Design Features of Various Wagons

Wagon Body:

The superstructure attached to the underframe of a wagon is called wagon body. It consists of body side and ends with their supporting structures such as stanchions, corner angle in case of open wagons, copings, roof structures, carlines; roof sheets in the case of covered wagons; hoppers and their supporting members in case of hopper wagons; tank barrels, cladding, if any, and supporting saddles in the case of tank wagons. Doors, door fittings, operating handles, louvers for ventilation and various fittings such as cleats, handles, hooks, footsteps, hand brake wheel and ladders also form part of the body.

GENERAL CONSTRUCTION OF OPEN WAGON

SIDES

Sides are made up of side panels and side stanchions, which are attached to the underframe by crib angles and side stanchions. They include top copings, intermediate copings if any, doors, door fittings, hand holds, tarpaulin cleats and label holders.

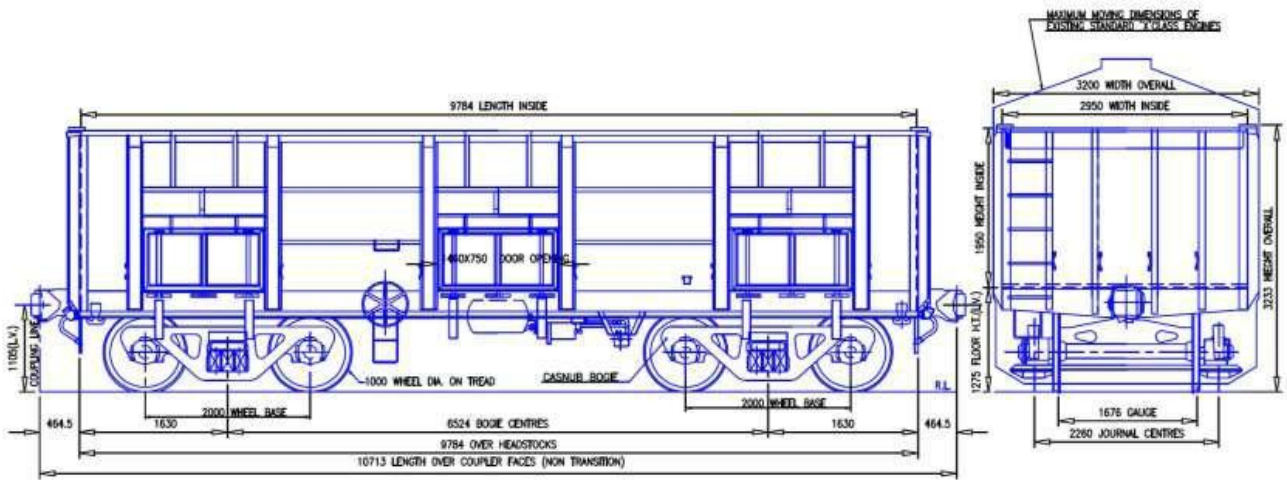
ENDS

Ends are similar in construction to sides in that they consist of end panels, end stanchions, top copings and intermediate copings. Attachment to the underframe is by means of end floor angles, corner angles and through the stanchions. Corner angles connect the ends with the sides. Open wagons have reinforcing angles at each end together with reinforcing gussets and corner pressings at the corner top.

DOORS

Each side of the wagon is provided with door for manual unloading. The doors are hinged at the bottom with locking arrangement by chainless cotter at the top. In BOXN wagons two locking bolts per door have been provided to avoid slipping of chainless cotter during tippling of wagon.

SALIENT FEATURES OF 'BOX'N WAGON



Sl. No.	Particulars	Description
1.	Estimated tare weight	22.47T
2.	Payload	58.81T
3.	Gross load	81.28T
4.	Axle load	20.32T
5.	Ratio of pay load to tare weight	2.72
6.	Track load density (gross)	7.59T/m
7.	Floor area	20.87 sq m
8.	Volumetric capacity	56.29 cubic m
9.	Overall width	3200mm
10.	Inside width	2950mm
11.	Journal center	2260mm
12.	Length over center buffer faces (NT)	10713mm
13.	Length over headstock	9784mm
14.	Bogie center's	6524mm
15.	Wheel diameter on tread (new /condemning)	1000mm / 906mm
16.	Wheel base	2000mm

17.	Height of CBC from rail level	1105mm
18.	Distance between side bearers	1474mm
19.	Type of side bearers	Roller type
20.	Type of center pivot	IRS spherical
21.	Type of brake beam	Unit type fabricated brake beam
22.	Suspension details	Long travel helical spring suspension
23.	Type of roller bearing	Std. AAR CTRB suitable for 152.4 x276.4 mm (6”x11” wide jaw)
24.	Type of bogie	CASNUB 22W
25.	‘A’ dimension	mm

