भारत सरकार - रेल मंत्रालय
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Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
DID (0522) 2450115
DID (0522) 2465310

FINAL SPEED CERTIFICATE FOR OPERATION

No.	As per Header

Date	07.08.2020

A. महाप्रबन्धक (इंजीनियरिंग),

1. मध्य रेलवे, छत्रपति शिवाजी महाराज टर्मिनस, मुम्बई– 400 001
2. पूर्व रेलवे, फेयरली प्लेस, कोलकाता– 700 001
3. उत्तर रेलवे, बडौदा हाऊस, नई दिल्ली– 110 001
4. पूर्वोत्तर रेलवे, गोरखपुर– 273 001
5. पूर्वोत्तर फ्रन्टियर रेलवे, मालीगॉव, गुवाहाटी– 781 011
6. दक्षिण रेलवे, एनेक्सी, पार्क टाऊन, चेन्नई– 600 003
7. दक्षिण मध्य रेलवे, रेल निलायम, सिकन्दराबाद– 500 071
8. दक्षिण पूर्व रेलवे, गार्डन रीच, कोलकाता– 700 043
9. पश्चिम रेलवे, चर्चगेट, मुम्बई– 400020
10. उत्तर मध्य रेलवे, प्रयागराज– 211 001
11. उत्तर पश्चिम रेलवे, जयपुर– 302 006
12. पूर्व मध्य रेलवे, हाजीपुर– 844 101
13. पूर्व तटीय रेलवे, बीडीए रेंटल कालोनी रेलवे कॉम्पलेक्स, चन्द्रशेखरपुरा, भुवनेश्वर-751 023
14. दक्षिण पश्चिम रेलवे, हुबली– 580 023
15. पश्चिम मध्य रेलवे, जबलपुर– 482 001
16. दक्षिण पूर्व मध्य रेलवे, बिलासपुर– 495 004

B. प्रबन्ध निदेशक, डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि॰,पाँचवा तल, प्रगति मैदान मैट्रो स्टेशन बिल्डिंग काम्पलेक्स, नई दिल्ली–110 001.

Sub: Final speed certificate of Broad Gauge Bogie Flat wagon type 'BRNA' with maximum axle load of 20.32t for operation up to maximum permissible speed of 100 kmph in both empty and loaded conditions over Indian Railway B.G. routes and Eastern Freight Corridor and Western Freight Corridor of DFCCIL routes.

Ref: (i) Railway Board letter no. 2016/CEDO/ORI/O/01 dated 05-06-2018.
(ii) GGM/Mech.-I DFCCIL letter no. HQ/Mech./2018/Axle Load Wagon dt.18.09.19.
(iii) Railway Board Letter No. 2016/M(N) /204/3pt. dated 13-02-2020.

1.0	IMPORTANT PARAMETERS RELATED TO ROLLING STOCK

Type	Final / Provisional / Oscillation Trial / COCR Movement	Final

Validity/ Period or Permanent	IR / Sectional	IR& DFC

Stock Name	Broad Gauge Bogie Flat wagon type 'BRNA'

Max. Axle Load (Empty)	5.89t

Max. Axle Load (Loaded)	20.32t

Transportation Code	BRNA

GA Drg. No.	RDSO Drg. No.WD-92004-S-02-Alt.-06

Bogie Arrgt. Drg	Casnub 22NLB bogies		Suspension Arrgt. Drg	RDSO Drg. No. WD-89073-S/02

Commodity	Coal / Ore / Steel / Bagged / Oil /etc.	Steel products

Gauge	BG

Type of Bogie	Casnub

Type of Coupler	CBC

Wheel Dia. (mm)	New	Worn
	1000	906

Rake / Train consist for COCR / Oscillation Trial	Loco + 43 BRNA wagons + 1Brake Van

