CHAPTER 1

INTRODUCTION

101. GENERAL

a) For ensuring optimum performance of wagon fleet, it is necessary that:

- Preventive maintenance is given timely to avoid occurrence of defects
- Defects are attended effectively and well in time so that the wagons remain fit for traffic use till the next schedule falls due
- Detention during examination and repairs is kept to minimum
- Frequent failures of similar nature are studied and necessary modifications/ design changes are effected to eliminate the cause of such failure.

In course of time and based on experience, various procedures/ schedules for maintenance of wagons have been prepared. The schedules and procedures have been largely standardized and issued by Railway Board, RDSO, IRCA etc. However, in many cases, instructions have been issued piecemeal. This manual consolidates various standing instructions issued on wagon maintenance and lays down guidelines for ensuring uniformity in the practices to be followed on various railways. The important aspects of wagon maintenance have been covered and wherever necessary, the references are indicated so that the reader can refer these, if necessary, for detailed instructions and procedures not contained in this manual. In addition, the Workshop Orders, Carriage and Wagon circulars, important letters and Technical Standing Orders issued by Zonal Railways; taking into account the particular requirements and conditions existing on the railways; must be read in conjunction with this manual.

b) This manual does not deal with the special stock or ODCs for which separate instructions are issued by RDSO/manufacturers. It also doesn't cover non-pooled stock, used only on one or two zonal Railways.

c) At the end of this chapter, the list of important instructions and references have been given. Throughout this manual, wherever IRCA Part III has been mentioned, it refers to IRCA Part-III, 2000 edition.

d) While proper maintenance plays a vital role in ensuring effectiveness of the rolling stock, an equally crucial role is played by proper handling and careful operation of the wagon fleet so as to minimise the incidences of damage and subsequent need for repairs. Care must be taken to avoid bumping of wagons having CBC Knuckles in closed position. Proper release of brakes must be ensured. Cleaning of wagon interiors after unloading of corrosive, hygroscopic

or other harmful consignments is necessary by unloading party and to be ensured by the commercial staff. Place free end of hose pipes on dummy carriers and couplings on suspension hooks.

102. IMPORTANT DIMENSIONS OF WAGONS

The important dimensions and sketches of main type of wagons have been given below.

TABLE 1.1 UIC BOGIE WAGONS – VACUUM BRAKE

Type of wagons	**BOXT**	**BOXC**	**BCXT**
Length over Head stock (mm)	12800	12800	14500
Length over Buffers (mm)	14070	N.A.	15770
Length over Couplers (mm)	14082	13729	15782
Length inside/ Length of wall (mm)	12792	12790	14494
Width inside (mm)	2852	2852	2944
Inside height/ Height of wall (mm)	1880	1880	2446
Wheel Base (mm)	2000	2000	2000
Bogie Centre (mm)	8800	8800	10,000
Journal Size (mm)	RB 130	RB 130	RB 130
Journal Centre (mm)	2240	2240	2240
Wheel dia on tread (mm)	1000	1000	1000
Max. Axle load (t)	20.32	20.32	20.32
Tare (t)	26.23	25.0	28.5
Pay load (t)	55.05	56.28	52.8
Gross load (Pay + Tare) (t)	81.28	81.28	81.3
Ratio Gross Load/Tare	3.1	3.24	2.85
Loading density (t/m)	5.77	5.92	5.16
Floor Area (Sq. m)	36.5	36.5	42.7
Cubic Capacity (Cu. m)	68.58	68.58	104
Total Brake power- Empty (Kg)	19339	19339	18618
Total Brake power – Loaded (Kg)	34913	34913	34192