Detailed Salient Features Of BOXN Wagon:-

1. No. of Doors in BOXN wagon - 2 nos. at both ends
2. DRAW & BUFFING GEAR:-
    - High capacity, high friction draft gear used.
    - High tensile straight CBC used.
    - CBC coupler working capacity – 120 ton.
    - Proof load – 170 ton.
    - Hauling capacity in 1:100. In up gradient – 9000 ton.
3. Bogie:-
    - CASNUB bogie used.
    - Axle load capacity 22.9 ton.
    - Secondary suspension, helical spring used.
    - Side frames are joined through spring plank & bolster.
    - UIC spherical type centre pivot fitted [except 22 W, 22 W(R)].

- Metal bonded constant contact rubber pad side bearer used.
- Fit for 90 kmph, 100 kmph for HS.
- Maintenance cost is less.
- Head stock with diagonal bar is removed.

4. BRAKE GEAR:-

- Single pipe air brake system.
- SAB, empty load device used.

- Clearance between wheel & brake block is maintained through SAB.
- Pocket liner type brake beam.
- No. of Brake Beam-4
- No. of Brake Block-8

GENERAL CONSTRUCTION OF COVERED WAGON

SIDES

Sides are made up of side panels and side stanchions, which are attached to the underframe by crib angles. They include top copings, doors, door fittings, label holders, rain protection angles above swing doors, door striking plates and anti bleeding device below the flap doors.

ENDS

Ends are similar in construction to sides in that they consist of end panels, end stanchions, top copings and in some cases, intermediate copings. Attachment to the underframe is by means of end floor angles, end angles and through the stanchions. Covered wagons are provided with ventilators at the upper end of body ends. Corner angles connect the ends with the sides.

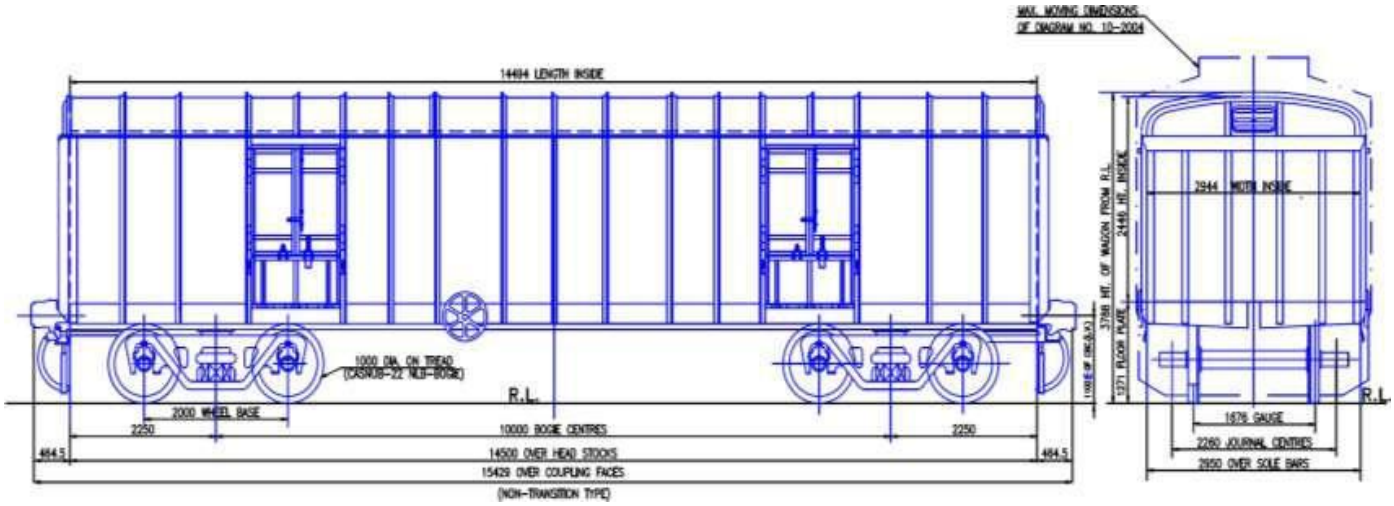
ROOF

Roofs of covered wagons consist of roof sheets and carlines. Roof sheets are much thinner than the sheets used for the body sides and end panels.

