

INDIAN RAILWAYS



ISSUED WITH REFERENCE TO

Your Letter No 1116.....

dated 7/6/10.....

& with Bill No 4790.....

For DIRECTOR GENERAL (WAGON)

R.D.S.O. LUCKNOW-226011

5-7/6/10

G-33 (Rev. 1)

TECHNICAL PAMPHLET

FOR

REQUIREMENTS OF TIPPLER INSTALLATION
FOR APPROVAL BY RDSO

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1.	May, 2010	Revision 1	-	First issue

ISSUED BY

RESEARCH DESIGNS AND STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
LUCKNOW-226 011

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1.0 Scope

- 1.1 This document provides guidelines for selection of tipplers for BG open Railway wagons of
 - a. Current design
 - b. Wagon designs, of 25t axle load, for existing routes
 - c. Proposed wagon designs, of **32.5t & 25t axle load, for DFC & Feeder routes**
- 1.2 This document also gives the basic requirements to be met for obtaining RDSO's approval for installation.

2.0 Types of wagons

- 2.1 The existing population of open wagons in the Indian railways consist of BOY, BOX, BOXN and BOXNHA wagons, of which BOXN wagons form the bulk.
- 2.2 However, new types of open wagons like BOY25, BOXNLW, and BOXNHL & BOXN25 are being introduced in the Indian Railways.
- 2.3 New designs for open wagons for coal and iron ore for DFC & Feeder routes are also under consideration & conceptual diagrams have been developed.
- 2.4 Conceptual Diagrams and other details of these wagons (both 25t & 32.5t axle load) are covered in the annexure.
- 2.5 These wagons are suitable for transporting coal, ore, lime stone etc., hence while planning for mechanised unloading, the parameters of these types of wagons should be taken into consideration.
- 2.6 For handling of any other special type of wagons, the purchaser should take into consideration the size & gross weight of the wagons or intimate the same to RDSO.
- 2.7 Introduction of new type of freight wagons is a continuous process. Hence, limiting boundary dimensions should be taken into consideration while planning a tippler. The limiting boundary dimensions are indicated in the item 8.2 (g).

3.0 Design parameters

- 3.1 These guidelines shall be applicable for both Side discharge and Rotary type wagon Tipplers.
- 3.2 Single wagon tippler shall be designed for handling a gross load of **140t**, taking into consideration a 4-axle bogie wagon with an axle load of **32.5t** plus the overloading caused due to variable density of the bulk material and heap loading of the wagon. For tipping two or more wagons at a time, the capacity parameters will increase proportionately.
- 3.3 The tippler shall be capable of handling either one or more open wagons of BOXNHL length i.e 10.963 m over couplers. The minimum length of the tippler table should 10.963 m or in multiples thereof, depending on the nos. of wagons to be tipped. When two or more wagons are tipped simultaneously, the wagons should be in coupled position.

- 3.4 However, wherever, older BOXC wagons have to be tippled (user shall have to consult the concerned zonal railway for this confirmation), the minimum length of the tippler table shall be at least 13.729m.
- 3.5 Additional extension piece may be utilized for tipping of iron ore wagons (i.e. BOY wagon variants), to compensate for their less height of the wagon, as in the existing tipplers.
- 3.6 Where a locomotive is required to pass over or stand on the tippler, the tippler shall be able to bear the load of the locomotive without sustaining any permanent deformation. The clearance diagram for the diesel loco is indicated vide Annexure - _14. For electric loco, a bypass track to be provided parallel to the wagon tipplers

4.0 General requirements

- 4.1 The design and construction of components of tipplers and auxiliary handling equipment coming into contact with any part of wagon shall be such that no damage whatsoever is caused to the wagon equipment or its paint.
- 4.2 The top clamping pressure shall be such as will hold the wagons firmly in position on rails and keep the running gear from getting dislodged without causing any deformation to the wagon structure.
- 4.3 Adequate compensating measures shall be taken in top clamps and side support beam to compensate for manufacturing imperfections, within the permissible limits, in the top copings and side stanchions of the wagon, so that clamping pressure on the contacting area on the side and top of the wagon is uniformly distributed.
- 4.4 The side supports for tipplers shall meet the following requirements:
 - a) The side support shall consist of a longitudinal beam, which shall be as long as the longest wagon to be tippled. This beam shall be continuous.
 - b) The side support shall be articulated so that it can take the tapered as well as parallel stanchions on the body of the wagons. Alternatively, the cradle shall be articulated on trunion to achieve this.
 - c) Full-face contact between the side support beam and the side stanchions shall be ensured. The side supports shall extend from a height of 1000 mm up to 2950mm, from rail level, i.e. contact the side of the wagon over a width of not less than 1950mm. [For wagons of height less than 2950mm, typically iron ore wagons, (user shall have to consult the concerned zonal railway for this confirmation) suitable slots shall be provided in the side support beam, to permit the top clamping of the wagons] **There shall be metal to metal contact between the side support beam and the side stanchions of the wagon** i.e. no rubber pad or any other alternative, shall be provided on the contact face of the side support beam
 - d) The side support beam shall be moveable type, the movement being done by hydraulic arrangement. (No external or moveable counter

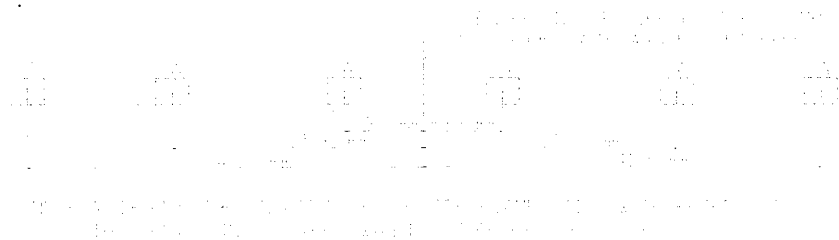
weights should be used with the side support beam) Facility of forward/ backward movement should exist, such that it should be able to move & touch the wagon without applying any pressure on the wagon side-wall. At this position it should get locked and the tilting operation can begin. At the end of the tipping cycle, the side support should return to its home position, so that the next wagon can be positioned on the tippler

Movement of the side support should be controlled & the speed should be crawling just before making contact with the wagon sidewall.

- e) Pressure gauge/s should be mounted, at easily accessible location, for reading the hydraulic pressure of the side support hydraulic arrangement.

4.5 The top clamping arrangement shall conform to the following requirements.

- a. The top clamping of the wagon shall be done through hydraulically locked top clamps. No external or moveable counter weights should be used with the hydraulic clamps
- b. Top clamps should engage when the wagon tilts by more than 15 degree. Top clamp locks should include a **wagon bogie spring relief mechanism for permitting release of bogie springs**. Top clamps should exert the bare minimum pressure on the top coping of the wagon, so as to just keep it in position. The pressure exerted by the top clamps at the tilt angle of 160 degrees should be just enough to bear the weight of the empty wagon, which should be achieved **through the bogie spring relief mechanism, incorporated in the tipplers design**.
- c. Pressure gauge/s should be mounted, at easily accessible location, for reading the hydraulic pressure of the top clamping hydraulic arrangement
- d. The top clamping arrangement shall be of longitudinal/ transverse type and provided with self-aligning feature, whereby the load is borne on the top at each of the wagons.
 - i. The transverse type top clamping shall have 6 nos transverse top clamping beams i.e. the bearing face of the beam shall contact the top of the wagon at 12 locations (six on each side). Each of the six top hydraulic clamps shall be individually articulated, to ensure firm clamping of wagon at every gripping point. The location of the clamping pads shall be as under:



- ii. The longitudinal type top clamping shall be such that the clamping pads cover the full length of wagon top coping. Each top hydraulic clamp shall be individually articulated, to ensure firm clamping of wagon at every gripping point.

- f. The beam shall be so arranged that the discharge of the contents of the wagon is not impeded to any appreciable extent
 - g. Each bearing face shall contact the top of the wagon over a width of not less than 250 mm and shall be provided with rubber pads or suitable alternative not less than 50 mm thick. The shore hardness of the rubber pad should not be less than 70A.
 - h. The total force between the wagon tops and supporting beam shall be not more than is necessary to ensure retention of the wagon and engagement of wagon wheels with the rails of the tippler throughout the tipping cycle
 - i. The design of the appliance shall take account of the nature of the material to be discharged, bearing in mind the maximum lump size, moisture content, possible climatic conditions and other influencing factors
- 4.6 Devices shall be built-in for spotting of wagons on the tippler table, so as to discharge the material in hoppers.
- 4.7 Size and gauge of rails on the wagon tippler platform shall be as per railway specifications taking into considerations the maximum duty condition that the wagon tippler has to undergo in field operation.
- 4.8 If so specified by the purchaser, integrated weigh bridges, load cell type or mechanical type, conforming to relevant Indian Standard shall be provided on the tippler to weigh the gross and tare weight of wagons which are being handled. There may also be a provision to record gross load, tare load, date and number of wagons.
- 4.9 **Marking** - All tipplers shall be marked permanently and legibly at a clearly visible place with the name of the manufacturer, serial number, the year of manufacture, type and capacity of tippler and RDSO allotted Serial No.
- 5.0 **Safety requirements** – Notwithstanding anything contained in various statutory regulations, safety requirements for tipplers, divided into the following three stages, shall be followed:
- 5.1 Construction stage
- a. The design of the tippler shall avoid, as far as possible, any spillage of the material handled by the wagons.
 - b. Devices shall be built-in to prevent any over run of the wagons in either direction.
 - c. The tippler shall be designed so that the wagon is securely held in all operating positions.
 - d. Automatic devices shall be provided to hold the tipplers securely in any position in the event of failure of the drive unit.
 - e. All tipplers shall have means to limit the angle of tipping.
 - f. Arrangement shall be made on tipplers to prevent feet being trapped between the platform and the base of the tippler.
 - g. Whenever possible mechanical or electrical devices shall be built-in to ensure that all the conditions allowing wagon tipping are coordinated.
 - h. Additionally, a device shall be provided to prevent an empty wagon from being released until the tippler is back in original position.
 - i. A device shall be provided to prevent the entry of a non-scheduled wagon into a tippler.

