भारत सरकार – रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
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Government of India – Ministry of Railways
Research Designs & Standards Organisation
Lucknow – 226011
DID (0522) 2450115
DID (0522) 2465310

FINAL SPEED CERTIFICATE FOR OPERATION

No.	TM/HM/S084/RBMV SAN	Date	As Signed

(A) महाप्रबन्धक (इंजीनियरिंग),

1. मध्य रेलवे, छत्रपति शिवाजी टर्मिनस, मुम्बई– 400001
2. पूर्व रेलवे, फेयरली प्लेस, कोलकाता– 700001
3. उत्तर रेलवे, बडौदा हाऊस, नई दिल्ली– 110001
4. पूर्वोत्तर रेलवे, गोरखपुर– 273001
5. पूर्वोत्तर फ्रन्टियर रेलवे, मालीगॉव, गुवाहाटी– 781011
6. दक्षिण रेलवे, एनेक्सी, पार्कटाऊन, चेन्नई– 600003
7. दक्षिण मध्य रेलवे, रेलनिलायम, सिकन्दराबाद– 500071
8. दक्षिण पूर्व रेलवे, गार्डनरीच, कोलकाता– 700043
9. पश्चिम रेलवे, चर्चगेट, मुम्बई– 400020
10. उत्तर मध्य रेलवे, प्रयागराज– 211001
11. उत्तर पश्चिम रेलवे, जयपुर– 302006
12. पूर्व मध्य रेलवे, हाजीपुर– 844101
13. पूर्व तट रेलवे, रेलवे कॉम्पलेक्स, भुवनेश्वर– 751023
14. दक्षिण पश्चिम रेलवे, हुबली– 580023
15. पश्चिम मध्य रेलवे, जबलपुर– 482001
16. दक्षिण पूर्व मध्य रेलवे, बिलासपुर– 495004

(B) प्रबन्ध निदेशक,

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि0 पाँचवा तल, प्रगति मैदान मेट्रो स्टेशन बिल्डिंग कॉम्पलेक्स नई दिल्ली–110001

Sub:	Final Speed Certificate for operation of Rail Borne Maintenance Vehicle (RBMV) (**Transportation Code- RBMVSAN8**) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore, upto a maximum speed of 100kmph when running on its own power as well as when running in train formation over Indian Railways BG routes and over routes of Eastern & Western dedicated freight corridors of DFCCIL.

Ref:	Railway Board's Contract No. 2018/Track-III/MC/13(i) dated 28.08.2019.

1.0	IMPORTANT PARAMETERS RELATED TO ROLLING STOCK

Type	Final / Provisional / Oscillation Trial / COCR Movement	Final

Validity / Period or Permanent	IR / Sectional/ DFCCIL	Permanent/ IR BG routes & Routes of Eastern & Western DFCCIL

Stock Name	Rail Borne Maintenance Vehicle

Max. Axle Load (Empty)	14.36t

Max. Axle Load (Loaded)	18.10t

Transportation Code	RBMVSAN8

GA Drg. No.	M/s San Engg. Drg. No. SNSK4713 Rev. 04

Bogie Arrgt. Drg. No.	M/s San Engg. Drg. No. SNSK 4909 (Rev.01)

Suspension Arrgt. Drg. No.	M/s San Engg. Drg. No. SNSK 4874 (Rev.02)

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

Gauge	BG

Type of Bogie	Bo-Bo	Type of Coupler	Transition Screw Coupling	Wheel Dia. (mm)	New	Worn
					952	877

Max. Permissible Speed for IR & for routes of Eastern & Western DFCCIL	Own Power	100kmph	Train Formation	100kmph

2.0	INTRODUCTION
2.1	Rail Borne Maintenance Vehicle (RBMV) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore, as per their M/s San Engg. GA Drg. No. SNSK4713 Rev. 04 is a self-propelled machine. The machine is used for carrying permanent way material and small track machines/tools to site of work for maintenance of permanent way. The machine was permitted to run provisionally upto a maximum speed of 60kmph when running on its own power as well as when running in train formation as a dead vehicle as per Provisional Speed certificate no. TM/HM/S084/RBMV SAN dated 08.11.2023 against design speed of 105kmph when running on its own power as well as when running in train formation as a dead vehicle and as a last vehicle. Subsequently the detailed oscillation trial was conducted over Mahoba-Khajuraho section of North Central Railway and the machine has shown satisfactory running behaviour upto a maximum speed of 115kmph when running on its own power as well as when running in train formation as a dead vehicle and average emergency braking distance is **471.08 meters** with payload-15t at 105kmph & **394.31 meters** with payload-15t + hauling load-65t at 90kmph in EBD test in self- propelled condition as per results contained in Oscillation trial report no. RDSO/2024/TG/MT-2191/F Rev.-0 Amendment–Nil dated 04.11.2024.
2.2	The maximum axle load and wheel diameter of machine are 18.10t and 952mm respectively. Suspension details of the machine are as per M/s San Engg. Drg. No. SNSK 4874 (Rev.02). The design speed of machine is 105kmph when running on its own power as well as in train formation as last vehicle and as a dead vehicle. The design details are given in Annexure-A.