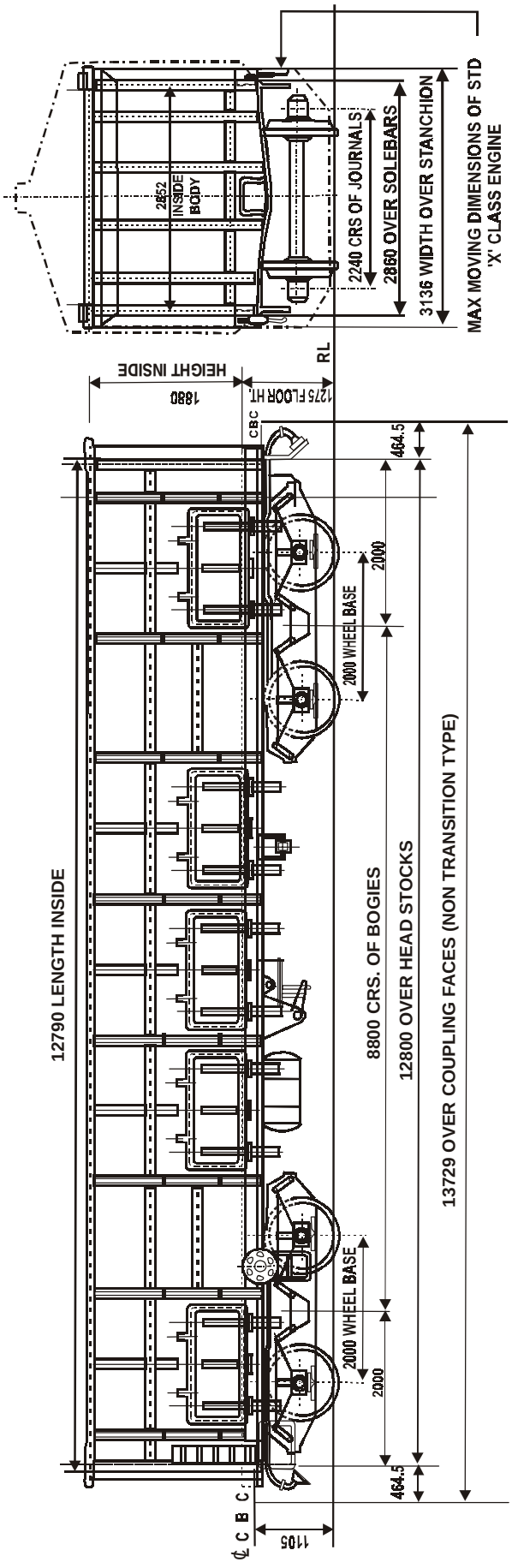


Fig. 1.1 BOX WAGON (Ref. R.D.S.O. SK.101-62601)