- j. Sharp edges and corners in all working spaces shall be avoided.
- k. The parts projecting into working spaces shall be as small as possible.
- l. All the frequently used lubrication points shall be accessible without it being necessary to remove the guards.
- m. It is recommended that equipment shall be so designed that maintenance and cleaning is facilitated.
- n. Fully integrated controls should be provided for wagon positioning system, wagon holding devices and wagon tippler. The controls should be interlocked so that there is no chance of accident due to error in sequence of operation.

5.2 Installation stage

- a. All tippler installations shall be marked permanently and legibly in a clearly visible place, with the following information:
 - i) Maximum capacity of the wagons & the type of wagons to be tipped.
 - ii) If locomotives are required to run over the tippler, the maximum permissible mass, maximum permissible axle loading and speed.
 - iii) Maximum speed of the wagon passing through the tippler and
 - iv) An instruction forbidding the tippler to be operated as long as the wagon is not held on the platform in its tipping position. This instruction shall also state that the tippler shall be held in appropriate position before an attempt is made to remove the empty wagon.
- b. The emergency stop controls shall be provided adjacent to the wagon tipplers in the readily accessible positions.
- c. Frequently used lubrication points shall be accessible without being necessary to remove guards and shall be painted to standard pattern.
- d. All starting and stopping devices shall be clearly indicated and easily accessible and shall be painted or printed as a standard pattern.
- e. Gangways, handrails, staircases, ladders, guards, etc. wherever provided shall be erected before installation is put into service.
- f. **The outhaul side track should satisfy the following conditions:**
 - The gradient of the outhaul track should not exceed "1 in 1200"
 - The length of the outhaul track, with the specified gradient, is not less than 650 m for full rake tipping.
 - For partial rake tipping (not less than the half rake), proportionate track length (equal to the half the rake length or more) with track gradient not exceeding "1 in 1200" will be permitted.
 - In case of limitation of adequate track length on the outhaul side, as specified above, the user can consider use of transfer platform for shifting the empty wagons, on a parallel track. This parallel track shall satisfy the same conditions of gradient as listed out above.
 - It should be certified that the length & the gradient of the outhaul track is within the limits, as per above, by the competent railway authority, under whose jurisdiction the tippler location lies. The same certificate should be submitted

to this office, along with other documents, at the time of approval by the firm/user.

5.3 Utilization stage

- a. The inspection, adjustment, maintenance and cleaning of moving components and of cleaning devices shall be carried out regularly according to the manufacturer's instructions.
- b. No person, other than a qualified and competent person so authorized shall operate the tippler.
- c. Normal and emergency stopping devices shall be made known to all personnel and be easily accessible. All areas giving access to them shall be kept clear of obstacles.
- d. All restarting operations on tippers which have been in operative because of an emergency or accidental stoppage shall be preceded by an inspection aiming at:
 - i) Determining the cause of the emergency or accidental stoppage
 - ii) Repairing the fault
- e. If so specified by the purchaser, a dust collection system shall be installed at the tippler.

6 Positioning system for wagon

Wagon tippers shall be provided with side arm charger for positioning of wagons on the tippers, such that

- a. Side arm charger should be of sufficient capacity, depending on whether complete train or some wagons are to be moved / positioned. **There should be some positive system for centering of wagon on the tippler table.**
- b. Drive unit for the side arm charger should be of positive type e.g. rack & pinion, so that sudden jerks/slippages are avoided. Suitable technology should be used, so that the wagon can be moved at slow speeds for placement on tippler table e.g. Low speed hydraulic motors, Variable frequency AC motors or thyristor controlled DC motors (through epicyclical reduction gearing), etc.
- c. Charger should be able to slow down to creeping speed just before the final positioning

7 Wagon & Train holding devices

7.1 Wheel grippers

- a. **These are mandatory** & should be located on the tippler table, to prevent inadvertent motion of the wagons during tipping operation.
- b. These should be so designed that balanced pressure is applied on both sides of the wheel rim. It should have a floating arrangement so as to

ensure that force on each gripper is same and should have some lateral float so that it can take a new position in case of variation in wheel gauge. Wheel grippers should be free from serrations or any such provision on its holding face. Wheel grippers should be made of soft material.

7.2 Retractable wheel chocks

- a. **These are mandatory** & should be fitted at the in-haul & out –haul tracks, to prevent accidental rolling of the wagons on the tippler table.
- b. They should be so designed that flange of the wheel is not contacted while blocking tread of the wheel. Shape of the chock should take into account the wheel incline, so that a line contact is made with the wheel.

8 Requirements for RDSO's approval for tippler installation

8.1 List of documents to be supplied to RDSO

- a. Name of the manufacturer.
- b. Name of the user & site of installation.
- c. Number of tipplers to be supplied / installed & their model no., if any.
- d. Nearest railhead.
- e. Commodity to be handled.
- f. **Site layout drawings (duly approved by the railways)**
- g. General arrangement drawings of tippler, clearly showing side support beam and top clamp with dimensions.
- h. Certificate, that the length & the gradient of the outhaul track is within the limits [as per clause 5.2(f)], by the competent railway authority, under whose jurisdiction the tippler location lies. The same certificate should be submitted to this office, along with the other documents.
- i. The maximum dimensions of the wagons that can be handled on the tippler should also be indicated.
- j. The clamping forces per pad achieved and the clamping angle for different types of wagons. Calculations of the clamping force shall be furnished separately for the all the type of open wagons, which will be tipped. (User shall have to consult the concerned zonal railway for this confirmation and submit a copy of the same to RDSO.)
- k. **Suitability of tippler for accepting locomotives weighing up to 140t, at a speed of 8 kmph**
- l. Capacity of the tipplers.
 - i. Maximum height of the wagon that can be handled.
 - ii. Number of tips per hour.
- m. Sketch showing location of clamps with respect to centre-line of the tippler.
- n. Details of side arm charger to be used for placement of wagons on the tippler.
- o. Complete maintenance instructions manual should be supplied along with trouble shooting, preventive maintenance and periodical inspection for different components of the tippler for its proper functioning.
- p. Force, pressure and moment calculations at 90 degree and 150 degree of rotation for the wagons to be tipped, as mentioned above.

- q. Pressure calculations on top coping and side stiffener at various angles of rotation as given above. Moment on side stiffener and wheel flange with respect to centreline of bogie pivots.
- r. Checklist of items as shown in a indicative sketch No. G-33-2000 and their details & type, namely
 - i. Side arm Charger
 - ii. Top clamps, hydraulically operated
 - iii. Movable side support beam, hydraulically operated
 - iv. Wagon holding device.
- s. A demand draft for consultancy charges, as prevalent, drawn in favour of Executive Director (Finance), RDSO, Lucknow.

8.2 List of conditions for tipplers

- a. Minimum 50 mm thick rubber lining on top clamp pads shall be provided. The shore hardness of the rubber pads shall be at least 70A.
 - b. Max. Angle of rotation should not exceed 160 degree for side discharge tippler.
 - c. **The tippler shall have the capacity to tip at least 25 wagons per hour i.e. 25 tips per hour, with suitable provisions so that the wagon is not damaged in the tipping process. If the client desires lesser numbers of tips, concurrence of the concerned railway shall be obtained.**
 - d. The forces exerted by the top clamps of the tipplers on wagon copings shall not exceed 1.5t per clamp pad. **This shall be ensured by providing some positive arrangement, other than provision of rubber pads, for absorbing the clamping forces (permitting release of bogie springs).** The rubber pads on the clamps are to be provided to take care of constructional undulations of wagon copings.
 - e. The length & the gradient of the outhaul track are within the limits [as per clause 5.2(f).
 - f. The location of the top clamp pads on the tippler should be as indicated below:
-
- g. The tipplers shall be capable of handling wagons with the following overall measurements without heavily impacting the wagons during the course of tipping.
 - i. Width : **3130 mm to 3660 mm**
 - ii. Height* : **3160mm to 4000 mm**
 - iii. Length over # : min. 10963 mm (or in multiples thereof for
coupler faces simultaneous tipping of two or more wagons)

Note: '*' – This range is true for coal wagons. However, the height requirement for iron ore wagons is lesser, range being 2393mm to 2650mm.

‘#’ – For tipping of older BOXC wagons, the minimum rail table length will be 13.729m

- h. The tippler shall be capable of handling a single wagon of upto 140t (gross). For tipping two or more wagons at a time, the capacity will increase proportionately.
- i. No tippler/handling equipment component should protrude more than 100 mm from the rail level within the rails.
- j. The tippler shall have such parking/arrangement as would facilitate placement of wagon centrally on the tippler table.
- k. After installation and commissioning of the tippler, Sr.DME of the concerned Division, Railway shall certify it safe for the operation.
- l. Operation of the tippler shall be suspended on request of the Sr.DME of the concerned Division in case of its causing damage to the wagons and not meeting any of the above conditions and requiring maintenance
- m. Sr DME of the concerned Railway Division or his representative may inspect the Tippler and its operation, whenever such a need is felt, or may depute Railway staff permanently for inspection of wagons after each tipping. The entire cost of inspection and attention to the wagons shall be borne by the owner of the tippler.
- n. It shall entirely be the responsibility of the owner for ensuring that no damage whatsoever is caused to the wagons during handling on the tippler. The owner shall guarantee to pay to the Railway the rectification charges in case of any damage to the wagons.
- o. The approval for operation of tippler is subject to withdrawal at any time in event of owner's failure to ensure handling of wagons without damage.
- p. Owner/User or his representative shall submit a certificate to Sr DME of the concerned Rly/Division in the prescribed format that the tippler is in good working condition, once in every six months.

