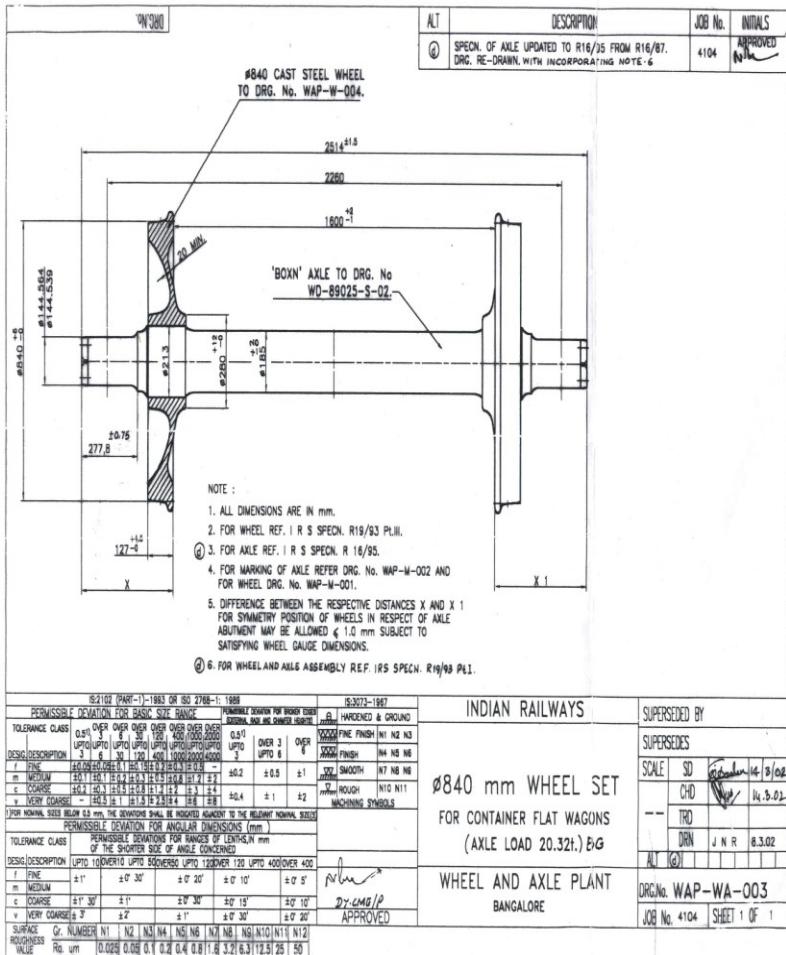


PLATE 27

WHEEL SOLID 915 mm diameter for 22.9 Ton AXLE

See Rule 2.8.1

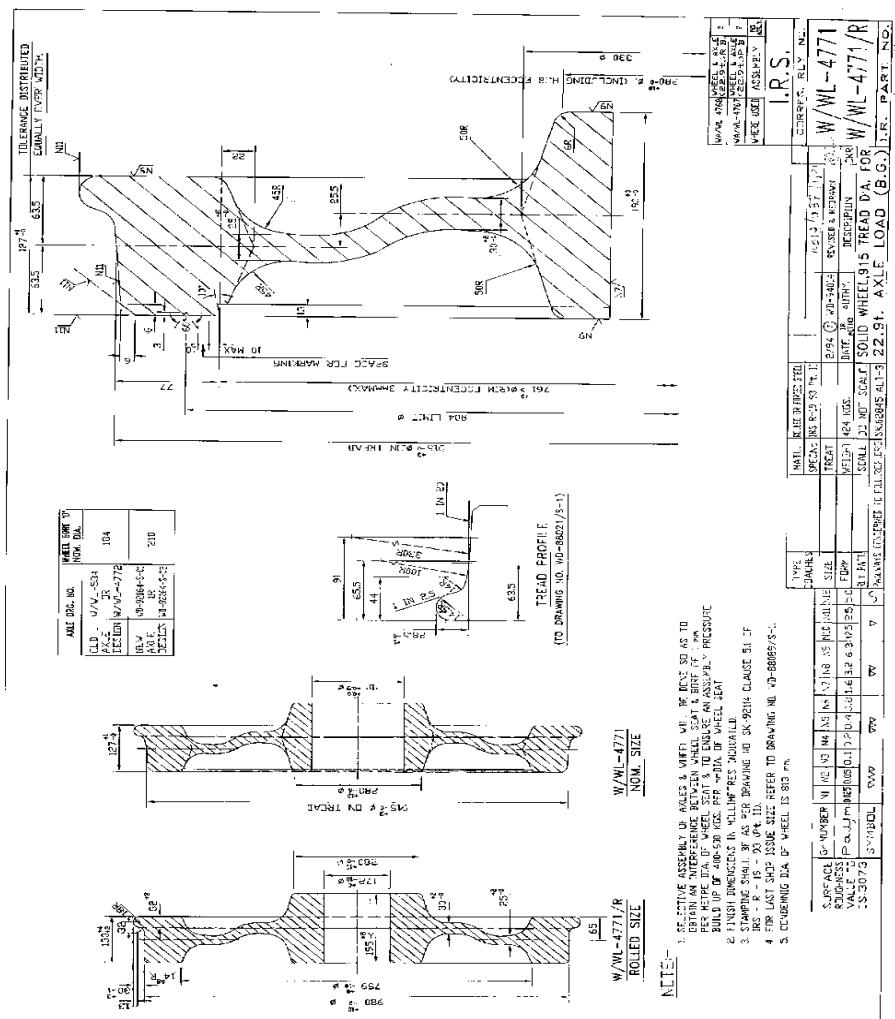


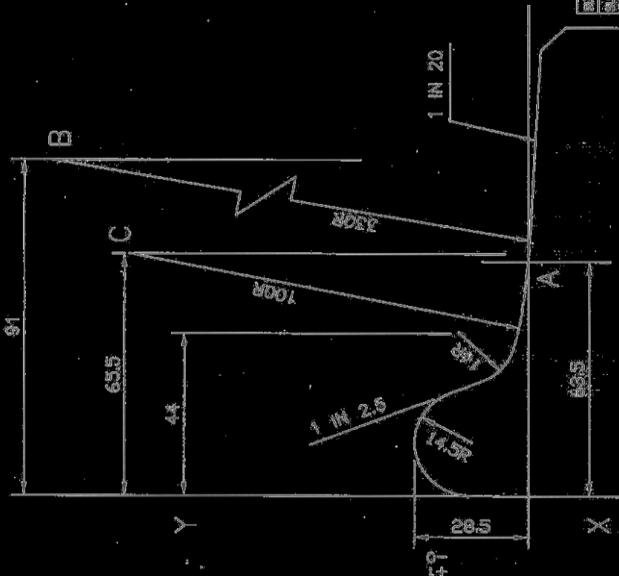
PLATE 28

WORN WHEEL PROFILE -BG

(See Rule 2.8.1 & 2.8.14.4)

PROCEDURE OF DRAWING:-

1. DRAW A VERTICAL LINE X-Y
2. DRAW SEMI-CIRCLE OF 14.5R TANGENTIAL TO LINE X-Y.
3. DRAW LINE 1:2.5 TANGENTIALLY TO 14.5R SEMI-CIRCLE.
4. DRAW A HORIZONTAL LINE AT 28.5mm FROM THE TOP OF THE FLANGE AND LOCATE PT. 'A' AT 83.5mm FROM THE LINE X-Y.
5. FROM PT. 'A' LOCATE CENTRE 'B' OF ARC OF 330R ON A VERTICAL LINE AT 91mm FROM X-Y.
6. DRAW ARC OF 330R FROM CENTRE 'B'.
7. LOCATE CENTRE 'C' ON VERTICAL LINE AT A HORIZONTAL DISTANCE OF 63.5mm FROM THE LINE X-Y SUCH THAT BC = (330 - 100) = 230mm.
8. DRAW ARC OF 100R WITH CENTRE AS 'C'.
9. DRAW ARC OF RADIUS 14mm TANGENTIALLY TO 100R ARC AND LINE 1:2.5.
10. DRAW LINE 1:2.0 TANGENTIALLY TO 330R ARC.

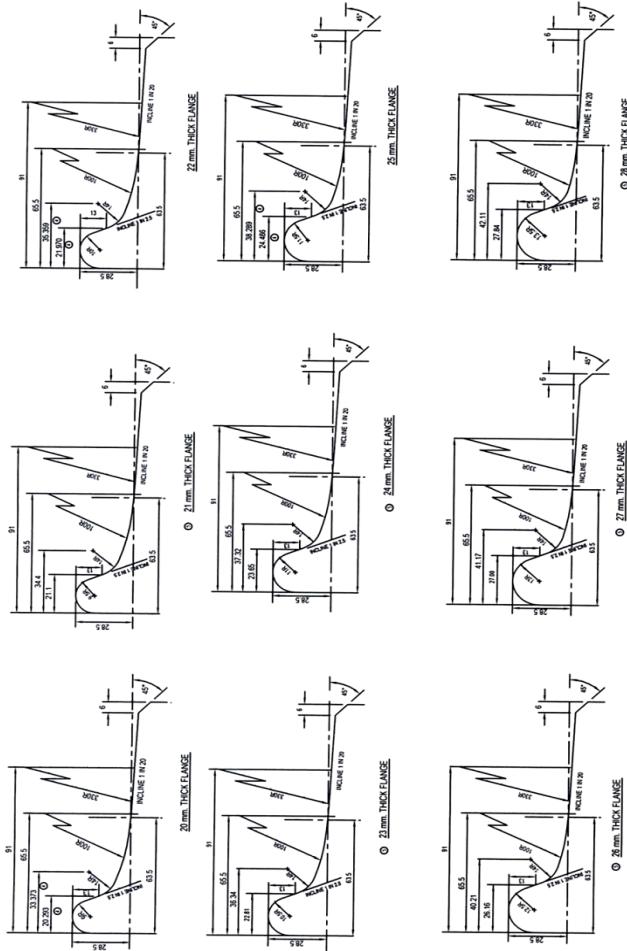


WORN WHEEL PROFILE		(FOR B.G. WAGONS)	
DESIGNER	DATE	REVISER	DATE
Supplementary Notes		Supplementary Notes	
1. PROBLEMS		2. PROBLEMS	
2. MATERIAL		3. MATERIAL	
3. DIMENSIONS		4. DIMENSIONS	
4. TOLERANCES		5. TOLERANCES	
5. FINISHES		6. FINISHES	
6. OTHERS		7. OTHERS	
7. DRAWING NO.		8. DRAWING NO.	
8. DATE		9. DATE	
9. APPROVED		10. APPROVED	
11. DRAWN		12. DRAWN	
13. CHECKED		14. CHECKED	
15. SUPERVISED		16. SUPERVISED	

B.G. W.D. - 88021

WD88021.dwg

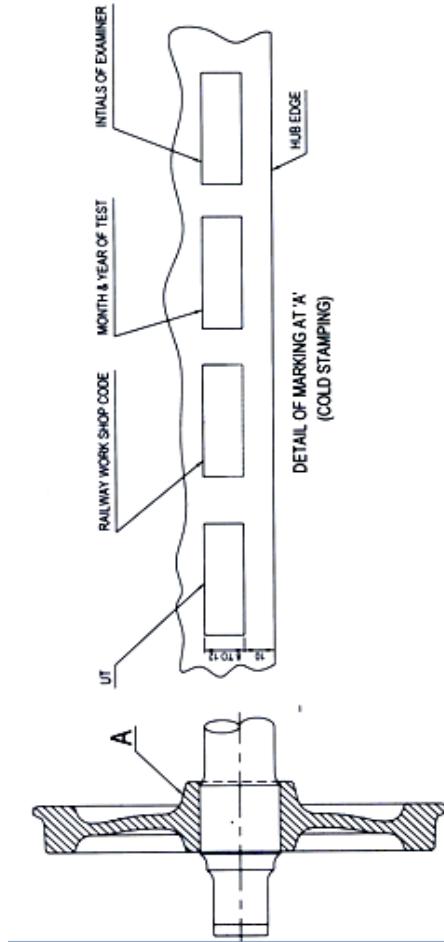
PLATE 29
INTERMEDIATE PROFILE OF WHEEL TREAD
See Rule 2.8.1



SUPERSEDED BY SUPERFERS		FOR WORN WHEEL PROFILE	
		DATE (TO DRAWINGS NO. WD-8807)	
SCALE PASSED: <u>SA</u>		CHECKED: <u>SA</u>	
DRAWN: <u>R. J. G. 8804</u>		TRACED: <u></u>	
REV'D: <u>1996</u>		ASSEMBLED: <u>Y. 900</u>	
REV'D & REGRAN: <u>895</u>		DESCRIPTION: <u></u>	
ITEM: <u>AL-1</u>		DATE: <u></u>	
AUTH: <u></u>		R. D. GROUP: <u>WD-880700 (S-2)</u>	

PLATE 30

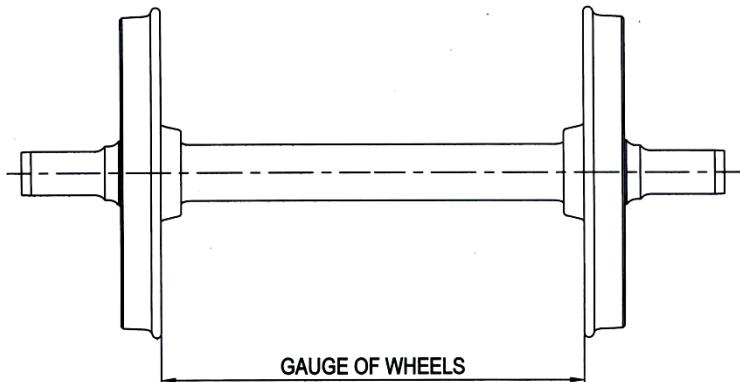
**MARKING FOR ULTRASONIC TESTING OF
AXLES**
(TO BE DONE ON WHEEL HUB)
See Rule 2.8.4 (c)



NOTE:

1. 'UT' INDICATES ULTRASONIC TESTING OF AXLES
2. THE MARKING SHALL BE STAMPED COLD ON THE INNER HUB FILLET AS SHOWN AT 'A' AFTER THE SURFACE IS GROUND PROPERLY
3. THE EXAMINING WORKSHOPS SHALL MAINTAIN ALL THE PARTICULARS OF AXLES TESTED viz
 IR. PART NUMBER, CONTRACT NUMBER, CAST AND CONSECUTIVE NUMBERS,
 MANUFACTURERS INITIALS AND YEAR OF MANUFACTURE IN REGISTER PROPERLY
 MAINTAINED BY THEM.

WHEEL TIGHT OR SLACK TO GAUGE
See Rule 2.8.5 & 4.19.1



Note: - (1) Vehicles or wagons may be refused if the gauge of any pair of wheels is –

On Broad Gauge: Less than 1599 or more than 1602.

(2) All dimensions are in millimetres.

PLATE 32
STAMPING SHOP INITIALS ON AXLES
See Rule 2.8.6



DATE AND INITIALS OF WORKSHOP
WHERE THE REAXLING IS DONE.



Note.—All markings to be done in 63 dia. recess on both journal faces.

PLATE 33

STAMPING SHOP INITIALS ON REDISCED WHEELS

See Rule 2.8.6.1

NOTE:

1. MARKING SHOULD BE DONE ON INDIVIDUAL WHEEL DISC.
2. REFER DRG.NO WD-81089 -S-1 FOR MARKING OF ULTASONIC TESTING (UT).

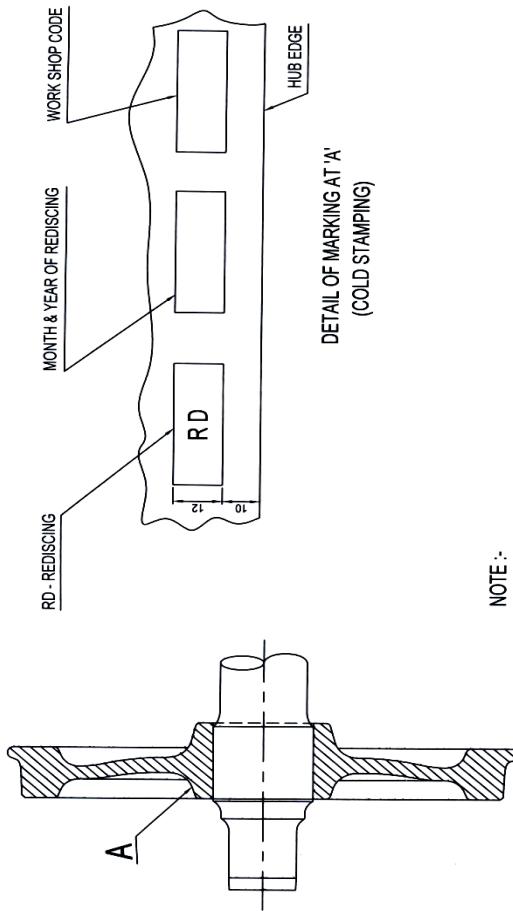


PLATE 34
SPRING SEAT (W/SN - 1616) (For 255 mm X 130
mm AXLE BOX WA/AB - 570)
See Rule 2.13.1 (i)

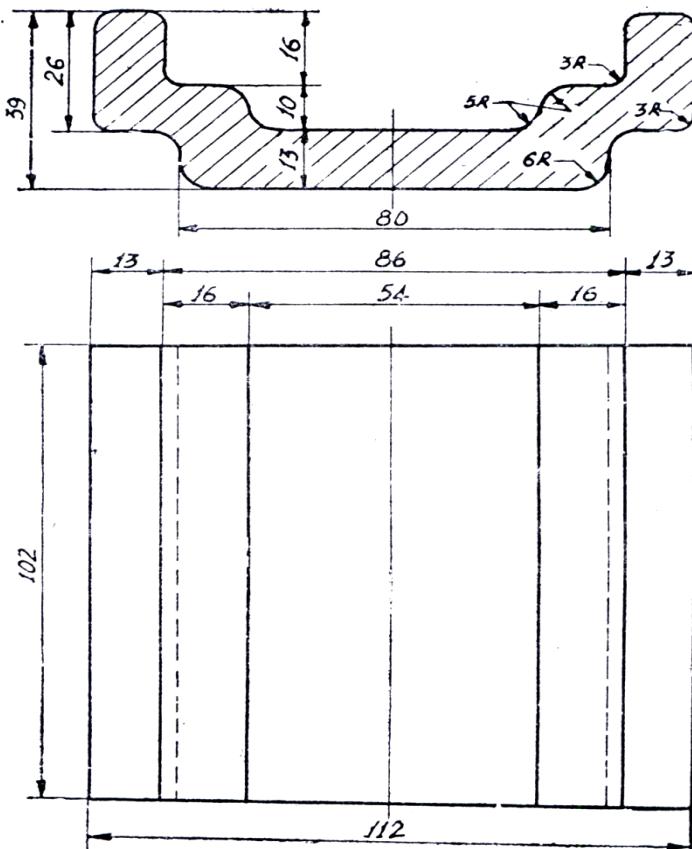


PLATE 35
MARKING OF CYLINDRICAL R.B. AXLE BOXES
AFTER POH

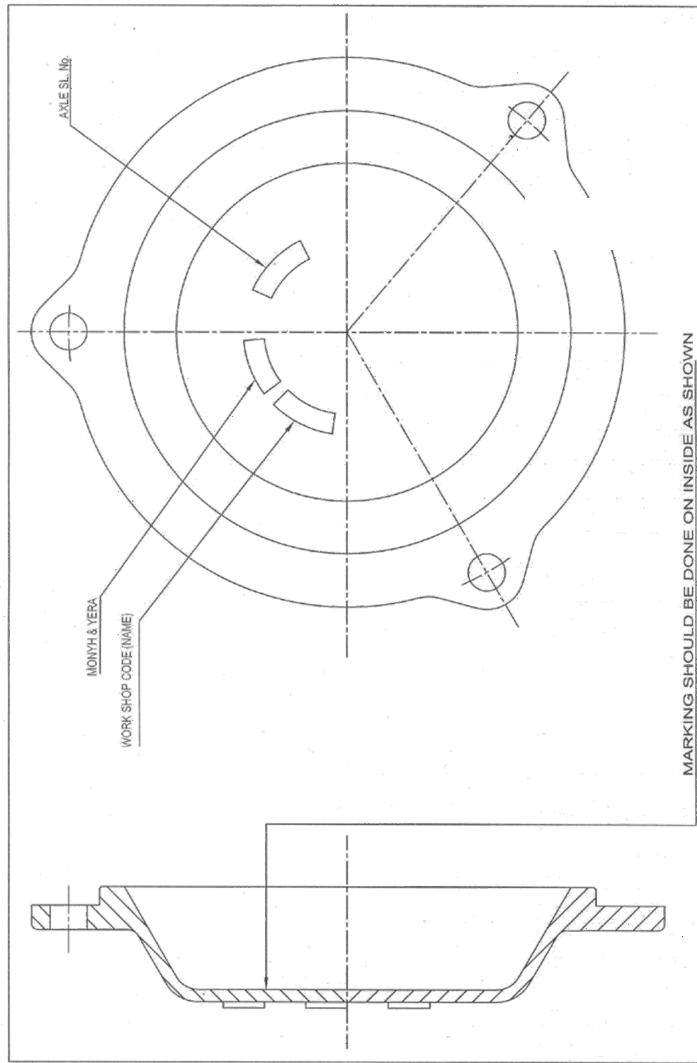
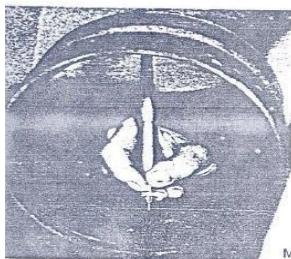
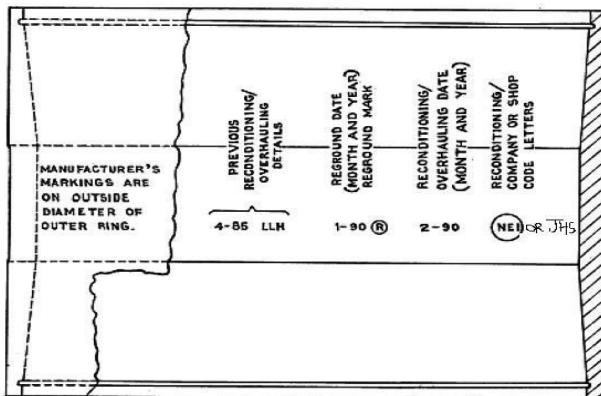


Plate 36

Bearing/CTRБ marking
See rule 2.9.1.2



OUTER RING MARKING

NOTE: Reconditioning and remanufacturing markings (encircled R for regrinding) must be on the inner diameter of the outer ring on the straight portion in the center between the raceways. Caution must be used to avoid nicking or damaging the raceway surfaces. Mark with a suitable scribing tool. Electric etching or steel stamping is not permitted.