Max. Permissible Speed	Empty	100kmph	Loaded	100 kmph

2.0	INTRODUCTION

2.1	Broad Gauge Bogie Flat Wagon type BRNA to RDSO drawing No. WD-92004-S 02-Alt.-06 with maximum axle load of 20.32t has been designed for maximum speed of110 kmph. BRNA wagons are being used for carrying steel products. The design parameters and salient features of 20.32t axle load BRNA wagon have been shown in RDSO Drg. No.WD-92004-S-02- Alt.-06 & Annexure-I.
2.2.	In order to assess the riding quality and stability behaviour of BRNA wagon in empty and loaded conditions, detailed oscillation trials have been conducted over Mahoba (MBA) - Khajuraho (KURJ) section of North Central Railway. The results of the trial are given in RDSO Report no. RDSO/2020/TG/MT-1668/F Rev.-0 Amendment–Nil dated 06/01/2020. Oscillation trial results indicate that BRNA wagon has exhibited satisfactory riding and stability behaviour up to a test speed of 110 kmph in both empty and loaded conditions on locations/stretches as per current revisions of "Third Report of Standing Criteria Committee" on track maintained as per standard specified under para 522 of 'IRPWM, June 2020' up to a maximum speed of 110 kmph.
2.3.	As DFC routes have a superior track structure than IR routes, therefore final speed certificate for DFC is issued on the basis of trial done on the referred section of IR.

3.0	Based on the design features of BG Bogie **Flat wagon type 'BRNA'** as detailed in Annexure-I and satisfactory test results as indicated in RDSO Report No. RDSO/2020/TG/MT-1668/F Rev.-0 Amendment –Nil dated 06/01/2020, it is certified that 'BRNA' wagon of axle load 20.32t to RDSO Drg. no. WD-92004-S-02-Alt.-6 may be permitted to run up to **maximum speed of 100 kmph in both empty & loaded conditions** over I.R. and Eastern Freight Corridor & Western Freight Corridor of DFCCIL routes subject to the following conditions:

3.1	**TRACK STRUCTURE DETAIL & SPEED:**

	For Indian Railway:				
3.1.1	The Track shall be a minimum standard of:-				
	Rail Section	**Sleeper Density**	**Ballast Cushion**	**Max. Speed in Empty condition**	**Max. Speed in Loaded condition**
	52kg (72 UTS)	1540 No./km, PSC Sleeper	250mm (100mm clean & rest in caked up)	Speed upto 65 kmph	Speed upto 50 kmph
	52kg (90 UTS)	1540 No./km PSC Sleeper	250mm (100mm clean & rest in caked up)	Speed more than 65 kmph and upto 100 kmph	Speed more than 50 kmph and upto 75kmph
	60 kg (90 UTS)	1660 No./km PSC Sleeper	300mm (150mm clean & rest in caked up)	Speed more than 65 kmph and upto 100 kmph	Speed more than 75 kmph and upto 100 kmph
3.1.2	For track maintained to lower standard than that mentioned above, the Chief Engineer shall decide the lower maximum permissible speed on the basis of maintenance condition. In this connection, instructions issued by Railway Board vide letter no. 65/WDO/SR/26 dated 19/20.10.1966 may be seen. When the Chief Engineer considers that the road bed is not compacted or there is improper drainage, he may suitably restrict the maximum permissible speed depending upon the local conditions.				
3.1.3	The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual, June 2020. Maximum cant deficiency of 75mm is permitted.				
3.1.4	The welds shall be protected by joggled fish plates as per provisions of Para 6.4 and Para 8.14 of USFD Manual and Para 6.3 of AT welding manual and other policy instructions of Railway Board. The maintenance of Rails and Rail joints shall be ensured as per Para 613 & 620 of Indian Railways Permanent Way Manual, June 2020. In addition, wherever condition warrants on account of corrosion on rail/weld collar, wear on rail, cupping of welds etc., necessary precautions shall be taken for fish plating/joggled fish plating.				
3.1.5	Zonal Railways may ensure further detailed examination of track as deemed fit, based on age cum condition basis, overdue renewal and condition of formation etc. as per provisions of Chapter–VII of Indian Railways Permanent Way Manual, June 2020 regarding permanent way renewals and may suitably restrict maximum speed of operation based on such examination.				