3.0	Based on design features, details given in Annexure-A of the machine supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore and satisfactory test results as indicated in Report No. RDSO/2024/TG/MT-2191/F Rev.-0 Amendment–Nil dated 04.11.2024, it is certified that the machine as per M/s San Engg. GA Drg. No. SNSK4713 Rev. 04 may be permitted **to run on regular basis up to a maximum permissible speed of 100kmph with/without 15t payload & 90kmph with 15t payload + 65t hauling load when running on its own power and 100kmph when running in train formation as a dead vehicle and as a last vehicle** for operation over Indian Railways and over routes of Eastern & Western dedicated freight corridors of DFCCIL, subject to the following conditions:-

3.1	TRACK				
3.1.1	FOR INDIAN RAILWAYS				
3.1.1.1	The track shall be to a minimum standard of-				
	Rail Section	**Sleeper Density**	**Ballast Cushion**	**Max. Speed (Own Power)**	**Max. Speed (Train Formation)**
	52 kg (72UTS)	1540 Nos./km PSC Sleeper	250mm (100mm clean & rest in caked up condition on compacted and stable formation)	Upto 50kmph	Upto 50kmph
	52 kg (90UTS)	1540 Nos./km PSC Sleeper	250mm (100mm clean & rest in caked up condition on compacted and stable formation)	Upto 100kmph	Upto 100kmph
3.1.1.2	Track geometry standards shall be maintained to as per provisions of Indian Railways Permanent Way Manual- 2024, containing track geometry standards under Para 522.				
3.1.1.3	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 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.				
3.1.1.4	The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual- 2024. Maximum cant deficiency permitted would be 75mm.				

3.1.1.5	The welds shall be protected by joggled fish plates as per provisions of USFD Manual and Indian Railways Permanent Way Manual- 2024 and other policy instructions of Railway Board. The maintenance of Rails and Rail joints shall be ensured as per provisions of Indian Railways Permanent Way Manual- 2024. 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.
3.1.1.6	Zonal Railways shall 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 Indian Railways Permanent Way Manual- 2024, regarding permanent way renewals and shall suitably restrict maximum speed of operation based on such examination.

3.1.2	**FOR EASTERN & WESTERN DEDICATED FREIGHT CORRIDORS OF DFCCIL**				
3.1.2.1	**The track structure shall be of minimum standard-**				
	Rail Section	**Sleeper Density**	**Ballast Cushion**	**Max. Speed (Own Power)**	**Max. Speed (Train Formation)**
	60 kg (90 UTS)	1660 Nos./km PSC sleeper	300mm (200mm clean & rest in caked up condition on compacted and stable formation)	100kmph	100kmph
3.1.2.2	The minimum standard of track geometry maintenance shall be as per provisions of Indian Railways Permanent Way Manual- 2024, containing track geometry standards under Para 522.				
3.1.2.3	For track maintained to lower standard than that mentioned above, the Chief Engineer/GGM (Engg.) concerned shall decide the lower maximum permissible speed on the basis of maintenance condition. In this connection, instructions issued by Railway Board's 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 shall suitably restrict the maximum permissible speed depending upon the local conditions.				
3.1.2.4	The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual- 2024. Maximum cant deficiency permitted would be 75mm.				
3.1.2.5	The welds shall be protected by joggled fish plates as per provisions of USFD Manual and Indian Railways Permanent Way Manual- 2024 and other policy instructions of Railway Board. The maintenance of Rails and Rail joints shall be ensured as per provisions of Indian Railways Permanent Way Manual- 2024. 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.				
3.1.2.6	DFCCIL shall ensure further detailed examination of track as deemed fit based on age cum condition basis, overdue renewal and condition of formation etc. as per the provisions of Indian Railways Permanent Way Manual- 2024 regarding permanent way renewals and may suitably restrict maximum speed of operation based on such examination.				

3.2	**BRIDGE STIPULATIONS**				
3.2.1	**FOR INDIAN RAILWAYS**				
3.2.1.1	The clearance refers to "Standard RDSO Spans" bridges with standard design of girders, slabs, pipe culverts, piers and abutments etc. issued by RDSO for BGML, RBG, MBG and 25t loading-2008 standard loadings.				
3.2.1.2	Superstructures & Bearings of "Special Spans" (designed and constructed by Zonal Railways based on site requirements), Arches and sub-structures (including foundation) of all bridges (Standard RDSO spans & Special Spans) are to be got examined by the Chief Bridge Engineer and certified safe with respect to current Indian Railway Standard Codes with up to-date correction slips.				
3.2.1.3	The clearance is subject to the following parameters of Rail Borne Maintenance Vehicle (RBMV) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore:-				
	Rolling Stock	**Maximum axle load (t)**	**Maximum tractive effort per axle (t)**	**Maximum braking force at rail level per axle(t)**	**Maximum CG height from rail level (mm)**
	Rail Borne Maintenance Vehicle	18.10	8.5	9.98	1230
3.2.1.4(i)	All Standard RDSO spans of BGML, RBG, MBG and 25t loading-2008 loading are fit for proposed speed of 100kmph (with/without 15t payload) when running on its own power as well				

