

# SPECIAL TYPE OF WAGONS

## BOXNCR WAGON SALIENT FEATURES

Bogie open wagon type BOXNCR is similar to BOXN wagon except the following:- i. Barring rolled sections, the wagon body is manufactured from steel to IRS M-44 instead of steel to IS: 2062 Fe410CuWA or IRSM-41. ii. Crib angles side to ISA 50x50x6 is manufactured from IRSM- 44 steel instead of IS: 2062 Fe 410 CuWA steel. iii. Sole bar is manufactured from IRSM-41 instead of IS: 2062 Fe Cu WA steel.

Other features like overall dimensions, bogie couplers and draft gear, brake gear, brake system, etc. are exactly same as BOXN wagon.

- Since BOXNCR wagon is similar to BOXN wagon, the maintenance schedule and repair procedure shall be similar to BOXN wagon. However, since the wagon body is made from IRSM-44 steel, the body panels, when corroded, shall be replaced with IRSM-44 steel panels only. The IRSM-44 steel panels/plates shall be cut either by shearing machine or by plasma cutting machine but not by oxy-cutting. For latest instructions G-72 (latest version) should be referred.

- **BOGIE LOW PLATFORM CONTAINER FLATS (BLC)**
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- Bogie container flat wagons have been designed for transportation of 2896 mm high Series-I, ISO containers for a gross payload of 61t at an operating speed of 100 km/h. These containers, when loaded on the earlier flat wagon caused infringement to the X-class MMD, resulting in constraints in their free movement.
- In order to ensure that the wagons loaded with 2896 mm containers lie within the X- class MMD, a low platform height of 1009 mm has been achieved with the use of hybrid design of bogie frame and bolster and with the use of smaller diameter wheels (840mm).
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- The wagons have all welded construction and are mounted on two cast steel bogies. The flats are formed into units of five wagons, each unit having two “A” car at ends and three intermediate “B” cars. One end of “A” car is fitted with centre buffer couplers to ensure proper coupling with the locomotive while the other end has slackless draw bar to couple with “B” cars. “B” cars are coupled together and to “A” cars by slackless drawbars.
- The length of A car over head stock is 13625 mm while the length of B car is 12212 mm. The coupler of A car for attaching to loco or other stock is at 1105mm. The coupler in the B car at both ends is at 845 mm from rail level. The wagons are equipped with Air Brake. The diameter of new wheel is 840 mm and the condemning size is 780 mm.

- **LOAD DISTRIBUTION**

- The weight distribution between centre pivot and side bearers is optimised to avoid hunting. 90% of the body weight under tare condition is borne by the side bearers which are of spring loaded design to ensure that no hunting takes place. The spring loaded side bearer arrangement has the distinct advantage of retaining the load distribution between centre pivot and side bearers irrespective of any manufacturing inaccuracies in the body and bogie bolster as well as the condition of the wheel (New or Worn). 10% of body weight under tare condition & full pay load will be borne by Centre Pivot.

- **MAINTENANCE SCHEDULES**

- Short duration check-ups:

- i) “B schedule” –every 3 months ☐ All items of intensive examination. ☐ All dirt collectors, drain cocks should be drained. ☐ Test Air Brake System to all the parameters as per test chart.

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- ii) “C schedule” –every 6 months ☐ All items of “B” schedule ☐ Load Sensing Device (VTA) tip to stopper distance 16 mm be set if required. ☐ Six months Schedule as prescribed by the Air Brake Manufacturer for the Air Brake System including the Pressure Reducing Valve may be maintained. ☐ Check for defective or damaged Elastomeric pads

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- **BRAKE SYSTEM**

- The basic system conforms to the Graduated release, single pipe air brake system as per RDSO specification 02-ABR-02 (with latest amendment) together with the latest amendments using "Automatic, two stage empty/load braking control". This changeover from load to empty braking condition is provided by the distributor valve type C3W2/KE2CSLA which in turn is governed by two nos. of change over valves, type VTA/Single Piece Load Sensing device one on each bogie.

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- Since the wagon is designed to carry one or two containers, the various loading patterns arising in service may require sensing of load even in one bogie though the other may be in empty condition. In view of this, two nos. of Changeover valves are provided, one on each bogie, so that even if any of the bogies is under loaded condition, the VTA valve / Single piece Load Sensing valve installed in that bogie would actuate and deliver a signal pressure to the C3W2 Distributor valve or KE2CSLA Distributor valve.