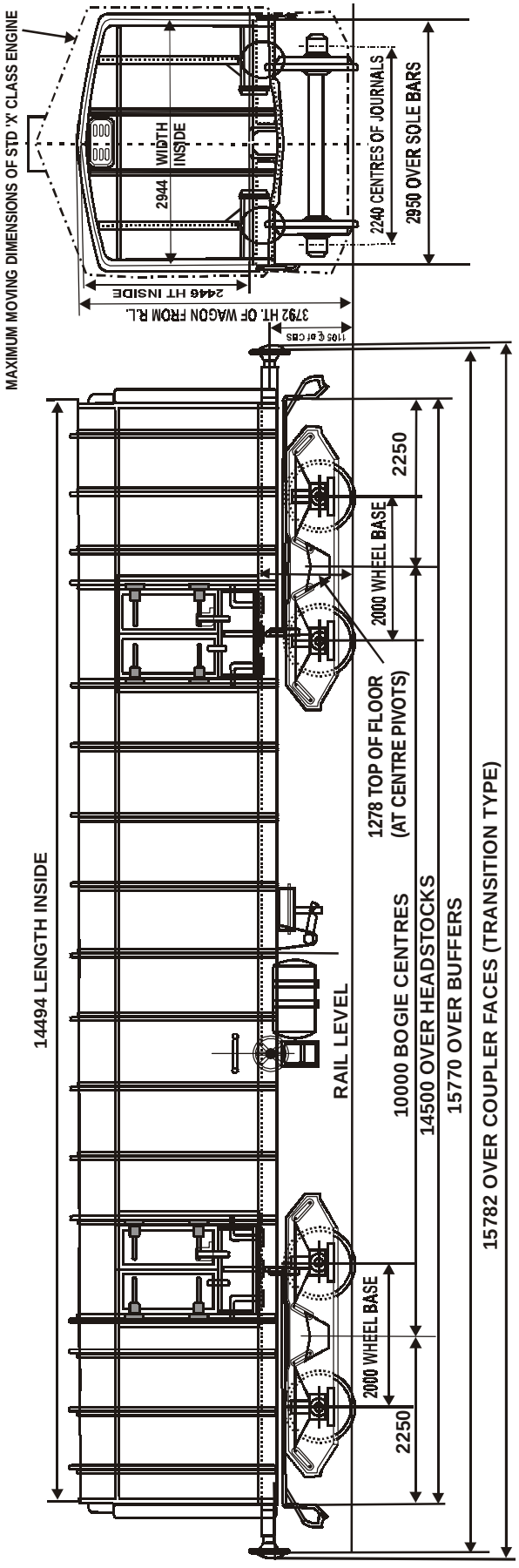


Fig. 1.2 BCX WAGON (Ref. R.D.S.O. SK. 701-63901)

TABLE 1.2 CASNUB BOGIE WAGONS – AIR BRAKE

Type of wagons	**BOXN**	**BCN**	**BRN**
Length over Head stock (mm)	9784	14500	13716
Length over Buffers (mm)	-	-	14986
Length over Couplers (mm)	10713	15429	14645
Length inside/ Length of wall (mm)	9784	14494	13716
Width/Dia inside (mm)	2950	2944	2845
Inside height/ Height of wall (mm)	1950	2446	
Wheel Base (mm)	2000	2000	2000
Bogie Centre (mm)	6524	10,000	9144
Journal Size (mm) CTRB	144.5	144.5	144.5
Journal Centre (mm)	2260	2260	2240
Wheel dia on tread (mm)	1000	1000	1000
Max. Axle load (t)	20.32	20.32	20.32
Tare (t)	22.47	27.20	24.4
Pay load (t)	58.81	54.08	56.9
Gross load (Pay + Tare) (t)	81.28	81.28	81.3
Ratio Gross Load/Tare	3.62	2.99	3.33
Loading density (t/m)	7.59	5.27	5.55
Floor Area (Sq. m)	28.86	42.67	39
Cubic Capacity (Cu. m)	56.28	104.37	
Total Brake power- Empty (Kg)	18900	18900	18900
Total Brake power – Loaded (Kg)	33642	33642	33642

TABLE 1.3 OPEN FOUR WHEELER WAGONS

Particulars	Broad gauge		Metre gauge		
Mechanical code	O	OM	MO	MOX	MOM
Description	Open general purpose	Open military	Open	Open heavy	Open military
Tare (t)	10.31	10.62	5.69	5.84	5.5
Pay load (t)	22.29	21.98	18.71	18.56	18.9
Axle load(t)	16.30	16.30	12.2	12.2	12.2
Length over buffers/couplers (mm)	7214	9652	7786	7786	7786
Floor area (Sq.m)	16.91	23.85	14.98	14.97	14.98
Cubic capacity (Cu.m)	27.00	15.07	17.5	21.28	9.5
Journal centre (mm)	2235	2235	1475	1475	1475
Journal size (mm)	255x127	255x127	230x115	230x115	230x115
Wheel dia on tread (mm)	1090	1090	725	725	725
Wheel base (mm)	3504	4877	3657	3657	3657
Type of coupler	Screw coupling	Screw coupling	ABC	ABC	ABC
Type of bearing	Plain	Plain	Plain	Plain	Plain
Type of brakes	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum

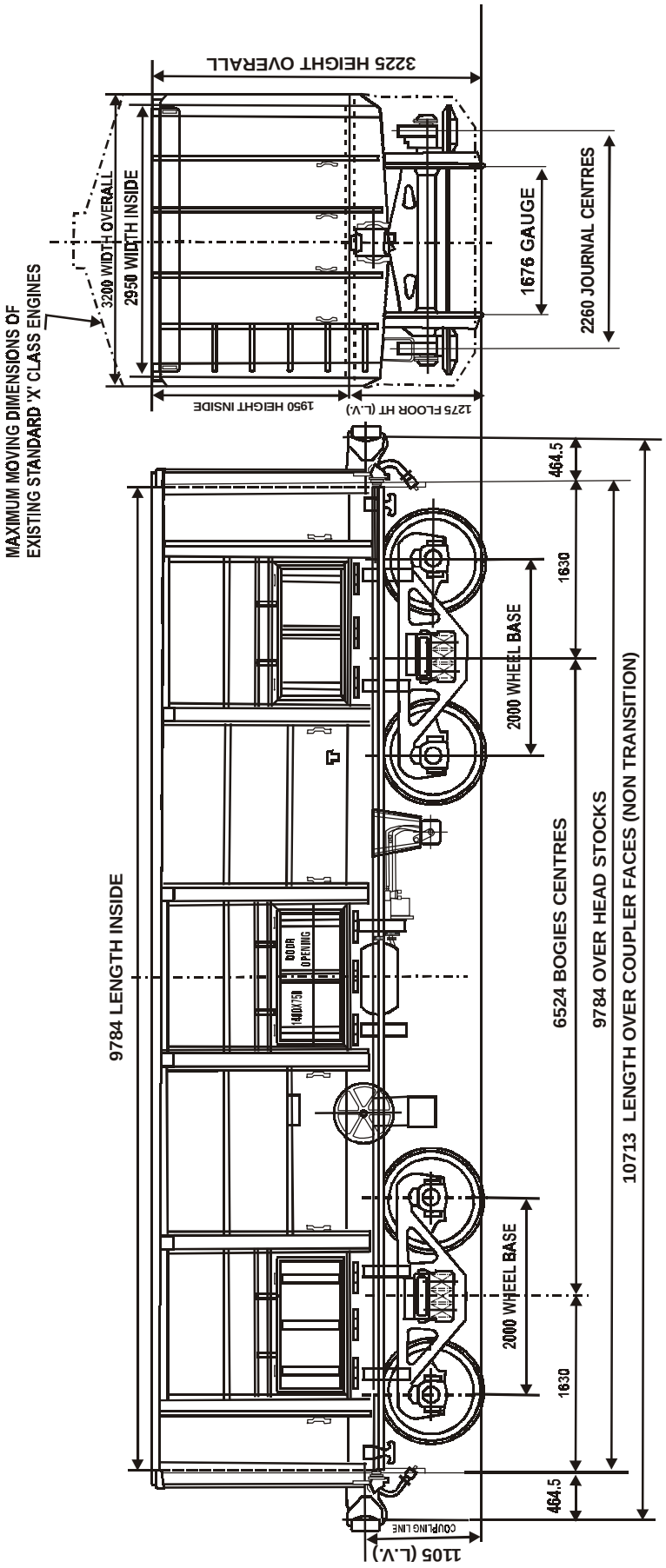


Fig. 1.3 BOXN WAGON (Ref. R.D.S.O. WD - 80007/S-2)