	For DFC:				
3.1.6	The Track shall be a minimum standard of:-				
	Rail Section	**Sleeper Density**	**Ballast Cushion**	**Max. Speed in Empty condition**	**Max. Speed in Loaded condition**
	60kg (90 UTS)	1660 No./km PSC Sleeper	300mm (200 mm clean & rest caked up)	100 kmph	100 kmph
3.1.7	For track maintained to lower standard than that mentioned above, the Chief Engineer/ GGM (Engg.) shall decide the lower maximum permissible speed on the basis of maintenance condition. In this connection, instructions issued by Railway Board vide letter no. 65/WDO/SR/26 dated 19/20.10.1966 may be seen. When the Chief Engineer/ GGM (Engg.) considers that the road bed is not compacted or there is improper drainage, he may suitably restrict the maximum permissible speed depending upon the local conditions.				
3.1.8	The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual, June2020. Maximum cant deficiency of 75mm is permitted.				
3.1.9	The welds shall be protected by joggled fish plates as per provisions of USFD Manual and AT welding manual and other policy instructions of Railway Board. The maintenance of Rails and Rail joints shall be ensured as per Para 613 & 620 of Indian Railways Permanent Way Manual, June 2020. In addition, wherever condition warrants on account of corrosion on rail/weld collar, wear on rail, cupping of welds etc., necessary precautions shall be taken for fish plating/joggled fish plating.				
3.1.10	DFCCIL may ensure further detailed examination of track as deemed fit, based on age cum condition basis, overdue renewal and condition of formation etc. as per provisions of Chapter–VII of Indian Railways Permanent Way Manual, June 2020 regarding permanent way renewals and may suitably restrict maximum speed of operation based on such examination.				

3.2	**BRIDGE STIPULATIONS:**

3.2.1	Clearance is subjected to following parameters of BRNA wagons:		
	S. No.	**Parameters**	**Details**
	(i)	Maximum axle load (empty)	5.89t
	(ii)	Maximum axle load (loaded)	20.32t
	(iii)	Track loading density (gross)	5.55t/m
	(iv)	Maximum braking force	10% of axle load
	(v)	C.G. height from rail level (empty)	800mm
	(vi)	C.G. height from rail level (loaded)	1620mm
	For Indian Railway:		
3.2.2	For operation in empty and loaded condition, there are no speed restrictions on all standard spans of BGML/RBG/MBG loading standards for proposed speed of 100kmph.		
3.2.3	The clearance refers to bridges “Standard Spans” with standard design of girders, slabs, pipe culverts, piers and abutments etc. issued by RDSO for BGML, RBG and MBG-1987 standard loadings. However, the bearings of span 76.2 m (clear) designed for BGML standard loading as per RDSO’s drawing		

	no. BA-11154 shall be strengthened by providing two additional anchor bolts.
3.2.4	Superstructures & bearings of "Standard Spans" (designed and constructed by Zonal Railways based on site requirements) including Arches and sub-structures of all bridges (all Standard & Special Spans) are to be examined under the directions of the Chief Bridge Engineer concerned and certified safe with respect to current Indian Railway Standard Codes with up to-date correction slips.
3.2.5	Other specific restrictions are applicable which are indicated in relevant Speed Certificates of hauling single/multiple locomotives issued by RDSO.
3.2.6	Location of bridges on which speed restrictions are imposed shall be notified by the Zonal Railways and incorporated in the working timetable, so that all operating staff is aware of the instructions.
3.2.7	The above clause has been arrived considering bridges are in physically sound condition. In case the bridges are not in satisfactory physical condition, necessary speed restriction to be imposed by concerned Chief Bridge Engineer of the Zonal Railway.
	For DFC:
3.2.8	For regular operation in empty and loaded condition, there are no speed restrictions on bridges of DFC Loading standards for proposed speed of 100kmph.
3.2.9	The clearance refers to bridges "Standard RDSO Spans" with standard design of girders, slabs, pipe culverts, piers and abutments etc. issued by RDSO for "DFC loading (32.5t axle load)"
3.2.10	Superstructures & Bearings of "Special Spans" (designed and constructed by Zonal Railways/DFCCIL based on site requirements) including all Arches and sub-structure of all bridges (all Standard Spans & Special Spans) are to be examined under the directions of the Chief Bridge Engineer/GGM (Engg.) concerned and certified safe with respect to current Indian Railway Standard Codes with up to-date correction slips.
3.2.11	Other specific restrictions are applicable which are indicated in relevant Speed Certificates of hauling locomotives/attached wagon issued by RDSO.
3.2.12	Location of bridges on which speed restrictions are imposed shall be notified by the Railways and incorporated in the working timetable so that all operating staff is aware of the instructions.
3.2.13	The above clause has been arrived considering bridges are in physically sound condition. In case the bridges are not in satisfactory physical condition, necessary speed restriction to be imposed by concerned Chief Bridge Engineer/GGM (Engg.) of the DFCCIL.