DOOR

Each side of the wagon is provided with door for manual unloading. The doors consist of swing doors at the top with label holder hinged to the angles on the sides and flap doors at the bottom, hinged at the bottom with Anti bleeding device.

SALIENT FEATURES OF 'BCN' COVERD WAGON:



S.No	PARTICULARS	Parameter
1	Length over head stock (mm)	14500
2	Length over couplers (mm)	15429
3	Length inside (mm)	14494
4	Width inside/Width Overall (mm)	2944/3100
5	Height inside/Height (max.) from RL.	2446/3788
6	Bogie centers (mm)	10000
7	Journal length × dia. (mm)	RB144.5 Ø
8	Journal centers (mm)	2260
9	Wheel dia. on tread (New/Worn) (mm)	1000/906
10	Height of C.B.C. from R.L. (mm)	1102
11	C.G. from R.L. (empty) (m)	1.016

12	C.G. from R.L. (loaded) (m)	1.974
13	Floor area (Sq.M)	42.67
14	Cubic Capacity (Cu.M)	104.00
15	Maximum axle load (tonne)	20.32
16	Tare Weight (tonne)	27.20
18	Gross load (Pay+Tare) (tonne)	81.28
19	Ratio gross load/Tare	2.99
20	Ratio (Pay load to tare)	1.99
21	Track Loading density (tonnes/meter)	5.268
22	No. of wagons per train	40
23	Brake System	Air Brake
24	Coupler	C.B.C.
25	Bearing	CTRB
26	Maximum Speed (Loaded)/ Empty	75 kmph / 80 kmph

GENERAL CONSTRUCTION OF FLAT WAGON AND WELL WAGON

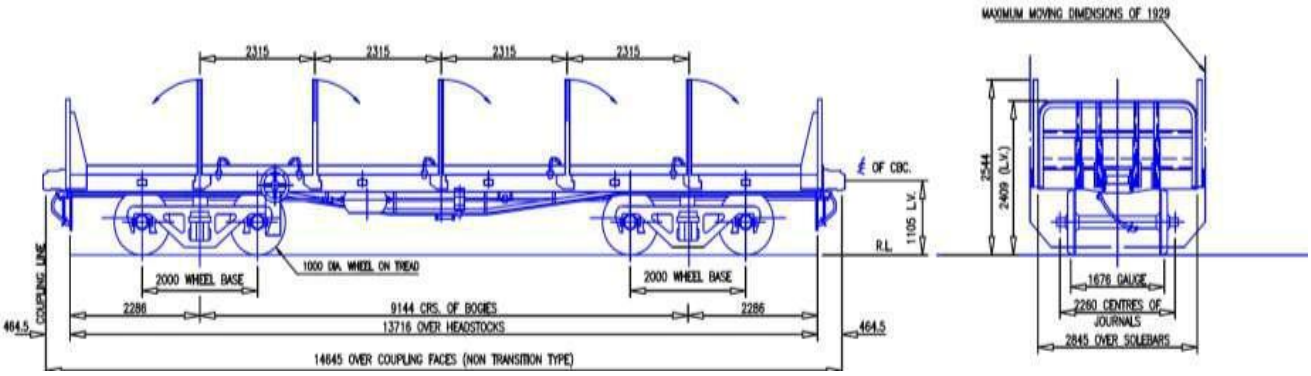
ENDS

Flat/well wagons do not have side wall and roof. The superstructure consists of either fixed or flexible ends. These are fixed to the underframe through stanchions, side attachment plates and crib angle.

SIDE STANCHION

Flexible side stanchions are attached to the sole bar through brackets. In addition, support brackets are also provided in rail wagons and well wagon. In container flat wagons, retractable anchoring locks are provided.

SALIENT FEATURES OF 'BRN' WAGON:



	PARTICULARS	Parameter
1	Length over head stock (mm)	13716
2	Length over couplers (mm)	14645
3	Length inside (mm)	13716
4	Width inside/Width Overall (mm)	2845
5	Height inside/Height (max.) from RL.	---/ 2544
6	Bogie centers (mm)	9144
7	Journal length × dia. (mm)	RB144.5 Ø
8	Journal centers (mm)	2260
9	Wheel dia. on tread (New/Worn) (mm)	1000/906
10	Height of C.B.C. from R.L. (mm)	1105
11	C.G. from R.L. (empty) (m)	-
12	C.G. from R.L. (loaded) (m)	-
13	Floor area (Sq.M)	-
14	Maximum axle load (tonne)	20.32
15	Tare Weight (tonne)	24.393
16	Pay load (tonne)	56.887
17	Gross load (Pay+Tare) (tonne)	81.28
18	Ratio gross load/Tare	3.33
19	Ratio (Pay load to tare)	2.33
20	Track Loading density (tonnes/meter)	5.55
21	No. of wagons per train	42

22	Brake System	Air Brake
23	Coupler	C.B.C.
24	Bearing	CTRB
25	Maximum Speed (Loaded)/ Empty	75 kmph / 80 kmph

GENERAL CONSTRUCTION OF HOPPER WAGON

SIDES

Sides are made up of side panels and side stanchions, which are attached to the underframe. They include top copings, side stiffeners, doors in side discharge wagons, and label holders.