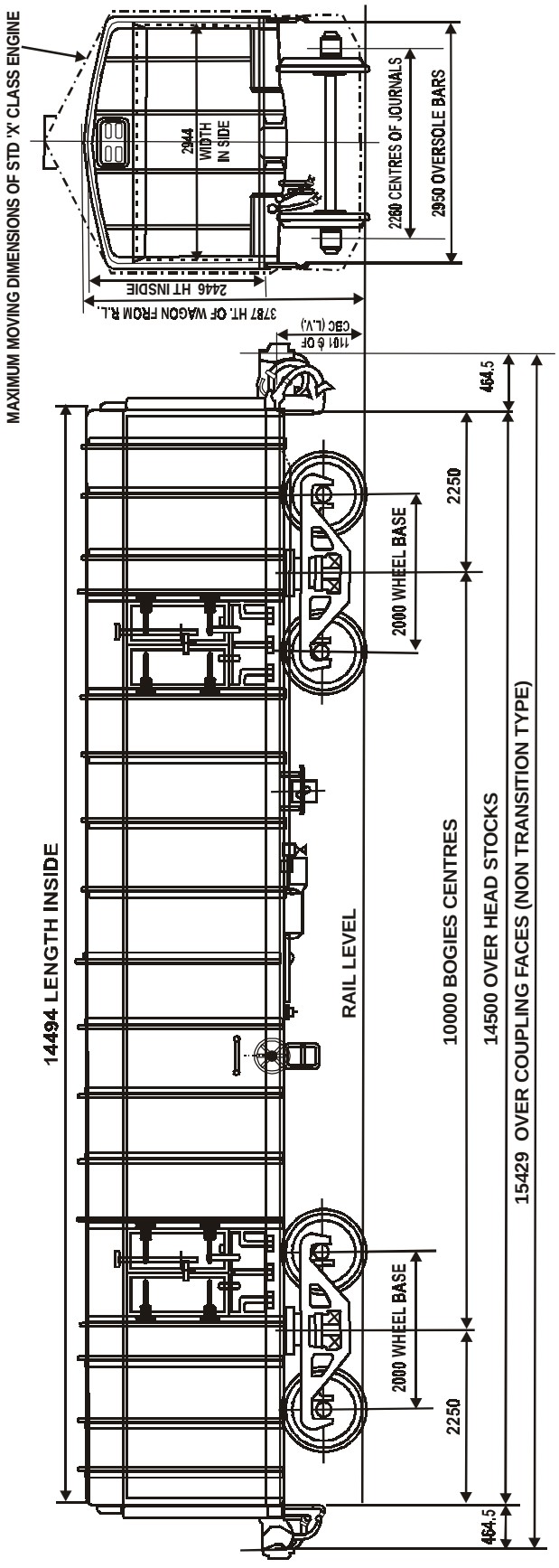


Fig. 1.4 BCN WAGON (Ref. R.D.S.O. WD 84014-S-1)

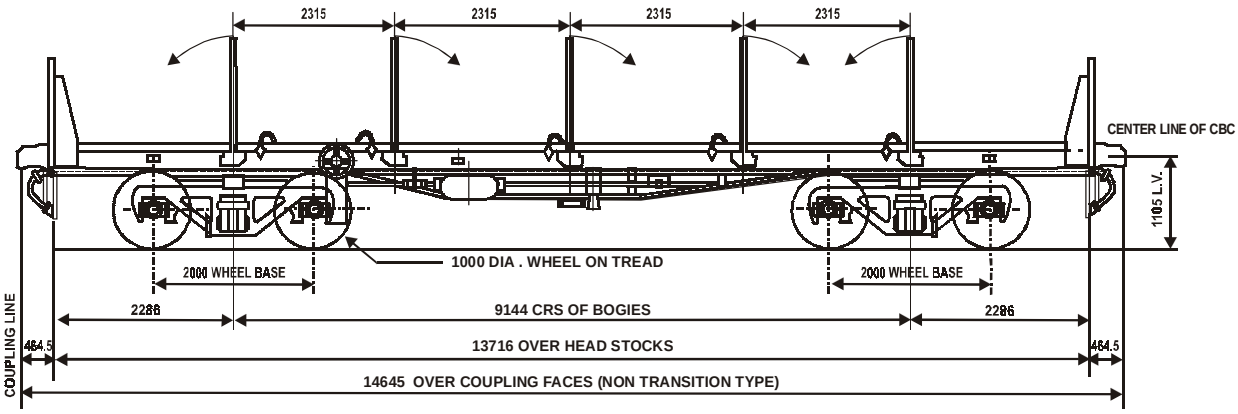


Fig. 1.5 BRN WAGON (Ref. RDSO WD 84013-S-1)