3.3	**SIGNALLING STIPULATIONS**

	For Indian Railway & DFC:
3.3.1	Provisions of GR, SR, IRSOD, SEM & all extant instructions issued from time to time as applicable shall be complied with.
3.3.2	In case of rolling stocks / Train (having this wagon in its composition) having EBD of more than 1 Km and non-provision of second distant signal / 4 Aspect automatic signalling in the section, suitable speed restriction and other measures shall be taken by the Railways as deemed appropriate, to prevent SPAD.

3.4	**TRACTION STIPULATIONS:**

	For Indian Railway:
3.4.1	In 25KV AC traction area, the PCEE of the Railway shall have to ensure that the minimum height of Contact Wire and electrical clearances as stipulated in provisions of Chapter -V and V-A, Electric Traction “Schedule of Dimensions of 1676 mm Gauge (BG) revised 2004” with latest Addendum & Corrigendum Slips is not violated and strictly followed to ensure its safe running.
3.4.2	In addition to above, the Principal Chief Electrical Engineer of the concerned Railway may impose any temporary speed restriction on the basis of personal knowledge, experience of the Sectional OHE and the field conditions prevailing on the particular section.
3.4.3	When the wagon/departmental vehicle is being moved, it shall be ensured that all the protruding parts are withdrawn and suitably locked, so that during the run there is no possibility of any infringement occurring to the standard moving dimensions.
	For DFC:
3.4.4	In 25kv AC traction area, the GGM (electrical) of the DFCCIL shall have to ensure that the minimum height of contact wire and electrical clearances as stipulated in provisions of Chapter-XIV, Electric Traction ‘Standard Schedule of Dimensions for Dedicated Freight Corridors’ with latest Addendum & Corrigendum slips is not violated and strictly followed to ensure its safe running.
3.4.5	In addition to above, the GGM (electrical) of the concerned DFCCIL may impose any temporary speed restriction on the basis of personal knowledge, experience of the sectional OHE and field conditions prevailing on the particular section.

3.5	**ROLLING STOCK STIPULATIONS**

	For Indian Railway:
3.5.1	Safety items of the wagon shall be maintained as per standard contained in the following documents (i) Bogie maintenance manual No G-95. (ii) Air brake maintenance manual No G-97. (iii)Coupler maintenance manual No G-80 for workshop staff. (iv)Coupler maintenance manual No G-76 for line staff.
3.5.2	Based on the above cited maintenance instructions and other relevant Rolling Stock documents cited in the Annexure-I of the speed certificate, before the commencement of the operation of BRNA wagon, the PCME of the concerned Zonal Railway shall arrange to certify the track worthiness and safety of the Rolling Stock. He shall also ensure the proper maintenance of the rolling stock.
3.5.3	The brakes of the locomotive and the rake of wagons shall be in good working order during operation.
	For DFC:
3.5.4	Before initiating the operation, the GGM (Mechanical) of the DFCCIL shall arrange to certify the track worthiness and safety of the rolling stocks. He shall ensure the proper maintenance of the rolling stocks.
3.5.5	Brakes of the rake of wagons shall be in good working order during the operation.