	as when running in train formation as a dead vehicle.
3.2.1.4(ii)	All Standard RDSO spans of BGML, RBG, MBG and 25t loading-2008 loading are fit for proposed speed of 90kmph (with 15t payload + 65t hauling load) when running on its own power.
3.2.1.4.1	Track on bridges and approaches of standard RDSO spans of 3.0m & 3.7m (all effective) of BGML Loading standard and 1.0m, 1.5m & 3.0m (all effective) of RBG loading standard and 1.0m, 1.5m & 3.0m (all effective) of MBG loading standard shall be strengthened or modified in such a way so as to allow for dispersion of longitudinal force as per clause 2.8.3.2 of IRS Bridge Rules. In cases where dispersion cannot be allowed as per clause 2.8.3.2 such as due to provision of SEJ in bridges etc., the bridge superstructure including bearings and sub-structure shall be checked for longitudinal force without dispersion and certified safe by the Chief Bridge Engineer concerned.
3.2.1.5	During operation of Rail Borne Maintenance Vehicle with single/multiple locomotives and other rolling stocks the speed certificate issued by RDSO of the single/multiple locomotives/rolling stocks in empty/loaded condition shall be strictly complied with. Therefore, speed certificate of each single/multiple locomotive and rolling stocks in train formation shall be examined carefully & speed restriction/strengthening/prohibition/any other restriction shall be imposed according to most restrictive rolling stock/locomotive/multiple locomotives in train formation.
3.2.1.6	Location of bridges on which speed restrictions are imposed should be notified by the Railways and incorporated in the working timetable.
3.2.1.7	The final speed on bridges shall also be governed by the track structure on the bridges. Therefore, the lower of the two speeds i.e. speed on particular bridges and speed for track structure over those particular bridges shall prevail as the running speed.
3.2.1.8	The above Para have been arrived at considering bridges are in physically sound condition. In case the bridges are not in satisfactory physical condition, necessary speed restriction to be imposed by Chief Bridge Engineer of Zonal Railway on condition basis.

3.2.2	**FOR EASTERN & WESTERN DEDICATED FREIGHT CORRIDORS OF DFCCIL**
3.2.2.1	The clearance refers to “Standard RDSO Spans” bridges with standard design of girders, slabs, pipe culverts, piers and abutments etc. issued by RDSO for “DFC loading (32.5t axle load)”.
3.2.2.2	Superstructures & Bearings of “Special Spans” (designed and constructed by DFCCIL based on site requirements), Arches and sub-structures (including foundation) of all bridges (Standard RDSO spans & Special Spans) are to be examined by DFCCIL and certified safe with respect to current Indian Railway Standard Codes with up to-date correction slips.
3.2.2.3	The clearance is subject to the following parameters of Rail Borne Maintenance Vehicle (RBMV) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore:-

Rolling Stock	**Maximum axle load (t)**	**Maximum tractive effort per axle (t)**	**Maximum braking force at rail level per axle(t)**	**Maximum CG height from rail level (mm)**
Rail Borne Maintenance Vehicle	18.10	8.5	9.98	1230

3.2.2.4(i)	All Standard RDSO spans of DFC loading are fit for proposed speed of 100kmph (with/without 15t payload) when running on its own power as well as when running in train formation as a dead vehicle.
3.2.2.4(ii)	All Standard RDSO spans of DFC loading are fit for proposed speed of 90kmph (with 15t payload + 65t hauling load) when running on its own power.
3.2.2.5	During operation of Rail Borne Maintenance Vehicle with single/multiple locomotives and other rolling stocks the speed certificate issued by RDSO of the single/multiple locomotives/rolling stocks in empty/loaded condition shall be strictly complied with. Therefore, speed certificate of each single/multiple locomotive and rolling stocks in train formation shall be examined carefully & speed restriction/strengthening/prohibition/any other restriction shall be imposed according to most restrictive rolling stock/locomotive/multiple locomotives in train formation.
3.2.2.6	Location of bridges on which speed restrictions are imposed should be notified by DFCCIL and incorporated in the working timetable.
3.2.2.7	The final speed on bridges shall also be governed by the track structure on the bridges. Therefore, the lower of the two speeds i.e. speed on particular bridges and speed for track structure over those particular bridges shall prevail as the running speed.
3.2.2.8	The above Para have been arrived at considering bridges are in physically sound condition. In case the bridges are not in satisfactory physical condition, necessary speed restriction to be imposed by DFCCIL on condition basis.

3.3	SIGNALLING STIPULATIONS
3.3.1	Provisions of GR, SR, IRSOD, DFC-SSOD, SEM & all extant instructions issued from time to time as applicable shall be complied with.
3.3.2	In case of locomotive/rolling stocks /train (having this machine in its composition) having EBD of more than 1 km and non-provision of second distant signal/4 Aspect Automatic signalling in the section, action as per para 7.8.9 of IRSEM (issue July 2021) shall be taken.
3.3.3	While running through a station yard, speed of the Rolling stock shall be restricted to the maximum permissible speed as per standard of interlocking provided at the station or any other speed restriction whichever is severe.

3.4	ROLLING STOCK STIPULATIONS
3.4.1	Before initiating the operation of the Rail Borne Maintenance Vehicle (RBMV) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore, the Chief Engineer (Track Machine) of the concerned Railway/CGM (Civil Engg.) of the DFCCIL shall ensure the safety of the rolling stock and certify the track worthiness. He shall ensure the proper maintenance of the rolling stock.
3.4.2	Brake of the Rail Borne Maintenance Vehicle (RBMV) shall be in perfect working condition during the operation.