- **WAGON IN EMPTY CONDITION**

- Since the VTA valve/s/ Single piece LSD is/are not actuated in this condition, the compressed air at the inlet port of the VTA valve/s is/are not connected to the delivery ports of these valves. On the contrary, the delivery ports are connected to the atmosphere at the exhaust ports of the VTA valve/s.
- In the absence of the signal pressure from any of these VTA valves, the empty load port of the C3W2 Distributor valve is connected to atmosphere and hence any braains the specified application and release timings as per the specifications.
- ke application during this stage will be maintained in empty condition by the Distributor valve. However, irrespective of the empty or loaded Brake cylinder pressure, the Distributor valve maintains the specified application and release timings as per the specifications.

- **WAGON IN LOADED CONDITION**

- If both the VTA valves/ Single piece LSD are actuated due to bogie deflection on both sides, the compressed air at the inlet ports of the VTA valves/ Single piece LSD is connected to the delivery ports which are interconnected at the 24-A Double check valve. Since the compressed air pressure to one of the VTA valves is maintained by the Reducing valve type N1 to be specifically lower than that which could come to the other VTA valve, the higher of the two delivery pressure from the VTA valves will push the shuttle inside the Double check valve to the opposite side and charges into the Distributor valve. Under the influence of the load sensing signal pressure, the Distributor valve generates a higher Brake cylinder pressure during all brake applications in this stage.

## AUTOMATIC TWIST LOCKS (ATL)

The automatic twist lock (ATL) is the compact container locating and securing device fitted at the locating points of under frame sole bar. These devices conform to specification AAR M-952. The older designs of ATL devices were having Rubber (Bonded) Torsion Springs in their internal mechanism. However the rubber bonded steel mechanism has been replaced with Steel Springs in new version of ATL devices.

A max. force of 800 lbs. is required for twisting the lock during entrance of the container and while removing the same force of 1600-2200 lbs. is required(Ref. AAR M-952).

The container is positioned so that the bottom aperture of the four corner castings are above the twist locks heads. The container is then lowered down slowly. The weight of the container causes the twist head to rotate and the corner casting slide past the twist head. Immediately after this the twist head rotates back in place engaging the corner casting and thereby securing the container.

If 20ft containers are used the locks on the middle should be kept in position. If the 40 ft. container is loaded to a wagon the middle locks mounted on folding brackets should be folded down before placement of 40ft. container on them.

# BROAD GAUGE BOGIE CONTAINER FLAT WAGON (BLLA & BLLB)

## FEATURES OF THE WAGON

The wagon is an all welded steel construction suitable for transportation of two 20 feet or one 40 feet ISO series-1 containers of maximum height 2896 mm (9'6") and width 2438 mm (8") per wagon and domestic containers of one 45" container or 2-22 container/one 20" & 24" container. The material used in the wagon construction is micro alloyed high strength steel to IS: 2062:E450.

- Low floor height of the wagon from the use of low diameter wheel of 840 mm (in new condition), permits the loaded profile within the maximum moving dimension of standard X-class engine. The maximum axle load is 20.32 t and pay load 61.0 tonnes. The maximum operating speed of the wagon is 100 kmph in empty and loaded condition. The wagon can negotiate a minimum curvature of 175 m radius.

The wagons have been designed to work in units of 5 wagons consisting of two BLLA wagons (A-car) at extreme ends and three intermediate BLLB wagons (B-car). Outer ends of the A-cars are equipped with Non transition type center buffer couplers. Inner ends of A-cars and both ends of B-cars are fitted with slackless draw bars. The wagons are provided with cast steel two axle friction damped bogies and graduated release air brake system.

Net braking ratio in empty and loaded condition of the wagon is changed with the help of pneumatically operated load sensing device mounted on bogie bolster. Automatic twist locks are provided on the wagon for securing the containers during movement.

## BOGIE

The bogies shall be fitted and supplied complete with top centre pivot, retaining ring, centre pivot pin with shackle lock and lock pin, spring loaded side bearers, suspension springs, friction wedge, brake rigging including brake shoes, elastomeric pads, wheel sets, bearings, wide jaw adapters, side frame keys with key bolt, nut and washer in a ready- to-use condition. Elastomeric pad used between the bearing adapter and side frame crown shall be to RDSO Specification No. WD-30-Misc-99 (latest revision). The wheel and axle assembly shall conform to Drg. No. CONTR-9404-S/12 and RDSO specification R19/93 Pt I. The wheels are solid cast or forged type. The tread diameter in new condition is 840 mm and condemning size is 780 mm.