Method of Permanently Marking Reconditioned
Roller Bearing Parts
(Mandatory).

Note: bearing that have been serviced during POH or otherwise because of redisising, hot box, accident etc have to be permanantly and legibly marked on the Cup/Outer ring inner diameter on the straight portion in the centre between the raceways as shown in the above Figure.

Plate 37

MARKING OF OVERHAULING PARTICULARS ON BACKING RING OF CTRB (See rule 2.9.1.2)

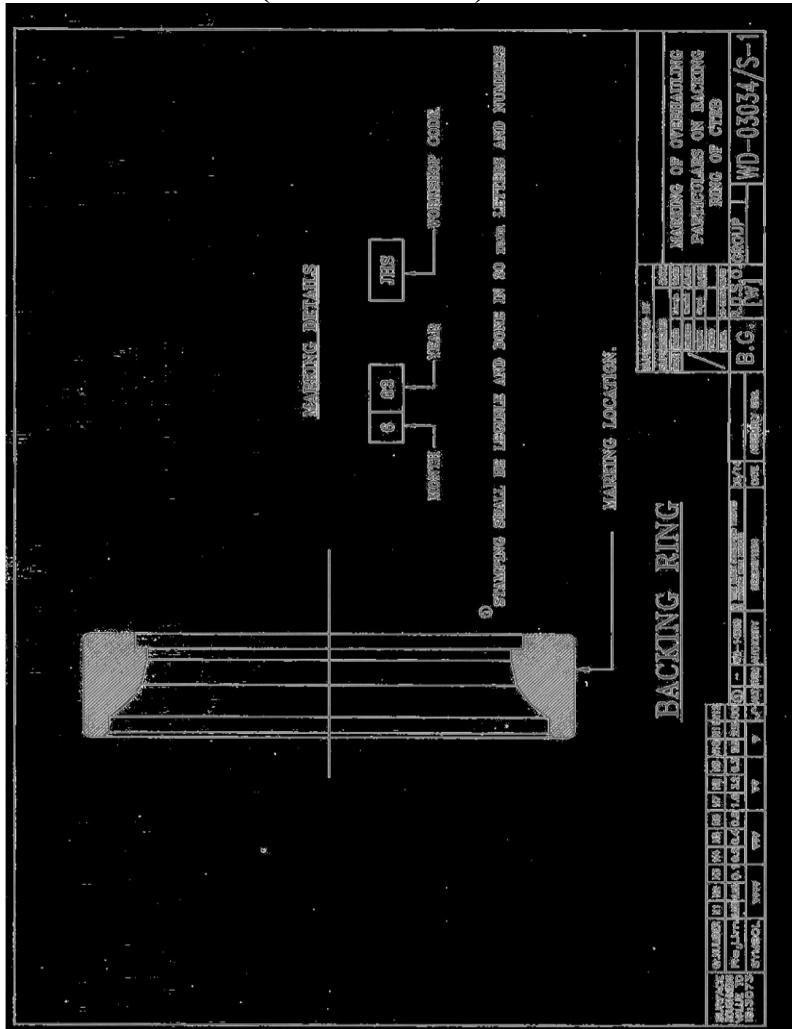
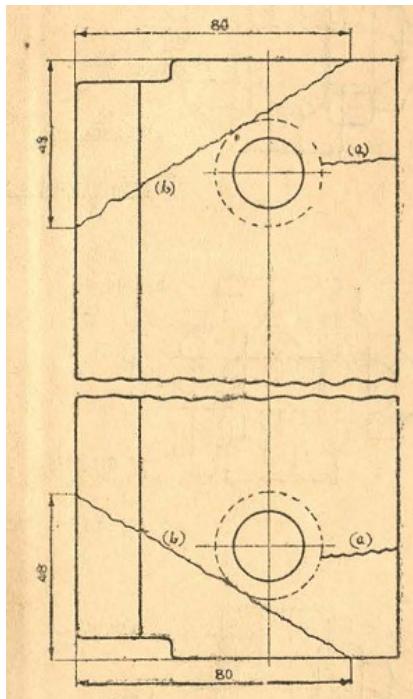


Plate No 38

**PLATE SHOWING EXTENT TO WHICH CRACKED/
BROKEN HORN CHEEK MAY BE ACCEPTED IN
INTERCHANGE
(See rule 4.11.2)**



(a) Any crack not extending up to any of the rivet hole is permissible.

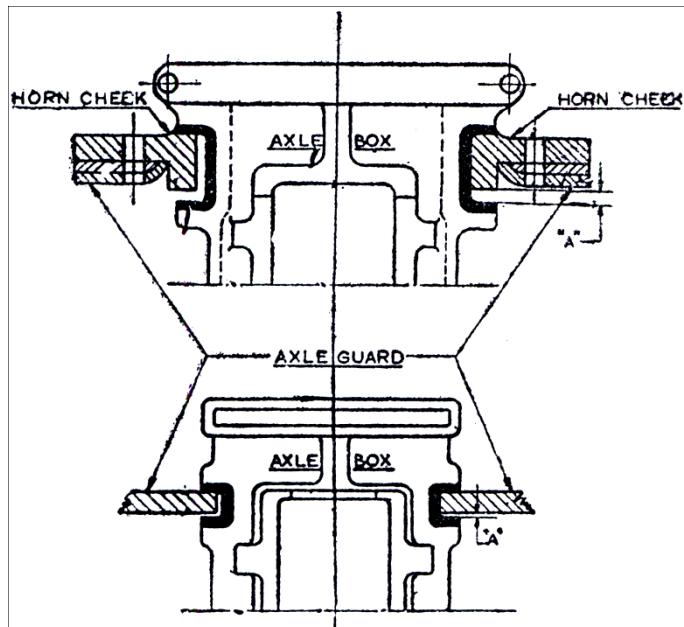
(b) Maximum permissible breakage/ cracked portion of the cheeks, crack/ breakage not to pass through rivet holes.

Note: All dimensions are in millimetres.

PLATE 39

**MAXIMUM PERMISSIBLE CLEARANCE
ALLOWED
BETWEEN AXLE BOX & AXLE GUARD**

See Rule 2.10.1

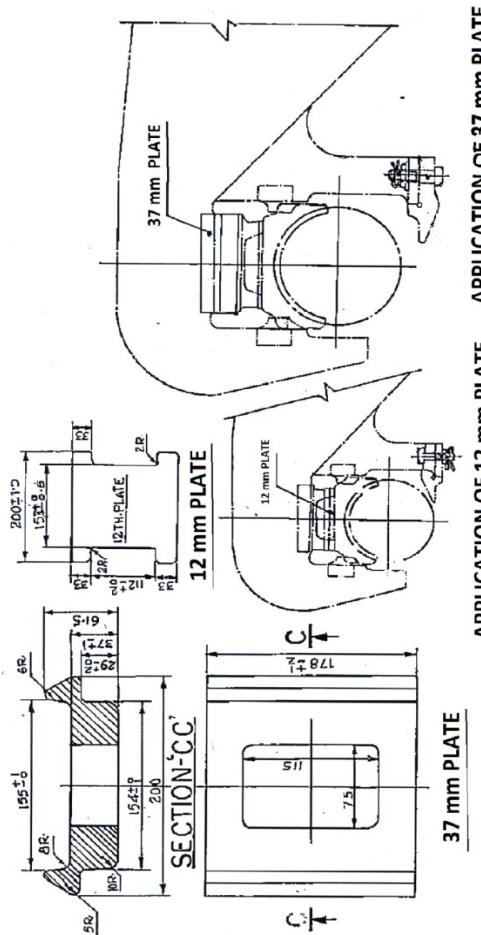


‘A’ – INDICATES LATERAL CLEARANCE

**‘B’ - INDICATES LONGITUDINAL
CLEARANCE**

Plate 40

**PACKING PLATE FOR CBC HEIGHT
ADJUSTMENT FOR CASNUB BOGIE
(See rule 2.13.1)**



(REF. DRAWING No.- WD-91074/S1)

PLATE 41

DIAGRAMS OF SECURITY FASTENINGS FOR BOLTS

See Rule 2.15.1

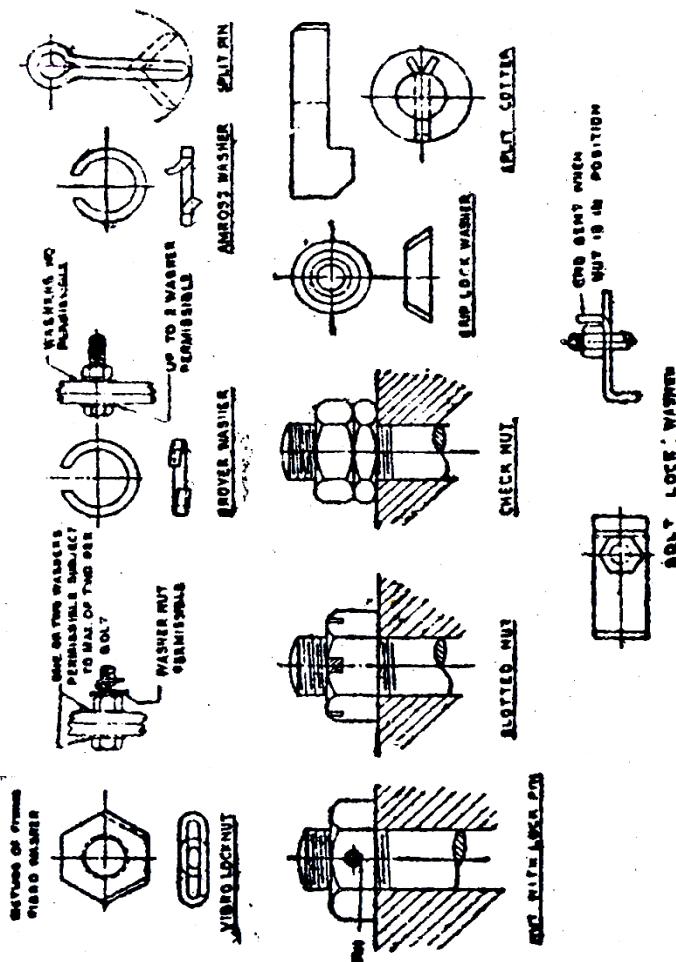
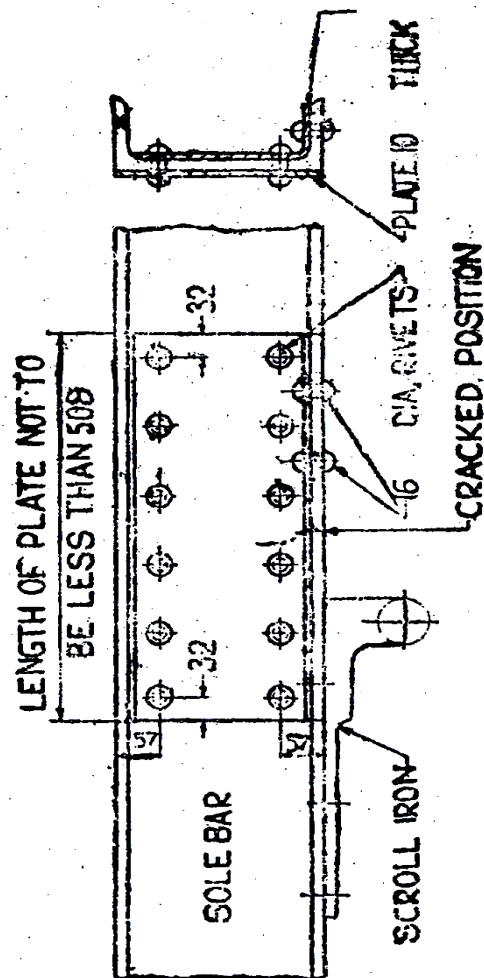


PLATE 42

PATCHING OF SOLE BAR

See Rule 2.20.2.4.1



Note: (1) All dimensions are in millimetres.
(2) Pitch of rivets should not be more than 89

PLATE 43

ANTI-PILFERAGE DEVICE FOR BRAKE BLOCK
AND BRAKE BEAM HANGER WITH BOGIE
COLUMN OF B.G BOGIE WAGONS

See Rule 2.22.1. (a. i)

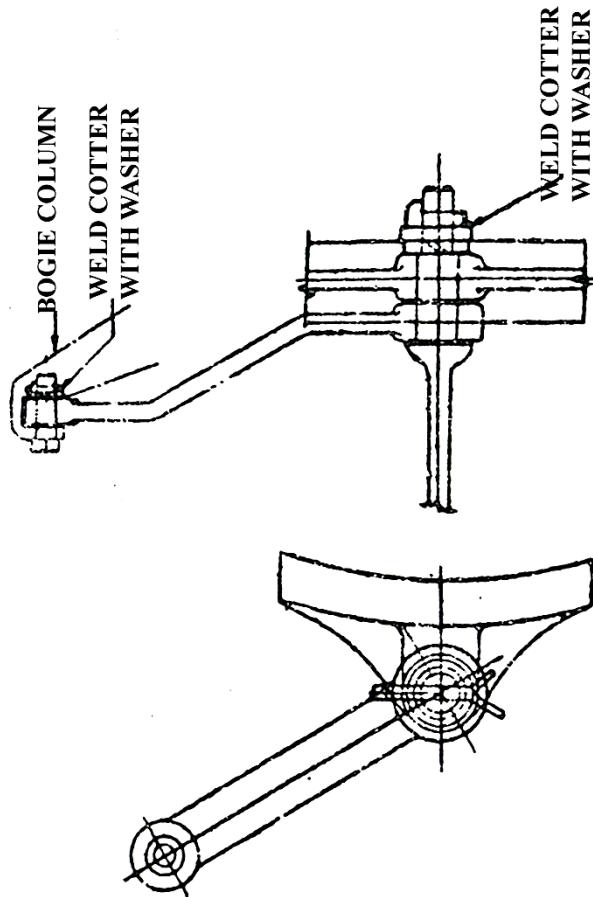


PLATE 44

**ANTI-PILFERAGE DEVICE FOR PUSH ROD
SUPPORT LINK, BRAKE CONNECTING LINK
AND SWING LINK WITH BRAKE EQUALISING
LEVER OF B.G BOGIE WAGONS**

See Rule 2.22.1 (a. ii)

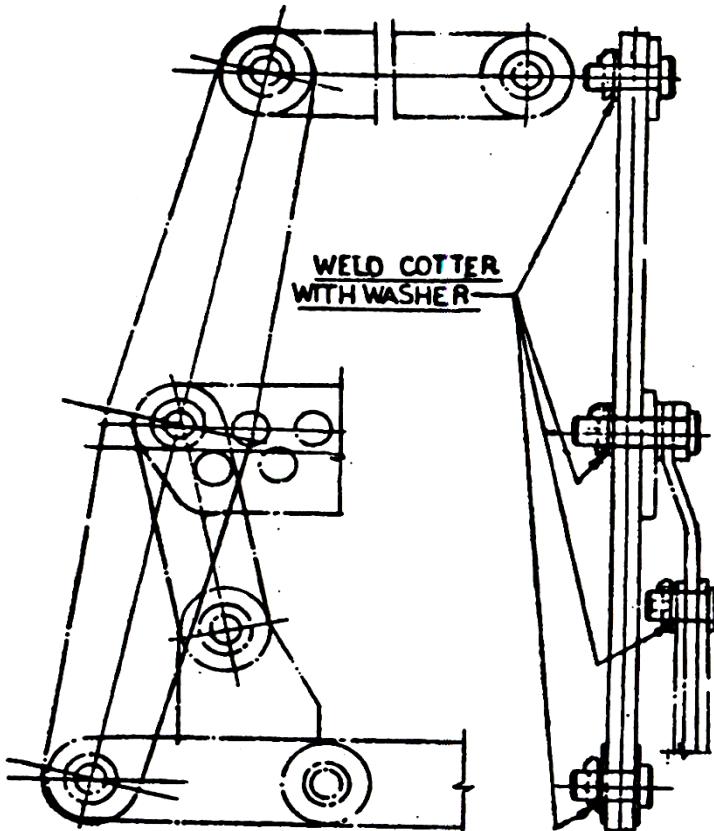


PLATE 45

ANTI-PILFERAGE DEVICE FOR HAND BRAKE
LEVER PULL ROD, SHORT CONNECTING
LINK, WITH BRAKE SHAFT ARM ARRG'T. OF
B.G. BOGIE WAGONS EXCEPET 'BWL' AND
'BWX'

See Rule 2.22.1 (a. iii)

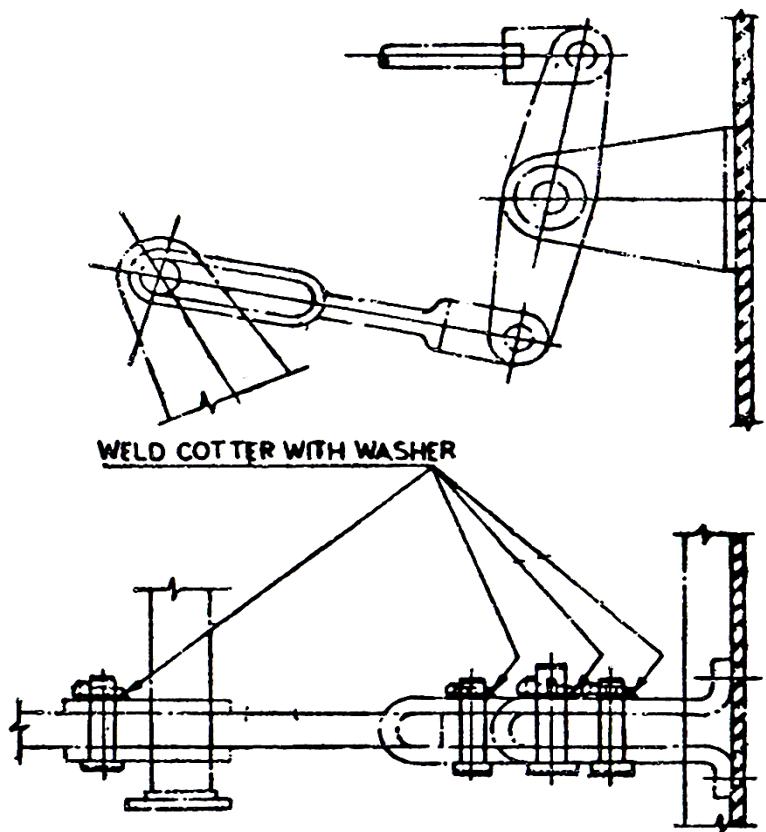


PLATE 46
ANTI-PILFERAGE DEVICE FOR BRAKE AXLE
PULL ROD CONNECTING LINK PUSH ROD
SUPPORT LINK WITH BRAKE EQUALISING
LEVER OF B.G. BOGIE WAGONS
See Rule 2.22.1 (a iv)

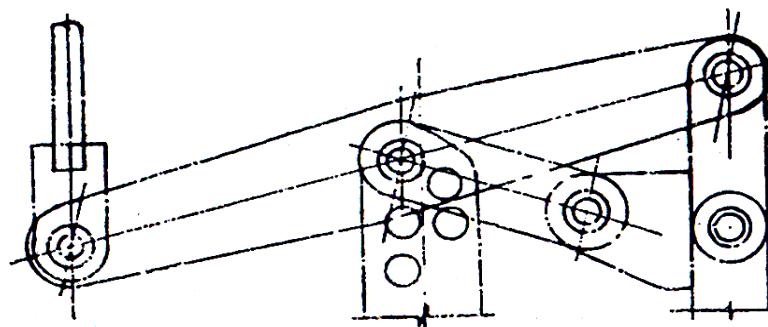
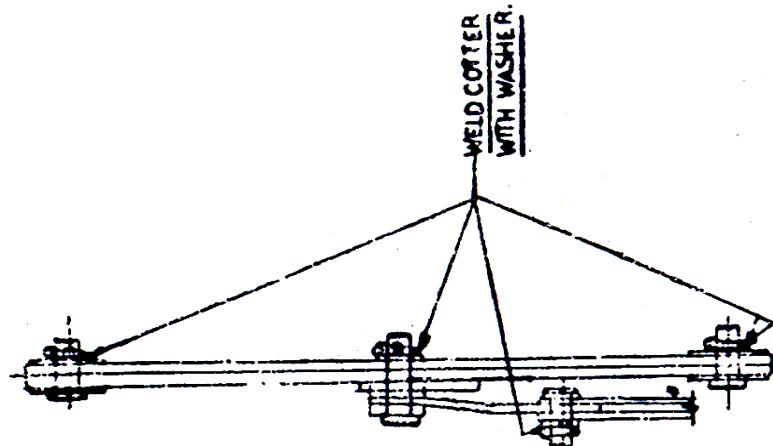


PLATE 47

ANTI-PILFERAGE DEVICE FOR HAND BRAKE
BELL CRANK HAND BRAKE BELL CRANK
BRACKET AND PULL ROD OF B.G. BOGIE
WAGONS

See Rule 2.22.1 (a. v)

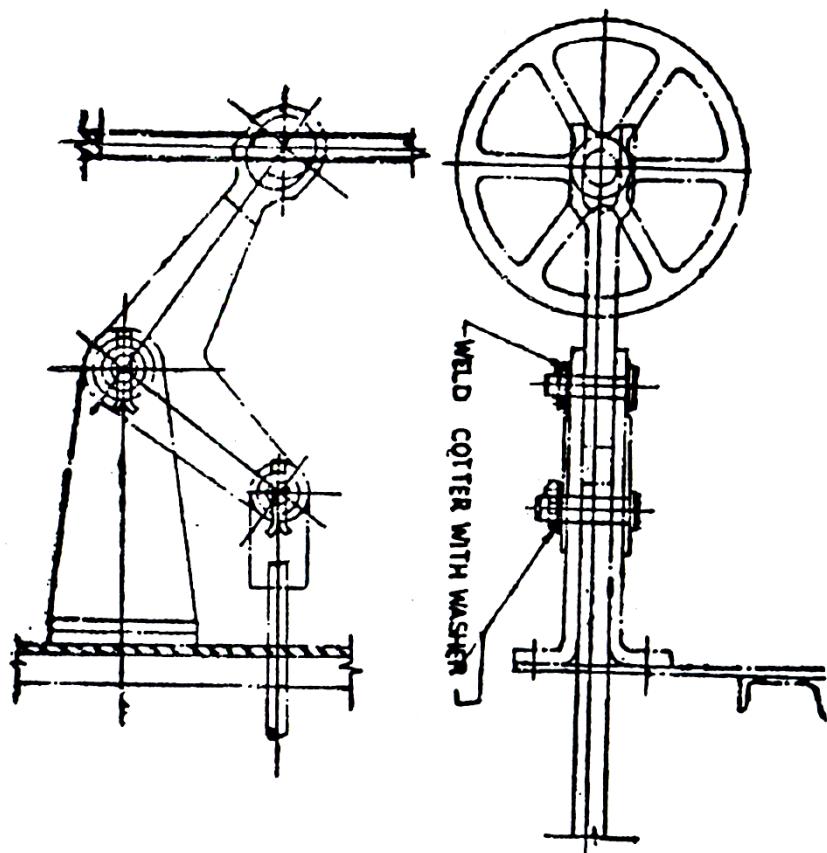


PLATE 48
ANTI-PILFERAGE DEVICE FOR HAND BRAKE
WHEEL OF B.G. BOGIE WAGONS
See Rule 2.22.1 (b)

