

CLASSIFICATION OF FREIGHT STOCKS

Requirement of Wagon Design

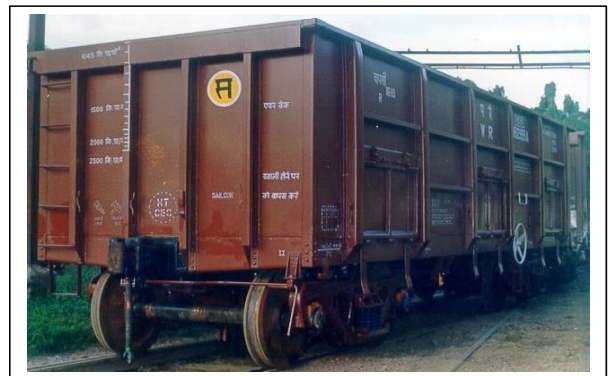
- Reduction in the tare weight of freight stock
- Increase in pay/tare ratio
- Increase in the speed potential of the freight stock
- Increase in the reliability of the wagon component :- It will increase by upgrading of specification of component (material) and reduction of the maintenance cost by increasing ROH from 18 to 24 months.

Types of Wagon

- **Open type** – BOXN, BOXNHS, BOXNHA, BOXNCR, BOST, BOSTHS, BOXNLW, BOXNHL, BOXNAL, BOY-25, BOXN-25, BOBSN-25
- **Closed type** – BCN, BCNA, BCNAHS, BCNHL.
- **Hopper type** – BOBR, BOBRN, BOBYN, BOBRNAL, BOBRN-25
- **Flat type** – BRN, BFNS, BFKI, BOXKH, BLC etc.
- **Well type** -- BTW
- **Tank type** – BTPN, BTPGLN, etc.
- **Brake Van** – BVZC, BVZI, BVCM

BOXN

Estimated tare – 22.47 t
Axle load – 20.32 t
Pay load – 58.81 t
Gross load – 81.28 t
Length - 10713 mm
Width - 3200 mm
Height - 3225 mm
Speed - 80 Kmph
Fitted with CASNUB 22NLB Bogie
and AAR-'E' type high tensile CBC Coupler



BOXNHS

Estimated tare – 23.1 t
Axle load – 22.32 t
Pay load – 66.18 t
Volumetric cap. – 56.29 m³
Gross load – 89.28 t
Length - 10713 mm
Width - 3200 mm
Height - 3233 mm
(higher than BOXN and lower than BOXNHA.)



BOXNHA

- Estimated Tare - 23.17 t
- Axle load - 22.1 t
- Gross load - 88.40 t
- Pay load - 65.23 t
- Length & width – same as Boxn
- Height - 3450 mm (225 mm higher than BOXN)
- Use of IRSM -41 - Floor plate - 6 mm
 - Side stanchion – 8 mm
 - Body side sheet – 5mm
 - End sheet – 5 mm
 - Door sheet – 5 mm

IRSM -41 steel has following properties :-

- stronger than mild steel
- easily weldable
- develops its own protective film against corrosion.

BOXN CR

BOXNCR is similar to BOXN except the following :-

- **The wagon body** is manufactured from steel to IRSM M-44 instead of steel to IS 2062 or IRSM -41.
- **Crib angles side** is mfd. From IRSM-44 steel instead of IS 2062.
- **Sole bar** is mfd from IRSM-41 instead of IS 2062 steel.
- Other features like overall dimensions, CBC, brake gear, brake system are same as BOXN.
- IRSM-44 shall be cut by shearing or plasma cutting m/c and for welding.

BOXNLW

It has been designed with the purpose of reducing tare wt. as also to achieve higher put within the constraints of existing axle loads and TLD.

Tare – 20.6 t against 22.47 t (Tare is reduced by using CRF section in place of fabricated members.)

06 doors are provided.