TABLE 1.4 OTHER STANDARD WAGONS

Particulars	Broad gauge				Metre gauge		Narrow gauge
Mechanical code	TP	CRT	BOI	BOY	MBO	MBOC	NOL
Description	Tank Petrol	Covered wagon	Open gondola	Open gondola	Bogie open	Open coal	Bogie open
Tare (t)	12.2	13.1	22.80	19.9	10.82	13.98	8.48
Pay load (t)	20.4	27.54	58.48	71.7	37.98	35.82	24.03
Axle load(t)	16.3	20.32	20.32	22.9	12.2	12.2	8.1
Length over buffers/ couplers (mm)	8280	8822	11629	11929	12511	14340	11430
Floor area (Sq.m)		23.2	30.47	32.13	25.78	29.96	22.76
Cubic capacity (Cu.m)	25.5	61.9	32.0	37.75	16.32	35.0	29.02
Journal centre (mm)	2235	2240	2240	2260	1475	1475	1220
Journal size (mm)	255 x 127	RB 130	130	144.5	230x115	230x115	180x95
Wheel dia on tread (mm)	1090	1000	1000	1000	725	725	585
Wheel base (mm)	4572	4900	6700	7330	7620	9449	7925
Type of coupler	Draw bar	Tran. CBC	CBC	CBC	ABC	ABC	ABC
Type of bearing	Plain/ RB	RB	RB	RB	Plain	Plain	Plain
Type of brakes	Vac	Vac	Vac/Air	Air brake	Vac	Vac	Vac

TABLE 1.5 TANK WAGON

Particulars	Broad gauge				
Mechanical code	TBT	TR	TM	TPGL	TPGLR
Description	Bitumen tank	Coal Tar tank	Molasses tank	Liquid petroleum gas tank	Liquid petroleum gas tank
Tare (t)	13.00	10.8	10.75	20.66	17.1
Pay load (t)	19.5	21.7	21.76	11.84	15.4
Axle load(t)	16.3	16.3	16.3	16.3	16.3
Length over buffers/ couplers (mm)	7215	7215	7215	9652	9652
Dia inside barrel (mm)	2362	2143	2143	2000	2300
Cubic capacity (Cu.m)	23.5	19.4	19.4	24.1	33.1
Journal centre (mm)	2235	2235	2235	2235	2235
Journal size (mm)	RB120 dia	RB120 dia	RB120 dia	RB120 dia	RB120 dia
Wheel dia on tread (mm)	1090	1090	1090	1090	1090
Wheel base (mm)	3505	3505	3505	4877	4878
Type of coupler	Screw coupling	Screw coupling	Screw coupling	Screw coupling	Screw coupling
Type of bearing	RB	RB	RB	RB	RB
Type of brakes	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum

TABLE 1.6 BRAKE VAN

Particulars	Broad Gauge	
Mechanical code	BVG	BVM
Description	Brake van goods	Brake van match truck
Tare (t)	10.77	12.7
Pay load (t)		
Axle load(t)	16.3	16.3
Length over buffers/ couplers (mm)	7213	7213
Journal centre (mm)	2235	2235
Journal size (mm)	225 x 127	225 x 127
Wheel dia on tread (mm)	1090	1090
Wheel base (mm)	3505	3505
Type of coupler	Screw coupling	CBC
Type of bearing	Plain	Plain
Type of brakes	Vacuum	Vacuum