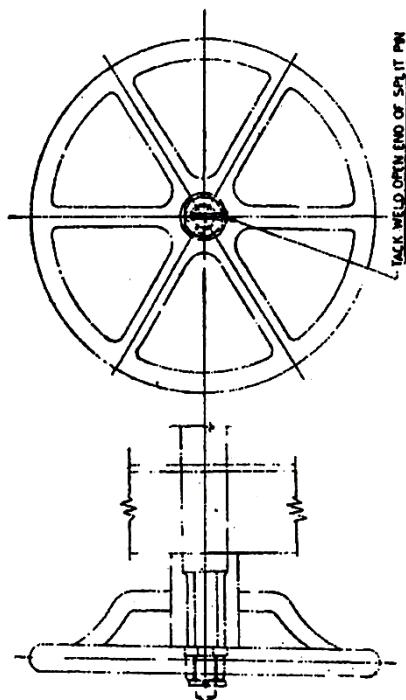


PLATE 49

Method of securing brake cylinder with brackets arrangement

Method of securing hand brake wheel arrangement

Method of securing release valve lever and spindle arrangement

Method of spindle pull rod roller and hanger arrangement

(See Rule 2.22.3)

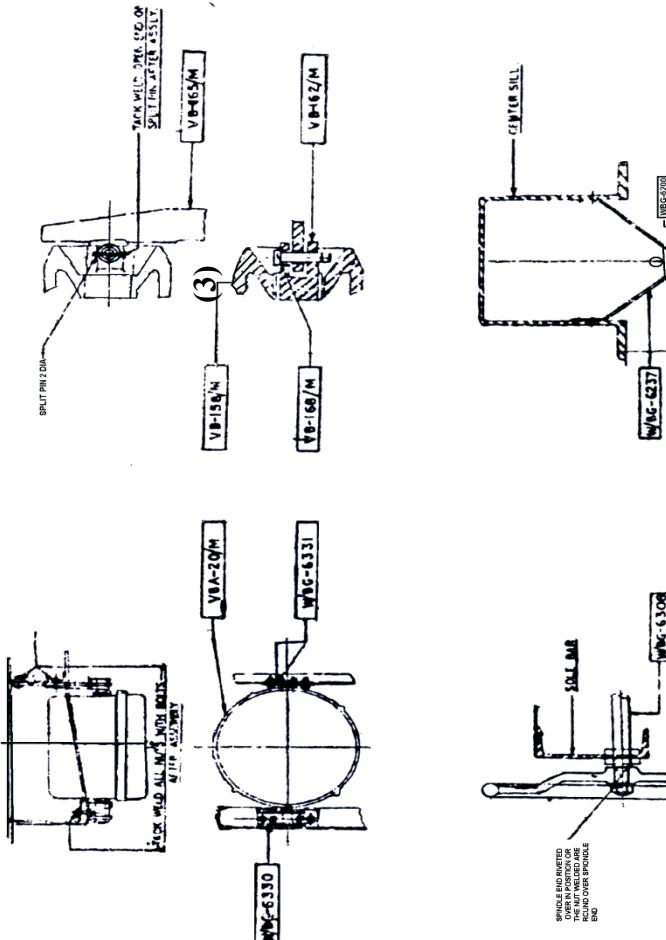


PLATE 50

ANTI - PILFERAGE MEASURES FOR TANK WAGON FITTINGS

See Rule 2.22.2 .1, 2.22.2.2 & 2.22.2.3

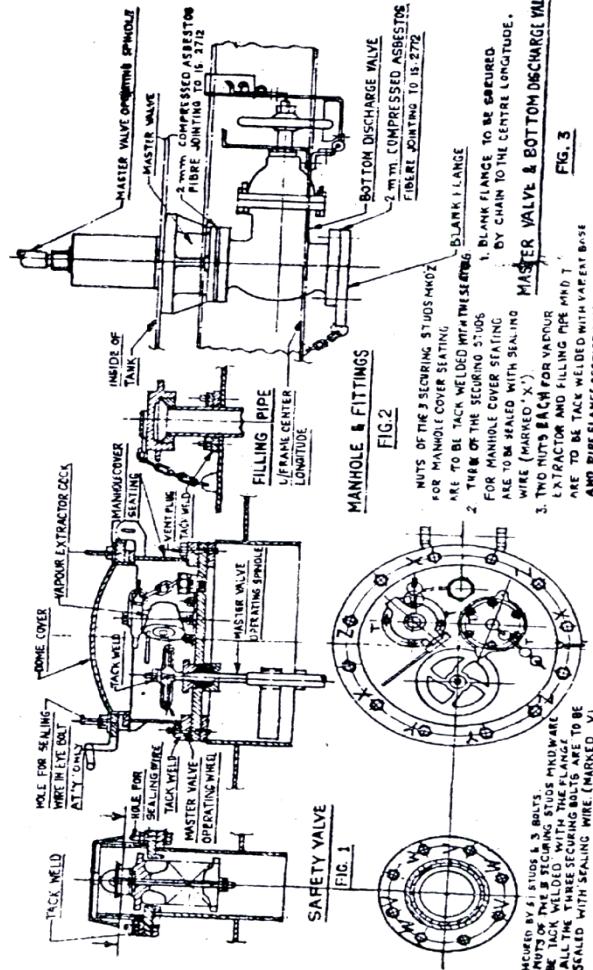


Plate 51

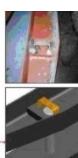
ANTI – PILFERAGE MEASURES FOR MODIFIED BRAKE SYSTEM

See Rule 2.22.1.c

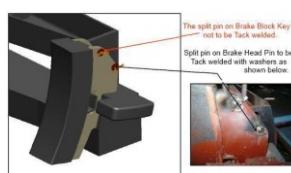


(A)	APD for Pins on Bogie Brake Cylinder
(B)	APD for Primary Brake Beam
(C)	APD for Secondary Brake Beam
(D)	APD for Push Rod
(E)	APD for Brake Head
(F)	APD for Cable Equalizer
(G)	APD on APM
(H)	Lock nut on APM

B



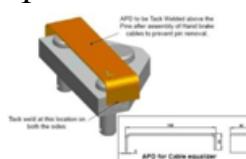
E



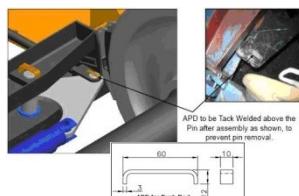
C



F



D



333

G

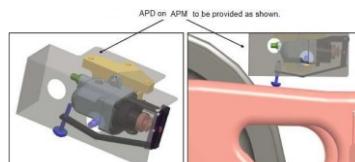
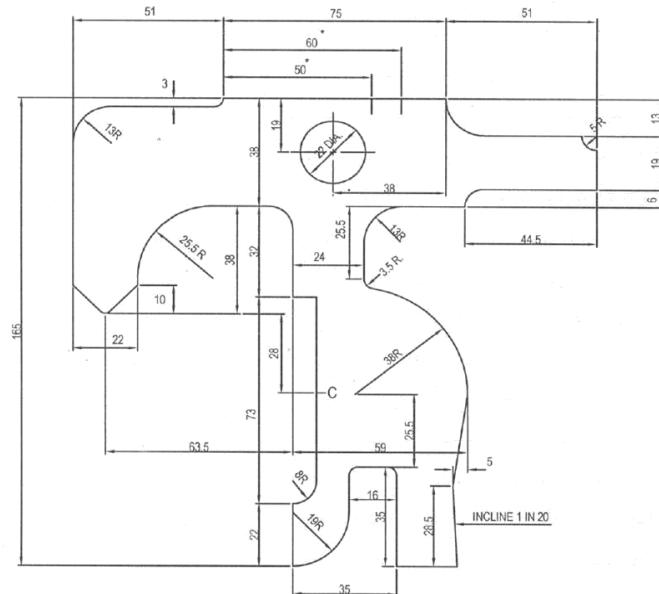


PLATE 52

**TYRE DEFECT GAUGE FOR SOLID WHEELS
FOR BROAD GAUGE STOCK**

(Steel Plate 3.2 mm Thick)

See Rule 3.3.5 & S 4.19.1



NOTE:-

- (1.) ALL DIMENSIONS ARE IN mm.
 - (2.) MARKS TO BE STAMPED ON BOTH SIDES OF GAUGE AS:-
'C' FOR CONDEMNING MARK.
 - (3.) STEEL PLATE 3.2 mm. THICK TO IS: 226, Fe 410-S.
 - (4.) DIMENSIONS MARKED THUS *
50 mm. FOR ICF & BEML COACHES
60 mm. FOR B.G. WAGONS.

PLATE 53

**METHOD OF USING TYRE DEFECT GAUGE
FOR CONDEMNING DIA. OF WHEEL RIM**

See Rule 3.3.5 & S 4.19.1

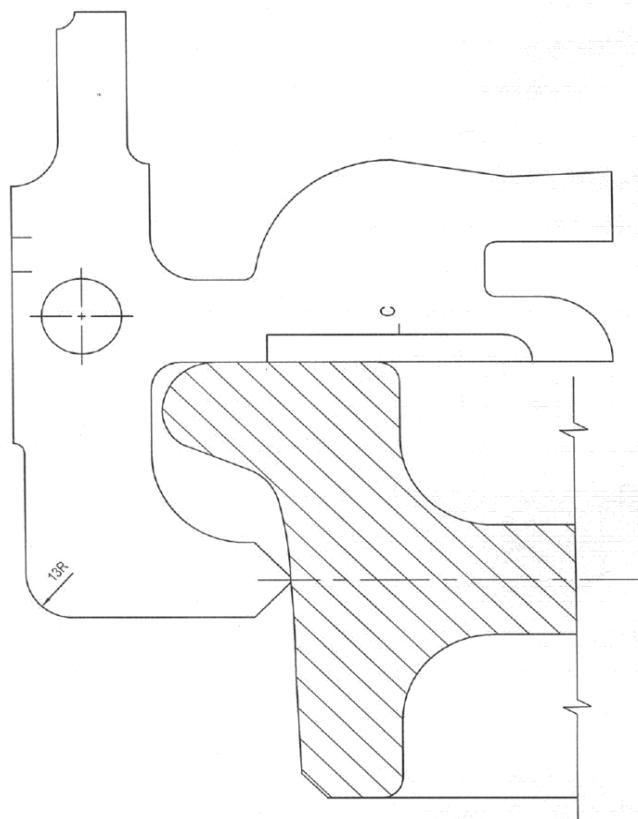


PLATE 54

**METHOD OF USING TYRE DEFECT GAUGE
FOR WORN TYRE OR DEEP FLANGE**

See Rule 3.3.5 & S 4.19.1

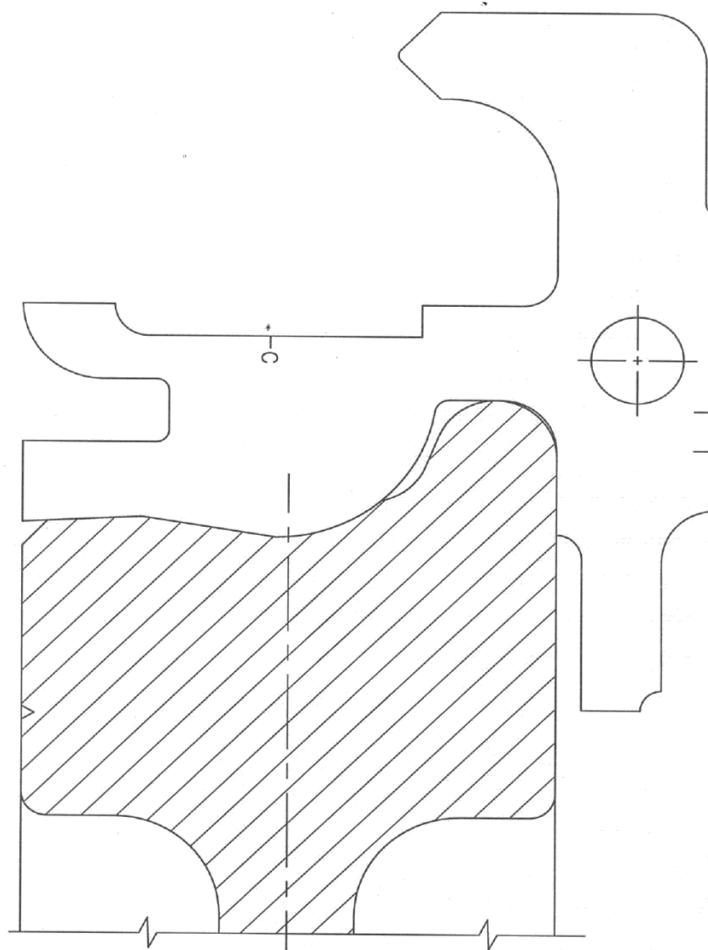
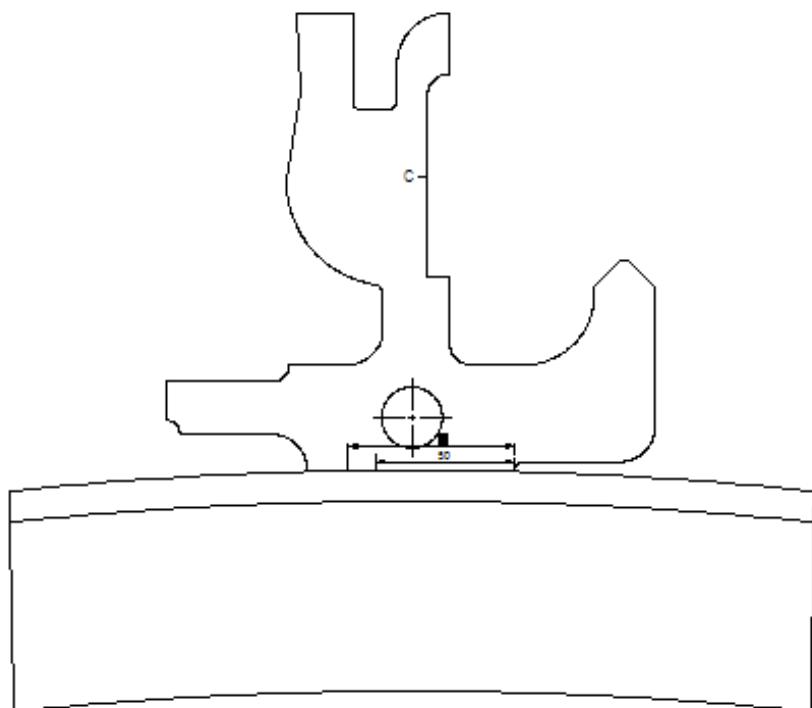
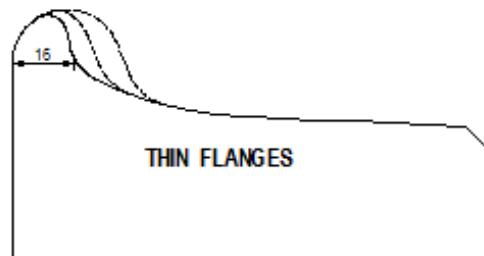


PLATE 55
METHOD OF USING TYRE DEFECT GAUGE
FOR FLAT PLACES ON TYRES
See Rule 3.3.5 & S 4.19.1

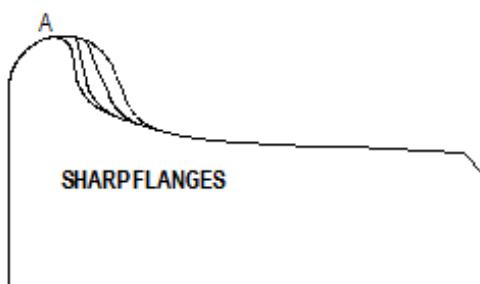


PERMISSIBLE FLAT TYRE LIMIT FOR FREIGHT STOCK = 60 mm (Max.)

PLATE 56
THIN AND SHARP FLANGE ON TYRES
See Rule 3.3.5 & S 4.19.1



Wheels may be passed provided the flange is 16 mm thick or over.
This sketch shows the minimum permissible thickness.



Wheels must not be allowed to run if the flanges are worn to knife edges as shown in this sketch, but may be passed if there is a radius at 'A' of not less than 5 mm.

PLATE 57

**METHOD OF USING TYRE DEFECT GAUGE
FOR THIN FLANGE AND EXCESSIVE DEPTH**

See Rule 3.3.5 & S 4.19.1

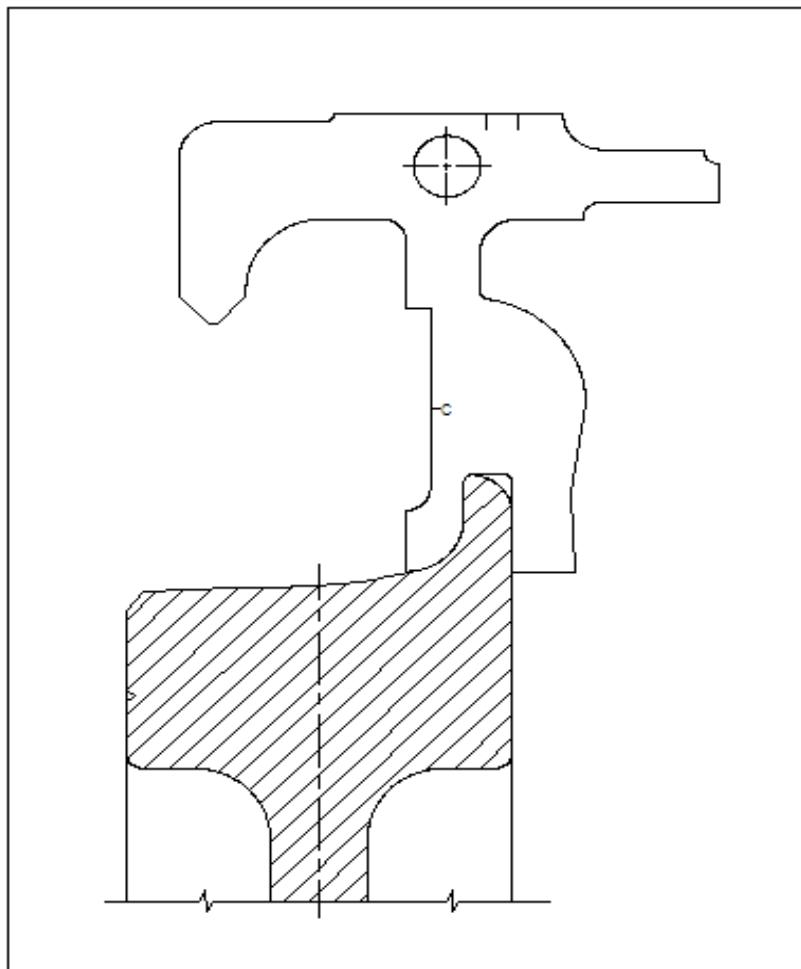


PLATE 58

**METHOD OF USING TYRE DEFECT GAUGE
FOR RADIUS TOO SMALL AT ROOT OF
FLANGE**

See Rule 3.3.5 & S 4.19.1

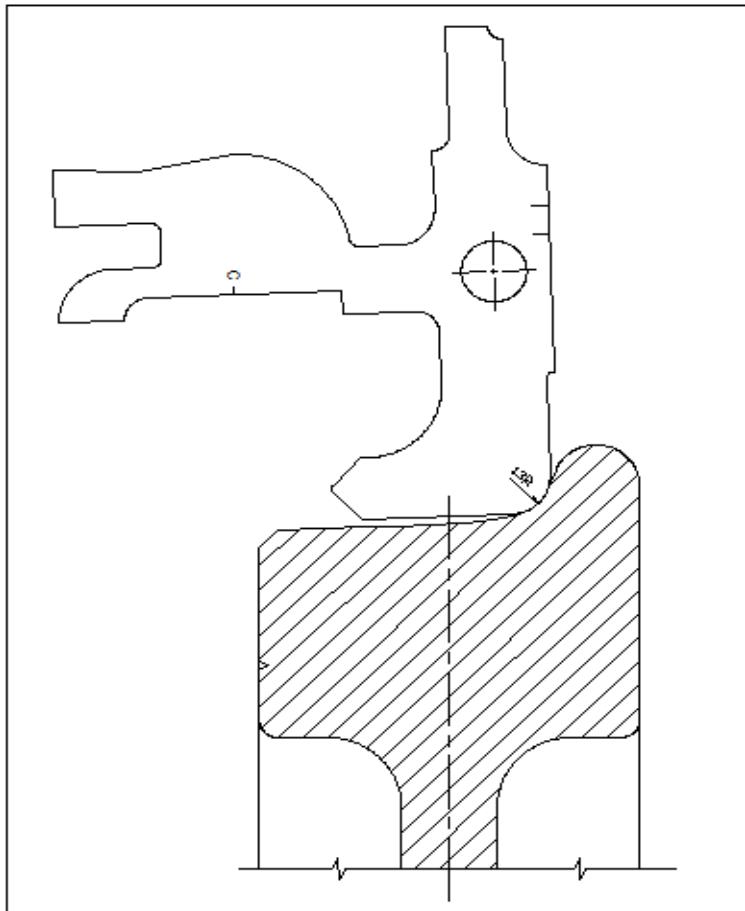


PLATE 59

DAMAGE LABELS

Size 185X140 mm.

See Rule 3.5.1 & 3.13.6

PLATE 60
RETURN SHOWING VEHICLES OR WAGONS
UNFIT OR FIT TO RUN
See Rule 3.5.2 & 3.9.1
Sample From A

No..... Railway.....

Return of vehicles or wagons cut off trains
as unfit to run or re-issued to traffic as fit to run.

..... 19

The Station Master..... Station
Please note the following vehicles/wagons are now
unfit/fit for use:—

No.	Description	Owning Railway	Remarks

..... Train Examiner

Note.—This form should be printed on foolscap paper.