Length over coupler faces – 10713 mm

Width overall – 3250 mm

Width inside – 3022 mm

Height overall - 3263 mm

Pay load – 60.87 t

Tare – 20.6 t

Gross wt. – 81.28 t

Axle load – 20.32 t

Pay/tare – 2.94

TLD – 7.59 t/m

Vol. cap – 58.84 m³

Benefits of BOXNLW

- Reduction in tare wt. – 1.8 t
- Increasing in pay load – 1.8 t
- Increase in pay to tare ratio – 2.94 compared to 2.61
- Lower maintenance cost
- Structural members – CRF
- Plates & Sheets – Stainless steel so as to minimize corrosion

BOXNHL

22.9 T AXLE LOAD OPEN TYPE WAGON

Estimated tare–20.6 t

Axle load – 22.9 t

Pay load - 71.0 t

Gross load – 91.6 t

Length - 10963 mm

Width - 3250 mm

Height - 3301 mm

volumetric cap. – 61.05 m³

Floor ht.– 1273

Benefits of BOXNHL Wagon

- Pay to tare ratio of 3.45 (v/s 2.5 of existing BOXN)
- TLD of 8.35 t/m (v/s 7.59 t/m of existing BOXN)
- Nos. of wagons/rake – 58
- Increase in revenue of Rs. 1.2 Crores per rake per year over BOXN (CC+6+2 t)

Materials used in BOXNHL

- Center sill – IS8500 & IRSM -44, HRF, CRF, press
- Sole bar – IRSM -44 – CRF pressed
- Pillar – 8 mm – IRSM -44 pressed
- Door way stiffener – 4 mm, same, pressed
- Top coping – 7 mm, same, pressed
- Side wall plate – 4 mm, same
- Floor plate – 4 mm, same
- Middle coping – 4 mm, same, pressed
- End wall sheet – 4 mm, same
- End stanchion – 4 mm, same, pressed

- Door – 4 mm, same
- Stringers – 4 mm, same, pressed

BOST

Open Air brake type Wagon for steel consignment

- Width (overall) : 3100
- Height (from rail level) : 2835
- Cubic Capacity (in cum) : 65.84
- Bogie type : Casnub 22 HS
- Wheel diameter (in mm) : 1000 mm
- Speed Potential (in Kmph)E/L : 80/75
- Axle Load (in tonnes) : 20.32
- TLD (in tonne/meter) : 5.92
- Payload (in tonnes) : 55.78
- Tare Weight (in tonnes) : 25.5
- Gross Load (in tonnes) : 81.28
- Pay to Tare Ratio : 2.18
- Length (over head stock) : 12800
- Length is same as BOX wagon
- Fitted with Casnub bogie air brake
- Lower side walls as compared to BOX wagon
- Speed – 100 Kmph
- Underframe has been strengthened to sustain to point loading of steel consignment
- Pay load – same as BOX wagon

Purpose to introduce

- Sizable proportion of steel plant products like **Plates, Sheets, Coils etc.** are being loaded in BOX wagon.
- The population of BOX wagon is declining because of condemnation

Benefits of BOST

- Suitable for consignment from steel plants which can not be loaded in BOXN due to shorter length
- Equal in length to BOX and equipped with air brake
- Speed – 100 kmph
- Casnub bogie

BOXNAL

- All body and steel under frame designed for carrying bulk commodity like coal and iron ore without

Particulars	BOXN	BoxnHA	BoxnHs	BoxncR	BoxnHL
Tare	22.47	23.17	23.1	BoxN	20.6

door.

- Except under frame all body structure, end sheets, side sheets and floor plates – Aluminium alloys.

Advantages

- Lightness
- Corrosion resistance
- External appearance
- Eliminate painting
- Easy to work with

Disadvantages

- Very expensive
- It is prone to pilphorage

Benefits of BOXNAL

- Use of AL alloys in BOXN will result in
- 4.21 t reduction in tare wt.
- 4.21 t increase in pay load
- Pay to tare ratio 3.45 compared to 2.61 of existing BOXN wagon

BOY

Specific features –

- Specially for transport of iron ores
- Fitted with air brake
- Fitted with SAB, Empty load device
- Suitable for tripling
- Fitted with cast steel friction snubbed bogies.
- 52 wagons per rake

Axle load	20.32	22.1	22.32	BoxN	22.9
Pay load	58.81	65.23	66.18	BoxN	71.0
G load	81.28	88.40	89.28	BoxN	91.6
Length	10713	same	same	same	10963
Width	3200	same	same	same	3250
Ht.	3225	3450	3233	same	3301

Comparison of various open wagons :-

COVERED WAGON



BCN- Bogie Covered Wagon (Riveted construction) fitted with Air Brake and CBC .

Tare – 25.9 t

Pay load – 55.4 t

Axle load – 22.9 t

Height – 3.79 m

Length over head stock – 14.5 m

BCNA : Taller BCN variant (Welded construction) fitted with CASNUB 22NLB bogie and AAR ‘E’ type high tensile CBC.