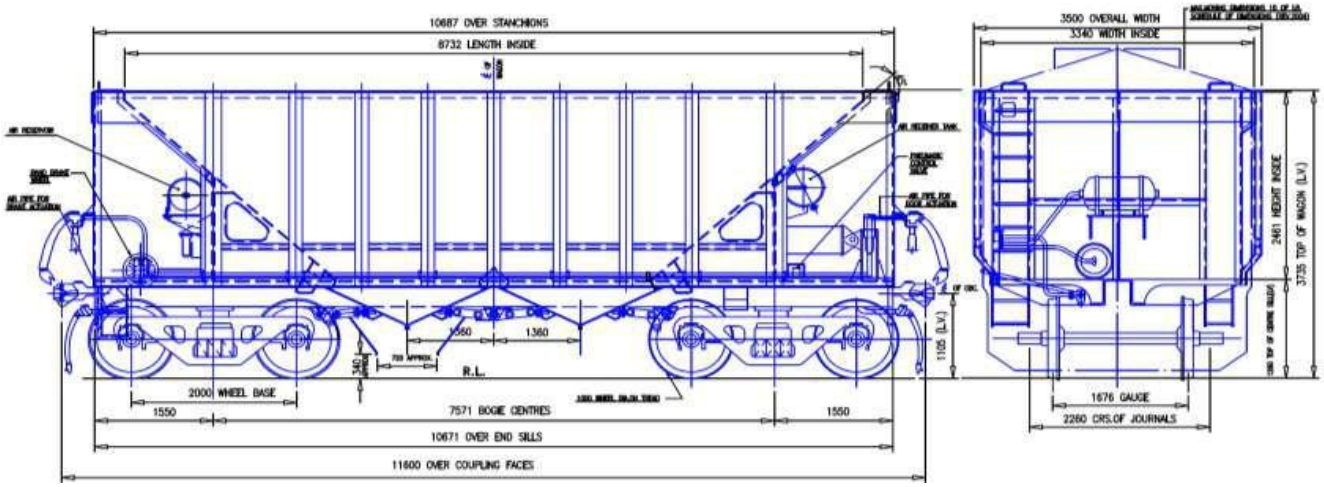
ENDS

Ends consist of end panels, end stanchions, end top copings and in some cases, stiffeners. Attachment to the underframe is through the stanchions. Corner angles connect the ends with the sides.

DOOR AND DOOR OPERATING MECHANISM

Hopper wagons are provided with either side discharge/centre discharge doors or both. Door operating mechanism is generally manually operated by means of bevel wheel and worm wheel connected to door operating hand wheel. In some special type of hopper wagons like BOBRN, pneumatically operated door operating mechanism has been provided.

SALIENT FEATURES OF 'BOBR' HOPPER WAGON:



S.No	PARTICULARS	Parameter
1	Length over head stock (mm)	10671
2	Length over couplers (mm)	11600
3	Length inside (mm)	8732
4	Width inside/Width Overall (mm)	3340/3500
5	Height inside/Height (max.) from RL.	2461/3735
6	Bogie centers (mm)	7571
7	Journal length × dia. (mm)	RB144.5Ø
8	Journal centers (mm)	2260
9	Wheel dia. on tread (New/Worn) (mm)	1000/906
10	Height of C.B.C. from R.L. (mm)	1105
11	C.G. from R.L. (empty) (m)	1.13
12	C.G. from R.L. (loaded) (m)	2.06
13	Floor area (Sq.M)	---
14	Cubic Capacity (Cu.M)	57.2
15	Maximum axle load (tonne)	20.32
16	Tare Weight (tonne)	26.40
17	Pay load (tonne)	54.88
18	Gross load (Pay+Tare) (tonne)	81.28
19	Ratio gross load/Tare	3.08
20	Ratio (Pay load to tare)	2.08
21	Track Loading density (tonnes/meter)	7.00
22	No. of wagons per train	53
23	Brake System	Air brake
24	Coupler	C.B.C.
25	Bearing	CTRB
26	Maximum Speed (Loaded)/ Empty	80 kmph / 80 kmph

GENERAL CONSTRUCTIONAL OF TANK WAGON

Underframe

The design of the underframe of four wheeled and eight wheeled wagon is generally similar to that of other IRS wagons except that a pair of saddles is provided on the underframe at each end for mounting the barrel.