PLATE 61
METHOD OF LOADING WHEELS
See Rule 3.9.2

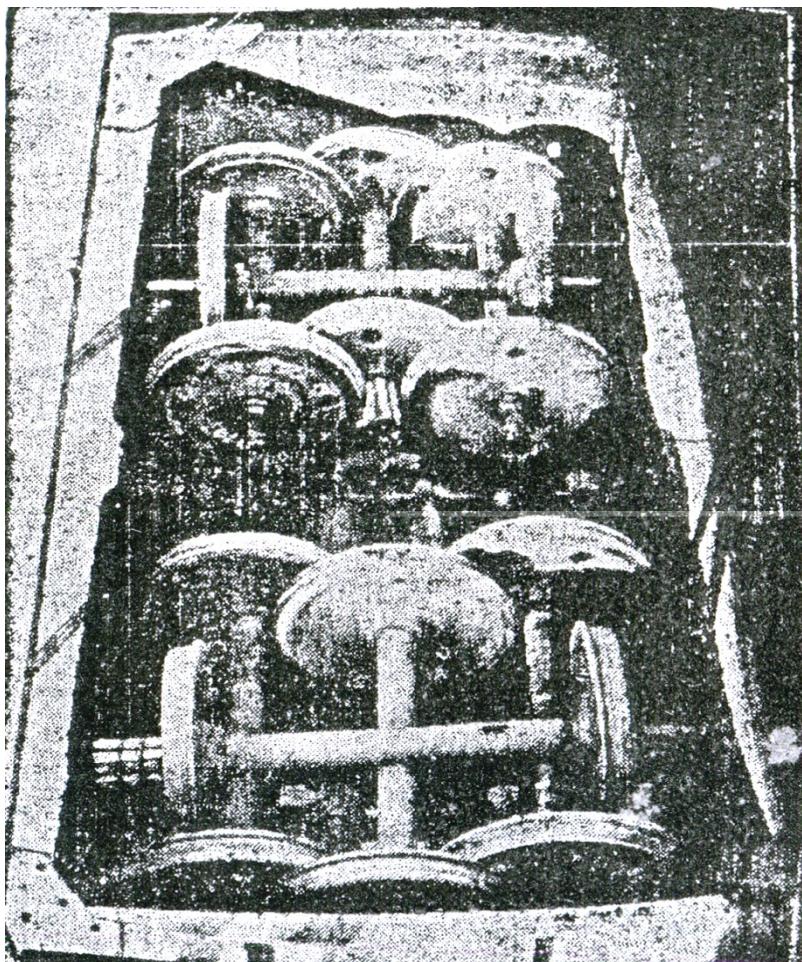


PLATE 62
MAXIMUM AND MINIMUM DIMENSIONS (BG)
See Rule 3.9.3.4 & 'S' 4.8.1

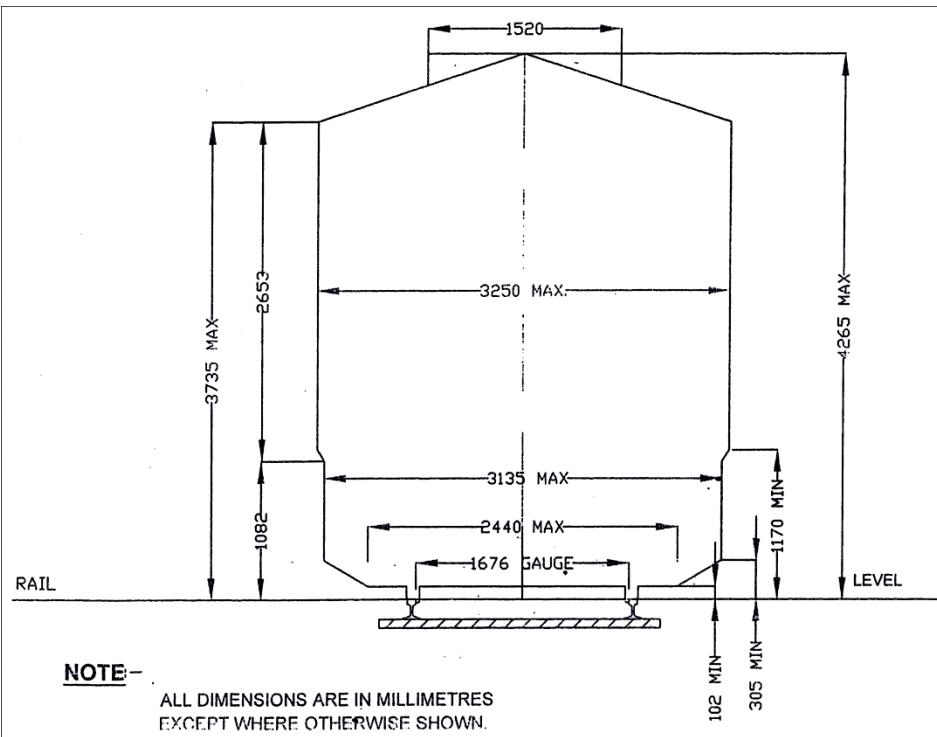


PLATE 63

RETURN OF DAMAGES CAUSED BY THEFT

See Rule 3.10

Sample form B

Station

Dated

No.....

To
The Police Inspector
.....

I beg to report the following deficiencies/ damages
which appear to have been caused by theft/mischief for
necessary action by your Department.

Date	Time	Vehicle or Wagons		Particulars of Deficiencies/ Damages	Remarks
		No.	Train		

***Guard.....# Station Master.....Train
Examiner.....**

* To be signed by the Guard when theft or mischief has occurred on a running train.

To be signed by the Station Master if it occurred in traffic yard or siding.

Note: This form should be printed on half foolscap paper.

PLATE 64

**PRO FORMA FOR REPORTING DEFECTS IN
THE NEWELY BUILT WAGONS IN THE
PRIVATE SECTOR DURING WARRANTY
PERIOD**

See Rule 3.11.2 & 3.11.3

1. Contract No.
 2. Wagon No.
 3. Code Mach./Transp.
 4. Owning Railway.
 5. Name of the Manufacturer.
 6. Date of commissioning.
 7. Date of warranty inspection.
 8. Defects attributable to the manufacturer.

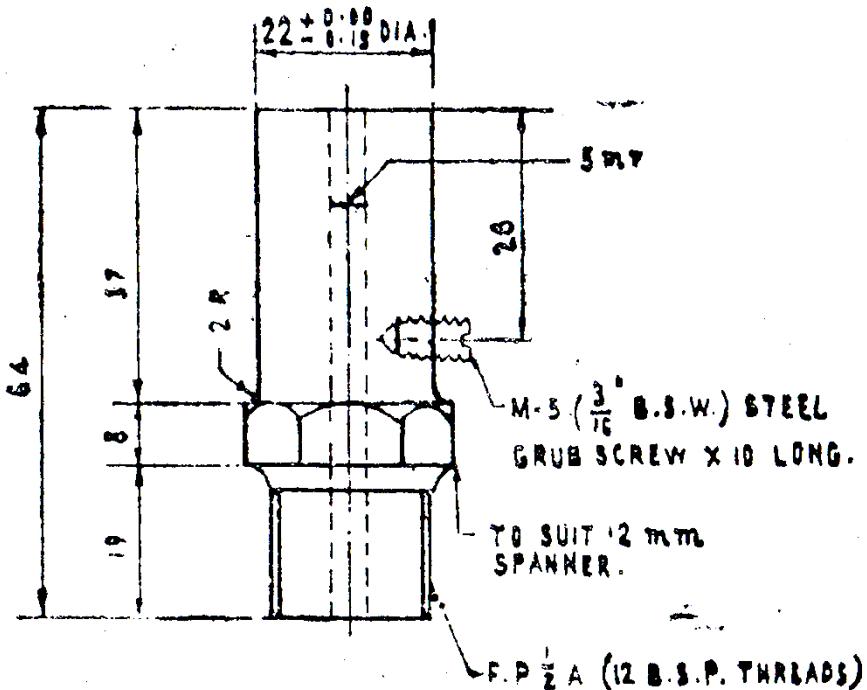
 9. Estimated cost of rectification.
 10. Remarks.
- No. Date.

.....
Head Train Examiner

Copy forwarded to—

- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
- for necessary action.

PLATE 65
INDIAN RAILWAY STANDARDS VAN VALVE
ADAPTER 'B' (B.G)
See Rule 4.6.6



Note:

- (1) Freely interchangeable with VBA 92 except for metric threads.
- (2) All dimensions are in millimetres

PLATE 66

Schematic Arrangement of Single pipe Air Brake Equipment
on BOXN, BCN etc. Type of Wagons
See Rule D.1.1.1

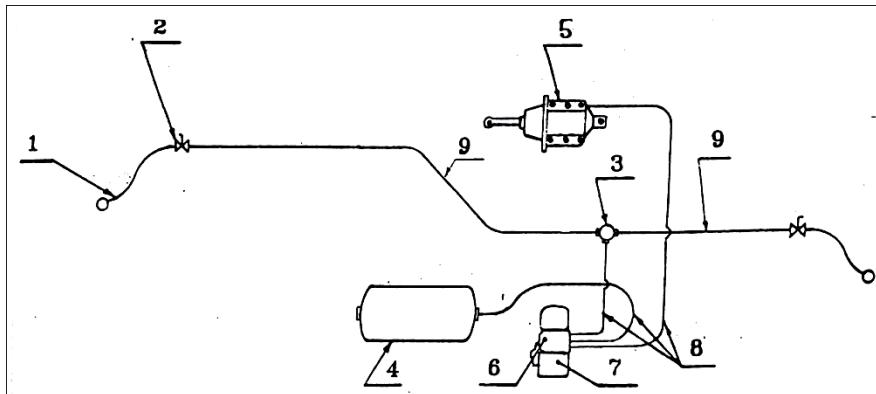
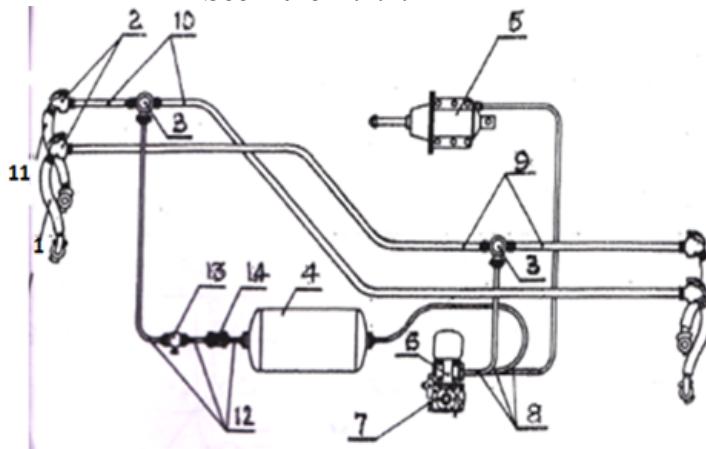


FIG. REF . NO	DESCRIPTION	QTY.
1	AIR BRAKE HOSE COUPLING	2
2	CUT OF ANGLE COCK	2
3	DIRT COLLECTOR	1
4	AUXILIARY RESERVIOR 100 lt.	1
5	BRAKE CYLINDER 355 MM	1
6	PIPE BRACKET WITH CONTROL RESERVIOR	1
7	DISTRIBUTOR VALVE WITH ADAPTOR	1
8	PIPES 20 mm. NB	1 set
9	PIPES 32 mm. NB	1 set

PLATE 67

Schematic Arrangement of Twin pipe Air Brake Equipment
See Rule D.1.1.1



SN	Description	Qty.	SN	Description	Qty.
01	Air brake Hose Coupling for BP	02	08	Pipe 20 mm NB (Branch pipes for B.P.)	01 Set
02	Cut off angle cock	04	09	Brake Pipes 32 mm NB	01 Set
03	Dirt Collector	02	10	Feed Pipes 32 mm NB	01 Set
04	Auxiliary Reservoir	01	11	Air brake Hose Coupling for FP	02
05	Brake Cylinder	01	12	Pipe 20 mm NB (Branch pipes for F.P.)	01 Set
06	Pipe Bracket with Control Reservoir	01	13	Isolating Cock	01
07	Distributer Valve with adapter	01	14	Check valve	01

PLATE 68

**Schematic Arrangement of Air Brake Equipment
of BVZC BRAKE VANS.
See Rule D.1.1.2**

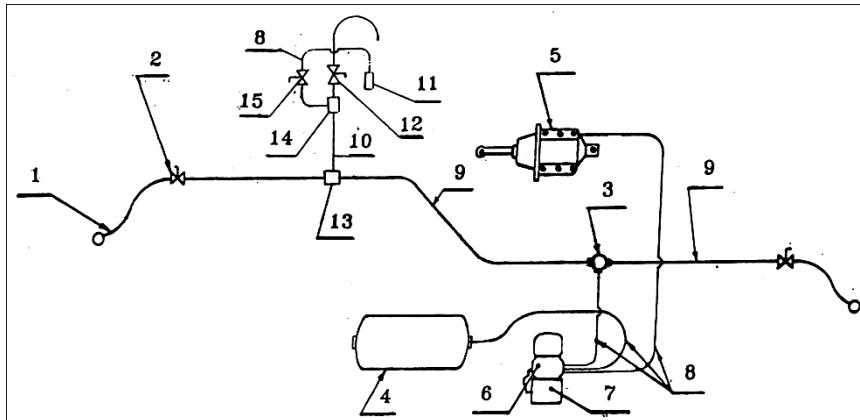


FIG.REF. NO	DESCRIPTION	QTY.
1	HOSE COUPLING BP	2
2	CUT OF ANGLE COCK	2
3	DIRT COLLECTOR	1
4	AUXILIARY RESERVIOR 75 lt.	1
5	BRAKE CYLINDER 300 mm.	1
6	PIPE BRACKET WITH CONTROL RESERVIOR	1
7	DISTRIBUTOR VALVE WITH ADAPTOR	1
8	PIPES 20 mm. NB	1 set
9	PIPES 32 mm. NB	1 set
10	PIPE 25 mm NB	1 set
11	QUICK COUPLING	1
12	GUARD'S EMERGENCY BRAKE VALVE	1
13	TEE FLANGE 32X32X25	1
14	TEE FLANGE 25X25X20	1
15	ISOLATING COCK	1

PLATE 69

**Schematic Arrangement of Air Brake Equipment
of BVZC BRAKE VANS for Twin Pipe Brake System
See Rule D.1.1.2**

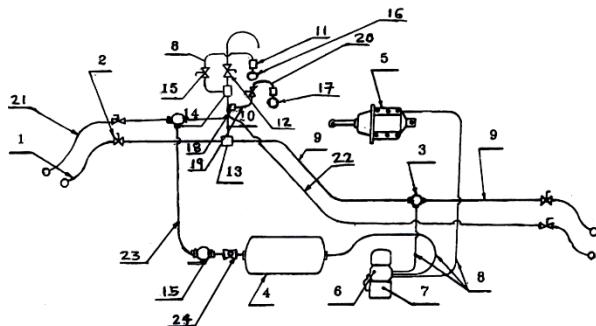


FIG. REF. NO	DESCRIPTION	QTY.	FIG. REF. NO	DESCRIPTION	QTY.
1	HOSE COUPLING BP	2	13	TEE FLANGE 32X32X25	1
2	CUT OF ANGLE COCK	4	14	TEE FLANGE 25X25X20	1
3	DIRT COLLECTOR	2	15	ISOLATING COCK	3
4	AUXILIARY RESERVIOR 75 lt.	1	16	PRESSURE GAUGE (63 MM) for BP	1
5	BRAKE CYLINDER 300 mm.	1	17	PRESSURE GAUGE (63 MM) for FP	1
6	PIPE BRACKET WITH CONTROL RESERVIOR	1	18	ELBOW FLANGE with NIPPLE	1
7	DISTRIBUTOR VALVE WITH ADAPTOR	1	19	PIPE 20 mmM N.B	1
8	PIPES 20 mm. NB	1 set	20	PIPE 20 mm N.B	1
9	PIPES 32 mm. NB	1 set	21	HOSE COUPLING FP	2
10	PIPE 25 mm NB	1 set	22	PIPE 32 mm NB	1 Set
11	QUICK COUPLING	1	23	PIPE 32 mm. NB	1 Set
12	GUARD'S EMERGENCY BRAKE VALVE	2	24	CHECK VALVE	1

PLATE 70

**Schematic Arrangement of Air Brake Equipment
On BOBR/BOBRN wagons.
See Rule D.1.1.3**

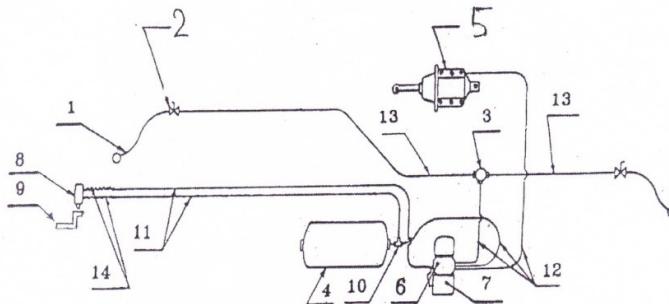


FIG. REF. NO	DESCRIPTION	QTY.
1	HOSE COUPLING BP	2
2	CUT OF ANGLE COCK	2
3	DIRT COLLECTOR	1
4	AUXILIARY RESERVIOR 100 lt.	1
5	BRAKE CYLINDER 355 mm.	1
6	PIPE BRACKET WITH CONTROL RESERVIOR	1
7	DISTRIBUTOR VALVE WITH ADAPTOR AND RELAY VALVE	1
8	SINGLE PIECE LOAD SENSING DEVICE	1
9	LOWER BRACKET LSD	1
10	TEE FLANGE	1
11	PIPES 15 mm. NB	1 set
12	PIPES 20 mm. NB	1 set
13	PIPE 32 mm NB	1 set
14	FLEXIBLE HOSE	2

**Schematic Arrangement of Air Brake Equipment
On BOBR/BOBRN Wagons for Twin Pipe
System
See Rule D.1.1.3**

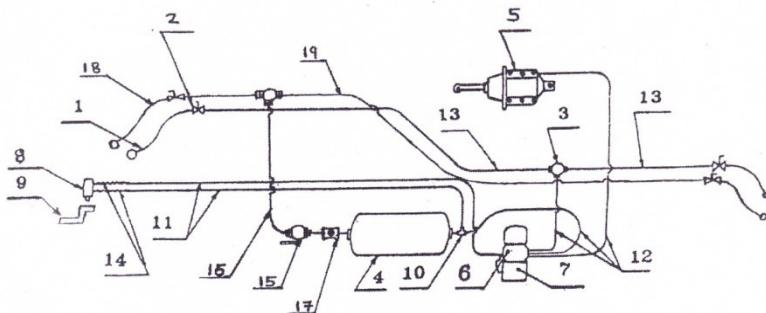


FIG. REF. NO	DESCRIPTION	QTY.
1	HOSE COUPLING BP	2
2	CUT OF ANGLE COCK	2
3	DIRT COLLECTOR	1
4	AUXILIARY RESERVIOR 100 lt.	1
5	BRAKE CYLINDER 355 mm.	1
6	PIPE BRACKET WITH CONTROL RESERVIOR	1
7	DISTRIBUTOR VALVE WITH ADAPTOR AND RELAY VALVE	1
8	SINGLE PIECE LOAD SENSING DEVICE	1
9	LOWER BRACKET-LSD	1
10	TEE FLANGE	1
11	PIPES 15 mm. NB	1 set
12	PIPES 20 mm. NB	1 set
13	PIPE 32 mm NB	1 set
14	FLEXIBLE HOSE	2
15	ISOLATING COCK	1
16	PIPE 20 mm. N.B	1Set
17	CHECK VALVE	1
18	HOSE COUPLING FP	2
19	PIPE 32 mm N.B	1Set

PLATE 72

PIPE BRACKET WITH CONTROL RESERVOIR

See Rule D.1.2.1

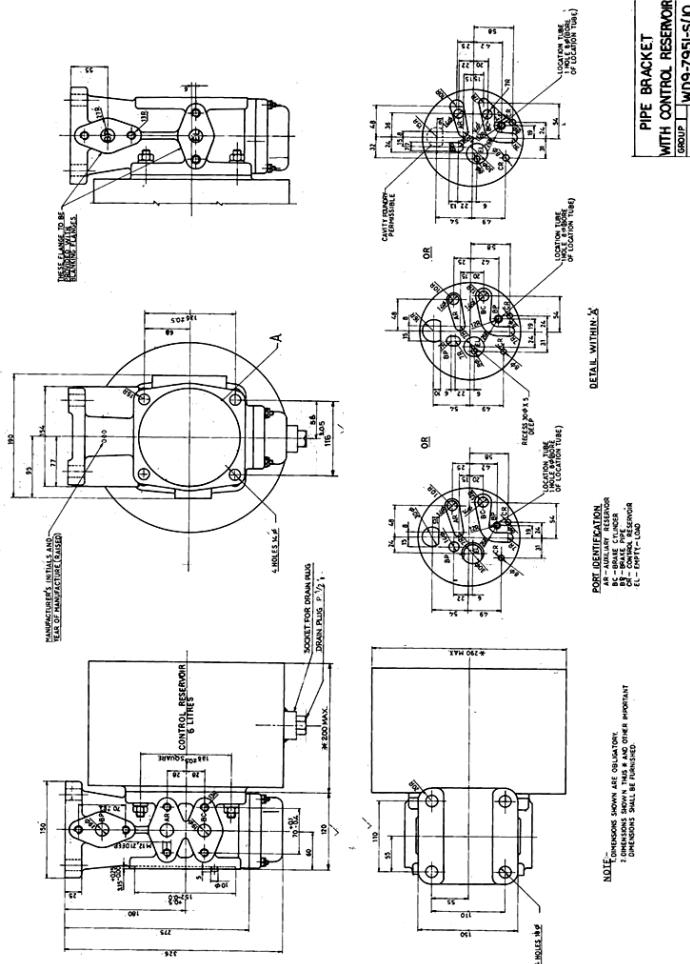


PLATE 73

BRAKE CYLINDER (355 mm)
See Rule D.1.2.2

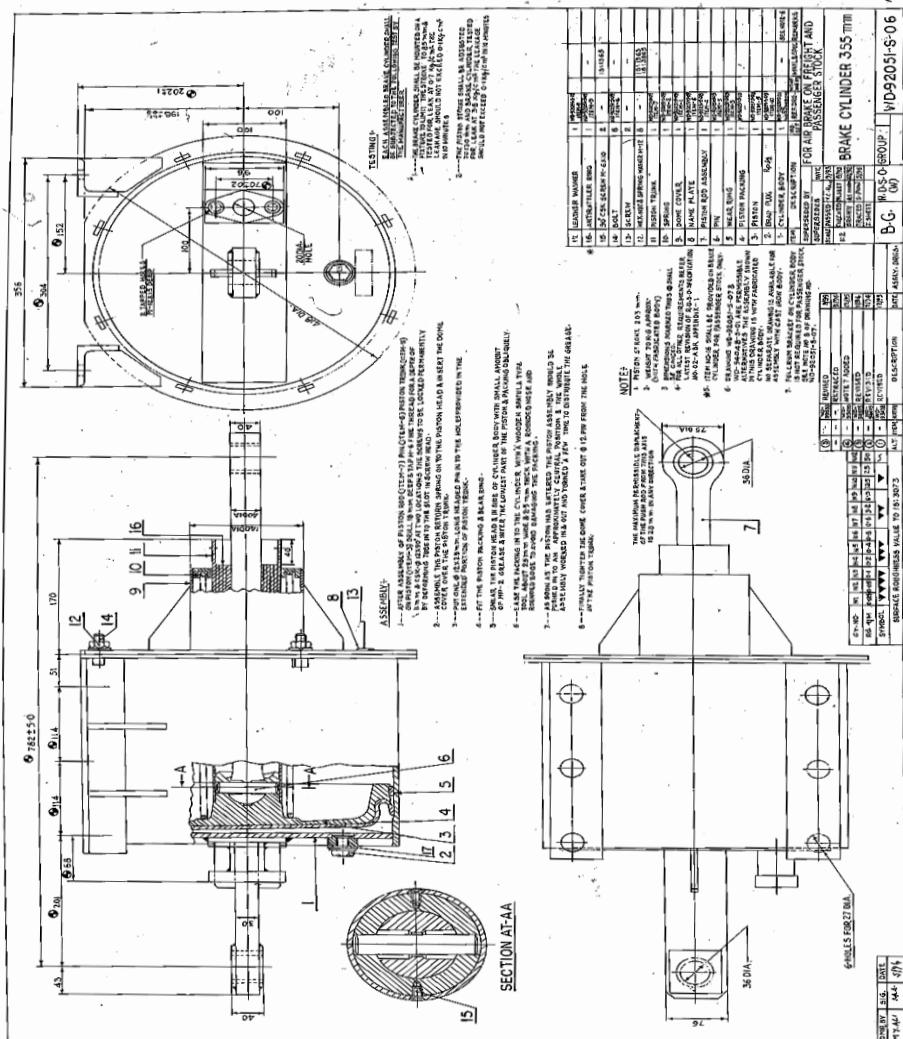


PLATE 74

BRAKE CYLINDER (300 mm)