Tare – 24.5 t

Pay load – 56.8 t

Axle load – 22.9 t

Length over head stock – 13.52 m

Height – 4.01 m

BCNAHS – High speed (100 Kmph) BCNA Variant, fitted with CASNUB 22HS Bogie
 Pay to tare ratio of 2.31 (v/s 1.85 of BCX)
 TLD of 5.625 t/m (v/s 5.15 t/m of BCX)
 Nos. of wagons/rake – 44
 Increase in revenue of Rs. 1.41 Crores per rake (of 20.32 t BCNAHS) per year over BOXC

BCNHL : 22.9 T A/L COVERED WAGON TYPE BCNHL

Designed in 2006
 22.9 t axle load
 CRF section
 Stainless steel made structures
 One door in one side


- Pay to tare ratio of 3.40 (v/s 2.30 of existing BCNA)
- TLD of 8.35 t/m (v/s 5.625 t/m of existing BCNA)
- Wagon length reduced to 10.963 m from existing 14.45m for BCNA wagon
- Nos. of wagons/rake – 58 (v/s 44 of existing BCNA)
- Increase in revenue earning of Rs. 5 Crores per rake per year over BCNA (CC+8+2 t, Cement)

BCCN

- BCN variant for carrying bulk (loose) cement
- Loading is through port at the top unloading via chutes at the bottom
- A fewer wagon also marked BCCN are double- decker wagons intended for carrying automobiles, have a low platform with 840 mm wheel diameter..

Comparison of diff. version of covered wagons :-

Description	BCN	BCNA/HS
Length over coupler	15429	14450
Length over h/stock	14500	13521
Height	3787	4017
Width over sole bar	2950	2950
Tare	27.20	24.55
G. Weight	81.28	81.28
		32
		73
		/HS



VARIOUS HOPPER WAGONS ARE :

- **BOBR** – A long pull rod is used for connecting two bogies.
- **BOBRN** – A SAB is used for this purpose.
- **BOBYN** - Side buffers
 - CBC transition type
 - DOM – 04 hand wheels are provided for operating side doors and bottom doors.

BOBRNAL

- Carrying bulk commodities like iron ores & coal
- Bottom discharge wagon for fast unloading of commodities
- Aluminium is used in structures and remains parts – same
- 3.2 t reduction in tare wt.
- 3.2 t increase in pay load
- Pay to tare ratio 2.63 against 2.17% of existing BOBRN wagon



TANK WAGON



BTPN : Bogie Tank Wagon Type BTPN For Petroleum Products.

- Pay to tare ratio – 2.0 (v/s 1.74 of TPR)
- TLD of 6.54 t/m (v/s 3.921 of TPR)
- Nos. of wagons/rake – 47
- Volumetric capacity – 70.4 m³
- Increase in revenue earning of Rs. 4.8 Crores per rake per year over TPR

BTFLN

- It is a frameless bogie tank wagon, was developed and validated for strength during the year.
- Existing BTPN has pay load /tare wt. ratio – 2.0 A need to improve payload with the existing axle load .
- No center sill
- Tractive & buffing forces are taken up by the barrel itself, thus optimizing the use of wagon mass which is subjected to bi-axial stress.

Comparison bet BTPN &BTFLN

<u>Comparison bet BTFLN & BTPN</u>		
Description	BTPN	BTFLN
Length over H/stock	11491	11491
Axle load	20.32	20.32
Tare wt	27	23.53
Pay load	54.28	57.75
Pay/Tare	2.0	2.45
Vol. Cap.	70.40	76
Pay load/rake	2605	2772