3.5	TRACTION INSTALLATION
3.5.1	FOR INDIAN RAILWAYS
3.5.1.1	In 25KV AC traction area, the Principal Chief Electrical Engineer of the concerned 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 1676mm Gauge (BG) revised 2022' with latest Addendum & Corrigendum Slips is not violated and strictly followed to ensure its safe running.
3.5.1.2	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.
3.5.1.3	When the Rail Borne Maintenance Vehicle (RBMV) 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.

3.5.2	FOR EASTERN & WESTERN DEDICATED FREIGHT CORRIDORS OF DFCCIL
3.5.2.1	In 25 KV 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 VII of Eastern Corridor & Chapter XIV of Western Corridor, 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.
3.5.2.2	In addition to above, the GGM (Electrical) of DFCCIL 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.
3.5.2.3	When the Rail Borne Maintenance Vehicle (RBMV) 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.

3.6	GENERAL STIPULATIONS
3.6.1	The working of Maintenance Machine shall be as per provision of Indian Railways Permanent Way Manual- 2024.
3.6.2	The profile of Rail Borne Maintenance Vehicle (RBMV) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore, as per their GA Drg. No. SNSK4713 Rev.04 does not infringe with the Clauses of Chapter IV(D) of Indian Railway Schedule of Dimensions B.G. Revised-2022 and clauses of Chapter-IV for Eastern Dedicated Freight Corridor and Chapter-XI for Western Dedicated Freight Corridor of 'Standard Schedule of Dimensions of January'2013.
3.6.3	All the permanent and temporary speed restrictions in force and those that shall be imposed from time to time due to track, bridges, curves, signalling and interlocking etc. shall also be observed. In this connection, the speed on curve shall be in accordance with para 3.1.1.4 for Indian Railway Track and para 3.1.2.4 for DFCCIL track of this speed certificate.
3.6.4	For the movement of the machine, in case of failure of the machine in block sections, the instructions of the para 708(4) of Indian Railways Track Machine Manual, September -2019 shall be followed.
3.6.5	Competent track machine staff who can apply the machine brakes in case of train parting shall

	escort the machine while running in train formation as a dead vehicle.
3.6.6	This Final Speed Certificate is valid only for Rail Borne Maintenance Vehicle (RBMV) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore coming under Railway Board's Contract No. 2018/Track-III/MC/13(i) dated 28.08.2019.

ENCLOSURES:/ संलग्नक:

i)	Annexure-A
ii)	M/s San Engg. GA Drg. No. SNSK4713 Rev. 04
iii)	M/s San Engg. Bogie arrangement Drawing No. SNSK 4909 (Rev.01)
iv)	M/s San Engg. Suspension arrangement Drawing No. SNSK 4874 (Rev.02)
v)	Railway Board's letter No. 2020/M(C)/202/6(MTM) dated 31.10.2023
vi)	Railway Board's letter No. 65/WDO/SR/26 dated 19/20.10.1966.
vii)	Para 708(4) of Indian Railways Track Machine Manual, September -2019
viii)	Para 704 of Indian Railways Track Machine Manual, September -2019.

NITIN MEHROTRA
Digitally signed by NITIN MEHROTRA
Date: 2024.12.07 14:55:42 +05'30'

(नितिन मेहरोत्रा)
कार्यकारी निदेशक मानक/चालन शक्ति

प्रतिलिपि:

1. **सचिव, {यांत्रिक/विद्युत/इंजीनियरिंग(जी)}, रेलवे बोर्ड, रेल भवन, नई दिल्ली– 110001**
2. **मुख्य रेल संरक्षा आयुक्त, अशोक मार्ग, लखनऊ–226001**
3. **महाप्रबन्धक(यांत्रिक/विद्युत/संचालन/संकेत एवं दूर संचार)**
   - i) मध्य रेलवे, छत्रपति शिवाजी टर्मिनस मुम्बई– 400 001
   - ii) पूर्व रेलवे, फेयरली प्लेस, कोलकाता– 700 001
   - iii) उत्तर रेलवे, बडौदा हाऊस, नई दिल्ली– 110001
   - iv) पूर्वोत्तर रेलवे, गोरखपुर– 273001
   - v) पूर्वोत्तर फ्रन्टियर रेलवे, मालीगॉव ,गुवाहाटी– 781 011
   - vi) दक्षिण रेलवे, एनेक्सी, पार्क टाऊन, चेन्नई– 600 003
   - vii) दक्षिण मध्य रेलवे, रेल निलायम, सिकन्दराबाद– 500 071
   - viii) दक्षिण पूर्व रेलवे, गार्डन रीच, कोलकाता– 700 043
   - ix) पश्चिम रेलवे, चर्चगेट, मुम्बई– 400020
   - x) उत्तर मध्य रेलवे, प्रयागराज– 211 001
   - xi) उत्तर पश्चिम रेलवे, जयपुर– 302 006
   - xii) पूर्व मध्य रेलवे, हाजीपुर– 844 101
   - xiii) पूर्व तट रेलवे, रेलवे कॉम्पलेक्स, भुवनेश्वर– 751 023
   - xiv) दक्षिण पश्चिम रेलवे, हुबली– 580 023
   - xv) पश्चिम मध्य रेलवे, जबलपुर– 482 001
   - xvi) दक्षिण पूर्व मध्य रेलवे, बिलासपुर– 495 004
4. **अध्यक्ष एवं प्रबन्ध निदेशक, कोंकण रेलवे कारपोरेशन लिमिटेड, बेलापुर भवन, सेक्टर–11, सी.बी.डी.बेलापुर नवी मुम्बई–400 614.**
5. **जी.जी.एम (मेकैनिकल/इंजी/यातायात/संकेत एवं दूर संचार) डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि0 नई दिल्ली–110001.**