9.0 Check sheet for joint inspection

Check sheet for the six monthly joint inspection of the tipplers to conducted by DME/Sr.DME (C&W) of the concerned division or his authorised representative and representative of the siding owner, as per Railway Board letter no.98/M(N)/951/12 dated 27.11.02, is as follows:

S N	Item		Check	Remark
1	End frame platform side beam	(i) (ii)	Steel work to be examined for damage or defects Check & record the gap between the side beam and the wagon side stanchion, during tipping operation.	
2	Drive gear	(i) (ii)	Check proper matching of rack and pinion tooth & tooth wear Check whether coupling gives jerk during rotation. The tipping operation should be smooth & without any jerks	
3	Top hydraulic	(i)	Check the level of clamp pad.	

	clamp	(ii) (iii) (iv) (v) (vi)	Whether sitting properly or not. Check the condition & thickness of clamp pad (thickness should not be less than 50 mm) Check the smoothness of clamp movement Check for provision of indicators on the tippler table for all types of wagon stock, which are likely to be tipped on the tippler. This is to ensure that wagons are placed on the tippler table in such a manner that the top clamping pads position is near the side stanchions. Force exerted by the top clamps should not exceed 1.5t per clamp pad. Check & record the value. Check for provision of a wagon bogie spring relief mechanism in the top clamp locks for permitting release of bogie springs.	
4	Rail table of wagon tippler	(i)	Check the level and alignment of rail. The level of track on tippler table and that of approach rails should be the same so that the wagons do not experience any jerk during in-haul and out-haul	
5	Limit switches	(i)	Check for proper function	
6	In haul & out haul stop linkage	(i) (ii)	Check satisfactory working of stop movement Check the gradient on the outhaul side	
7	Side arm charger*	(i) (ii) (iii) (iv) (v)	Check damage / defects of steel work Check proper matching of drive pinion & rack & tooth wear Check the smooth movement and final position of arm hoist Check the proper tightening of fastener & condition of track Check for proper functioning of limit switches & proximity switches	
8	Damages to wagons	(i)	Damages during tipping & post tipping damages: <ul style="list-style-type: none"> • Dents/nick on the side stanchions, top copings, wagon body, etc • Displacement of bogie pivot or suspension springs • Damages to air brake pipes • Axle box adopter shifting 	

			<ul style="list-style-type: none"> • Coupler damages • Any other 	
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*Note: (1) There should not be any loose shunting of the wagons. In-haul and out-haul arrangements consisting of side arm charger should be used for placement and removal of wagon on tippler table. The practice of shunting empty wagon after tipping by rake of loaded wagons, is not acceptable as it results into large scale damages to CBC and bogies

**Representative of the
Siding owner**

**Sr DME (C&W) /DME
or
Authorised representative**

Format of approval certificate

फैक्स/Fax : 91-0522-2452494

तार : 'रेलमानक' लखनऊ

Telegram : 'RAILMANAK'

Lucknow

टेलीफोन/Tele: 2451200 (PBX)
2450567 (DID)भारत सरकार --रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226011Government of India - Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226011

No.

Dated :

APPROVAL FOR TIPPLER INSTALLATION

1	Certificate No. and Date	
2	Manufacturer	
3	Contractor	
4	User/Consignee	
5	Site	
6	Nearest Railhead	
7	Tippler Model no	
8	Drg. reference	
9	Type of Tippler	
10	Capacity (Wt & height of wagon)	
11	Max rotation angle	
12	Tipping Cycle time	
13	Area of contact(top clamp & side support)	
14	RDSO no allotted	
15	Approval	

Remarks: The above approval is provisional and subject to following conditions:

1. RDSO allotted No. may be indicated on the control panel of the wagon tippler.
2. The tippler shall have the capacity to tip at least 25 wagons per hour i.e. 25 tips per hour.

(DSW/WD)

For Director General (Wagon)

Copy to.

1. GM/Mech, Railway.
2. User/Owner
3. Sr. DME, Division, Railway.
4. Tippler supplying firm.

List of conditions for tipplers

- a. Minimum 50 mm thick rubber lining on top clamp pads shall be provided. The shore hardness of the rubber pads shall be at least 70A.
- b. Max. Angle of rotation should not exceed 160 degree for side discharge tippler.
- c. **The tippler shall have the capacity to tip at least 25 wagons per hour i.e. 25 tips per hour, with suitable provisions so that the wagon is not damaged in the tipping process. If the client desires lesser numbers of tips, concurrence of the concerned railway shall be obtained.**
- d. The forces exerted by the top clamps of the tipplers on wagon copings shall not exceed 1.5t per clamp pad. **This shall be ensured by providing some positive arrangement, other than provision of rubber pads, for absorbing the clamping forces (permitting release of bogie springs).** The rubber pads on the clamps are to be provided to take care of constructional undulations of wagon copings.
- e. The length & the gradient of the outhaul track are within the limits [as per clause 5.2(I)].
- f. The location of the top clamp pads on the tippler should be as indicated below:

- g. The tipplers shall be capable of handling wagons with the following overall measurements without heavily impacting the wagons during the course of tipping.
 - i. Width : **3130 mm to 3660 mm**
 - ii. Height* : 3160mm to 4000 mm
 - iii. Length over # : min. 10963 mm (or in multiples thereof for coupler faces simultaneous tipping of two or more wagons)

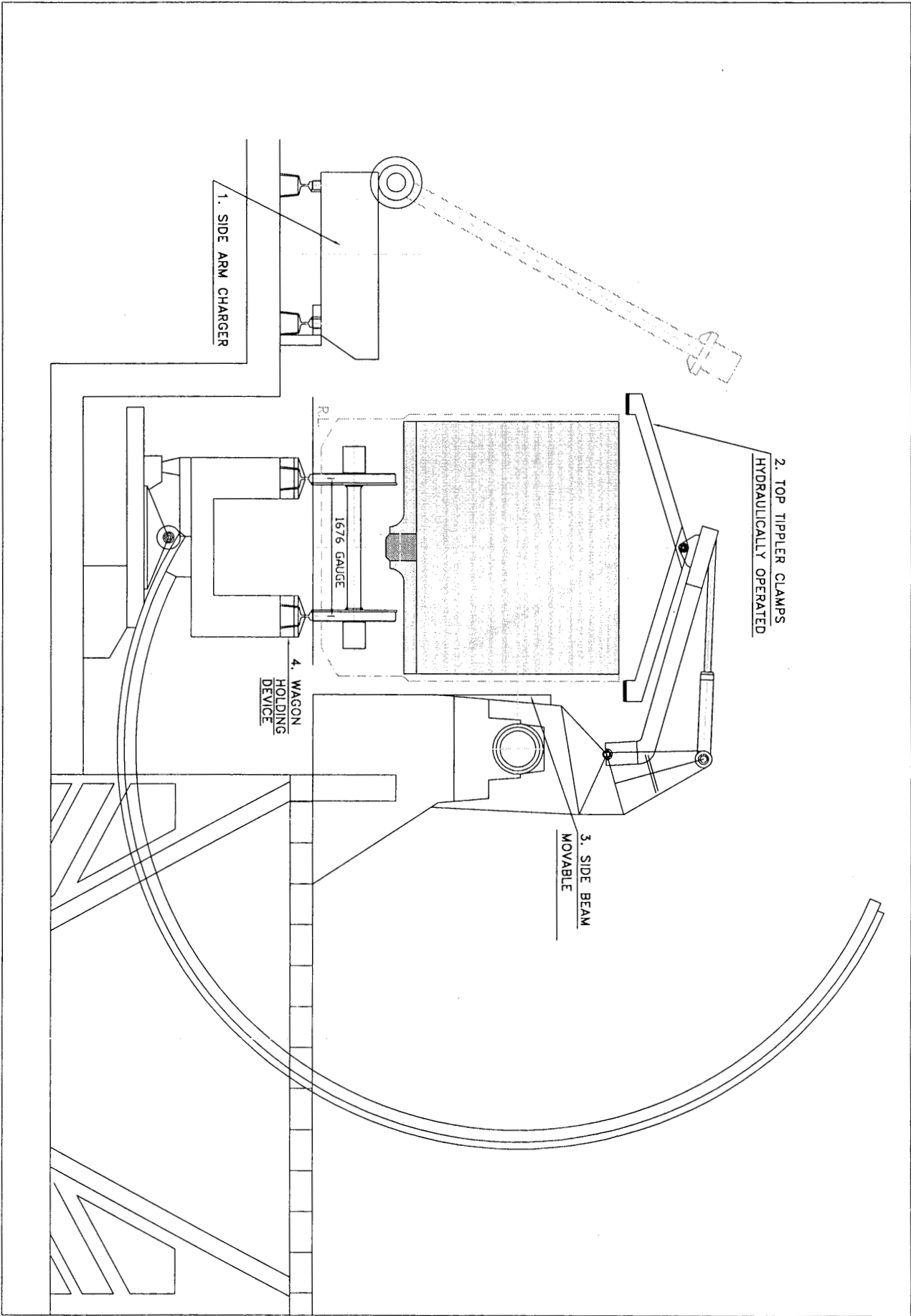
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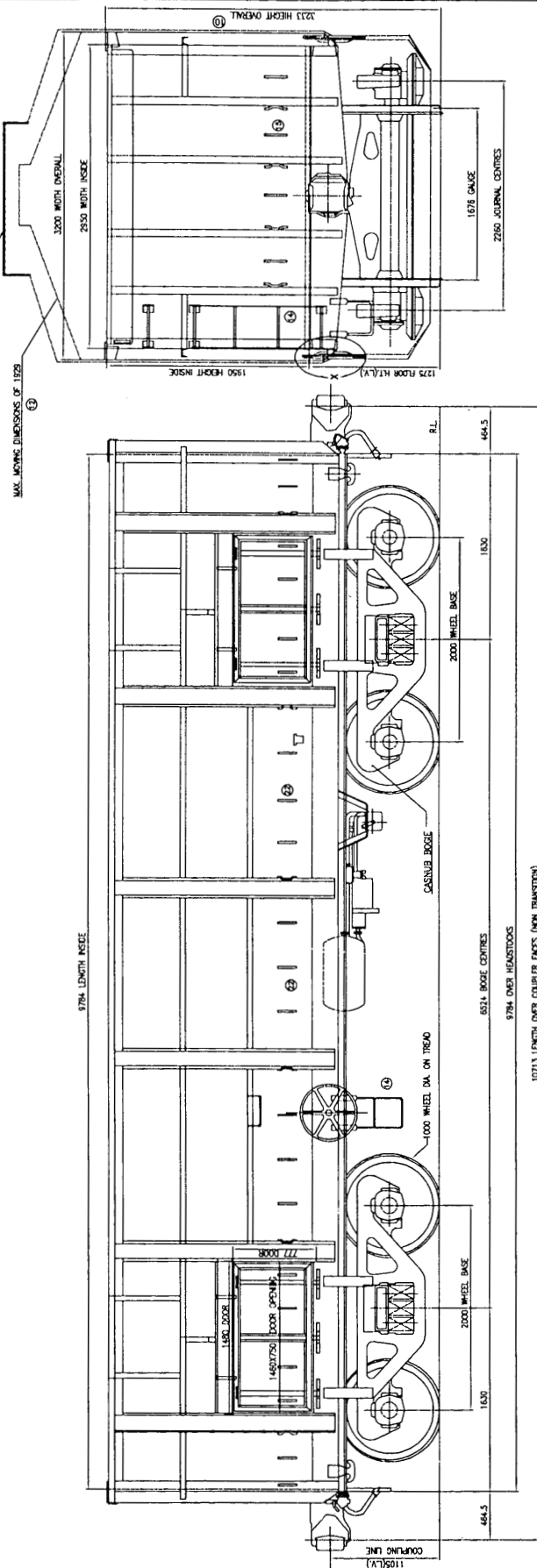
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- h. The tippler shall be capable of handling a single wagon of upto 140t (gross). For tipping two or more wagons at a time, the capacity will increase proportionately.
- i. No tippler/handling equipment component should protrude more than 100 mm from the rail level within the rails.
- j. The tippler shall have such parking/arrangement as would facilitate placement of wagon centrally on the tippler table.
- k. After installation and commissioning of the tippler, Sr.DME of the concerned Division, Railway shall certify it safe for the operation.