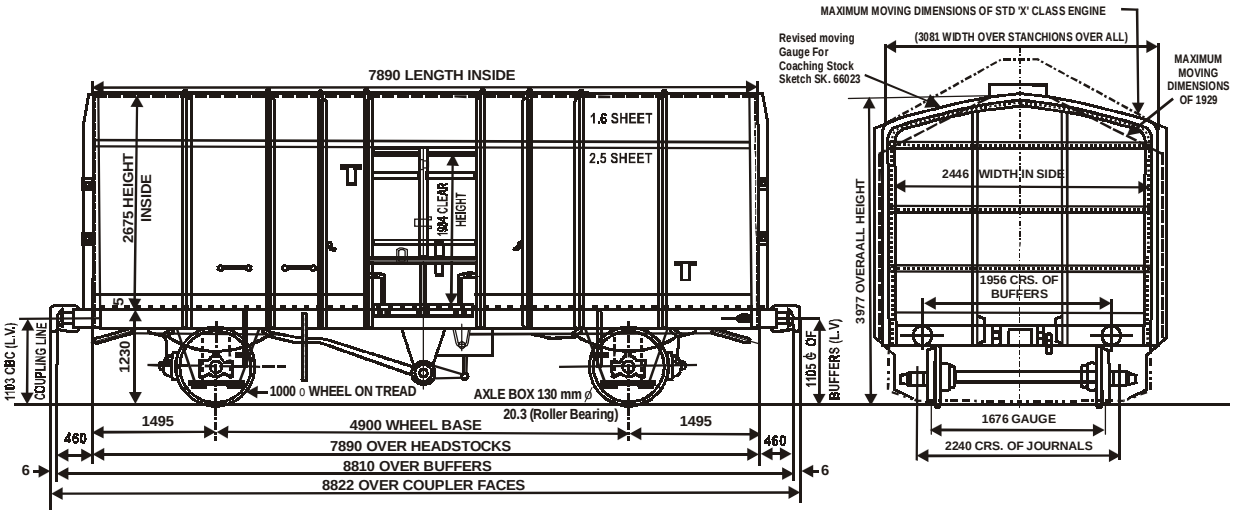


Fig. 1.6 CRT WAGON (Ref. R.D.S.O. SK. 71605)

103. IMPORTANT RULE BOOKS AND REFERENCES

List of technical monograms/instructions relevant to maintenance of freight stock are included in the compendium of instructions/ technical monograms issued vide Railway Board's letter No. 99/EAR/3400/21 dt. 4.5.99. The following rule books, pamphlets and monograms contain information required to supplement this manual. These may be referred to for details not available in this manual.

i. IRCA Conference Rules Part III (2000) - Rules for Maintenance, Examination and Interchange of Goods Stock (BG & MG System) of Indian Government Railways

ii. Prevention of Hot Boxes - A Guide (Published by Railway Board)

iii. RDSO's Technical Pamphlet G-16 - Instructions for Maintenance and Operation of Box Wagons

iv. RDSO's Technical Pamphlet G-37 - Recommended practice for welded fabrication in wagons

v. RDSO's Technical Pamphlet G-38 - Instructions for Maintenance and Operation of 'TCL' Tank wagon

vi. RDSO's Technical Pamphlet G-40 - Manual of Instructions for Anhydrous Ammonia Tank.

vii. RDSO's tech. Pamphlet No. G-44H/Jan 78 Instructions for operating staff hump shunting and marshalling of BOX wagon

viii. RDSO's tech. Pamphlet No. G-45H Instructions for fitting trapauling equipment on BOX wagon.

ix. RDSO's tech. Pamphlet No. G-55H/Aug.76 Instructions for maintenance and operation of hydrochloric acid tank wagon type THA.