ENCLOSURES:/ संलग्नक:

i)	Annexure-A
ii)	M/s San Engg. GA Drg. No. SNSK4713 Rev. 04
iii)	M/s San Engg. Bogie arrangement Drawing No. SNSK 4909 (Rev.01)
iv)	M/s San Engg. Suspension arrangement Drawing No. SNSK 4874 (Rev.02)
v)	Railway Board's letter No. 2020/M(C)/202/6(MTM) dated 31.10.2023
vi)	Railway Board's letter No. 65/WDO/SR/26 dated 19/20.10.1966.
vii)	Para 708(4) of Indian Railways Track Machine Manual, September -2019

viii)	Para 704 of Indian Railways Track Machine Manual, September -2019.

(Signed)
(नितिन मेहरोत्रा)
कार्यकारी निदेशक मानक/चालन शक्ति

Annexure-A

Salient features of Rail Borne Maintenance Vehicle (RBMV) (Transportation Code RBMVSAN8) supplied by M/s. San Engineering & Locomotive Co. Ltd., Bangalore.

S.No.	Description	Details
1.	Principal dimensions of rolling stock	M/s San Engg. GA Drg. No. SNSK4713 Rev. 04 a) Length over buffers : 22210 mm b) Bogie centre distance : 14783mm c) Wheel base : 2896 mm d) Max. axle load : 18.10 t e) Max. design speed- i) Own power : 105kmph ii) In train formation : 105kmph f) Weight: i) Empty : 56.96t ii) Loaded : 71.96t
2.	Bogie details & Wheel dia	M/s San Engg. Bogie arrangement Drawing No. SNSK 4909 (Rev.01) Wheel dia.: New - 952 mm Worn - 877 mm
3.	Suspension arrangement	M/s San Engg. Suspension arrangement Drawing No. SNSK 4874 (Rev.02).
4.	Brake system details	Air Brake System as per M/s San Engg. Drawing No. SNSK 4832 (Rev-5) (Sheet 1 & 2)
5.	Details of Coupler and Buffer	Coupler : Transition Screw Coupling Buffer : As per RDSO sketch no. 98145
6.	Power transmission system	Make: Cummins diesel engine Model: QSN 14R, 400 HP @ 2100 rpm
7.	Safety	As per Para 704 of Indian Railways Track Machine Manual, September -2019.

1) ALL DIMENSIONS ARE IN mm UNLESS STATED OTHERWISE.
2) CODE OF PRACTICE, ABBREVIATION ETC., TO IS : 696.
3) WORK TO COARSE/MEDIUM/FINE TOLERANCES OF IS : 2102 FOR DIMENSIONS WITHOUT TOLERANCE.
4) DO NOT SCALE, IF IN DOUBT PLEASE ASK.
5) * INDICATES NO SEPARATE DRAWINGS.