Low friction type composition brake shoes (L- type) to Drg,. No. CONTR-9404- S/11 and conforming to Specification No. WD-13-ABR-2003 or latest of RDSO, Lucknow. shall be used for tread braking. They shall be procured from RDSO approved sources.

Cartridge taper roller bearing of AAR „E“ type to RDSO schedule of Technical requirement (STR) No. AB-RB-39-2002 Rev.2 or latest suitable for 6”×11” journal shall be provided on the axle. The bearings shall require no field lubrication. Bearings shall be procured from sources approved by RDSO.

Grease to RDSO's Specification No. WD-24-MISC-2003 is to be used in CTRB. Before applying the grease, clean all the equipment to be used for lubrication. Apply grease to each single assembly and between the roller and cage assemblies in the quantity as given below:

Amount of grease to be applied To Single Roller Assembly (Each Cone Assembly)- 115 gm

Between Roller Assembly(Around spacer)-170 gm

Total  $\pm$  30 gm -400gm

**BRAKE SYSTEM** - The wagon shall be equipped with single pipe graduated release compressed air brake system consisting of Distributor valve suitable for two-stage VTA type automatic load sensing device. The load sensing device shall be installed on the wagon. Brake rigging shall have double acting slack adjuster type IRSA-600 or equivalent. The brake system shall be thoroughly tested in all wagons using single car test rig.

## AUTOMATIC TWIST LOCKS

Ten numbers of twist locks shall be provided on each car as per drawing No. 45-A2001-S/17 to facilitate positioning of one 40 feet or two 20 feet ISO containers and domestic containers of 45" or 2-22" containers or one 20" & one 24" container. The locks at the head stock ends are fixed type and those at middle of the car are retractable type to avoid infringement with 40 feet container.

## . **BOGIE COVERED DOUBLE DECKER WAGON TYPE BCACBM General:-**

The Double Decker Wagon Type “BCACBM”, the broad Gauge Bogie Covered Auto-car carrier wagon to diagram drawing No.-11013-S-01 has been developed by RDSO for transportation of automobile cars. A rake of these wagons consists of 3 units; each unit consists of 9 wagons – 2 nos. wagons „A” & 7 nos. wagons „B”. Both „A” & “B” wagons have twin decks to accommodate cars. The upper decks of both wagons are movable to accommodate different heights of cars by diamond screw jack arrangement fitted in the wagon.

Wagon-A is fitted with CBC couplers on both ends with the coupler at one end at a designed height from rail level as 1105 mm, the other end incorporates CBC at a lower height of 861 mm. Wagon-B is fitted with CBC couplers on both ends at a designed height from rail level as 861 mm. Each unit shall be moved as one entity and the movement of individual wagon (i.e. Wagon A & Wagon B) shall not be done. The design incorporates LCCF 20(C) bogie with speed potential of 100 Kmph and single pipe graduated release air brake system. This wagon is fit to run up to a maximum permissible speed of 100 Kmph in empty and 95 Kmph in loaded condition.

## BOBRNM 1

In 2006 for operation up to CC+6+2 t, suspension of BOBRN modified by providing four additional springs, O-2 & I-2. Differentiated from BOBRN by a caption “Fitted with additional springs for A/L 22.232 t” in centre of wagon in Golden Yellow. Also, on bogie side frame Golden Yellow band provided. Speed 70/80 Km/h.

BOBRNHSM 1 -Designed in 2006. A/L 22.32 t. Variant of BOBRN with modified Casnub 22 HS bogie for increasing speed. Spring O14, I-14, S-4. BOBRNHS was not manufactured, instead this was manufactured. Speed 60/65 Km/h.

BOBRNEL -In 2008 for operation at 25t A/L, suspension of BOBRN modified by providing eight additional springs, Outer-2 & Inner-6. Bogie renamed as Casnub 22 NLC. Also, min. wheel tread diameter 950 mm min. axle wheel seat dia. 210 mm, reduction in POH to 3 years and ROH to 1 year and strict monitoring during maintenance prescribed. Differentiated from BOBRN by an Olive Green band. Speed restricted to 50/65 Kmph.