See Rule D.1.2.2

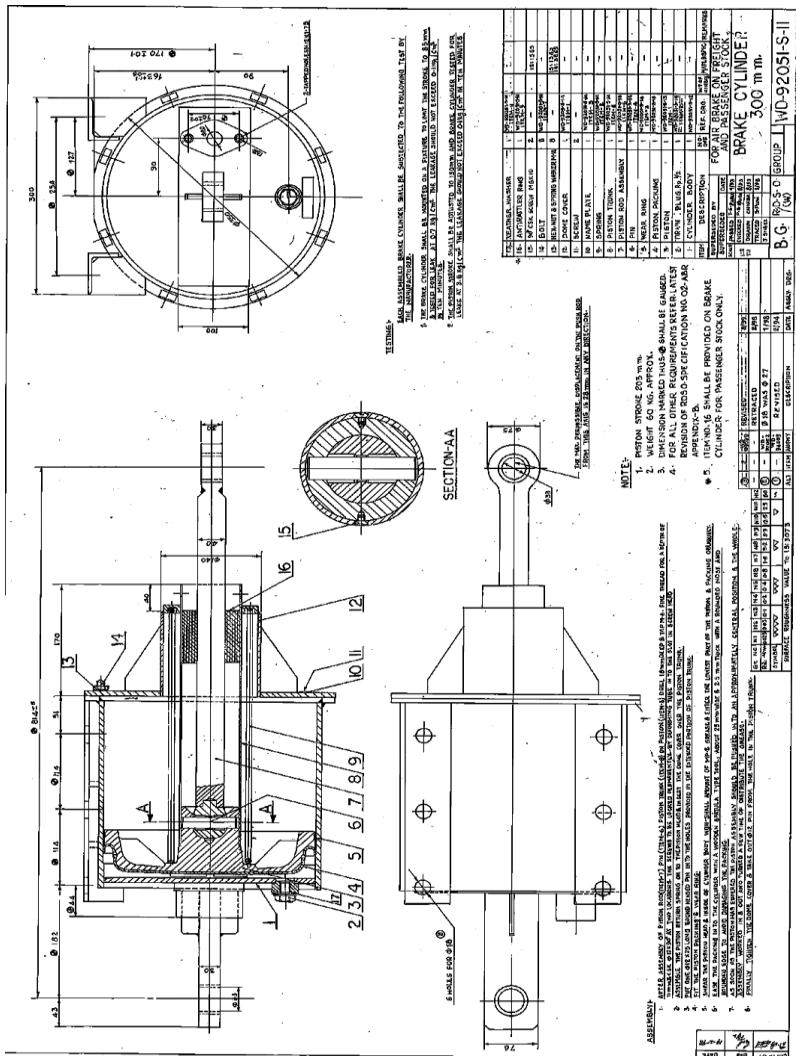


PLATE 75

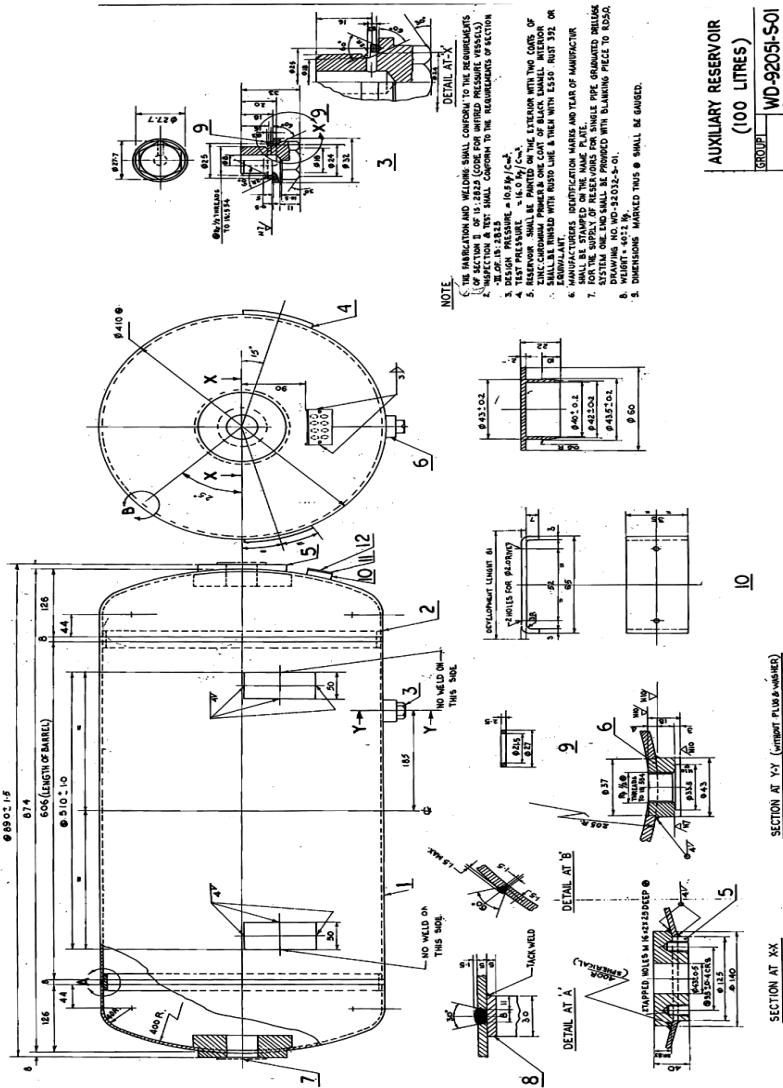
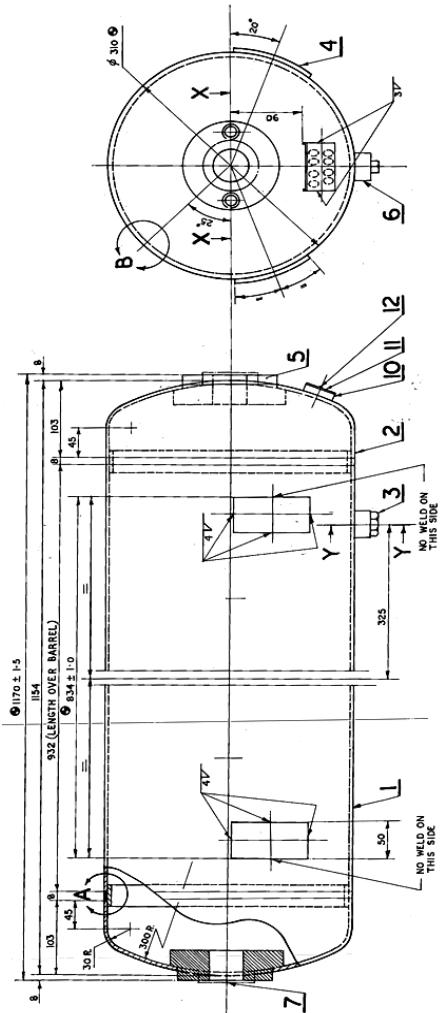


PLATE 76
AUXILIARY RESERVOIR (75 L)
See Rule D.1.2.3



NOTE: THE FABRICATION & WELDING SHALL CONFORM TO THE REQUIREMENTS OF SECTION E. & F. OF 2020 EDITION, FOR UNPUNCHED, PRESSURE VESSELS. INSPECTION & TEST SHALL CONFORM TO THE REQUIREMENTS OF SECTION E. & F. OF 1928 EDITION.

DESIGN PRESSURE = 10.5 kg/cm²

TEST PRESSURE = 16.5 kg/cm²

5. KNEE PLATE SHALL BE PAINTED ON THE EXTERIOR, WITH TWO COATS OF PRIMER, AND ONE COAT OF PAINT, WITH THE COLOR RUST OR EQUIVALENT.

6. MANUFACTURER'S IDENTIFICATION MARKS AND YEAR OF MANUFACTURE SHALL BE STAMPED ON THE NAME PLATE.

7. THE SUPPLY OF THE NAME PLATE, FOR STAMPING, IS THE MANUFACTURER'S RESPONSIBILITY.

8. APPROXIMATE WEIGHT = 52.5 kg.

9. DIMENSIONS MARKED THIS SIDE, SHALL BE GAUGED.

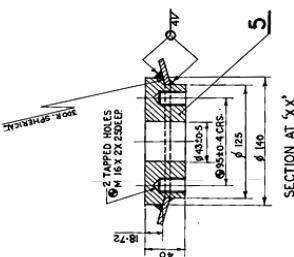


PLATE 77

See Rule D.1.2.4

NOTE:-

1. TEST PRESSURE 10kg/cm^2
2. MANUFACTURER'S INITIAL AND YEAR OF MANUFACTURE
3. TO BE CAST ON BODY AT SUITABLE LOCATION
4. DIMENSIONS MARKED THUS \odot SHALL BE GAUGED.

FOR AIR BRAKE ON WAGONS
 CUT OFF. ANGLE
 COCK WITH VENT
 GROUP WD 8812

SUPERSEDED BY	SUPERSEDES	DATE
	SCALE PASSED - 34.1 cu	7/19 '69
	CHECKED - d-4	7/19 '69
11	DRILLED - 5650	12/19 '66
	TRACED ABB-AB	9/1966
	J.SHEET	
	B.G.	R.D. S.O.

5/5

D
111 COLUMN.

REVISE
ADDED IN TITL

101

35
31

10

—CLOSE

100

13

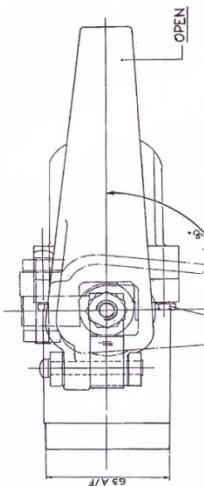
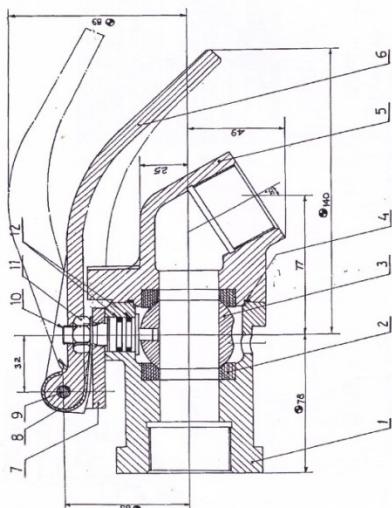


PLATE 78
AIR BRAKE HOSE COUPLING FOR BRAKE PIPE
See Rule D.1.2.5

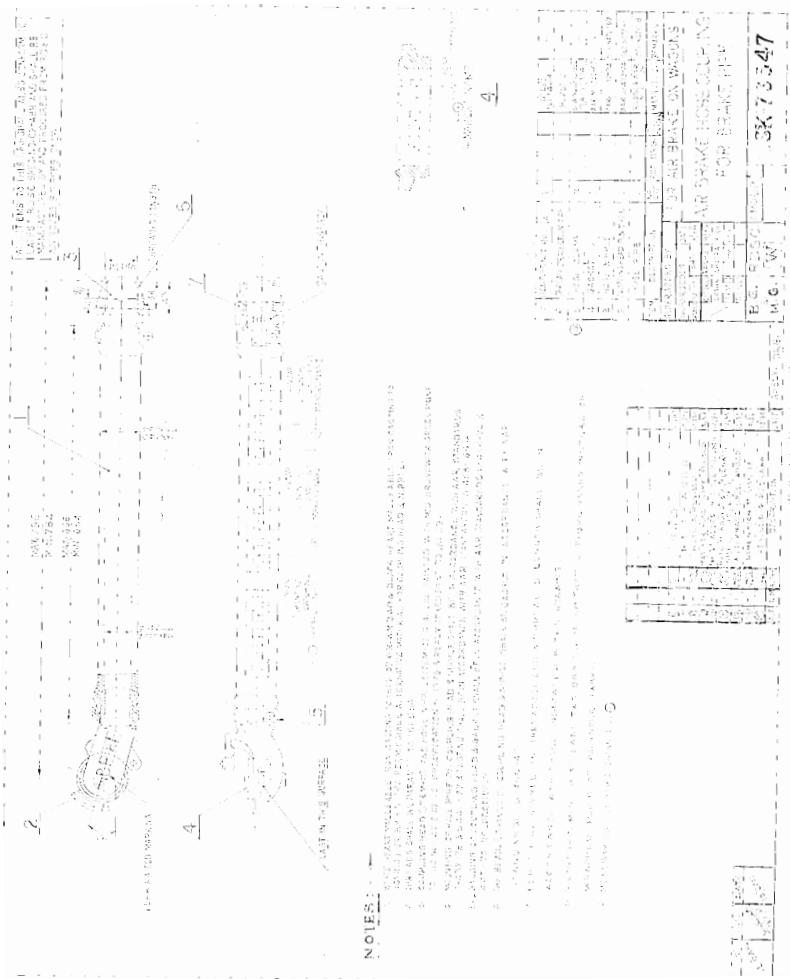
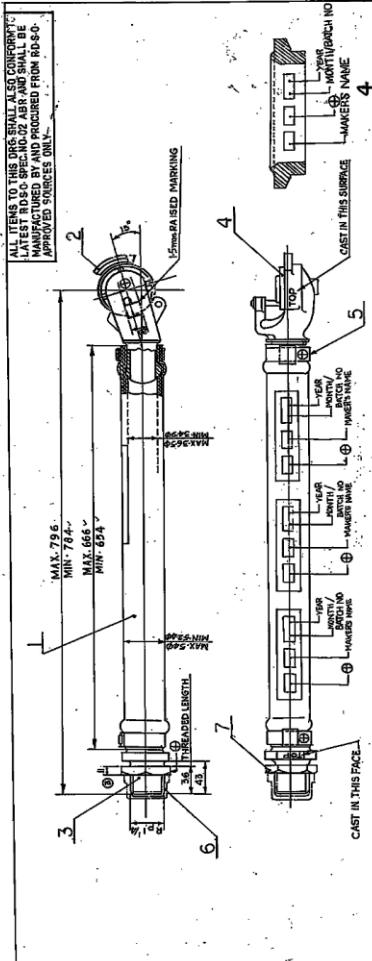


PLATE 79

AIR BRAKE HOSE COUPLING FOR FEED PIPE

See Rule D.1.2.5



NOTE:

1. COUPLING HEAD SHALL BE TURNED BY 90° AND DROPPED HAND TO AIR SP. EDITION 3-439-74.
2. WHITE HEART MALLEABLE IRON CASTING TO 15107 GRADE 340 & BLACK HEART MALLEABLE IRON CASTING TO 15112 GRADE 340 ARE PERMISSIBLE ALTERNATIVE MATERIAL FOR COUPLING HEAD AND NIPPLE.
3. THREADS SHALL BE PARALLEL TO 15: 5: 4.
4. COUPLING HEAD (TAPERED) AND HOSE NIPPLE (TAPERED) SHALL BE PAINTED WITH READY MIXED WHITE PAINT (TIN IS SPECIFICATION 1-17).
5. MOUNTINGS ON HOSE PIPE ON COUPLING HEAD & NIPPLE SHALL BE IN ACCORDANCE WITH AAR STANDARDS 5-459-76 & 5-459-77, ABOVE SHALL BE IN ACCORDANCE WITH AAR STANDARDS 5-459-72.
6. GASKET OF COUPLING HEAD AND NIPPLE SHALL BE ACCORDANCE WITH AAR STANDARDS 5-459-72 (GASKET SHALL BE OF POLYESTER FABRIC).
7. BEADS & SHANKS OF COUPLING HEAD & NIPPLE SHALL BE GAUGED IN ACCORDANCE WITH AAR STANDARDS 5-459-76 & 5-459-77.
8. LENGTH OF NIPPLE ON THE THREADED END & TAPERED END, 'A' SHALL BE IN ACCORDANCE WITH THOSE INDICATED IN THIS DRAWING.
9. REINFORCEMENT OF AT LEAST TWO BRAIDS OF SYNTHETIC FIBRE VANS INSTEAD OF WRAPPED PILES OF POLYESTER FABRIC.
10. NUMBER SHALL BE MARKED AS SHOWN THUS: ①'

ITEM	DESCRIPTION	STANDARD	REF'D TO	REF'D TO	REF'D TO
1	HOSE PIPE	1	1	1	1
2	TOP	1	1	1	1
3	HOSE NIPPLE	1	1	1	1
4	GASKET	1	1	1	1
5	HOSE CLAMP	1	1	1	1
6	PIPE PROTECTION CAN	1	1	1	1
7	HOSE PIPE NUT R.P. 1 1/4	1	1	1	1

ITEM	DESCRIPTION	STANDARD	REF'D TO	REF'D TO	REF'D TO
1	HOSE PIPE	1	1	1	1
2	TOP	1	1	1	1
3	HOSE NIPPLE	1	1	1	1
4	GASKET	1	1	1	1
5	HOSE CLAMP	1	1	1	1
6	PIPE PROTECTION CAN	1	1	1	1

ITEM	DESCRIPTION	STANDARD	REF'D TO	REF'D TO	REF'D TO
1	HOSE PIPE	1	1	1	1
2	TOP	1	1	1	1
3	HOSE NIPPLE	1	1	1	1
4	GASKET	1	1	1	1
5	HOSE CLAMP	1	1	1	1
6	PIPE PROTECTION CAN	1	1	1	1

ITEM	DATE	RECEIVED	REMOVED	REMOVED	REMOVED
1					
2					
3					
4					

ITEM	DESCRIPTION	STANDARD	REF'D TO	REF'D TO	REF'D TO
1	HOSE PIPE	1	1	1	1
2	TOP	1	1	1	1
3	HOSE NIPPLE	1	1	1	1
4	GASKET	1	1	1	1
5	HOSE CLAMP	1	1	1	1
6	PIPE PROTECTION CAN	1	1	1	1

ITEM	DESCRIPTION	STANDARD	REF'D TO	REF'D TO	REF'D TO
1	HOSE PIPE	1	1	1	1
2	TOP	1	1	1	1
3	HOSE NIPPLE	1	1	1	1
4	GASKET	1	1	1	1
5	HOSE CLAMP	1	1	1	1
6	PIPE PROTECTION CAN	1	1	1	1

PLATE 80

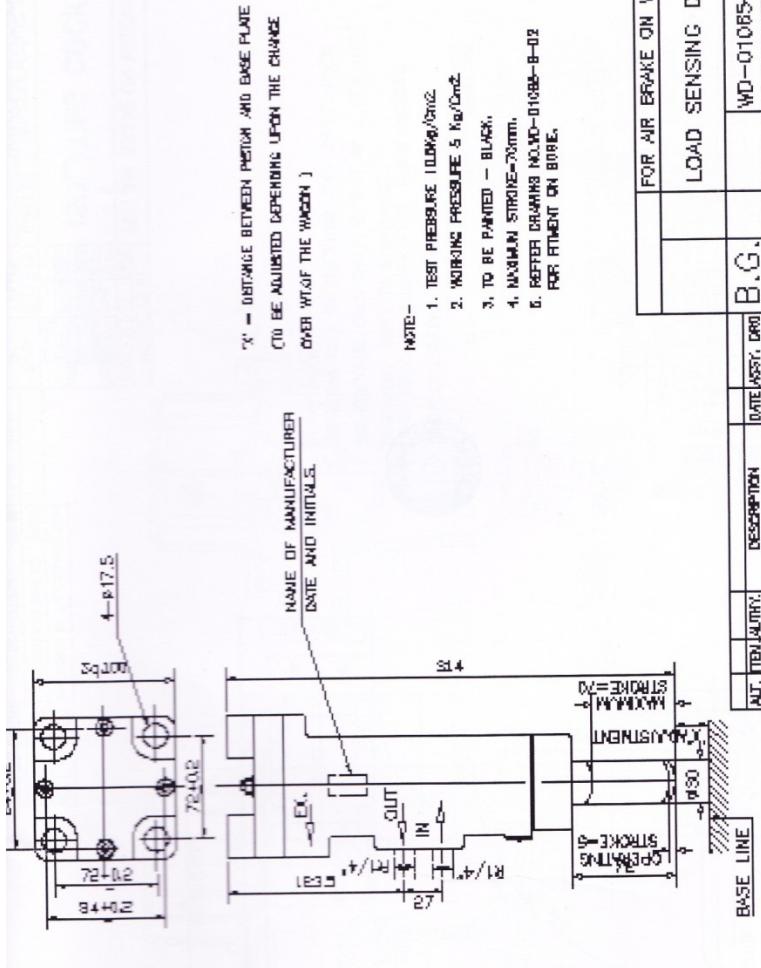
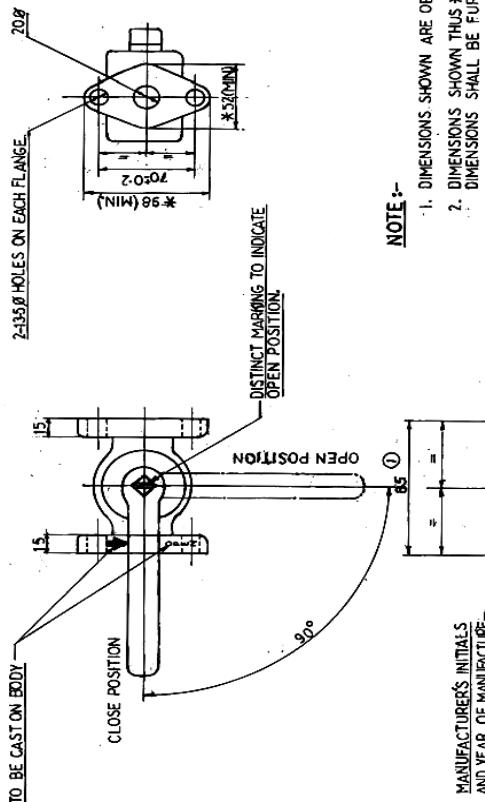


PLATE 81

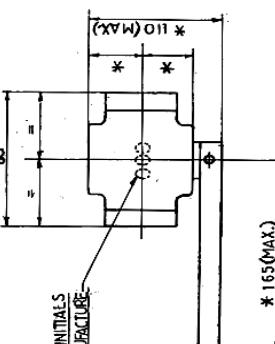
ISOLATING COCK

See Rule D.1.2.11



NOTE :-

1. DIMENSIONS SHOWN ARE OBLIGATORY.
2. DIMENSIONS SHOWN THUS * AND OTHER IMPORTANT DIMENSIONS SHALL BE FURNISHED.
3. THE ISOLATING COCK SHALL BE BALL VALVE C.L.P. TYPE.
4. THE FLOW AREA OF ISOLATING COCK SHALL MATCH 20 mm. OPENING.