3.6	**GENERAL STIPULATIONS**

	For Indian Railway:
3.6.1	All the permanent and temporary speed restrictions enforced and those that may be imposed from time to time due to track, bridges, curves, signalling and interlocking etc. shall be observed. In this connection, the speed on curves shall be in accordance with Para 3.1.3 of this speed certificate.
3.6.2	For placement/movement of wagon on any private or assisted siding for loading or unloading the consignments, the Chief Engineer of concerned Zonal Railway shall be referred to.
3.6.3	The design of 'BRNA' wagon does not infringe to any clauses of chapter IV-A of IRSOD-2004.
3.6.4	Zonal Railways shall carry out study of the sections as per above and accordingly proposed operation of these wagons with precautions / speed restrictions at locations having restricted clearance.
3.6.5	The maximum permissible speed of empty & loaded wagon in the siding at originating point and destination shall be decided by the Chief Engineer concerned.
	For DFC:
3.6.6	All the permanent and temporary speed restrictions enforced and those that may be imposed from time to time due to track, bridges, curves, signaling and interlocking etc shall be observed. In this connection, the speed on curves shall be in accordance with Para 3.1.8 of this speed certificate.
3.6.7	For movement of wagon on any private or assisted siding for loading or unloading the consignments, the GGM (Engg.) of DFCCIL shall be referred to.
3.6.8	The design of 'BRNA' wagon does not infringe to any clause of Chapter IV for Eastern Dedicated Freight Corridor and Chapter XI for Western Dedicated Freight Corridor of Standard Schedule of Dimensions of January 2013.

ENCLOSURES: / संलग्नक:

i)	RDSO Drg. No. WD-92004-S-02 Alt. 06
ii)	Annexure-I (salient features of wagon)
iii)	Annexure-II (Soft/PDF copies in CD)

/

(वी. के. अग्रवाल)
कार्यकारी निदेशक मानक/चालन शक्ति

प्रतिलिपि:

(1) सचिव (मैकेनिकल /इंजी), रेलवे बोर्ड, रेल भवन, नई दिल्ली– 110001

(2) मुख्य रेल संरक्षा आयुक्त, अशोक मार्ग, लखनऊ–226001

(3) महाप्रबंधक (मैकेनिकल/यातायात/संकेत एवं दूरसंचार),

(i) मध्य रेलवे, छत्रपति शिवाजी महाराज टर्मिनस, मुम्बई– 400 001.
(ii) पूर्व रेलवे, फेयरली प्लेस, कोलकाता– 700 001.
(iii) उत्तर रेलवे, बड़ौदा हाउस, नई दिल्ली– 110 001.
(iv) दक्षिण रेलवे, पार्क टाउन, चेन्नई– 600 003.
(v) दक्षिण मध्य रेलवे, रेल निलायम, सिकन्दराबाद– 500 071.
(vi) दक्षिण पूर्व रेलवे, गार्डेन रीच, कोलकाता– 700 043.
(vii) पूर्वोत्तर रेलवे, गोरखपुर– 273 012.
(viii) पूर्वोत्तर सीमान्त रेलवे, मालीगॉव, गुवाहाटी– 781 011.
(ix) पश्चिम रेलवे, चर्च गेट, मुम्बई– 400 020.
(x) पूर्व मध्य रेलवे, हाजीपुर– 844 101.
(xi) पूर्व तटीय रेलवे, बीडीए रेंटल कालोनी, रेलवे काम्पलेक्स, चन्द्रशेखरपुरा, भुवनेश्वर,–751 016.
(xii) उत्तर मध्य रेलवे, प्रयागराज– 211 001.
(xiii) उत्तर पश्चिम रेलवे, जयपुर– 302 006.
(xiv) दक्षिण पश्चिम रेलवे, हुबली– 580 023.
(xv) पश्चिम मध्य रेलवे, जबलपुर– 482 001.
(xvi) दक्षिण पूर्व मध्य रेलवे, आरई आफिस काम्पलेक्स, बिलासपुर– 495 004.

(4) जी0जी0एम0 (मैकेनिकल/यातायात/संकेत एवं दूर संचार), डेडीकेटेड फ्रेट कोरीडोर कार्पोरेशन आफ इण्डिया लि0, नई दिल्ली–110 001.