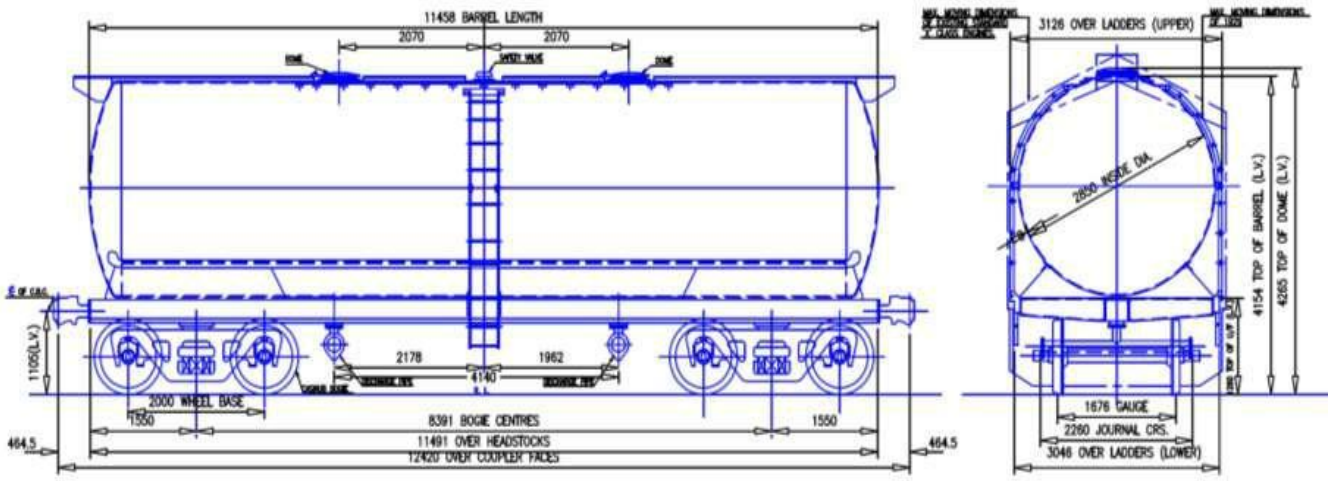
Barrel and saddles

The barrel is cylindrical vessel generally fabricated out of low carbon structural steel to IS:2062 Fe 410CuW. The barrel is placed longitudinally on the underframe and secured by means of rivets to the saddle. The saddle is welded on underframe at each end.

Barrel mountings and safety fittings

Various types of barrel mountings are necessary for filling, measuring and decanting upon the product handled. Safety fittings are generally provided inside the dome on a diaphragm plate so as to protect them from accidental injury.

SALIENT FEATURES OF 'BTPN' TANK WAGON:



S.No	PARTICULARS	Parameter
1	Length over head stock (mm)	11491
2	Length over couplers (mm)	12420
3	Length of barrel inside (mm)	11434
4	Dia. inside (barrel) (mm)	2850
5	Overall Height from R.L. (mm).	4265
6	Bogie centers (mm)	8391
7	Journal length × dia. (mm)	277.8x144.5
8	Journal centers (mm)	2260
9	Wheel dia. on tread (New/Worn) (mm)	1000/906
10	Height of C.B.C. from R.L. (mm)	1105
11	C.G. from R.L. (empty) (m)	1.43
12	C.G. from R.L. (loaded) (m)	2.23
13	Max. Volumetric carrying capacity (L)	---
14	Cubic Capacity (Cu.M)	70.40
15	Maximum axle load (tonne)	20.32
16	Tare Weight (tonne)	27.00
17	Pay load (tonne)	54.28
18	Gross load (Pay+Tare) (tonne)	81.28
19	Ratio gross load/Tare	3.01
20	Ratio (Pay load to tare)	2.01
21	Track Loading density (tonnes/meter)	6.54
22	No. of wagons per train	47
23	Brake System	Air brake
24	Coupler	C.B.C.
25	Bearing	CTRB
26	Maximum Speed (Loaded)/ Empty	75 kmph / 80 kmph

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