BCBFG -Bogie Covered Hopper Wagon for Food Grain This wagon has been designated for transportation of food grain in Bulk. This wagon is designated with CASNUB-22HS MOD-I bogie, non transition CBC, single pipe graduated release air brake system with automatic load sensing device. There are two Nos. gravity discharge gates at bottom for unloading. A/L 21.82t. Speed 75/ 75 Kmph.



BVZI -Bogie Brake Van This 8 wheeled brake van was designed in 2004 with ICF bogie to achieve comfort level (Ride Index) equivalent to loco criteria for goods guards and capable of running at 100 Kmph. The brake van is 5 meter longer than BVZC brake van.

Double Stake Container Operation -In March 2006 double stack container train operation started with restricted speed of 75 Kmph. This was for the first time in the world that double stack container train operation on flat wagon was done. Speed 75/75 Kmph.

BCACM -In year 2007, to meet the immediate requirement of auto car industry, design of existing container flat wagons (A type & B type) modified by provision of a suitable bi level structure for transportation of auto cars. One rake can carry up to 270 auto cars. Two such rakes converted by Jagadhari workshops are in operation. 11

## BOYEL-

In 2006 for operation at 25t A/L, suspension of BOY modified by providing four additional inner springs. Bogie renamed as Casnub 22NLC. Also. Min. wheel tread diameter 950 mm. min. axle wheel seat dia 210 mm reduction in POH to three years and ROH to 1 year and strict monitoring during maintenance prescribed. Differentiated from BOY by an Olive Green Band. Speed restricted to 50/65 Km/h.

BOXNM1-In 2005 for operation up to CC+6+2 t, suspension of BOXN modified by providing four additional springs. O-2 & I-2. Differentiated from BOXN by a caption "Fitted with additional springs for A/L 22.82t" in centre of the wagon in Golden Yellow.

Also, on bogie side frame Golden Yellow band provided. Speed 70/80 for CC+6+2t and 60/80 for CC+8+2t. For MGS –GZB route speed at CC+8+2t 75/80 Kmph.

BOXNEL-In 2006 for operation at 25tA/L, suspension of BOXN modified by providing eight additional springs. O-2 & I-6. Bogie renamed as Casnub 22 NLC. Also, min. wheel tread diameter 950mm, min. axle wheel seat dia 210mm, reduction in POH to 3 years and ROH to 1 year and strict monitoring during maintenance prescribed. Speed 50/65 Kmph.

## BOXNCR

Designed in 1999. Material of body of BOXN changed to Stainless steel (IRS:M 44). Other parameters same as BOXN.

BOXNR -Designed in 2007, it is upgraded rehabilitated version of BOXN. Entire superstructure of MS replaced with Stainless steel (IRS:M44). Height 177 mm more than BOXN. Carrying capacity increased by 6t. Nine Stanchions provided, instead of six in BOXN. Use of CRF section and lock bolting included. A/L 22.9t.

- **BOXNHA**

- This wagon was designed in 1998 for transportation of coal to axle load of 23.5t/22.1t. Bogie: IRF 108 HS, Spring O-14 & I-14, S-4. Its height is more than BOXN. Serial manufacturing of this wagon was not undertaken due to constraint of some tipplers for handling these wagons. Cleared Speed at CC+8+2 t A/L of 75/100 Kmph.

## BOXNLW

Designed in 1988 to meet the requirement of higher payload to take ratio A/L 20.32 t. Casnub 22 HS bogie, Spring O-14 & I12, S-4. Width 50 mm more than BOXN. Stainless steel (IRS: M 44) & Corton Steel (IRS: M41) used in body & under frame and Cold Rolled Formed (CRF) section were used in design to reduce the tare weight of the wagon. Manufacturing of this wagon started in 2005. Speed 100/100 Km/h.

## BOXNLWM1

In the year 2008, Designed and suspension of BOXNLW modified for operation up to CC+8+2 t in the design, centre sill was strengthen by providing three additional plates and in suspension two additional inner springs provided. As an interim measure , wagons not having strengthening of centre sill also allowed to operate up to CC+8+2 t with the instruction to carry out centre sill strengthening during POH and special checking of centre sill during ROH and once in a month. Speed 60/65 for both CC+6+2 t and CC+8+2 t.