Annexure-1

- l. Operation of the tippler shall be suspended on request of the Sr.DME of the concerned Division in case of its causing damage to the wagons and not meeting any of the above conditions and requiring maintenance
- m. Sr DME of the concerned Railway Division or his representative may inspect the Tippler and its operation, whenever such a need is felt, or may depute Railway staff permanently for inspection of wagons after each tipping. The entire cost of inspection and attention to the wagons shall be borne by the owner of the tippler.
- n. It shall entirely be the responsibility of the owner for ensuring that no damage whatsoever is caused to the wagons during handling on the tippler. The owner shall guarantee to pay to the Railway the rectification charges in case of any damage to the wagons.
- o. The approval for operation of tippler is subject to withdrawal at any time in event of owner's failure to ensure handling of wagons without damage.
- p. Owner/User or his representative shall submit a certificate to Sr DME of the concerned Rly/Division in the prescribed format that the tippler is in good working condition, once in every six months





10713 LENGTH OVER COUPLER FACES (NON TRANSITION)

S.NO.	SUMMARY OF WEIGHTS (ESTIMATED)	MEASURES	MEASURES	MEASURES
1.	UNDERFRAME	3.78 t	3.78 t	3.78 t
2.	FLOOR PLATE	1.296 t	1.296 t	1.296 t
3.	BODY STRUCTURE COMPLETE	5.21 t	5.21 t	5.21 t
4.	BRAKE GEAR ON UNDERFRAME	0.60 t	0.60 t	0.60 t
5.	C.B.C COMPLETE INCLUDING UNCOUPLING GEAR	1.32 t	1.32 t	1.32 t
6.	COUPLER ASSEMBLY WITH DRAWBAR AND CENTRE PIVOTS	3.536 t	3.536 t	3.536 t
7.	FOUR PAIRS OF WHEELS & AXLES	5.75 t	5.75 t	5.75 t
8.	FOUR CARTRIDGE BEARING UNITS AND WAXTERS	0.368 t	0.368 t	0.368 t
9.	BOLSTER SPRINGS AND SHOCK SPRINGS	0.224 t	0.224 t	0.224 t
10.	CENTRE PIVOT ASSEMBLY	0.50 t	0.50 t	0.50 t
11.	BOGIE BRAKE GEAR COMPLETE	3.31 t	3.31 t	3.31 t
12.	ESTIMATED TARE	58.18 t	58.18 t	58.18 t
13.	PAY LOAD	81.28 t	81.28 t	81.28 t
14.	GROSS	20.32 t	21.82 t	22.32 t
15.	AXLE LOAD	2.52 t	2.78 t	2.85 t
16.	RATO (PAY LOAD TO TARE)	7.58 t/m	8.15 t/m	8.33 t/m
17.	TRUCK (LOADING DENSITY) (GROSS)	38	38	38
18.	NO. OF WAGONS PER TRAIN	3722 t	3654 t	3658 t
19.	PAY LOAD PER TRAIN (FOR WAGONS)	4714 t	5094 t	5178 t
20.	GROSS LOAD PER TRAIN	1.016 m	1.016 m	1.016 m
21.	C.G. FROM R.L.(EMPTY)	1.974 m	2.000 m	2.058 m
22.	C.G.FROM R.L.(LOADED)	28.87 m	28.87 m	28.87 m
23.	FLOOR AREA	58.29 m ²	58.29 m ²	58.29 m ²
24.	VOLUMETRIC CAPACITY	58.29 m ³	58.29 m ³	58.29 m ³

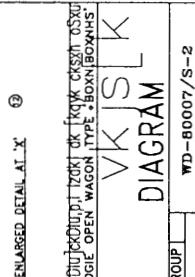
S.NO.	WAGON DATA (LIGHT)	mm
1.	HIGHT OF CENTRE BUFFER COUPLER FROM R.L.	1105
2.	DISTANCE BETWEEN WHEEL FLANGES AND FLOOR	240.5
3.	SIDE BEAMER CLEARANCE (NOMINAL)	-

S.NO.	BOGIE DATA (TARE)	mm
1.	H.T OF BOTTOM BOGIE FRAME FROM R.L AT CENTRE	165
2.	DISTANCE FROM R.L TO TOP OF TOP PIVOT	932
3.	DISTANCE FROM R.L TO TOP OF SIDE BEAMER	A
4.	HIGHT OF SPRINGS	B
5.	WHEEL DIALON TREAD	1000
6.	WHEEL DIALON TREAD CONSIDERING SIZE	906
7.	DAY OF WHEEL SEAT	210
8.	JOURNAL CENTRES	2260
9.	JOURNAL SIZE	144X278

NOTE:-
 1. FITTED
 2. WITH SINGLE GRADUATED RELEASE BRAKE
 3. 12 HIGH TENSILE (NON TRANSITION TYPE CENTRE BUFFER COUPLER)
 4. 12 HIGH TENSILE (NON TRANSITION TYPE CENTRE BUFFER COUPLER)
 5. TO LATEST SPECIFICATION

* THE VALUE OF C.G. CALCULATED FOR NON ONE ONLY.
 A = 917 FOR CASUB 22W, A=921 FOR CASUB -22 W (M), A=921 FOR CASUB -22 N/LB, A= 921 FOR CASUB HS BOGIE.
 B = 254 FOR CASUB -22 W CASUB -22 W (N), CASUB - 22 N/L & N/B
 B= 251 FOR CASUB HS BOGIE.