ISOLATING COCK		SUPERSEDED BY	FOR AIR BRAKE ON WAGONS
SUPERSEDED	DATE	SUPERSEDED	DATE
SUPERSEDED	DATE	SUPERSEDED	DATE
CREATED	01/96	CREATED	01/96
125 DRAWN	01/96	125 DRAWN	01/96
125 TESTED	01/96	125 TESTED	01/96
125 SHEET	01/96	125 SHEET	01/96

9.G.	R.D.S.O.	GROUP	WD 3062-S-04
ALL ITEM AUTH.	DESCRIPTION	DATE ASSY DRGS,	

DIRT COLLECTOR
See Rule D 1.2.6

NOTE:-

1. TEST PRESSURE. - 10 Kg./Cm.².
2. SURFACE PROTECTION BLACK ENAMEL ALL OVER EXCEPT ON MACHINED AREAS.
3. APPROXIMATE WEIGHT 5 Kg.
4. DIMENSIONS MARKED TRUS. \odot SHALL BE GAUGED.
5. APPLY RUST PREVENTIVE OIL ON NUT.

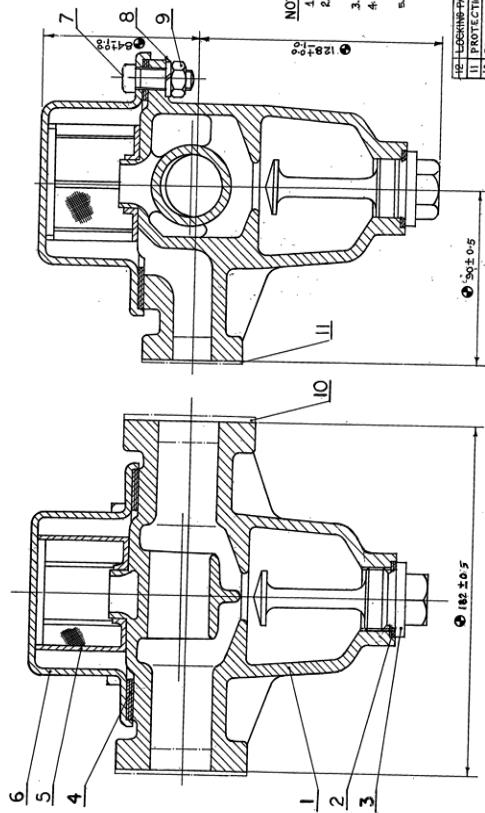
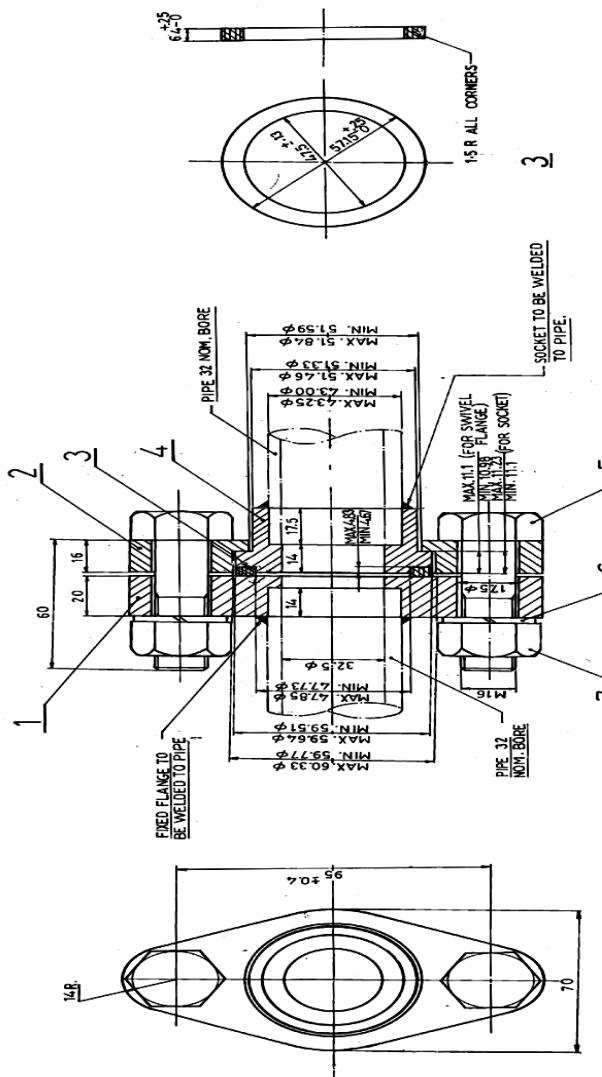


PLATE 83

FLANGE WELDED JOINT

See Rule D.1.2.8



NOTE:-

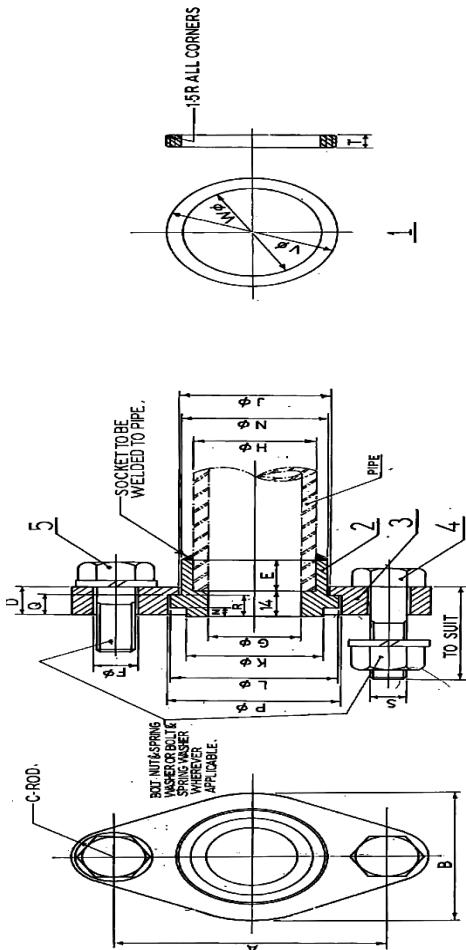
11. DIMENSIONS SHOWN ARE OBLIGATORY.

2. TEST PRESSURE '10 K_g/Cm²

3. ALL STEEL ITEMS SHALL HAVE MANUFACTURER'S INITIALS STAMPED AT SUITABLE LOCATION. RUBBER ITEM SHALL HAVE MANUFACTURER'S INITIAL, MONTH AND YEAR OF MANUFACTURE EGBILY MOULDED AT SUITABLE LOCATION.

365

PLATE 84



NOTE

11-DIMENSIONS SHOWN ARE OBLIGATORY.
12-TEST PRESSURE IS 10 K/cm²

2.1.3.1 PRESSURE 10 K₃/C₁₁ =

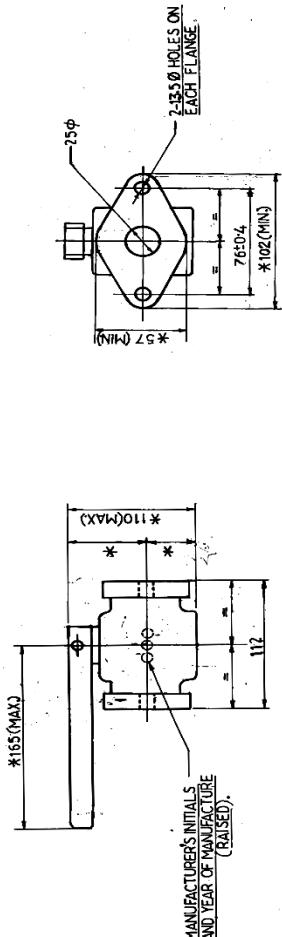
3. ALL STEEL ITEMS SHALL HAVE MANUFACTURER'S INITIALS STAMPED AT SUITABLE LOCATION.
RUBBER ITEM SHALL HAVE MANUFACTURER'S INITIALS, MONTH AND YEAR OF MANUFACTURE LEGIBLY MOULDED AT SUITABLE LOCATION.

FLANGE WELDED JOINT [PIPE TO EQUIPMENT]

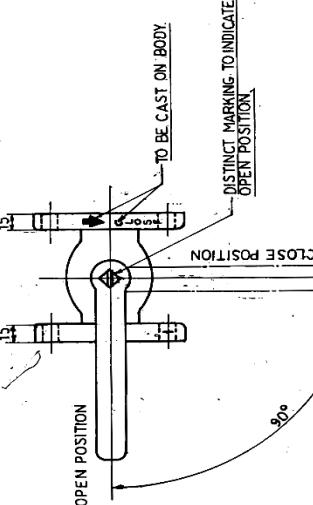
GROUP WD-83062-S-07

PLATE 85

GUARD's EMERGENCY BRAKE VALVE
See Rule D.1.2.9



- NOTE—
1. DIMENSIONS SHOWN ARE OBLIGATORY.
 2. DIMENSIONS SHOWN THUS * AND OTHER IMPORTANT DIMENSIONS SHALL BE FURNISHED.
 3. THE VALVE SHALL BE BALL AND OLF. TYPE.
 4. THE FLOW AREA OF VALVE SHALL MATCH 25 mm².
 5. THE VALVE FOR PASSENGER STOCK SHALL BE PROVIDED WITH Ø 8 mm HOLE AT OUTLET PORT AS PER PARA 3 OF APPENDIX-C OF Q2-ABR.



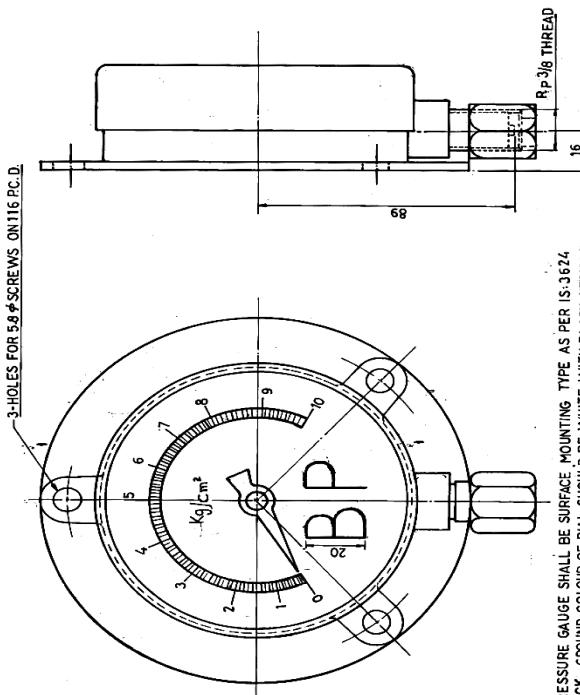
GUARD'S EMERGENCY BRAKE VALVE		SUPERSEDED BY	FOR AIR BRAKE ON BRAKE VAN
SUPERSEDES	DATE		
SUPERSEDED	03/94	03/94	03/94
REVISED	10/96	10/96	10/96
REVISED	08/02	08/02	08/02

ALT/TYPE	AUTHO	DESCRIPTION	DATE, ASY. DRGS.	R.D.S.O.	GROUP	SK.
						73549

PLATE 86

PRESSURE GAUGE (100 mm) FOR BRAKE PIPE

See Rule D.1.1.2



1. PRESSURE GAUGE SHALL BE SURFACE MOUNTING TYPE AS PER IS:3624.
2. BACK GROUND COLOUR OF DIAL SHOULD BE WHITE WITH BLACK LEGIBLE MARKING AND A RED MARKING AT 519 cm^3 PRESSURE.
3. MARKING OF BP SHALL BE PROVIDED ON THE DIAL AS SHOWN IN RED.
4. CASING TO BE PAINTED WITH MID BRASSWICH GREEN PAINT TO IS: NO 2226 OF IS: SPECIFICATION 5-1975 AND READY MIXED. PAINT TO IS: 1119.
5. THREADS SHALL BE PARALLEL TO IS: 534.

SUGGESTED BY		FOR AIR BRAKE ON BRAKE VANS	
DESIGNER	DATE	DESIGNER	DATE
UNPASTED (40-100)	1/10/86	PRESSURE GAUGE(100 mm)	
DRAWN (40-100)	1/10/86	FOR BRAKE PIPE	
TRACED			
SHEET			

ITEM NO.	ITEM AUTH.	DESCRIPTION	ASSY. DRG.	B.G.	R.D.S.O. GROUP	M.G.
SK.73553						

PLATE 87

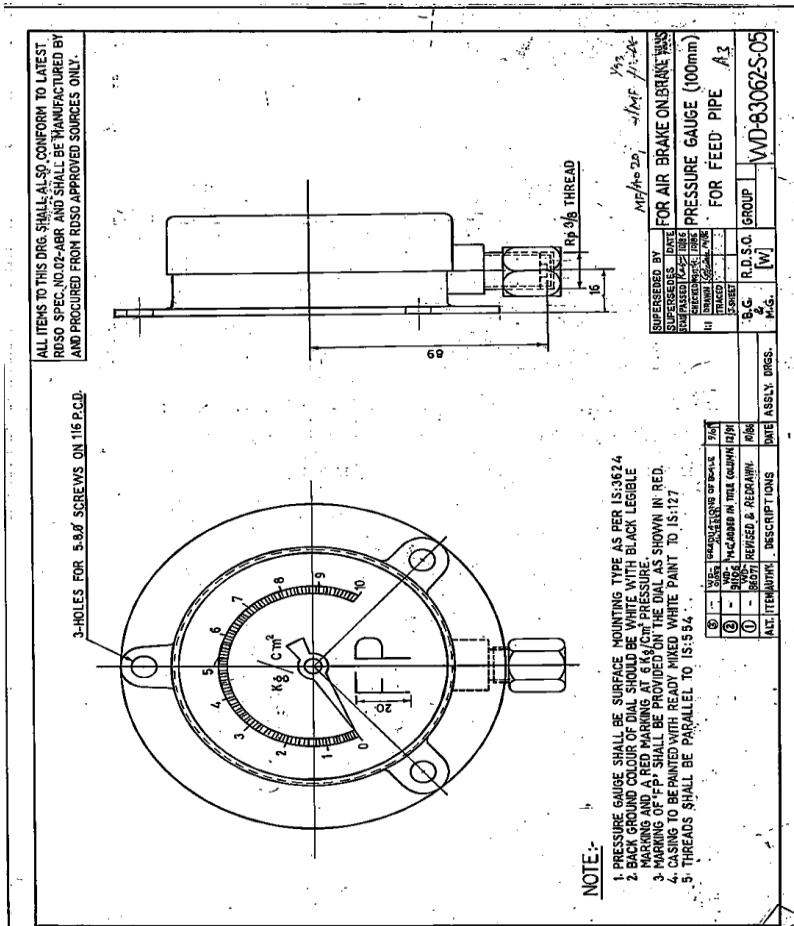


PLATE 88

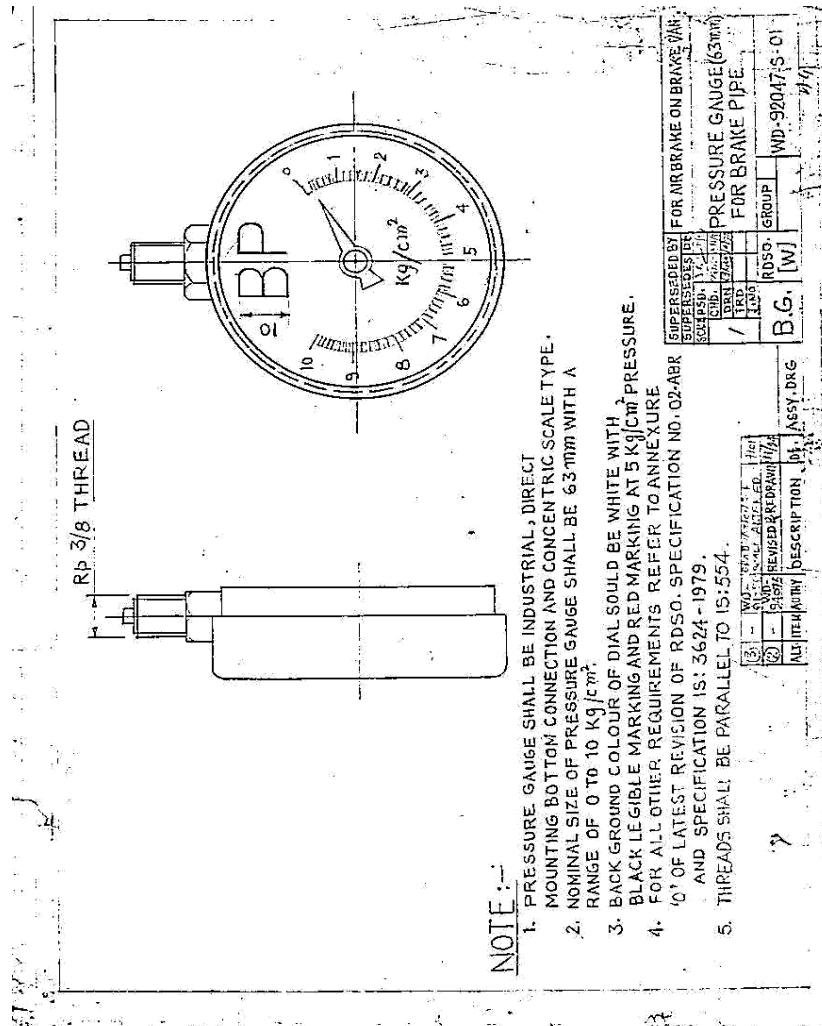


PLATE 89

PRESSURE GAUGE (63 mm) FOR FEED PIPE

See Rule D.1.1.2

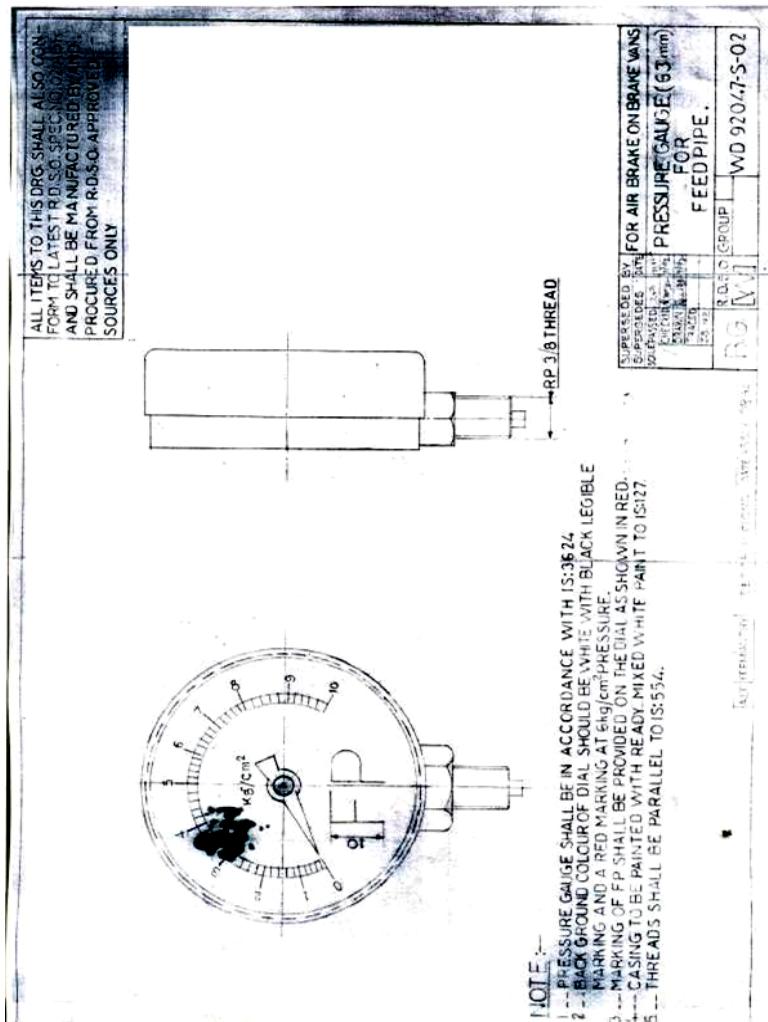
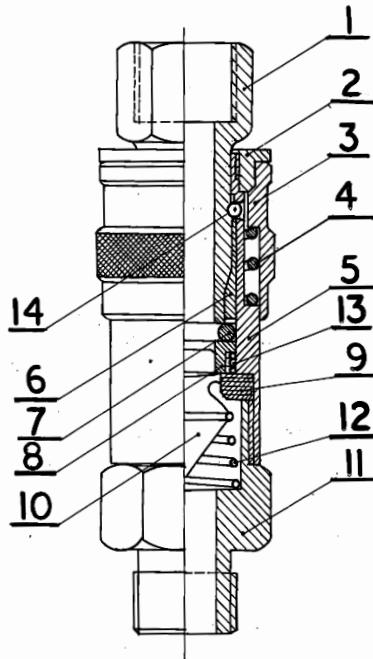


PLATE 90

QUICK COUPLING -BVZC
See Rule D.1.1.2 & D.1.2.10



QUICK COUPLING ARRANGEMENT (PLUG & SOCKET ASSLY.)