## BOXNHL

Designed in year 2005, 250 mm longer, 76mm higher & 50 mm wider than BOXN, A/L 22.9 t. Casnub 22 HS with flat Centre Pivot, „K“ type CBB and break beam. Spring O-14 & I-14, S-4. Stain less steel (IRS: M44) and CRF sections used in body and under frame to reduce the tare weight (20.6 t) has improved quality coupler and draft gears. Lock bolts used for joining, instead of rivets. Brake Cylinder of 300 mm, IRSA 750 slack Adjuster, brake rigging different from BOXN Auxiliary reservoir 75 lit. PU painting provided Initially Red Oxide colour specified, later on changed to Phiroziblue. In red Oxide colour wagons „SS“ written on side in a circle in Phiroziblue colour for identification Speed 75/100 Kmph.



## BOST

Designed in year 2000 for long steel products. A/L 20.32t. CASNUB 22HS, Spring O-14, I-12, S-4. Speed 75/80, Operation at CC+6+2 also allowed as an interim measure with speed retraction of 50/80 Kmph.

BOSTM1 -In 2006 for operation up to CC+6+2t, suspension of BOST modified by providing two additional inner springs. Differentiated from BOST by a caption “Fitted with additional springs for A/L 22.32t in centre of the wagon in Golden Yellow. Speed 60/65 Kmph.

## BCNAM1

In 2006 for operation up to CC+8+2t, suspension of BCNA modified by providing four additional springs. O-2, I-2. Differentiated from BCNA by a caption “Fitted with additional springs for A/L 22.82t” in centre of the wagon in Golden Yellow. Also, on bogie side frame Golden Yellow band provided Speed 75/80 for CC+6+2t and 60/80 Kmph CC+8+2t.

## BCNHL (Covered Wagon)

Designed in 2006 for bagged commodities. A/L 22.9t. Length reduced, width and height increased then BCNA. Number of wagons per rake increased to 58. Casnub 22 HS with Centre pivot, „K“ type CBB and brake beam. Spring O-14, I-14, S-4, Stainless steel (IRS: M44) and CRF sections use in body and under frame to reduce the tare weight. Has improved quality Coupler and draft gears. Lock bolts used for joining, instead of rivets. Brake Cylinder of 300mm, IRSA 750 Slack adjuster, brake rigging different from BCNA. Auxiliary reservoir 75 litre. PU painting provided, Phiroziblue, Speed 75/70 Kmph.

## BRNAHS

Designed in 2001. Variant of BRNA with Casnub HS bogie for increasing speed. Spring O-14, I-12, S-4. Speed 100/100 Km/h.

BFNS-Designed in 2002 specially for transportation of hot rolled/ cold rolled coils, plates, steels and billets etc. This first wagon designed in Indian Railway to carry point load. Casnub HS bogie, Spring O-14, I-12, S-4, A/L 20.32t. Speed 100/100 Km/h.

## BRHNEHS

This bogie rail wagon was designed in 2004 for use of Engineering department of various Zonal Railways for Track Relaying Trains (TRT), specially for loading RCC sleepers, Axle Load 20.32t. Casnub 22 HS, Spring O-14, I-12, S-4. The design was provided with Transition CBC and air brake system. Speed 50/65 Kmph.

BOBSNM1-In 2006 for operation at 25t A/L, suspension of BOBSN modified by providing four additional inner springs, Bogie renamed as Casnub 22 NLC, Speed 50/60 Kmph.

## BOBRM1

In 2006 for operation up to CC+6+ 2t, suspension of BOBR modified by providing four additional springs, O-2 & I-2. Differentiated from BOBR by a caption “Fitted with additional springs for A/L 22.32t in centre of wagon in Golden Yellow. Also, on bogie side frame Golden Yellow band provided. Speed 70/75 Km/h.

BTPGLN-Bogie liquefied petroleum gas tank wagon, tare 41.60t, CC 37.6 t, and Gross 79.20 t. The wagon is fitted with Air brake system, Casnub 22 NLB bogie, O-12, I-8, S-4. A/L20.32t. Speed 75/80 Km/h.

## BOXNHAM

A variant of BOXNHA wagon achieved by conversion of BOXN type wagons during POH/Rebuilding. Axle Load: 22.82 t Bogie: IRF 108 HS, Spring O-14 & I-14, S-4. Conversion being done through operation of Railway Board RSPs. Cleared Speed at CC+8+2 t A/L of 75/100 Kmph.