S.NO.	MEASURES	MEASURES	MEASURES	MEASURES
1.	WHEEL DIALON TREAD	1000	1000	1000
2.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
3.	DAY OF WHEEL SEAT	210	210	210
4.	JOURNAL CENTRES	2260	2260	2260
5.	JOURNAL SIZE	144X278	144X278	144X278
6.	WHEEL DIALON TREAD	1000	1000	1000
7.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
8.	DAY OF WHEEL SEAT	210	210	210
9.	JOURNAL CENTRES	2260	2260	2260
10.	JOURNAL SIZE	144X278	144X278	144X278
11.	WHEEL DIALON TREAD	1000	1000	1000
12.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
13.	DAY OF WHEEL SEAT	210	210	210
14.	JOURNAL CENTRES	2260	2260	2260
15.	JOURNAL SIZE	144X278	144X278	144X278
16.	WHEEL DIALON TREAD	1000	1000	1000
17.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
18.	DAY OF WHEEL SEAT	210	210	210
19.	JOURNAL CENTRES	2260	2260	2260
20.	JOURNAL SIZE	144X278	144X278	144X278
21.	WHEEL DIALON TREAD	1000	1000	1000
22.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
23.	DAY OF WHEEL SEAT	210	210	210
24.	JOURNAL CENTRES	2260	2260	2260
25.	JOURNAL SIZE	144X278	144X278	144X278



S.NO.	MEASURES	MEASURES	MEASURES	MEASURES
1.	WHEEL DIALON TREAD	1000	1000	1000
2.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
3.	DAY OF WHEEL SEAT	210	210	210
4.	JOURNAL CENTRES	2260	2260	2260
5.	JOURNAL SIZE	144X278	144X278	144X278
6.	WHEEL DIALON TREAD	1000	1000	1000
7.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
8.	DAY OF WHEEL SEAT	210	210	210
9.	JOURNAL CENTRES	2260	2260	2260
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22.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
23.	DAY OF WHEEL SEAT	210	210	210
24.	JOURNAL CENTRES	2260	2260	2260
25.	JOURNAL SIZE	144X278	144X278	144X278

ENLARGED DETAIL AT 'X'

S.NO.	MEASURES	MEASURES	MEASURES	MEASURES
1.	WHEEL DIALON TREAD	1000	1000	1000
2.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
3.	DAY OF WHEEL SEAT	210	210	210
4.	JOURNAL CENTRES	2260	2260	2260
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6.	WHEEL DIALON TREAD	1000	1000	1000
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22.	WHEEL DIALON TREAD CONSIDERING SIZE	906	906	906
23.	DAY OF WHEEL SEAT	210	210	210
24.	JOURNAL CENTRES	2260	2260	2260
25.	JOURNAL SIZE	144X278	144X278	144X278

DATE: 10/07/2004
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 DRAWN: K. L. / S. K. / R. S. /
 DESIGNED: S. S. / M. S. / R. S. /
 APPROVED: 10/07/2004

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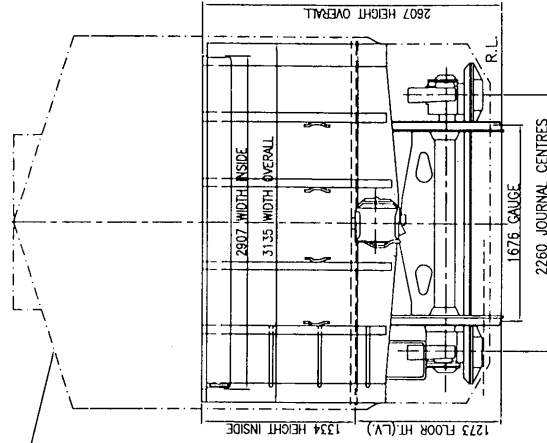
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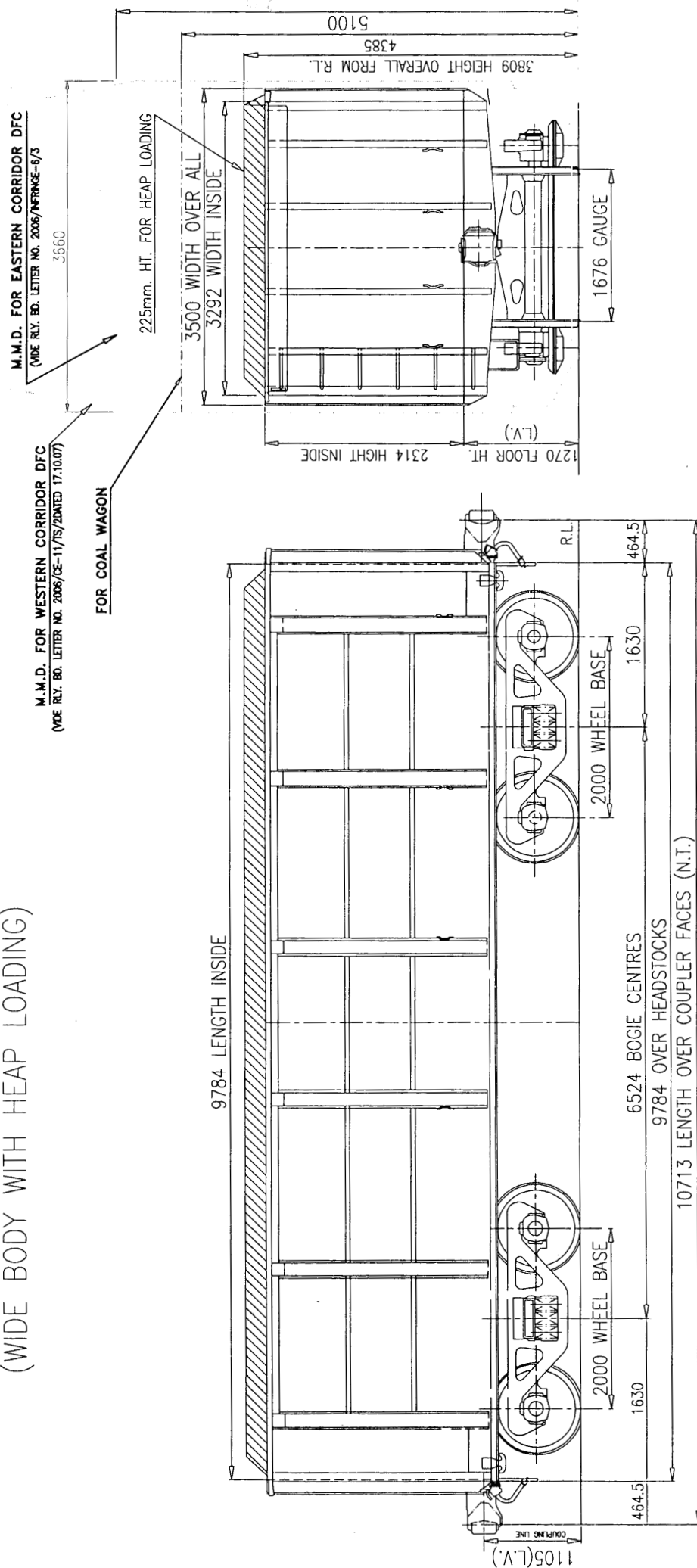
ENLARGED DETAIL AT 'X'		12
C:\pict\pict\p1\p2\p3\p4\p5\p6\p7\p8\p9\p10\p11\p12\p13\p14\p15\p16\p17\p18\p19\p20\p21\p22\p23\p24\p25\p26\p27\p28\p29\p30\p31\p32\p33\p34\p35\p36\p37\p38\p39\p40\p41\p42\p43\p44\p45\p46\p47\p48\p49\p50\p51\p52\p53\p54\p55\p56\p57\p58\p59\p60\p61\p62\p63\p64\p65\p66\p67\p68\p69\p70\p71\p72\p73\p74\p75\p76\p77\p78\p79\p80\p81\p82\p83\p84\p85\p86\p87\p88\p89\p90\p91\p92\p93\p94\p95\p96\p97\p98\p99\p100\p101\p102\p103\p104\p105\p106\p107\p108\p109\p110\p111\p112\p113\p114\p115\p116\p117\p118\p119\p120\p121\p122\p123\p124\p125\p126\p127\p128\p129\p130\p131\p132\p133\p134\p135\p136\p137\p138\p139\p140\p141\p142\p143\p144\p145\p146\p147\p148\p149\p150\p151\p152\p153\p154\p155\p156\p157\p158\p159\p160\p161\p162\p163\p164\p165\p166\p167\p168\p169\p170\p171\p172\p173\p174\p175\p176\p177\p178\p179\p180\p181\p182\p183\p184\p185\p186\p187\p188\p189\p190\p191\p192\p193\p194\p195\p196\p197\p198\p199\p200\p201\p202\p203\p204\p205\p206\p207\p208\p209\p210\p211\p212\p213\p214\p215\p216\p217\p218\p219\p220\p221\p222\p223\p224\p225\p226\p227\p228\p229\p230\p231\p232\p233\p234\p235\p236\p237\p238\p239\p240\p241\p242\p243\p244\p245\p246\p247\p248\p249\p250\p251\p252\p253\p254\p255\p256\p257\p258\p259\p260\p261\p262\p263\p264\p265\p266\p267\p268\p269\p270\p271\p272\p273\p274\p275\p276\p277\p278\p279\p280\p281\p282\p283\p284\p285\p286\p287\p288\p289\p290\p291\p292\p293\p294\p295\p296\p297\p298\p299\p300\p301\p302\p303\p304\p305\p306\p307\p308\p309\p310\p311\p312\p313\p314\p315\p316\p317\p318\p319\p320\p321\p322\p323\p324\p325\p326\p327\p328\p329\p330\p331\p332\p333\p334\p335\p336\p337\p338\p339\p340\p341\p342\p343\p344\p345\p346\p347\p348\p349\p350\p351\p352\p353\p354\p355\p356\p357\p358\p359\p360\p361\p362\p363\p364\p365\p366\p367\p368\p369\p370\p371\p372\p373\p374\p375\p376\p377\p378\p379\p380\p381\p382\p383\p384\p385\p386\p387\p388\p389\p390\p391\p392\p393\p394\p395\p396\p397\p398\p399\p400\p401\p402\p403\p404\p405\p406\p407\p408\p409\p410\p411\p412\p413\p414\p415\p416\p417\p418\p419\p420\p421\p422\p423\p424\p425\p426\p427\p428\p429\p430\p431\p432\p433\p434\p435\p436\p437\p438\p439\p440\p441\p442\p443\p444\p445\p446\p447\p448\p449\p450\p451\p452\p453\p454\p455\p456\p457\p458\p459\p460\p461\p462\p463\p464\p465\p466\p467\p468\p469\p470\p471\p472\p473\p474\p475\p476\p477\p478\p479\p480\p481\p482\p483\p484\p485\p486\p487\p488\p489\p490\p491\p492\p493\p494\p495\p496\p497\p498\p499\p500\p501\p502\p503\p504\p505\p506\p507\p508\p509\p510\p511\p512\p513\p514\p515\p516\p517\p518\p519\p520\p521\p522\p523\p524\p525\p526\p527\p528\p529\p530\p531\p532\p533\p534\p535\p536\p537\p538\p539\p540\p541\p542\p543\p544\p545\p546\p547\p548\p549\p550\p551\p552\p553\p554\p555\p556\p557\p558\p559\p560\p561\p562\p563\p564\p565\p566\p567\p568\p569\p570\p571\p572\p573\p574\p575\p576\p577\p578\p579\p580\p581\p582\p583\p584\p585\p586\p587\p588\p589\p590\p591\p592\p593\p594\p595\p596\p597\p598\p599\p600\p601\p602\p603\p604\p605\p606\p607\p608\p609\p610\p611\p612\p613\p614\p615\p616\p617\p618\p619\p620\p621\p622\p623\p624\p625\p626\p627\p628\p629\p630\p631\p632\p633\p634\p635\p636\p637\p638\p639\p640\p641\p642\p643\p644\p645\p646\p647\p648\p649\p650\p651\p652\p653\p654\p655\p656\p657\p658\p659\p660\p661\p662\p663\p664\p665\p666\p667\p668\p669\p670\p671\p672\p673\p674\p675\p676\p677\p678\p679\p680\p681\p682\p683\p684\p685\p686\p687\p688\p689\p690\p691\p692\p693\p694\p695\p696\p697\p698\p699\p700\p701\p702\p703\p704\p705\p706\p707\p708\p709\p710\p711\p712\p713\p714\p715\p716\p717\p718\p719\p720\p721\p722\p723\p724\p725\p726\p727\p728\p729\p730\p731\p732\p733\p734\p735\p736\p737\p738\p739\p740\p741\p742\p743\p744\p745\p746\p747\p748\p749\p750\p751\p752\p753\p754\p755\p756\p757\p758\p759\p760\p761\p762\p763\p764\p765\p766\p767\p768\p769\p770\p771\p772\p773\p774\p775\p776\p777\p778\p779\p780\p781\p782\p783\p784\p785\p786\p787\p788\p789\p790\p791\p792\p793\p794\p795\p796\p797\p798\p799\p800\p801\p802\p803\p804\p805\p806\p807\p808\p809\p810\p811\p812\p813\p814\p815\p816\p817\p818\p819\p820\p821\p822\p823\p824\p825\p826\p827\p828\p829\p830\p831\p832\p833\p834\p835\p836\p837\p838\p839\p840\p841\p842\p843\p844\p845\p846\p847\p848\p849\p850\p851\p852\p853\p854\p855\p856\p857\p858\p859\p860\p861\p862\p863\p864\p865\p866\p867\p868\p869\p870\p871\p872\p873\p874\p875\p876\p877\p878\p879\p880\p881\p882\p883\p884\p885\p886\p887\p888\p889\p890\p891\p892\p893\p894\p895\p896\p897\p898\p899\p900\p901\p902\p903\p904\p905\p906\p907\p908\p909\p910\p911\p912\p913\p914\p915\p916\p917\p918\p919\p920\p921\p922\p923\p924\p925\p926\p927\p928\p929\p930\p931\p932\p933\p934\p935\p936\p937\p938\p939\p940\p941\p942\p943\p944\p945\p946\p947\p948\p949\p950\p951\p952\p953\p954\p955\p956\p957\p958\p959\p960\p961\p962\p963\p964\p965\p966\p967\p968\p969\p970\p971\p972\p973\p974\p975\p976\p977\p978\p979\p980\p981\p982\p983\p984\p985\p986\p987\p988\p989\p990\p991\p992\p993\p994\p995\p996\p997\p998\p999\p1000\p1001\p1002\p1003\p1004\p1005\p1006\p1007\p1008\p1009\p1010\p1011\p1012\p1013\p1014\p1015\p101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MAX. MOVING DIMENSION
DIAGRAM NO. 1D-2004