NOTE:-

1. THE QUICK COUPLING WHEN ASSEMBLED WITH AND WITHOUT PLUG SHALL BE LEAK PROOF WHEN TESTED UPTO 10 KG/CM² AIR PRESSURE.
2. DIM. MARKED THUS \oplus SHALL BE GAUGED.
3. PLUG CONSISTS OF ONE PART ONLY - ITEM NO.1.
4. SOCKET CONSISTS OF 13 PARTS - ITEMS 2 TO 14.
5. FOR OTHER REQUIREMENTS REFER TO APPENDIX 'N' OF LATEST REVISION OF R.D.S.O. SPEC. NO. 02 ABR.
6. LOGTITE SOLUTION SHALL BE APPLIED ON THREADS WHILE ASSEMBLY.
7. COMPOUND GRADE 'C' OF CLAUSE 3.2.4.1 TO IRS R - 48 - 88.
8. COMPOUND GRADE 'E' OF CLAUSE 5.2.4.1 TO IRS R - 48 - 88.

PLATE 91

Schematic for Graduated Release Single Pipe Air Brake System with Bogie Mounted Brake System

See Rule D.1.1.4

SCHEMATIC FOR GRADUATED RELEASE SINGLE PIPE AIR BRAKE SYSTEM WITH BOGIE MOUNTED BRAKE SYSTEM

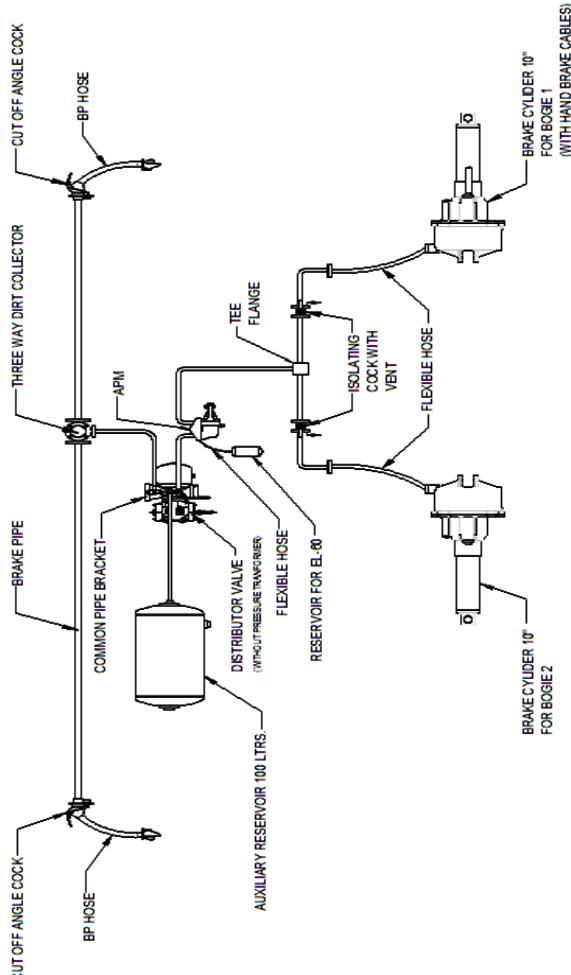


PLATE 92

Schematic for Graduated Release Twin Pipe Air Brake System with Bogie Mounted Brake System

See Rule D.1.1.4

SCHEMATIC FOR GRADUATED RELEASE TWIN PIPE AIR BRAKE SYSTEM
WITH BOGIE MOUNTED BRAKE SYSTEM

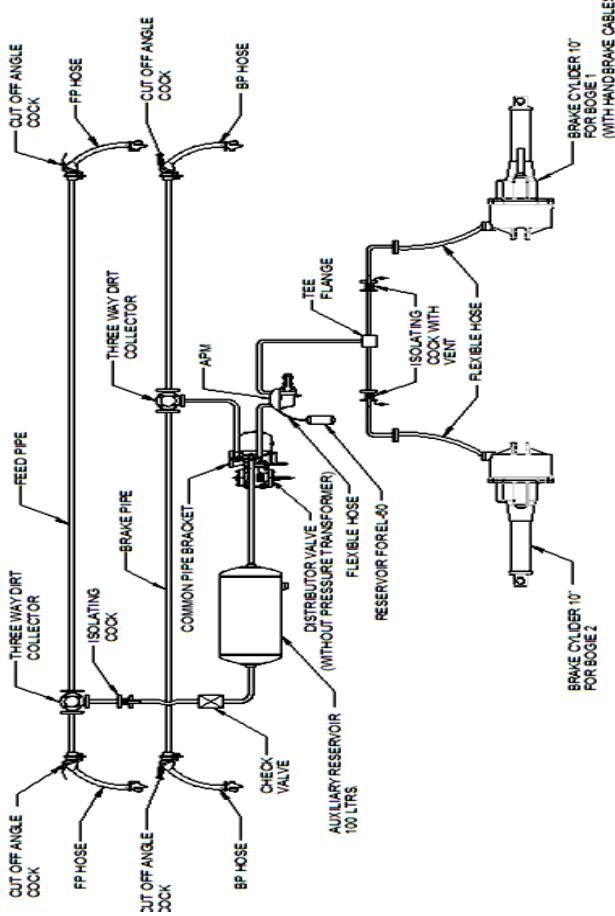


PLATE 93

Rake test rig for single pipe air brake system

See Rule D.1.3.1

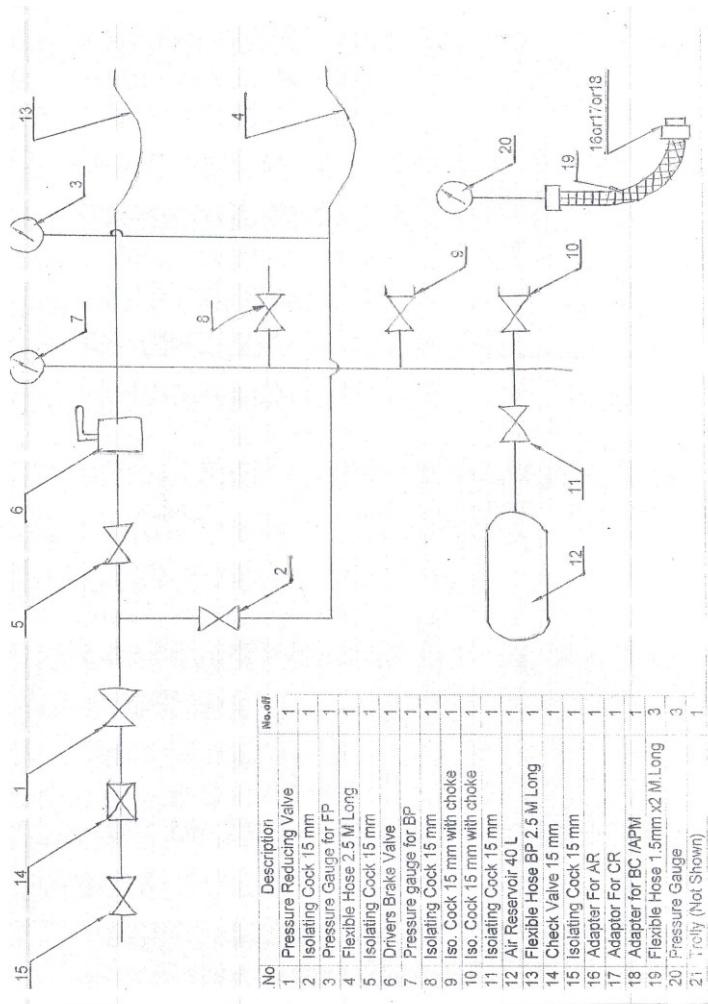
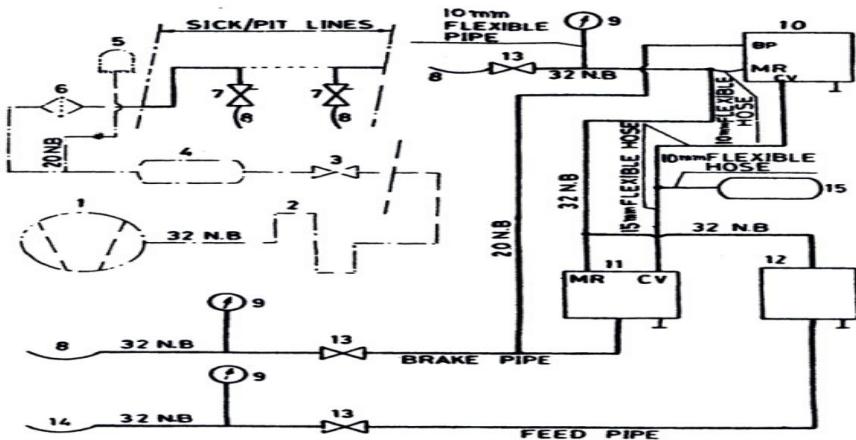


PLATE 94

RAKE TEST RIG FOR TWIN PIPE AIR BRAKE SYSTEM

See Rule D.1.3.1



Note: the equipments shown after the pit line are the parts of mobile test stand.

Fig. Ref. No.	Description	Qty.
1	Compressor 2000L/Min pressure 8-10 Kg/Cm ²	1
2	After Cooler	1
3	Check valve	1
4	Main reservoir 300 lts.1	1
5	safety valve	1
6	Filter	1
7	Cut off angle cock	2
8	Brake hose coupling BP	2
9	Single pressure gauge 6"	3
10	Driver's Brake valve	1
11	Relay valve DU -22	1
12	Feed valve F-2	1
13	Isolating cock	3
14	Brake hose coupling FP	1
15	Equalising reservoir 9L	1

PLATE 95

**MANUAL ADJUSTMENT OF BRAKE GEAR FOR
WAGON FITTED WITH CASNUB BOGIES**

See Rule D.2.1

During POH/ROH or in field when brake blocks are changed, manual adjustment of pin in end pull rod hole to be done as per wheel tread diameter given below.

Hole diameter on tread	Wheel
A	1000 - 982
B	981 - 963
C	962 - 944
D	943 - 925
E	924 – 906

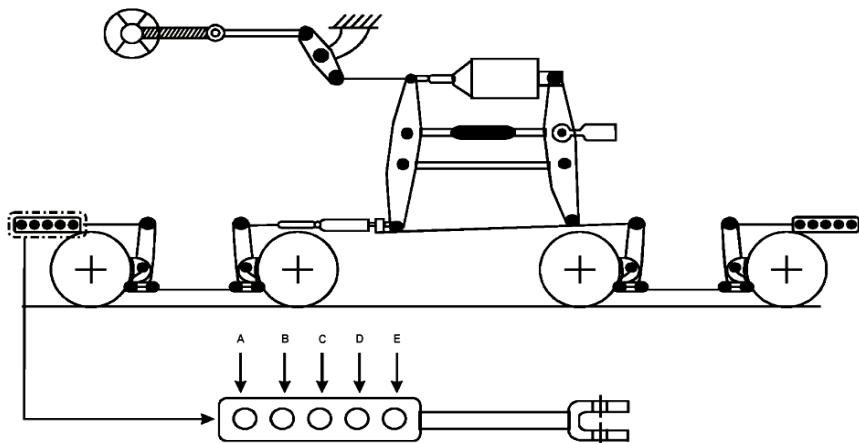


PLATE 96
EMPTY LOAD BOX FOR BOXN WAGON
BOGIES
See Rule D.2.2

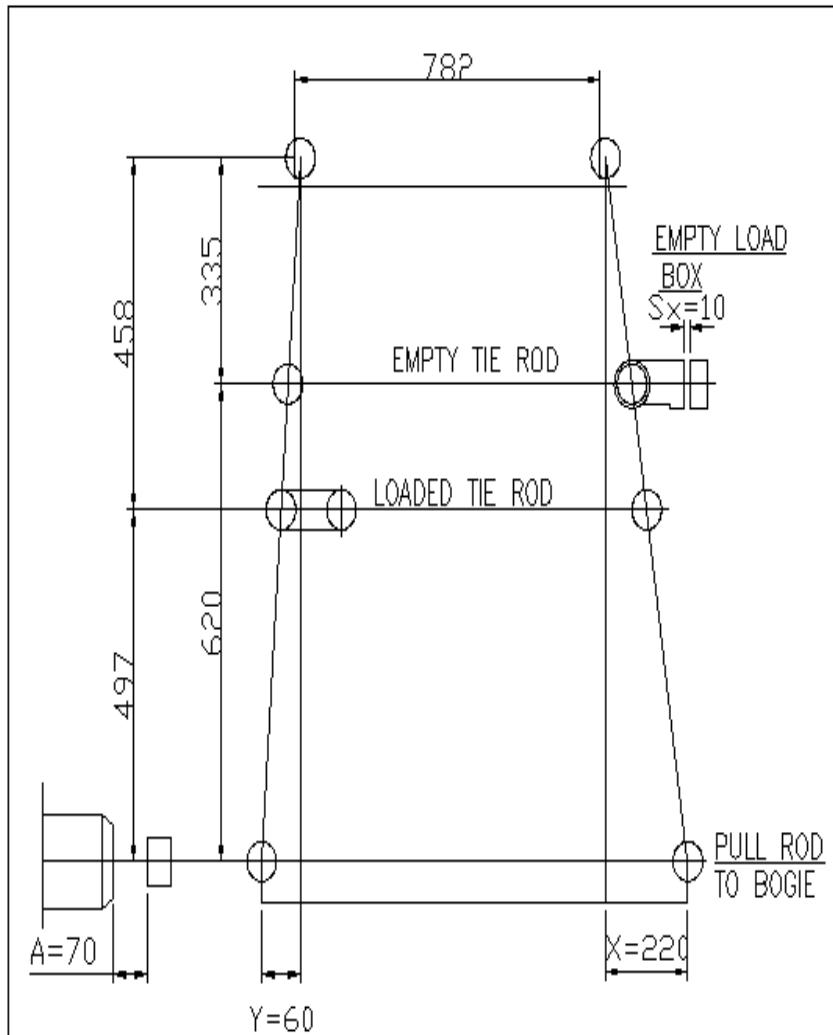
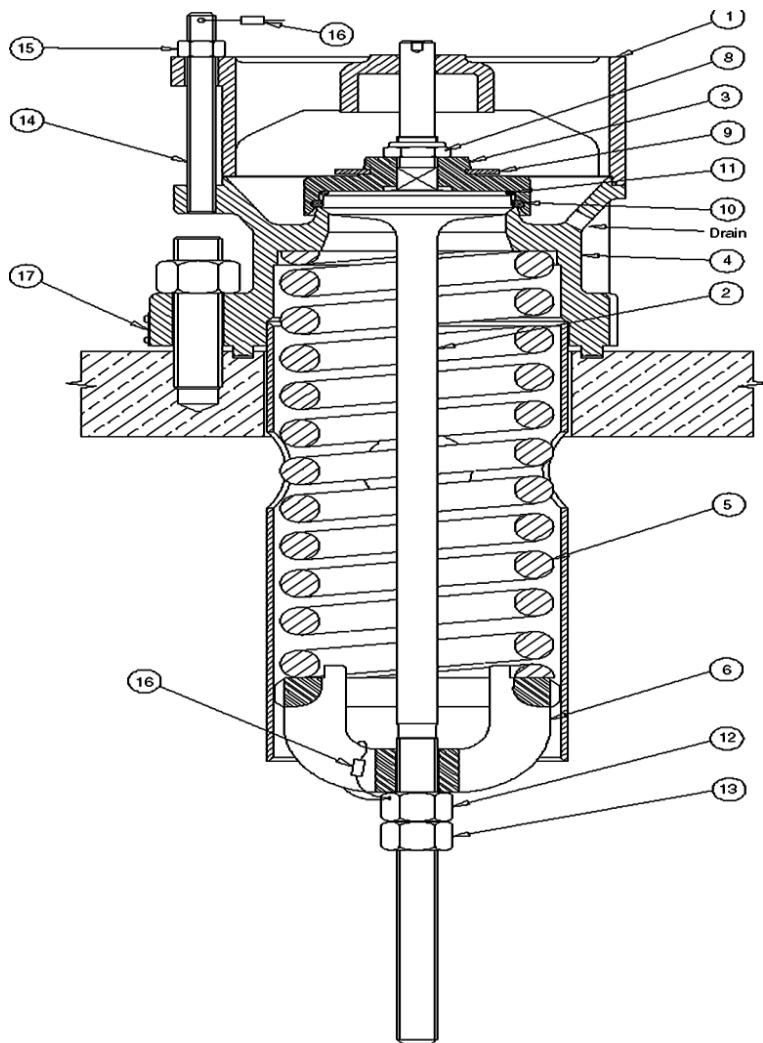


PLATE 97

300 SAFETY VALVE MIDLAND A-3200

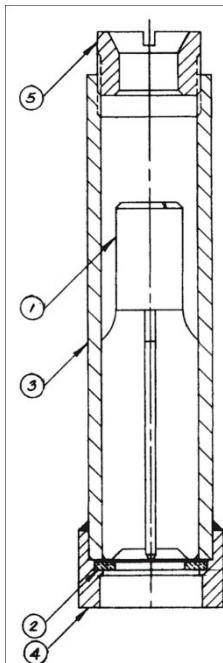
See Rule E.4.1.9.1 & 4.1.9.2



Sr. No.	Reqd. No	Description	Material	Item No.
1.	1	Top guide	Steel W S S insert	32-1-XS
2.	1	Stem	St. steel	32-2-S S
3.	1	Retainer	Steel Cd plated	32-3-C S
4.	1	Body	Steel	32-4-C S
5.	1	Spring	Metal alloy steel, Cd plated	See table
6.	1	Follower	Steel Cd plate	32-6-C S
7.	1	Spring guide	Steel	32-7-C S
8.	1	Top lock nut	Steel Cd plate	23-8-C S
9.	1	Washer	Layer neuprin	23-9-L N
10.	1	Seat 'O' ring	Buna N 70 D	32 -10-V N
11.	1	Stem 'O' ring	Buna N 70 D	32-11-V N
12.	1	Lower adjustment nut	Steel Cd plated	23-12-C S
13.	1	Lower lock nut	Steel Cd plated	23-13-C S
14.	4	Stud	Metal alloy steel, Cd plated	10-14-C S
15.	4	Stud nut	Steel Cd plated	10-15-C S
16.	2	Seal	Lead W S S wire	10-16-PV
17.	1	Name plate	St. steel	See table
Pressure setting	C F M (Air)	Spring no.	Valve no.	Name plate
225 P S E 15-85 KG/cm ²	21800 10.3 M3/see	322.5 AS	A-3225	32-23 SS

- (i) Remove the complete safety valve from the man hole cover plate and dismantle the components.
- (ii) Remove all the rust and dust from the components and inspect all them for any damage, excessive correction, damaged; excessively worn out components should be replaced.

PLATE 98
CHECK VALVE (MIDLAND A-134-W)
See Rule E.4.1.11.1

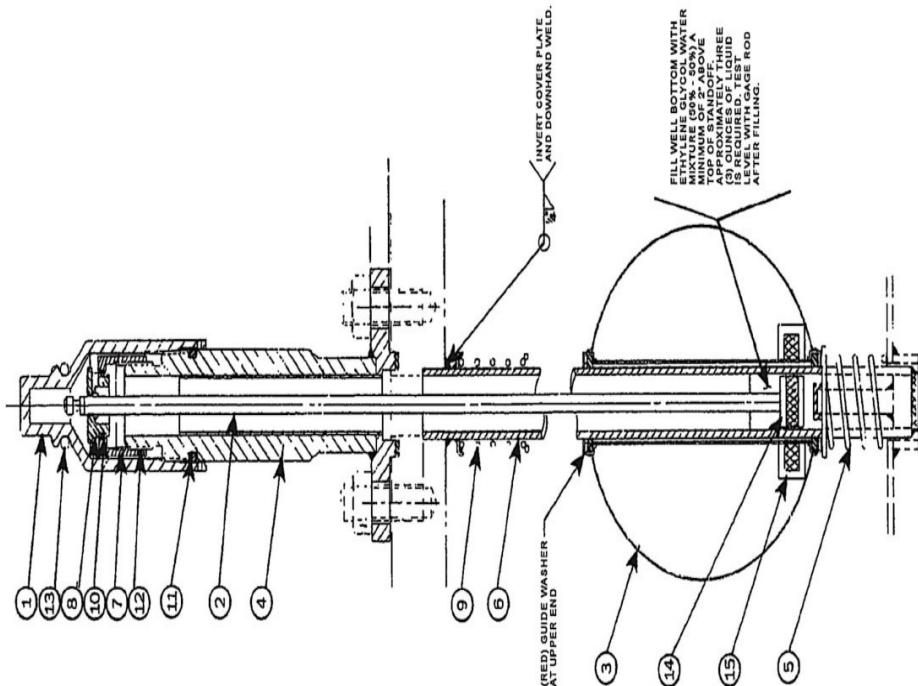


ITEM No.	PART NAME	MATERIAL	PART NUMBERS
1.	FLOT	MALL IRON	130-1-MI
2.	WASHER	STEEL	130-2-CS
3.	BODY	STEEL	134-3-CS
4.	COUPLING	STEEL	134-4-CS
5.	PLUG	STEEL	134-5-CS