(5) अध्यक्ष एवं प्रबन्ध निदेशक, कोंकण रेलवे कारपोरेशन लिमिटेड, पोस्ट बाक्स नं0 9, बेलापुर भवन, सेक्टर–11, सी.बी.डी. बेलापुर, नवी मुम्बई–400 614.

ENCLOSURES: / संलग्नक:

i)	RDSO Drg. No. WD-92004-S-02 Alt. 06
ii)	Annexure-I (salient features of wagon)
iii)	Annexure-II (Soft/PDF copies in CD)

Digitally signed by VINAY KUMAR AGARWAL
Date:Fri Aug 07 22:07:45 IST 2020
Reason: Approved

(वी. के. अग्रवाल)
कार्यकारी निदेशक मानक/चालन शक्ति

Annexure-I

Salient features of Bogie Flat Wagon type "BRNA"

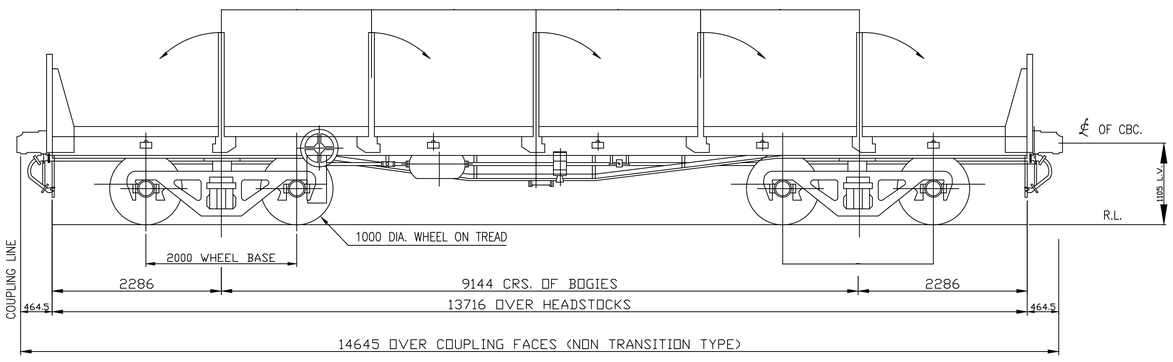
S. No.	Description	Details
1	Principal parameters of Rolling Stock	Length over coupler= 14645 mm Bogie Center = 9144 mm Wheel Base = 2000 mm Axle load (loaded) = 20.32 t Max. height from Rail Level= 2544mm
2	Bogie and Wheel	Casnub 22HS bogie to RDSO Spec. no. WD-17-CASNUB-22HS-BOGIE-92 1000 mm diameter wheels to RDSO Drg. No. WD-89025-S-01 and Specification No. R-19/93 Pt-I
3	Brake system	Single pipe graduated release air brake system
4	Brake rigging, brake ratio and parking brake	Brake rigging to RDSO drawing No. WD-92004-S-11 and Brake Diagram No. WD-92004-S-10 Brake Ratio (loaded)=41.39% Brake Ratio (empty)=80.89% Hand (parking) Brake=16.3%
5	Coupler and buffer	Coupler to RDSO specification No. WD-70-BD-10 Draft Gear to RDSO specification No. 49-BD-08.
6	Periodic maintenance schedules and standards (safety limits) to be followed in respect to safety items	a. Bogie maintenance manual G-95 b. For wheel and axle refer Para 2.8 of chapter 2 of IRCA Part-III-1973
7	Instructions regarding operation of rolling stock in case of failure of any of the safety items	c. Coupler maintenance manual G-76 (For line staff) d. Coupler maintenance manual G-80 (For workshop staff)
8	Carrying capacity	57.737t