[illegible]

S.NO.	DESCRIPTION	MEASURES
1.	ESTIMATED TARE	21.0t.
2	PAY LOAD	79.0t.
3.	GROSS	100t.
4.	AXLE LOAD	25t.
5.	RATIO (PAY LOAD TO TARE)	3.75
6.	TRACK LOADING DENSITY (GROSS)	9.33t./m.
7.	NO. OF WAGONS IN 636 m.	58
8.	PAY LOAD PER TRAIN (58 WAGONS)	4582t.
9.	GROSS LOAD PER TRAIN	5800t.
10.	FLOOR AREA	28.44m ²
11.	VOLUMETRIC CAPACITY	37.94m ³
12.	C.G. (TARE CONDITION)	0.853m
13.	C.G. (LOADED CONDITION)	1.663m

CONCEPTUAL SKETCH OF 25 t. AXLE LOAD OF COAL WAGON(FOR DFC) (WIDE BODY WITH HEAP LOADING)

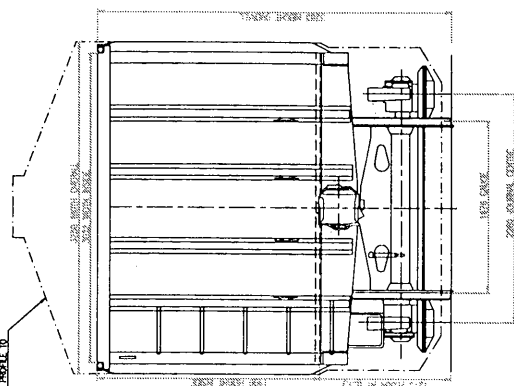
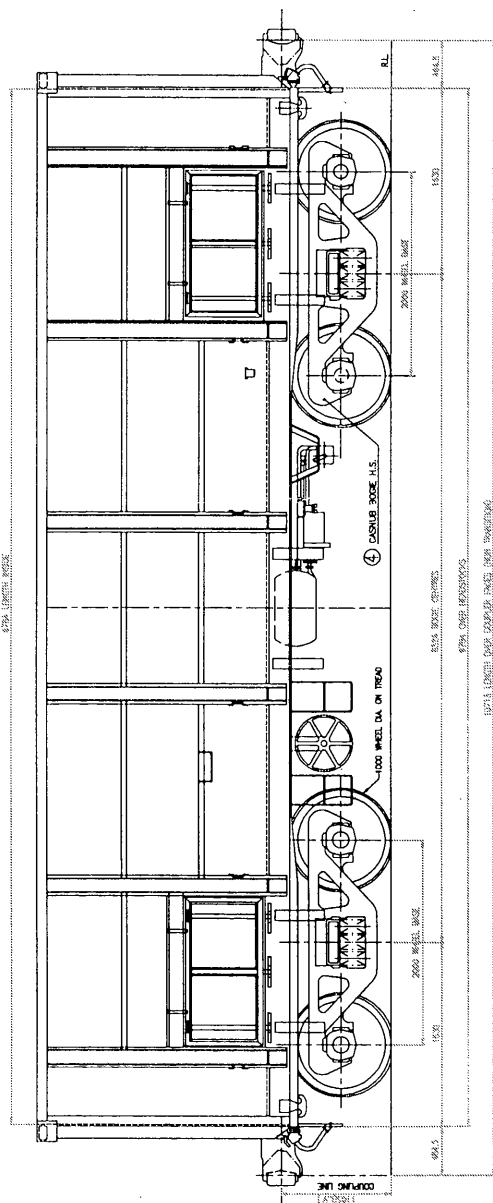


NOTE:-

1. BOGIE WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-45-MISC.-2006.
2. COUPLER/DRAFT GEAR WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-65-BD-06
3. BODY DESIGN WILL BE BASED ON TCI PROJECT FOR 25t. AXLE LOAD.

S.No.	WAGON DATA	DFC WAGON	BOXNHL	BOXN25
1	ESTIMATED PAY LOAD (WITH HEAP=5.2m ³) DENSITY OF COAL = 1.06 t/m ³	82 t	71 t	77 t
2	GROSS	100 t	91.6 t	100 t
3	AXLE LOAD	25 t	22.9 t	25 t
4	TRACK LOADING DENSITY(GROSS)	9.33 t/m	8.35 t/m	9.33 t/m
5	No.OF WAGONS/TRAIN(IN 620m. LOOP LENGTH)	58	58	58
6	PAY LOAD PER TRAIN	4756 t	4118 t	4466 t
7	PAY TO TARE RATIO	4.55	3.45	3.35

MAXIMUM MOVING TOWARD TO
E507-1043



S.NO.	DESCRIPTION	MEASURES
1.	UNDERFRAME (INCLUDING WELDING & RIVETING ALLOWANCES)	2.50t
2.	FLOOR PLATE (INCLUDING WELDING & RIVETING ALLOWANCES)	0.95t
3.	BODY STRUCTURE COMPLETE (INCLUDING WELDING & RIVETING ALLOWANCES)	4.10t
4.	WT. OF AIR BRAKE FITTINGS, PIPING & BRAKE GEAR ON U-FRAME	0.70t
5.	C.B.C. COMPLETE INCLUDING UNCOUPLING GEAR	1.32t
6.	BOGE COMPLETE EXCEPT SPRINGS, WHEELS & AXLES AND OTHER (CASNUB-22HS BOGE)	
7.	FOUR PAIRS OF WHEELS & AXLES	
8.	EIGHT CARTRIDGE TAPER ROLLER BEARINGS	
9.	BOLSTER AND SNUBBER SPRINGS	10.84t
10.	BOGE BRAKE GEAR COMPLETE	
11.	TWO TOP CENTRE PIVOTS	
12.	ESTIMATED TARE	20.41t
13.	CARRYING CAPACITY	50.87t
14.	GROSS LOAD	81.28t
15.	AXLE LOAD	20.32t
16.	RATIO PAY TO TARE	2.98
17.	TRACK LOADING DENSITY (GROSS)	7.58t/M
18.	NO. OF WAGONS IN 620M	58
19.	PAY LOAD PER TRAIN	3533t
20.	GROSS LOAD PER TRAIN	4714t
21.	FLOOR AREA	29.57M ²
22.	VOLUMETRIC CAPACITY (FOR LEVEL LOADING)	58.84CUM
23.	C.G. FROM R.L. (EMPTY)	1021mm
24.	C.G. FROM R.L. (LOADED)	1913mm