Max. Capacity -180 GPM of Propane

PLATE 99

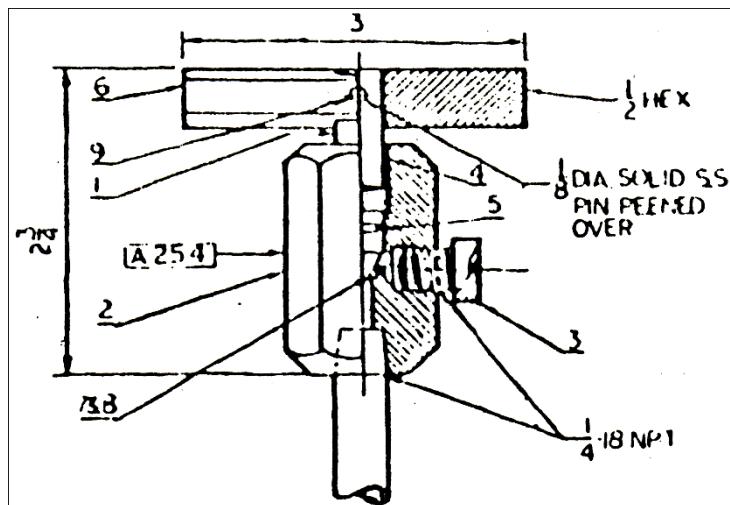
MAGNETIC DEVICE
See Rule E.4.1.12



Items of Magnetic Device

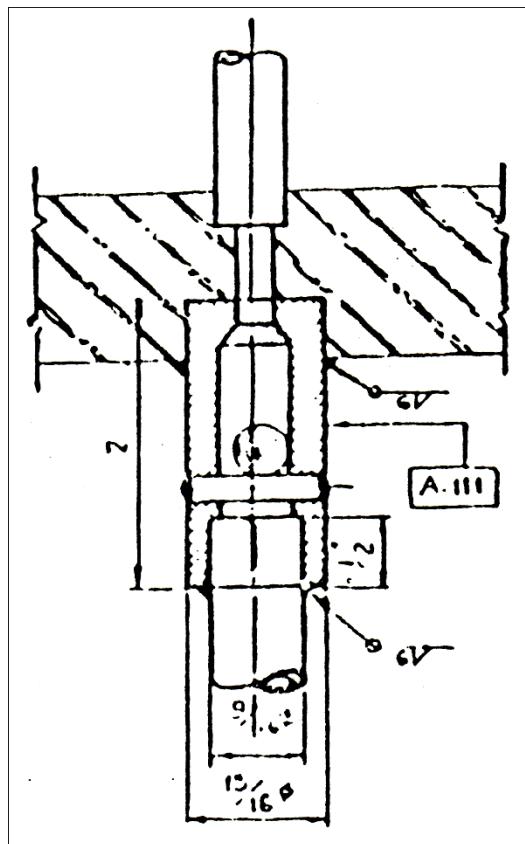
Sr. No	Item No.	Reqd No.	Name if items	Material
1.	612 -1 MI	1	Cover	Mild iron
2.	612 - 2 PE	1	Gauge rod	Plastic
3.	612 – 3 –SS	1	Float structure	St. steel
4.	612- 4-CS	1	Body	Steel
5.	612 – 5 S S	1	Spring	St. steel
6.	612 – 6 S S	1	Float gauge tube	St. steel
7.	612 – 7 C S	1	Install core nut	Steel
8.	612 – 8 P S	1	R G adjuster	Plastic
9.	612 – 9 V N	1	Spring bumper	Bune N
10.	612 – 10 S I	1	RG position seal	Silicon
11.	612 – 11 V N	1	Cover seal	Bune N
12.	612 – 12 C S	1	Set screw	Steel
13.	612 – 13 C S	1	Chain	Steel
14.	612 – 14 F C	1	Gauge rod magnetic structure	Plastic Ferro ceramic
15.	512 – 15 F C	1	Float magnetic structure	Plastic Ferro ceramic

PLATE 100
SAMPLING VALVE (MIDLAND A-254)
See Rule E.4.1.13



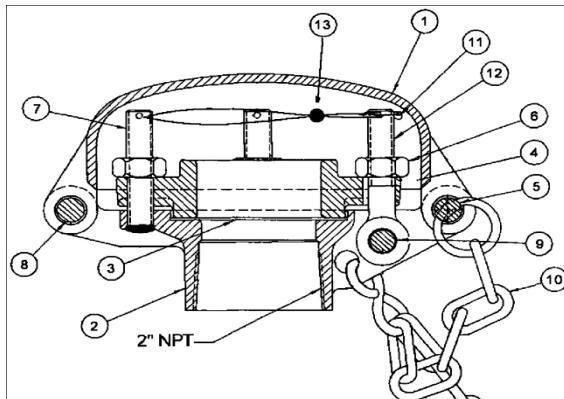
ITEM NO.	NAME	MATERIAL
1.	STEM	S.S
2.	BODY	S.S
3.	PLUG	S.S
4.	ROLL PIN	S.S
5.	'O' RING	BUNA-N
6.	HANDLE	C.R.S
7.	SEAT	TEFLON
8.	RE TAINER	S.S
9.	PIN	S.S

PLATE 101
FLOW CHECK VALVE FOR SAMPLING VALVE
See Rule E.4.1.13.5



ITEM NO.	NAME	MATERIAL
1.	VALVE FLOW CHECK	18.8.55

PLATE 102
SAFETY VENT A-434
See Rule E.4.4.3.3.1.5 (i)



ITEM NO.	NO REQD.	PART NAME
1.	1	TOP
2.	1	BASE
3.	1	DISC
4.	1	RETAINER
5.	1	SWING PIN
6.	4	NUT
7.	3	STUD
8.	1	HINGE PIN
9.	1	EYE BOLT PIN
10.	1	CHAIN
11.	4	COTTOR PIN
12.	1	EYE BOLT
13.	1	SEAL
14.	1	TEN CHAIN

PLATE 103
2" & 3" ANGLE VALVE A - 734
See Rule E.4.4.3.3.1.5 (ii)

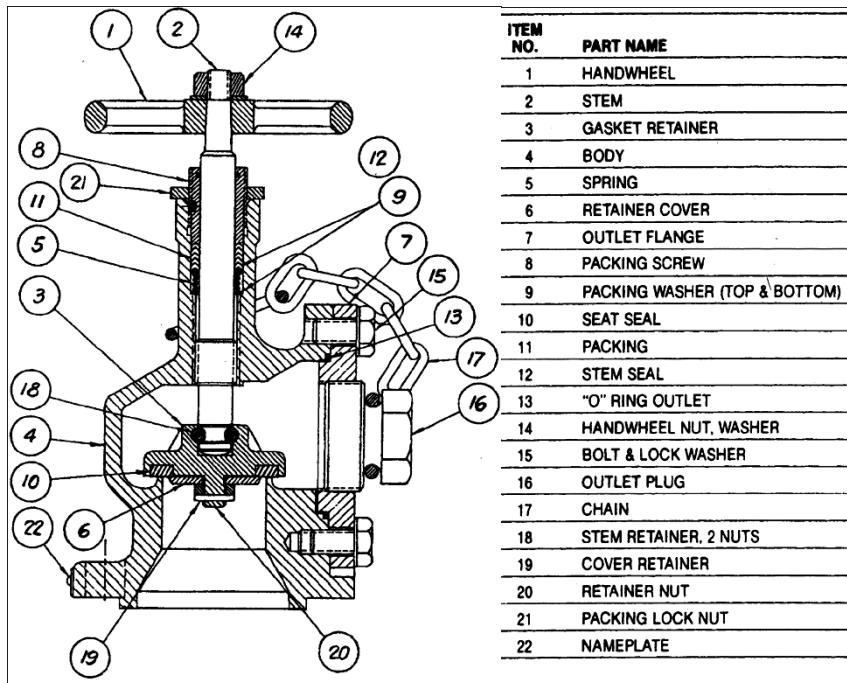
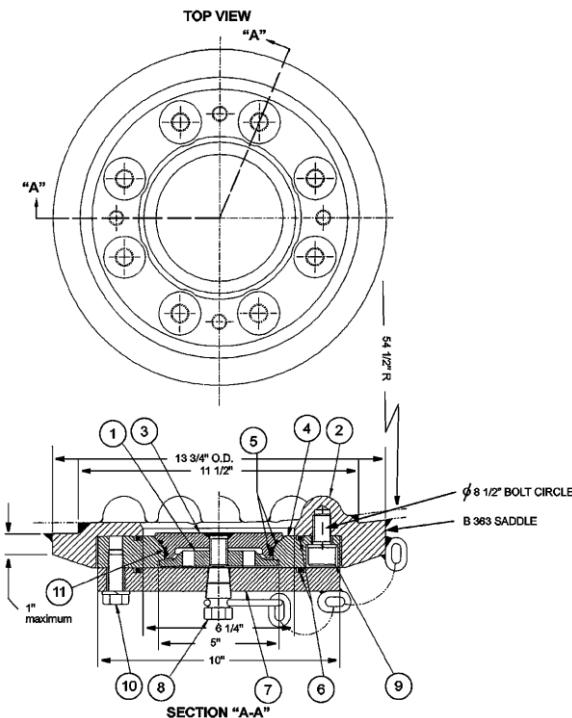


PLATE 104

WASHOUT PLUG

See Rule E.4.4.3.3.1.5 (v)



ITEM NO.	NO REQD.	NAME
1.	1	Plug retainer
2.	1	Washout plug
3.	1	Nozzle flange
4.	2	o-ring
5.	1	Blank flange
7.	1	3/4 ping plug
8.	3/88	Cap screw
9.	4	Shear bolt

PLATE 105
NOMINAL CLEARANCES (CASNUB 22W BOGIE)
See Rule E.2.4.2 (b) (iii)

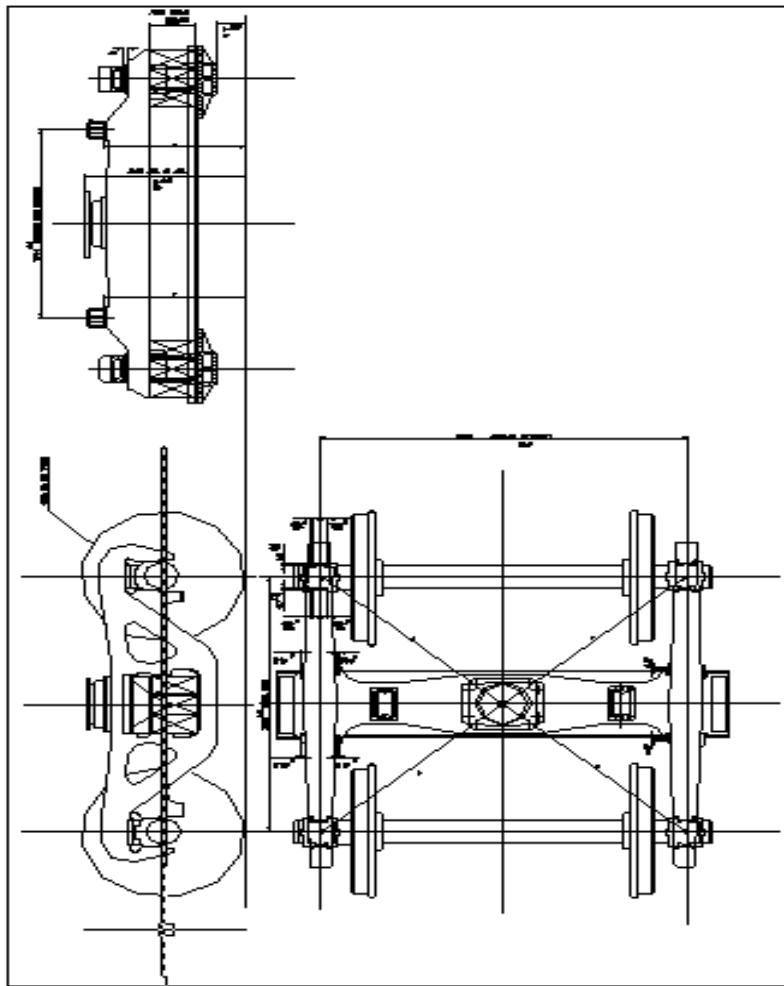


PLATE 106

SIDE BEARER DETAIL (CASNUB 22W BOGIE)

See Rule E.2.4.2 (b) (iv)

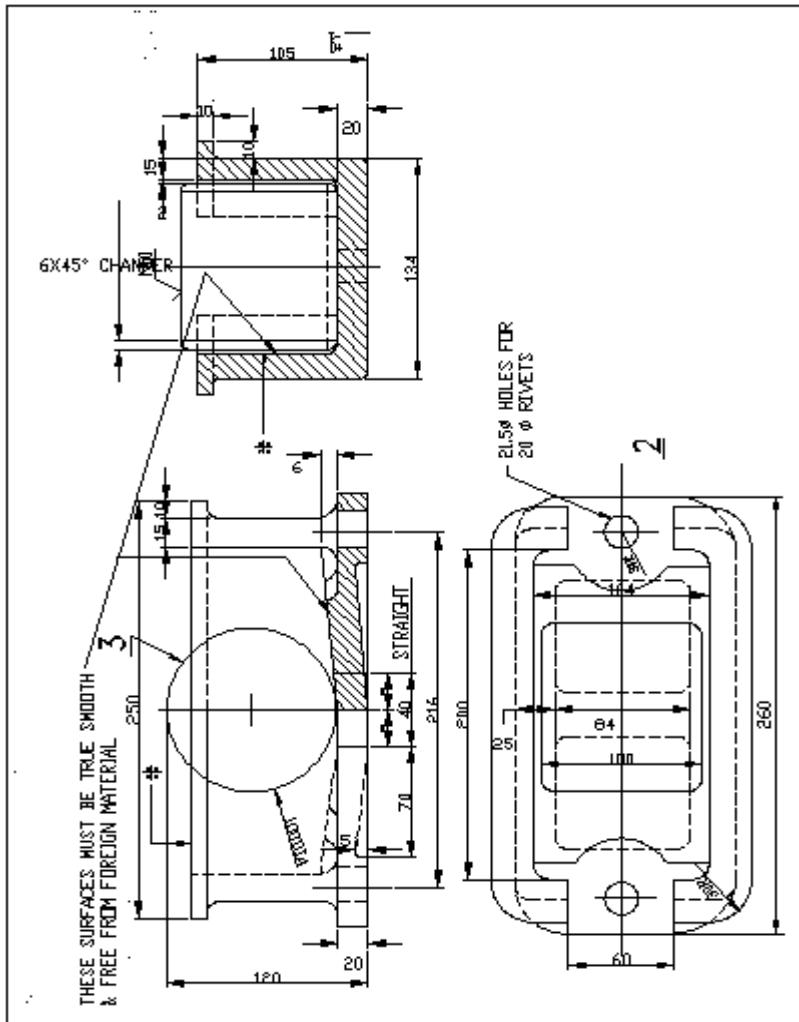


PLATE 107

SIDE BEARER DETAIL (CASN 22W BOGIE)

See Rule E.2.4.2 (b) (iv)

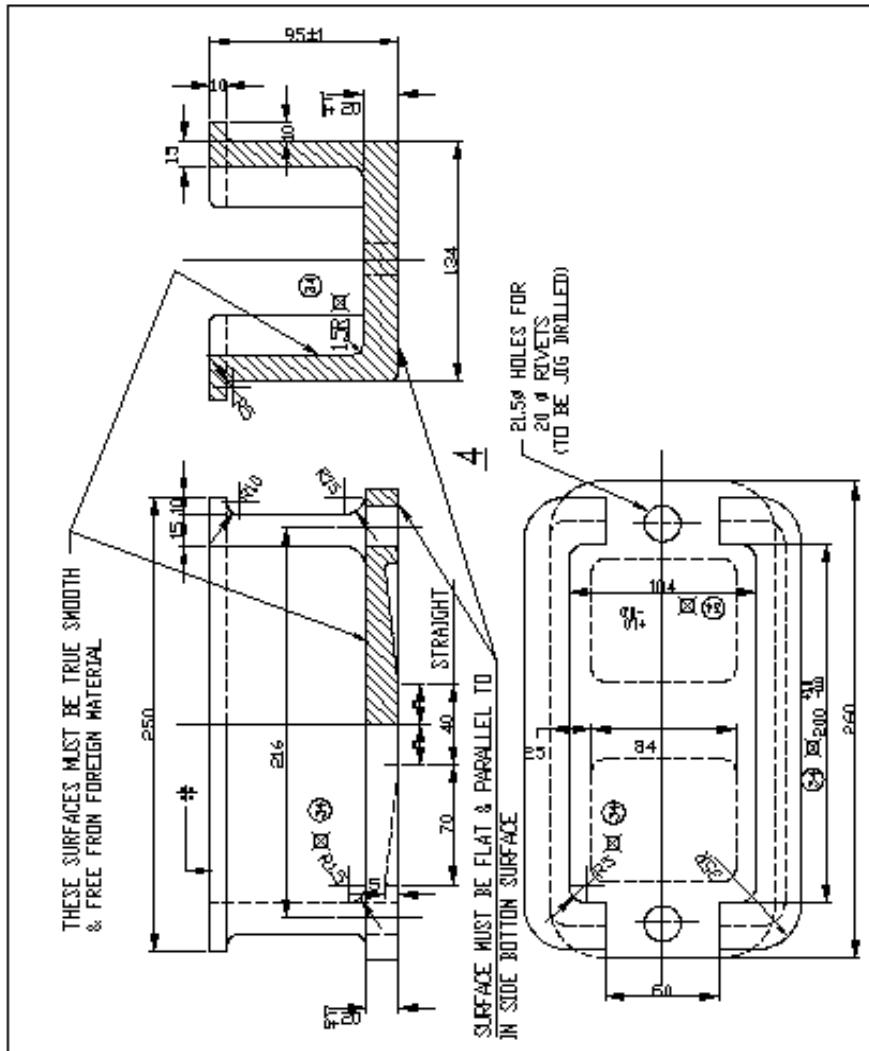
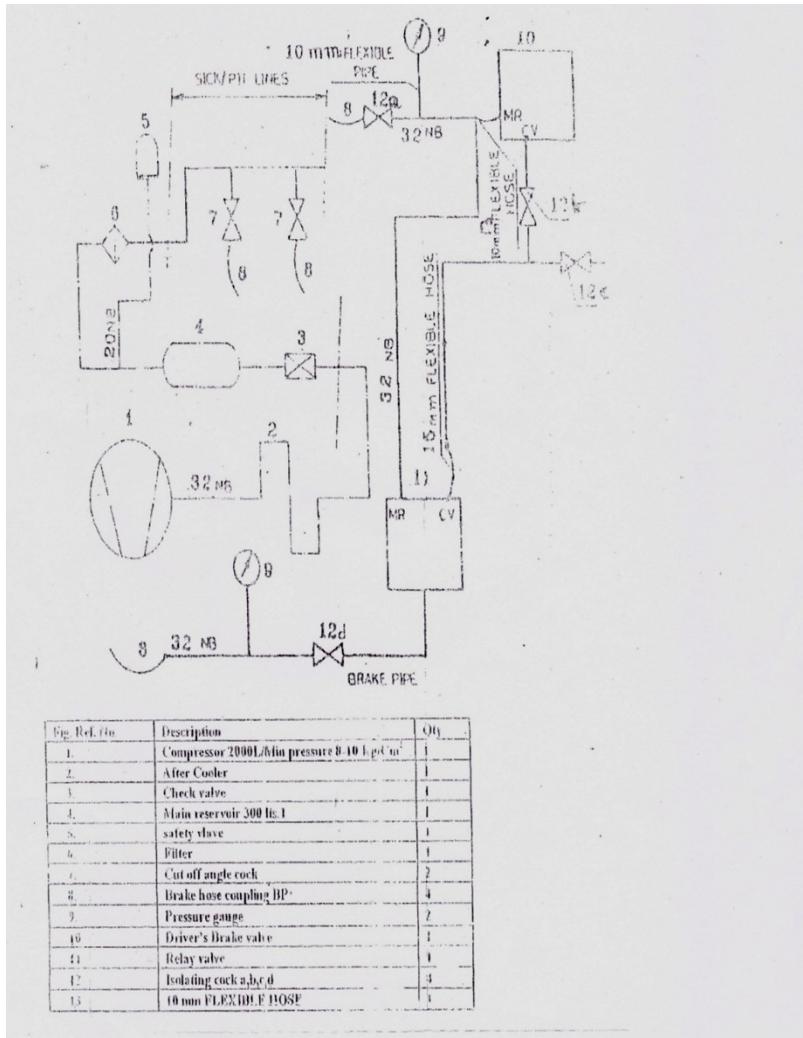


PLATE 108
SINGLE WAGON TEST RIG
See Rule E.2.4.2 (d) (ix)



LIST OF BOOKS/MANUALS REFERRED IN IRCA PART-III			
S N	RDSO publication	Description	Latest edition/ correction
1	G-52	Code of Practice for Rubber lining of Hydrochloric acid Tank Barrel	Nov.1967
2	G-55H	Instructions for Maintenance & Operation of Hydrochloric acid tank wagon type 'THA'	Aug.1976
3	G-62	Maintenance Manual of Alliance II Coupler	June.1977
4	G-65	Maintenance Manual for 4 wheeled Liquefied Petroleum Gas Tank Wagon type 'TPGLR' (Preliminary)	Dec.1999
5	G-66	Maintenance Manual for TSA & MBTSA	1983
6	G-70	Maintenance Manual for BOXN	Aug.1998
7	G-71	Maintenance Manual for Phosphoric acid Tank Wagon	Feb.1999
8	G-72 Rev.II	General Std. Spec. for Fabrication of Wagon 'U' frame & Bogies	Oct.2001 & Corrigendum No.1 of Nov.2002.
9	G-73	Inspection and Maintenance Manual for BOBR/BOBRN	Oct., 2005 (Rev. I)
10	G-76	Inspection and Maintenance of CBC for Line Staff	1987
11	G-79	Inspection and Maintenance of BTAL /BTALN	Apl.1999
12	G-80	Inspection and Maintenance of CBC for Workshop	1989
13	G-81	Inspection and Maintenance of Cartridge Roller Bearing fitted on Casnub Bogie	Feb.2000

S N	RDSO publication	Description	Latest edition/ correction
14	G-83	Instruction for operation and maintenance of bogie caustic soda tank wagon type BTCS.	
15	G-86 Rev.I	Maintenance Manual for Bogie Liquefied Petroleum Gas Tank Wagon type BTPGL	Dec.1999
16	G-90	Maintenance and Operating Instruction for Bogie Petroleum Tank Wagon type 'BTPN'	Aug.1998
17	G-95 Rev. I	Instructions for Inspection and Maintenance for Casnub Bogies	June.2003
18	G-97	Maintenance Manual for Air Brake System for Freight Stock	July 2001 & Amendment No.03 Jan.2010
19	G-100	Technical Pamphlet for Instructions & Maintenance of Automatic Twist Lock (ATL) devices fitted on Container flat wagons.	July. 2010 & May. 2012
20	G-103	Technical Pamphlet on strengthening of under frame, repair of critical weld joints, repair of centre sill, Centre girders and sole bar cracks.	Nov. 2010 May.2011 (Rev.2)
21	G-106	Operation and Maintenance Manual For BCACBM Wagon	Feb-2014 (Version-Nil)
22	G-108	Instruction for Maintenance and Operation of Bogie Petrol Tank Wagon type BTFLN	
23	WT-77-I	Instructions for Inspection and Maintenance of 20.3 tonne Roller Bearing axle boxes fitted on wagon.	Dec.1985

S N	RDSO publication	Description	Latest edition/correction
24	WT-79-I	Instructions for Inspection and Maintenance of 16.3 tonne Roller Bearing axle boxes fitted on wagon.	1987
24	WT-79-I	Instructions for Inspection and Maintenance of 16.3 tonne Roller Bearing axle boxes fitted on wagon.	1987
25	R-7	Instructions for Rectification of Welding Defect on Bogie frame (BOX Wagon)	Sep.1963

SUMMARY OF PLATES			
PLATE NO.	DESCRIPTION	RULE NO.	Page No.
1	Marking of Covered Wagon	2.4	01
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Disclaimer

These Rules shall be followed in Broad gauge Workshops, Sick lines/ROH depots and Yards along with the instructions issued by CMEs of the individual Railways.

It should be clear to all concerned that service wear limits mentioned in this book are not safety limits. Service wear limits are far more restrictive when compared with wear limits for safety. Hence, any variation from service wear limits as stipulated should, under no circumstances, be considered unsafe for running of wagons on trains.