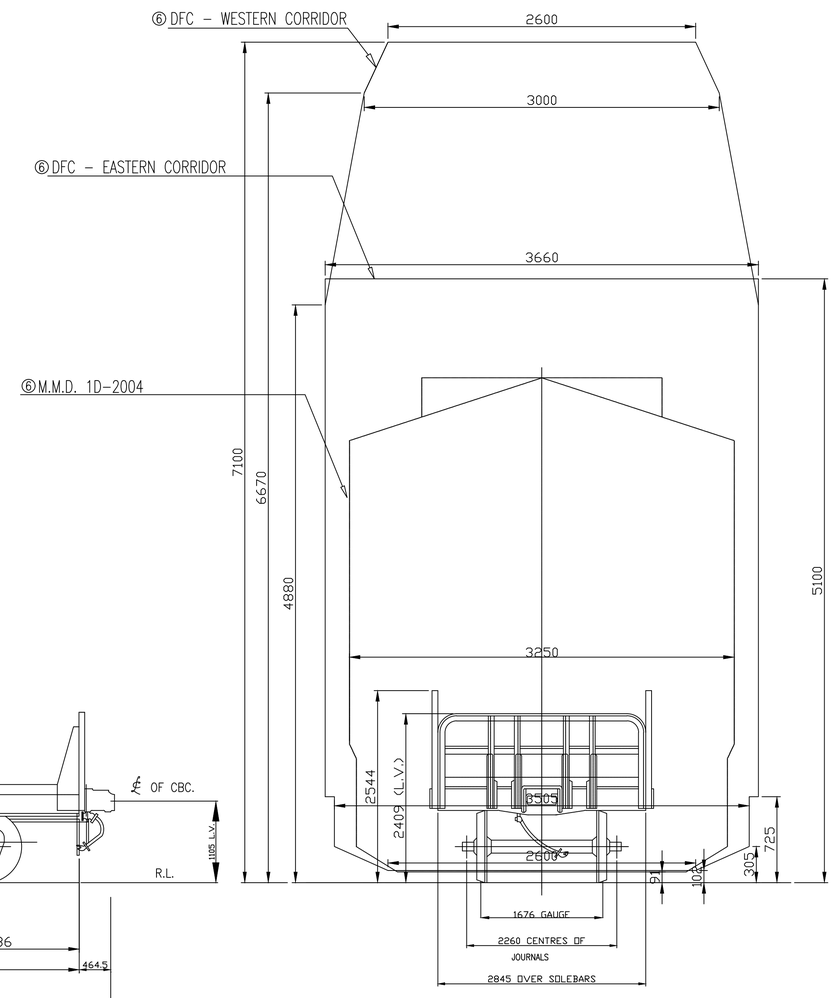
Remark- **CASNUB** 22 NLB Bogie was attached in BRNA Wagon for 20.32t axle load. Now CASNUB 22HS Bogie is attached in latest version of BRNA i.e. BRNAHS Wagon for 22.9t axle load.

Annexure-II

List of referred documents in the speed certificate are available in a Compact Disc

a) RDSO Drg.no.WD-92004-S-02 Alt.06,Wagon Diagram
b) Wheel Spec. no. R-19/93 Pt.1
c) RDSO's Oscillation trial Report MT-1668 F dated 06-01-2020
d) Para 2.8 of chapter 2 of IRCA Part III/1973
e) Air Brake spec. no. 02-ABR-02
f) Air Brake Maintenance Manual no. G-97
g) E/F NT.CBC Spec. No. 48-BD-08 / WD-70-BD-10
h) E/F NT.CBC Instruction & Maintenance Manual of CBC.
(i) G-80 (For workshop staff)
(ii) G-76 (For line staff)
i) Draft Gear Spec. No. 49-BD-08/ WD-71BD-15
j) Bogie Maintenance Manual No. G-95
k) Railway Board's letter No.65/WDO/SR/26 dated 19/20.10.1966
l) Indian Railways Permanent Way Manual, June 2020
m) USFD manual, Revised 2012
n) Brake Rigging Drg. No. WD-92004-S-11
o) Brake Diagram Drg. No. WD-92004-S-10
p) Railway Board's letter No.2016/CEDO/ORI/O/01 dated 05.06.2018
q) GGM/Mech-I DFCCIL letter no. HQ/Mech./2018/Axle Load Wagon dated 18-09-2019.
r) Railway Board Letter No. 2016/M (N) /204/3pt. dated 13-02-2020.
s) WD-17-Casnub- 22 HS Bogie-92
t) RDSO Drg. No. WD-89025-S-01
u) RDSO Drg. No. BA-11154
v) Max. Moving profile of 1D (EDO/T-2202) of IRSOD, revised 2004