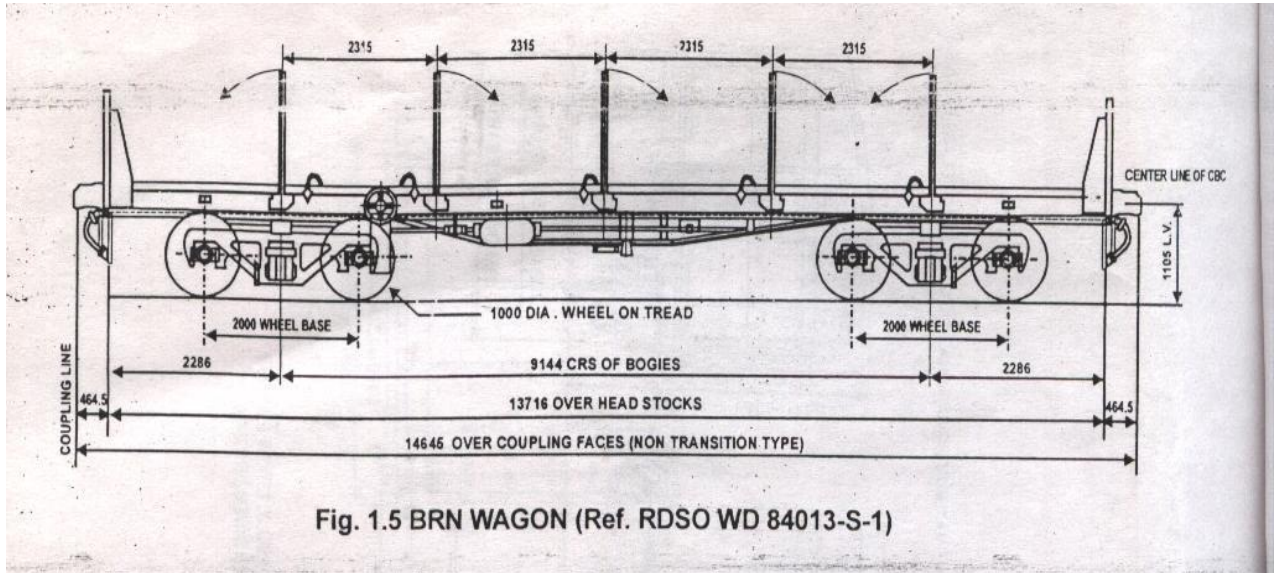
WELL WAGON

BWZ :

- Heavy-duty well wagon for load upto 220t
- Uses as carrying for large transformers and power plant equipments.

- Tare wt.- 146 t
- Payload - 220 t.(some versions are
 - limited to 180 t)
- Length – 37.81 m
- Width of Carbody - 3.74 m
- Speed limited to about 40 km/h

FALT WAGON



BFNS : Bogie flat steel wagon type for transportation of HR coil

Tare weight – 23.6 t

Pay load - 57.7 t

fit to run at 100 kmph.

adjustable stoppers have been provided for placement of coil in the groove and preventing longitudinal shifting of coils.

Length and width equal to BRN to facilitate loading flat products as being done on BRN.

- **Length** – 14645 mm over couplers
- **Height** – 2776 mm over stanchions bkt and - 2650 mm over side wall
- **Width** - 3045 mm over stanchions bkt

BRN – Bogie Rail wagon type

Purpose: For transportation of Rails, Steel Coils, Plates etc.

BFKN Wagon

- Air brake CASNUB bogie container flat wagons owned by container corporation Ltd.
- Converted from BFKI.
- Tare wt. – 20.5 t
- Pay load – 61 t

- Speed – 75 kmph

BLC Wagons



Special features of BLC wagons :-

- These wagons are designed to carry ISO containers with a height of 2896 mm as non- ODC load.
- These wagons are manufactured in multiple units. Each multiple units consist of two A-CARS.
- The buffer height of outer end of A-CAR is 1105mm and it the inner end is 845mm.

BRAKE VAN

BVZC

- Discomfort to Guard
- Chances to derailment due to sudden lifting of wheels as it is lighter than BOXN wagon specially
- in case of high speed.

BVZI

- Designed to improve riding quality of the brake van
- To increase speed potential to 100 kmph
- To provide increased comfort level for the guard during running goods train
- Two ICF bogie are used
- Oscillation trial is satisfactory up to 110 kmph
- Manufacturing at ASR workshop



Improved Amenities on Brake Vans –

- Provision of additional window.
- Provision of cushioned fixed seat with arms.
- Provision of table with sun mica top for writing.
- Provision of storage space in cabin for guard's equipment.
- Provision of additional railings and fencings for safety during exchange of signals.
- Provision of door locking arrangement from inside and outside.
- Provision of extended roof on both sides with steel sheet.
- Provision of modified footsteps with rounded corners.
- Provision of side window glass of transparent acrylic sheet with wire mesh.
- Painting outside with silver paint and inside with white enamel paint.
- Painting of railings with reflective red colour to make them visible during the night.
- Further, provision of light and fan in 50 brake vans has also been approved by Railway Board on trial basis.