S.NO.	WAGON DATA LIGHT	mm
1.	HEIGHT OF CENTRE BUFFER COUPLER FROM R.L.	1105
2.	DISTANCE BETWEEN WHEEL FLANGES & FLOOR	240.5
3.	SIDE BEARER CLEARANCE (NOMINAL)	NIL

S.NO.	BOGE DATA CASNUB 22HS (TARE)	mm
1.	H.T. OF BOTTOM BOGE FRAME FROM R.L. AT CENTRE	165
2.	DISTANCE FROM R.L. TO TOP OF TOP PIVOT	932
3.	DISTANCE FROM R.L. TO TOP OF SIDE BEARER	926
4.	HEIGHT OF SPRINGS	254
5.	WHEEL DIA. ON TREAD	1000
6.	WHEEL DIA. ON TREAD CONDEMNING SIZE	906
7.	DIA. OF WHEEL SHEAT	210
8.	JOURNAL CENTRE	2260
9.	JOURNAL SIZE	144X278

NOTE:-

THE WAGON IS EXACTLY SIMILAR TO THAT IN DRAWING NO. WD-88088-5/14 ALL THE DIMENSIONS FOR WAGON
HAS BEEN CONSIDERED BY THE RAILWAY BOARD LETTER NO.30/2020/50/1 DATED 11.1.1990

PRELIMINARY SKETCH

ONLY FOR PROTOTYPE APPLICATION

UNDER GUIDANCE OF R.D.S.O. (WAGON)

BOGE OPEN WAGON TYPE 'BOXN(LW)'

DIAGRAM

B.G. R.D.S.O. GROUP

WD-88088-S-02

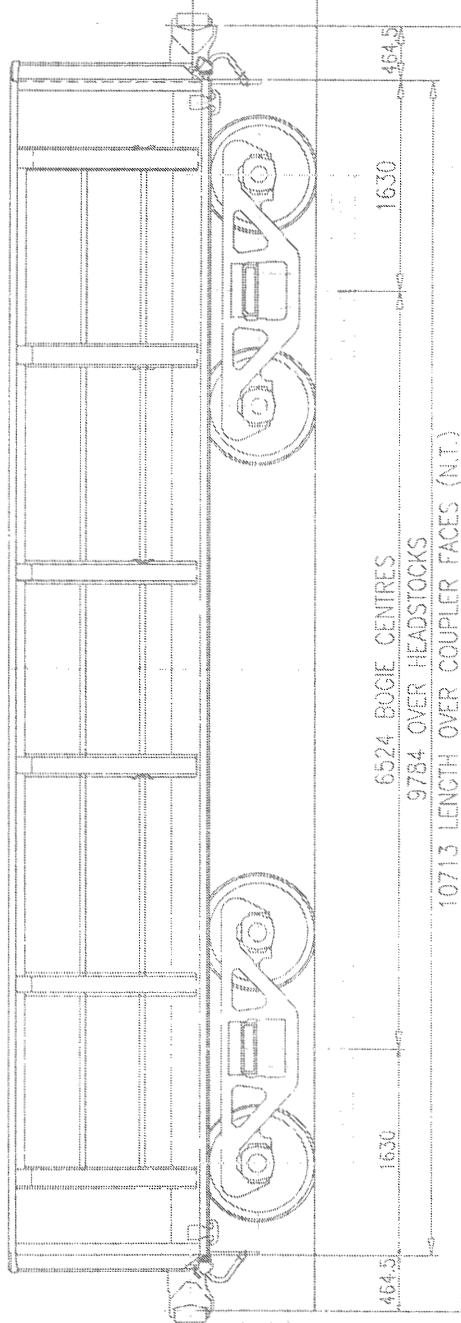
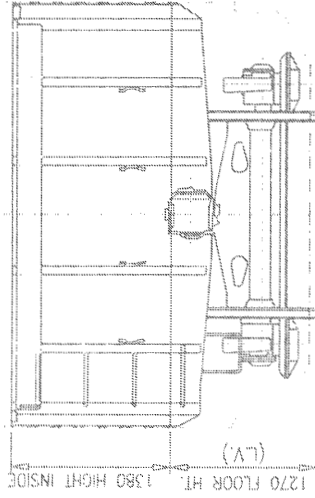
ITEM	DESCRIPTION	DATE	ASST. ENGR.
1.	WAGON DATA LIGHT		
2.	BOGE DATA CASNUB 22HS		
3.	WAGON DATA LIGHT		
4.	BOGE DATA CASNUB 22HS		
5.	WAGON DATA LIGHT		
6.	BOGE DATA CASNUB 22HS		
7.	WAGON DATA LIGHT		
8.	BOGE DATA CASNUB 22HS		
9.	WAGON DATA LIGHT		
10.	BOGE DATA CASNUB 22HS		
11.	WAGON DATA LIGHT		
12.	BOGE DATA CASNUB 22HS		
13.	WAGON DATA LIGHT		
14.	BOGE DATA CASNUB 22HS		
15.	WAGON DATA LIGHT		
16.	BOGE DATA CASNUB 22HS		
17.	WAGON DATA LIGHT		
18.	BOGE DATA CASNUB 22HS		
19.	WAGON DATA LIGHT		
20.	BOGE DATA CASNUB 22HS		
21.	WAGON DATA LIGHT		
22.	BOGE DATA CASNUB 22HS		
23.	WAGON DATA LIGHT		
24.	BOGE DATA CASNUB 22HS		

CONCEPTUAL SKETCH OF 32.5 t. AXLE LOAD OF IRON ORE WAGON(FOR DFC)

M.M.D. FOR EASTERN CORRIDOR DFC
(IDE RLY. BD. LETTER NO. 2006/INFRA-4/3
DATED 23.06.08)

M.M.D. FOR WESTERN CORRIDOR DFC
(IDE RLY. BD. LETTER NO. 2006/GE-11/RS/DATED 17.10.07)

3660 WIDTH OVER ALL



S.No.	WAGON DATA	DFC WAGON	BOY	BOY25
1	ESTIMATED PAY LOAD	108 t.	70.89 t.	79 t.
2	GROSS	130 t.	91.6 t.	100 t.
3	AXLE LOAD	32.5 t.	22.9 t.	25 t.
4	TRACK LOADING DENSITY(GROSS)	12.13 t/m.	7.678 t/m.	
5	No.OF WAGONS/TRAIN(IN 620m LOOP LENGTH)	58	52	9.388/m.
6	PAY LOAD PER TRAIN	6264 t.	3686.3 t.	4582 t.
7	PAY TO TARE RATIO	4.9	3.39	3.75

NOTE:-

1. BOGIE WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-45-MISC.-2006 (REV. 1)
2. COUPLER/DRAFT GEAR WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-65-BD-06
3. BODY DESIGN WILL BE BASED ON TTCI PROJECT FOR 32.5t. AXLE LOAD.

0.342 OVER END TOP COPING @
100.34 LENGTH INSIDE



THE WAGON IS FITTED WITH:-

1. SINGLE GRADUATED RELEASE AIR BRAKE SYSTEM
2. HIGH TENSILE (NON TENSION TYPE CENTRE BUFFER COUPLER.)
3. CAST STEEL CASNUB 22N1LB BOGIES

① TO STR No.WD-21-CASNUB 22N1LB-B00E-93

S.NO.	DESCRIPTION	MEASURES
1.	UNDERFRAME	2.70t.
2.	FLOOR PLATE	0.98t.
3.	BODY STRUCTURE COMPLETE	4.10t.
4.	BRAKE GEAR ON UNDERFRAME & AIR BRAKE FITTINGS	0.70t.
5.	C.B.C. COMPLETE INCLUDING UNCOUPLING GEAR	1.32t.
6.	BOGE COMPLETE EXCEPT SPRING WHEELS & AXLES	
7.	FOUR PAIRS OF WHEELS & AXLES	
8.	EIGHT CARTRIDGE TAPER ROLLER BEARINGS	10.8t.
9.	BOLSTER AND SNUBBER SPRINGS	
10.	TWO TOP CENTRE PIVOTS	
11.	BOGE BRAKE GEAR COMPLETE	
12.	ESTIMATED TARE	20.6t.
13.	PAY LOAD	71.0t.
14.	GROSS	91.6t.
15.	AXLE LOAD	22.9t.
16.	RATIO (PAY LOAD TO TARE)	3.45
17.	TRACK LOADING DENSITY (GROSS)	8.35t./m.
18.	NO. OF WAGONS IN 536 m.	58
19.	PAY LOAD PER TRAIN (58 WAGONS)	4118t.
20.	GROSS LOAD PER TRAIN	5313t.
21.	C.G. FROM R.L.(EMPTY)	1062mm
22.	C.G.FROM R.L.(LOADED)	2842mm
23.	FLOOR AREA	30.32m ²
24.	VOLUMETRIC CAPACITY	61.05m ³

[illegible]