x. RDSO's tech. Pamphlet No. G-62/June.77 Maintenance manual of alliance II coupler

xi. Indian Railways Code for the Mechanical Department (Workshops)

xii. RDSO's Technical Pamphlet G-65 Instructions for inspection and maintenance of TPGLR
xiii. RDSO's tech. Pamphlet No. G-66/1983 Maintenance manual for TSA.
xiv. RDSO's Technical Pamphlet G-70 Instructions for inspection and maintenance of BOXN wagons fitted with CASNUB Bogies and twin pipe air brake system.
xv. RDSO's tech. Pamphlet No. G-71 Maintenance manual for phosphoric acid tank wagon.
xvi. RDSO's tech. Pamphlet No. G-72 General standard specification for fabrication of wagon U frame and bogies.
xvii. RDSO's Technical Pamphlet G-73 Instructions for inspection and maintenance of BOBR
xviii. RDSO's Technical Pamphlet No.G-76 (Supersedes old pamphlet No.G-46)
xix. RDSO's tech. Pamphlet No. G-79 Instructions for operation and maintenance for BTAL/BTALN
xx. RDSO's Technical Pamphlet No. G-80(Supersedes old pamphlet No. G-47)
xxi. RDSO's Technical Pamphlet G-81 Instructions for inspection and maintenance of CTRB
xxii. RDSO's tech. Pamphlet No. G-82 Instructions for operation and maintenance BG bogie tank wagon for alumina type BTAL.
xxiii. RDSO's tech. Pamphlet No. G-83 Instructions for operation for maintenance of BTCS wagon
xxiv. RDSO's Technical Pamphlet G-86 Instructions for inspection and maintenance of BTPGL/BTPGLN
xxv. RDSO's tech. Pamphlet No. G-87 Safe handling of hazardous chemicals transported in rail tankers.
xxvi. RDSO's Technical Pamphlet G-90 Instructions for inspection and maintenance of BTPN
xxvii. RDSO's Technical Pamphlet G-92 Instructions for inspection and maintenance of Slack Adjuster type IRSA 450 & 600
xxviii. RDSO's Technical Pamphlet G-95 Instructions for inspection and maintenance of CASNUB Bogies
xxix. RDSO's Technical Pamphlet G-97 Instructions for inspection and maintenance of Air Brakes
xxx. RDSO's Technical Pamphlet No. WT-77-1 & WT-79-1 for inspection and maintenance of 20.3 Tonnes Roller Bearing and 16.3 Tonnes Roller Bearing axle boxes fitted wagons.

104. EXISTING WAGON FLEET

The strength of present wagon fleet on Indian Railways is given at the end of this manual in Appendix-I.

105. STANDARD INFRASTRUCTURE FOR WAGON DEPOT

The standard infrastructure required in wagon depot is given in Appendix-II.

106. IMPORTANT WAGON MODIFICATIONS

The list of important modifications to be carried out on freight stock is given in Appendix-III.

107. NUMBERING CONVENTION IN THE MANUAL

For convenience of indexing of reference, the paragraphs have been numbered according to a 3 /4 figure "Code", in which the last two figures give the number of the paragraphs and the remaining figures the number of the chapter. Thus paragraph 101 of any code is paragraph 1 of chapter 1 of that code and paragraph 1103, paragraph 3 of chapter 11.

The page number in each chapter in this manual starts from 1. The reader can easily identify the chapter number to which a page belongs by reading the header of the page where chapter number as well as chapter title is given. This scheme of page numbering is adopted to provide flexibility of easily revising the chapters in future, on account of design or procedure changes or induction of new stock without disturbing the page numbers of succeeding chapters.

108. NUMBERING OF TABLES AND FIGURES IN THE MANUAL

The tables in each chapter consist of two numbers separated by a decimal point. The number before decimal point indicates the chapter number whereas the number after the decimal point indicates the running serial number of the table which start from 1 in every chapter. The convention adopted for numbering the figures is also identical to the numbering scheme adopted for the tables.

■■■■■