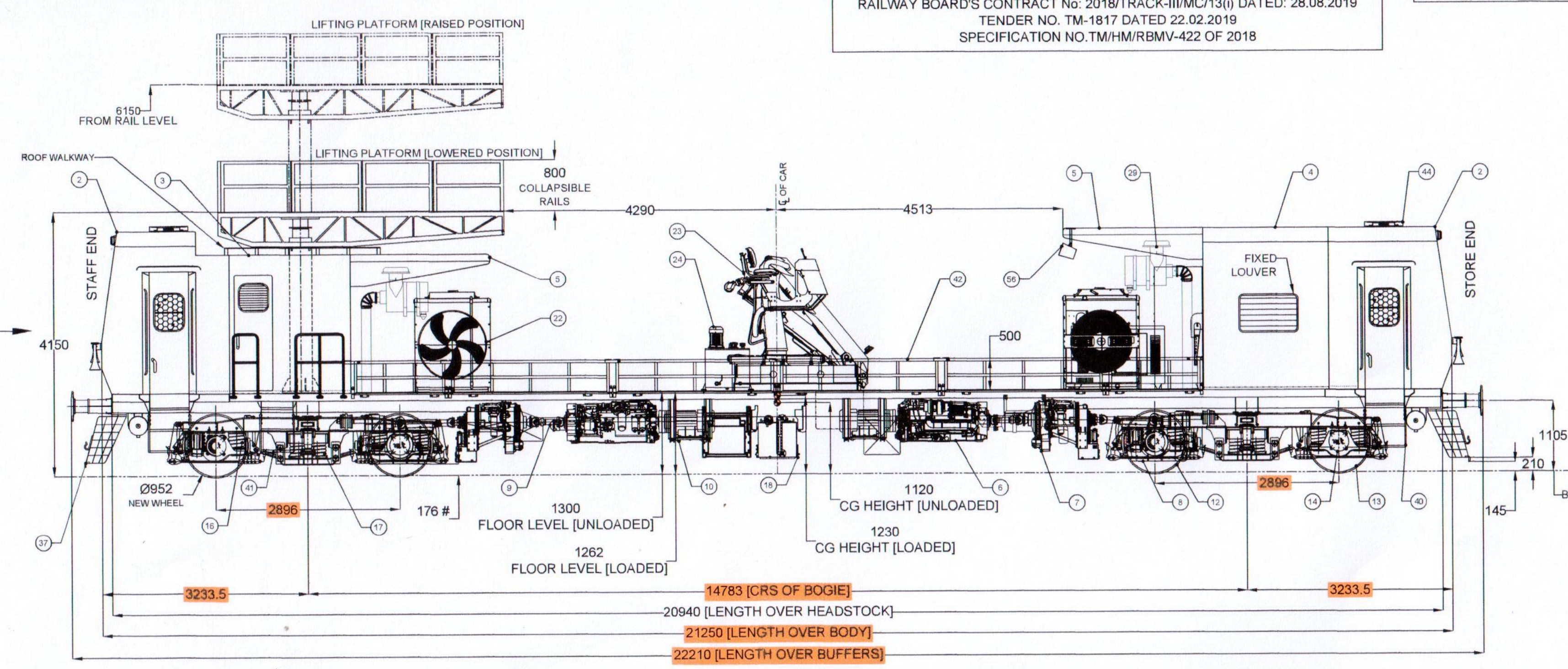
8-WHEELER RAIL BORNE MAINTENANCE VEHICLE - INDIAN RAILWAYS

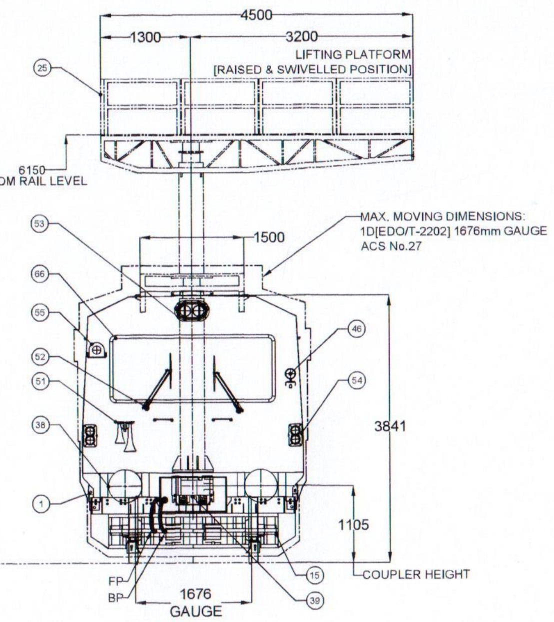
RAILWAY BOARD'S CONTRACT No: 2018/TRACK-III/MC/13(i) DATED: 28.08.2019
TENDER NO. TM-1817 DATED 22.02.2019
SPECIFICATION NO.TM/HM/RBMV-422 OF 2018

SUBMISSION No.:
DATE:

DRG. NO. SNSK4713

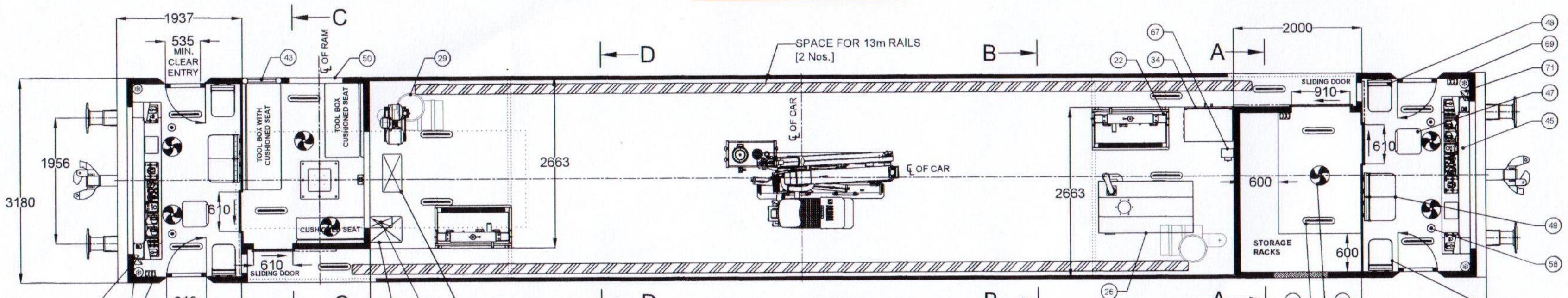
FOR PROTOTYPE ONLY



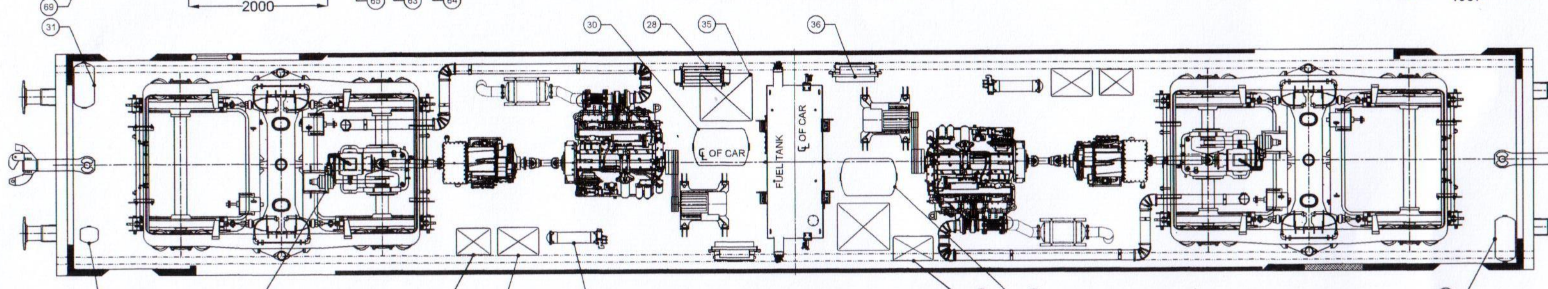


VIEW-Z

REFERENCE ONLY



ONBOARD ARRANGEMENTS



UNDERSLUNG ARRANGEMENTS

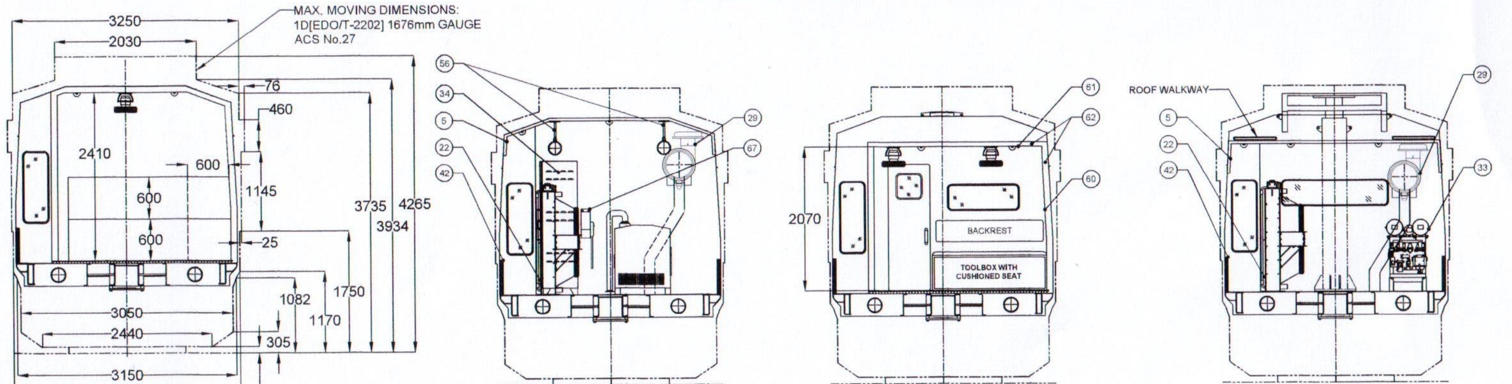
MAXIMUM AXLE LOAD [TON]	
APPLICATION	18
DESIGNED	20.32

MAXIMUM DESIGNED SPEED [kmph]	
OWN POWER	105
TRAIN FORATION	105

LIFTING & SWIVELLING PLATFORM	
LENGTH OF THE PLATFORM	4500 mm
WIDTH OF THE PLATFORM	1500 mm
PLATFORM FLOOR LEVEL ABOVE RAIL LEVEL WHEN ELEVATED	6150 mm
MAXIMUM LIFTING TIME TO FULL HEIGHT	45s
MAXIMUM TIME OF ROTATION FROM 0° TO 90°	45s
ROTATION RANGE OF PLATFORM TOWARDS SIDES	90°
SIDE SHIFTING REACH OF PLATFORM	3200 mm
FULL HEIGHT OF COLLAPSIBLE RAILING ABOVE PLATFORM FLOOR	800 mm

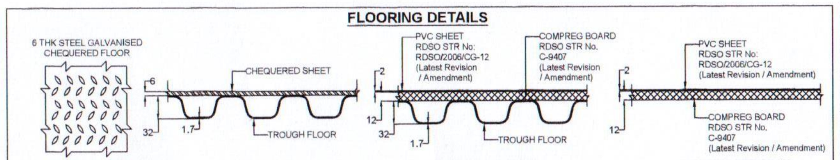
DETAILS OF MAJOR EQUIPMENTS

SL. NO.	DESCRIPTION	MAKE	RATING	MODEL	QTY / VEHICLE
1	ENGINE	CUMMINS	400HP @ 2100 RPM	QSN 14 R	2
2	TRANSMISSION	AVTEC	TC-580	CRT-5633	2
3	CRANE	HYDROLIFT	1 TON @ 8m	875K2-SPL	1
4	GENSET	KOHLER	7.5 kVA	KDG0008P1	1
5	AUXILIARY ALTERNATOR	KEL	110 V DC, 4.5 kW	KELA 45120FM	2



SECTION A-A | SECTION B-B | SECTION C-C | SECTION D-D

FLOORING DETAILS



FLOORING DETAILS IN OPEN PLATFORM AREA | FLOORING DETAILS IN STORE | FLOORING DETAILS IN STAFF CABIN | FLOORING DETAILS IN DRIVER'S CABIN

NOTE:

[1] {#} - THE CRITICAL LOWEST EQUIPMENT IS FINAL DRIVE WITH MINIMUM RAIL CLEARANCE OF 176mm (WITH NEW WHEEL ø952mm) & 138.5mm (WITH FULLY WORN WHEEL ø877mm) IN LOADED CONDITION.
[2] MAXIMUM TRACTIVE EFFORT PER AXLE = 8.5 TON
[3] MAXIMUM BRAKING FORCE PER AXLE = 9.98 TON