ANNEXURE-J

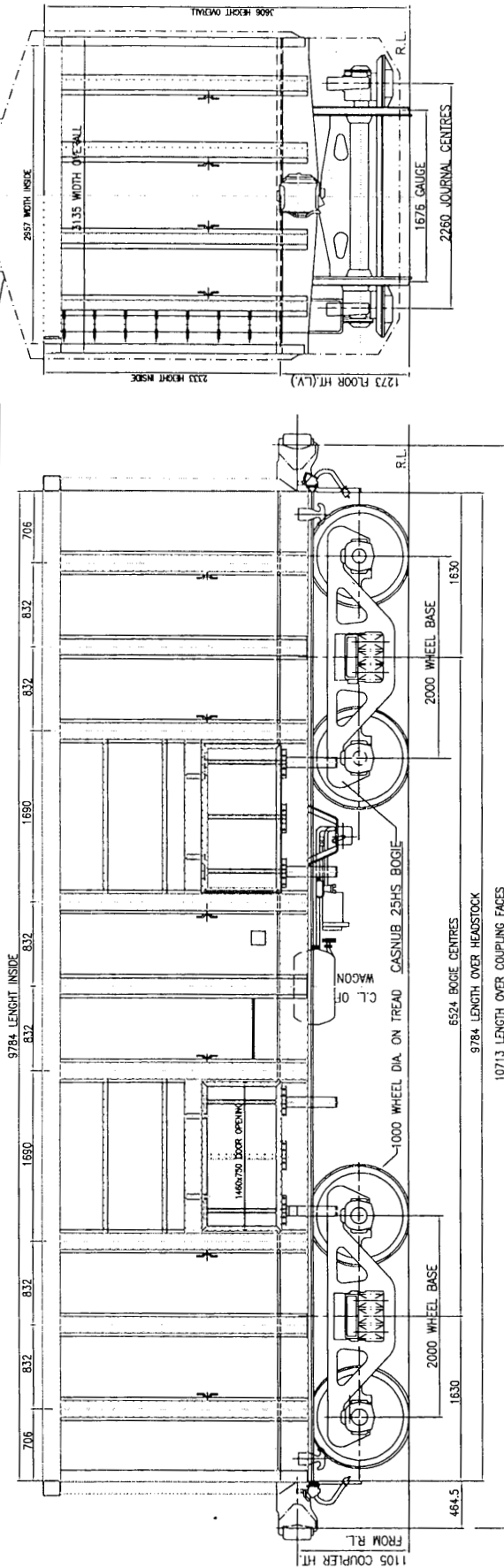


1. BOGIE WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-45-MISC.-2006 (REV. 1)
2. COUPLER/DRAFT GEAR WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-65-BD-06
3. BODY DESIGN WILL BE BASED ON TTCI PROJECT FOR 32.5t. AXLE LOAD.

S.No.	WAGON DATA	DFC WAGON	BOXNHL	BOXN25
1	ESTIMATED PAY LOAD (WITH HEAP=5.2m ³) DENSITY OF COAL = 1.06 t/m ³	108 t.	71 t.	77 t.
2	GROSS	130 t.	91.6 t.	100 t.
3	AXLE LOAD	32.5 t.	22.9 t.	25 t.
4	TRACK LOADING DENSITY(GROSS)	12.13 t/m	8.35 t/m	9.33 t/m
5	No.OF WAGONS/TRAIN(IN 620m. LOOP LENGTH)	58	58	58
6	PAY LOAD PER TRAIN	6264 t.	4118 t.	4466 t.
7	PAY TO TARE RATIO	4.9	3.45	3.35

9

MAX. MOVING DIMENSION
DIAGRAM NO. 1D-2004



- NOTE:
1. BODY STRUCTURE AND UNDERFRAME OF MATERIAL IRSM44 EXCLUDING CENTRE SILL.
 2. CENTRE SILL OF MATERIAL IS:8500 Fe 540Cu
 3. 4 DOORS PROVIDED

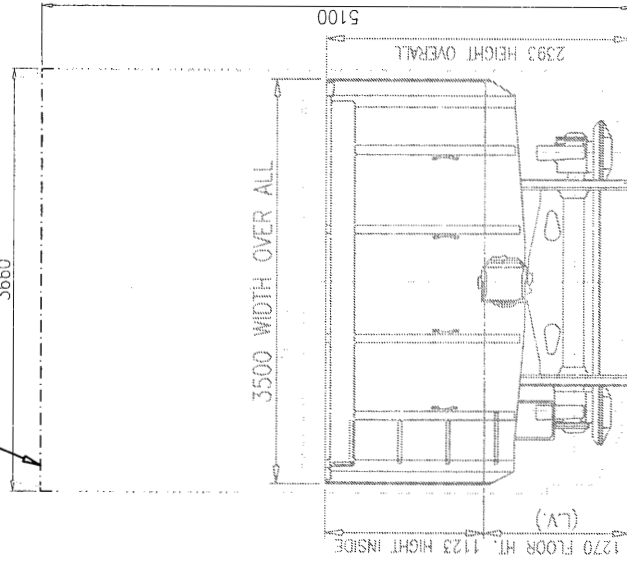
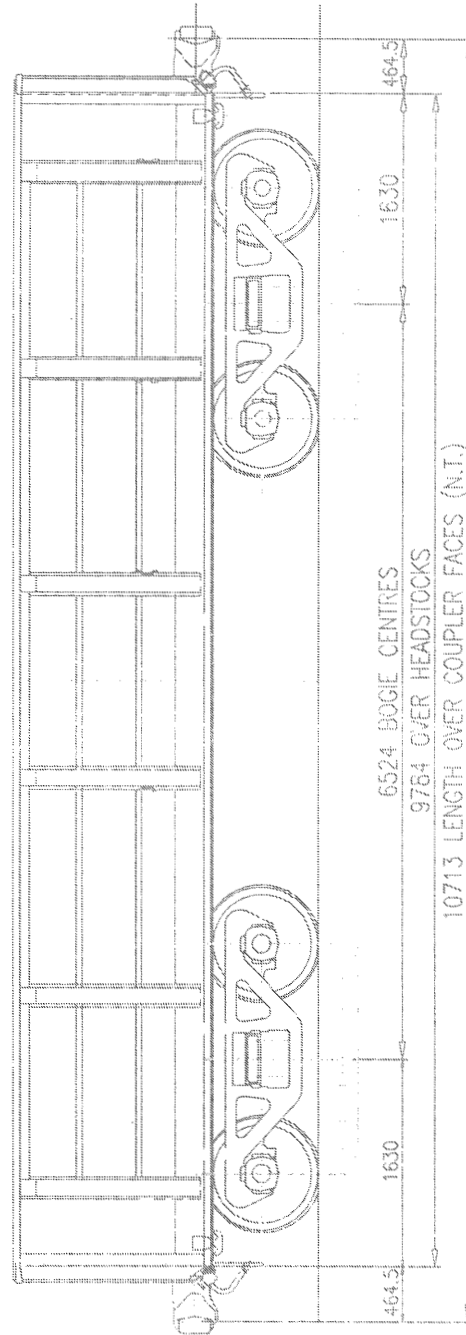
S.NO.	DESCRIPTION	ESTIMATED WEIGHT
1.	UNDERFRAME	3.59t.
2.	FLOOR PLATE	0.91t.
3.	BODY STRUCTURE COMPLETE	5.0t.
4.	BRAKE GEAR ON UNDERFRAME & AIR BRAKE FITTINGS	0.70t.
5.	C.B.C. COMPLETE INCLUDING UNCOUPLING GEAR	1.32t.
6.	BOGIE COMPLETE	11.48t
7.	ESTIMATED TARE	23t.
8.	PAY LOAD (WITH HEAP)	77t.
9.	GROSS	100t.
10.	AXLE LOAD	25t.
11.	RATIO (PAY LOAD TO TARE)	3.35
12.	TRACK LOADING DENSITY (GROSS)	9.33t./m.
13.	NO. OF WAGONS IN 624 m.	58
14.	PAY LOAD PER TRAIN (58 WAGONS)	4466t.
15.	GROSS LOAD PER TRAIN	5800t.
16.	FLOOR AREA	28.44m ²
17.	VOLUMETRIC CAPACITY	67.50m ³
18.	C.G.(EMPTY)	1121mm.
19.	C.G. (LOADED)	2102mm.

PRELIMINARY SKETCH		ONLY FOR REFERENCE DO NOT USE FOR GUIDANCE OF RDSO (WAGON)	
SUPERSEDES	DATE	BOGIE OPEN WAGON TYPE BOXN25	
APPROVED		DIAGRAM	
BY			
FOR			
DATE			
B.G. [W]		WD-07005-S-02	

CONCEPTUAL SKETCH OF 25 t. AXLE LOAD OF IRON ORE WAGON(FOR DFC)

M.M.D. FOR WESTERN CORRIDOR DFC
(Vide R.Y. Bd. Letter No. 2006/CE-11/TS/2DATED 17.10.07)

M.M.D. FOR EASTERN CORRIDOR DFC
(Vide R.Y. Bd. Letter No. 2006/NT/MS-6/3
DATED 23.06.08)



S.No.	WAGON DATA	DFC WAGON	BOY	BOY25
1	ESTIMATED PAY LOAD	84 t.	70.89 t.	79 t.
2	GROSS	100 t.	91.6 t.	100 t.
3	AXLE LOAD	25 t.	22.9 t.	25 t.
4	TRACK LOADING DENSITY(GROSS)	9.33 t/m.	7.678 t/m.	9.33 t/m.
5	No OF WAGONS/TRAIN(IN 620m. LOOP LENGTH)	58	52	58
6	PAY LOAD PER TRAIN	4872 t.	3686.3 t.	4582 t.
7	PAY TO TARE RATIO	5.25	3.39	3.75

NOTE:-

1. BOGIE WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-45-MISC.-2006 (REV. 1)
2. COUPLER/DRAFT GEAR WILL BE AS PER R.D.S.O. SPECIFICATION NO. WD-65-BD-06
3. BODY DESIGN WILL BE BASED ON ITI PROJECT FOR 25t. AXLE LOAD.