SUMMARY OF WEIGHTS (ESTIMATED)	TONNES
UNDERFRAME COMPLETE WITH BODY ENDS, METALLIC BOLTERS, FLOOR PLATES, SIDE STANCHIONS, LASHING CHAINS,	10.727
TWO CENTRE BUFFER COUPLER COMPLETE (NON–TRANSITION) WITH YOKES & TWO DRAFT GEARS	1.320
BRAKE GEAR ON U/FRAME AND AIR BRAKE EQUIPMENT INCLUDING PIPING ETC.	0.758
BOGIES COMPLETE EXCEPT SPRINGS WHEELS & AXLES AND BEARING ADAPTER & CENTRE PIVOTS	3.472
BOGIE BRAKE GEAR COMPLETE	0.500
FOUR PAIRS OF WHEELS & AXLES+BEARING.	6.082
ADAPTER	0.092
BOLSTER SPRINGS AND SNUBBER SPRING	0.368
TWO TOP CENTRE PIVOTS	0.224
ESTIMATED TARE	23.543
GROSS WEIGHT	81.28
CARRYING CAPACITY	57.737
GROSS WEIGHT PER METRE RUN OVER COUPLING FACES	5.55
RATIO OF CARRYING CAPACITY TO TARE	2.45

DATA (BOGIE)	WAGON UNDER TARE (mm)
HEIGHT OF CENTRE BUFFER COUPLER FROM RAIL LEVEL	1105
DISTANCE BETWEEN WHEEL FLANGES & FLOOR	229.5
DISTANCE BETWEEN TOP & BOTTOM SIDE BEARERS	NIL
TOP OF SOLE BAR AT BOGIE CENTRES FROM R.L.	1258

DATA (BOGIE)	UNDER TARE (mm)
HEIGHT OF BOTTOM OF BOGIE FRAME FROM RAIL LEVEL AT CENTRE	165
DISTANCE FROM RAIL LEVEL TO TOP OF PIVOT	932
DISTANCE FROM RAIL LEVEL TO TOP OF BOGIE SIDE BEARER	921
HEIGHT OF SPRINGS	254

NOTE:–

④ 1. FOR BOGIE ARRANGEMENT REF. DRG. NO. WD–89073–S/02. FOR 'BRNA' WAGON.

2. CASNUB 22 NLB BOGIES DERATED FOR 20.32t AXLE LOAD BY REMOVING CENTRAL NESTS OF SPRINGS,FOR BRNA WAGON.

3. FOR BOGIE ARRANGEMENT REF. DRG.NO. WD–92058–S–2

ALT.	ITEM	AUTHY.	DESCRIPTION	DATE	ASSEMBLY DRAWINGS
⑥	–	WD–20031	MAXIMUM MOVING DIMENSIONS ADDED	07/2020	
⑤	–	WD–04079	LASHING CHAIN DELETED & INCREASE THE SIDE STANCHION	10/04	
④	–	WD–02009	NOTE & REFERENCE FOR 'BRNAHS' ADDED.	1/02	
③	–	WD–00007	REVISED	3/2000	
②	–	WD–99014	REVISED & REDRAWN.	3/99	

MOHAMMAD SAIF

Digitally signed by MOHAMMAD SAIF
Date: 2020.08.03 15:57:23 +05'30'

PRELIMINARY SKETCH — ONLY FOR PROTOTYPE APPLICATION UNDER GUIDANCE OF R.D.S.O.(W)

SUPERSEDED BY

SUPERSEDES

BOGIE RAIL WAGON TYPE 'BRNA,BRNAHS' ④

			DATE
SCALE	PASSED	S.K.AGRAWAL	9/92
1:40	CHECKED	T.K.DUTTA	8/92
	DRAWN	HARISH	6/92
	TRACED	DINESH	3/99
	J.SHEET	WD–92004	1/92

DIAGRAM

(WITH CASNUB 22NLB BOGIE & AIR BRAKE)

B.G. | R.D.S.O. [W] | GROUP | WD–92004–S–02