ITEM No.	DESCRIPTION	QTY / VEHICLE
71	SPEED INDICATOR [RDSO SPEC : MP- 0.3700-07]	1
70	SPEED RECORDER CUM INDICATOR [RDSO SPEC : MP- 0.3700-07]	1
69	HAND SET	4
68	FIRE EXTINGUISHER	4
67	HAND BRAKE ASSEMBLY	1
66	STONE PROOF LOOKOUT GLASS [ICF/MD/SPEC-159]	2
65	110V DC BATTERY CHARGING SELECTOR SWITCH BOX	1
64	HYDRAULIC POWERPACK FOR LIFTING PLATFORM	1
63	ELECTRIC CONTROL PANEL FOR LIFTING PLATFORM	1
62	CABIN INSULATION [AS/NZS-4200.1]	1 SET
61	NAFTC SHEET [RDSO STR No. RDSO/2016/CG-02]	1 SET
60	L.P. SHEET PANELLING [RDSO STR No. C-K 514]	1 SET
59	FAN [RDSO/PE/SPEC/TL/0021/2000. REV-0]	7
58	SPOT LIGHT	4
57	FLUORESCENT LIGHT	14
56	SEARCH LIGHT [FOR LIFTING PLATFORM LIGHTING]	2
55	FLASHER LIGHT [ELRS/SPEC/LFL/0017, REV-1. SEPT-04]	2
54	MARKER LIGHT [ELRS/SPEC/PR0022]	4
53	HEAD LIGHT [RDSO/2017/SPEC/0134 REV-0]	2
52	WIND SCREEN WIPER [C-K 306]	2
51	HORN	2
50	WINDOW [RDSO/SPEC/CG-03]	1
49	FOLDABLE SEAT FOR 2 PERSONS	2
48	FOLDABLE SEAT	4
47	DRIVERS' SEAT	2
46	SEARCH LIGHT [ON END WALL]	2
45	DRIVERS' DESK	2
44	VENTILATOR [WLRRM4-7-3-402]	2
43	LADDER	1
42	COLLAPSIBLE RAILINGS	1 SET
41	FOOT STEP FOR PLATFORM	2
40	FOOT STEP FOR CABIN	4
39	COUPLER [RDSO/2009/CG-22]	2
38	SIDE BUFFER [RDSO/SK-98145]	4
37	CATTLE GUARD [WITH ADJUSTABLE RAIL GUARD]	2
36	R.R UNIT [110V DC]	2
35	24 V BATTERY BOX	2
34	110 V BATTERY BOX	1
33	BRAKE PANEL [RDSO SPEC No.MP-0.01.00.19, REV-0]	1
32	9 Litre AIR RESERVOIR	1
31	40 Litre AIR RESERVOIR	2
30	150 Litre AIR RESERVOIR	2
29	AIR CLEANER	2
28	AFTER COOLER	1
27	AIR DRYER	1
26	7.5 kVA GENSET	1
25	LIFTING & SWIVELLING PLATFORM WITH COLLAPSIBLE RAILS	1
24	HYDRAULIC OIL TANK [FOR CRANE]	1
23	CRANE	1
22	TRACTION ENGINE RADIATOR	2
21	T.C OIL COOLER	2
20	HYDRAULIC OIL COOLER	2
19	HYDRAULIC OIL TANK [RADIATOR FAN]	2
18	FUEL TANK [700 Litre]	1
17	SECONDARY SUSPENSION SPRINGS	8 SETS
16	PRIMARYSUSPENSION SPRINGS	16
15	AXLE GENERATOR FOR SPEEDOMETER [ON 1ST AXLE]	1
14	AXLE BOX ASSEMBLY	8
13	WHEEL AXLE ASSEMBLY [NON-POWERED]	2
12	WHEEL AXLE ASSEMBLY [POWERED]	2
11	TORQUE ARM ARRANGEMENT	2
10	AUXILIARY ALTERNATOR [110V DC]	2
9	CARDAN SHAFT	4
8	FINAL DRIVE ASSEMBLY	2
7	TRANSMISSION	2
6	ENGINE	2
5	CANOPY	2
4	STORE	1
3	STAFF CABIN	1
2	DRIVER'S CABIN	2
1	UNDERFRAME	1

WEIGHT TABLE	
TARE	56961 kg
PAY LOAD	15000 kg
GROSS	71961 kg

ECN. NO.	REV.	DESCRIPTION	DATE	INTL.
10659	04	ADDED LATEST REVISION / AMENDMENT COMMENT FOR COMPREG BOARD & PVC SHEET.	16.12.2020	KVA
10598	03	DRAWING REVISED & WEIGHT TABLE UPDATED.	09.10.2020	KVA
10520	02	REVISED & REDRAWN.	11.07.2020	KVA
10499	01	REVISED & REDRAWN.	10.06.2020	KVA

ECN. NO.	REV.	DESCRIPTION	DATE	INTL.

DRN.	RAM
TRCD.	
CHKD.	HBRK
APPD.	KVA

GENERAL ARRANGEMENT OF 8 WHEELER RAIL BORNE MAINTENANCE VEHICLE

SCALE 1:50

DATE 03.02.2020

SAN ENGG. AND LOCOMOTIVE COMPANY LTD. BANGALORE - 560 048

DRG. NO. SNSK4713 REV 04

San Engineering & Locomotive Co. Ltd. Bangalore 560048

A1

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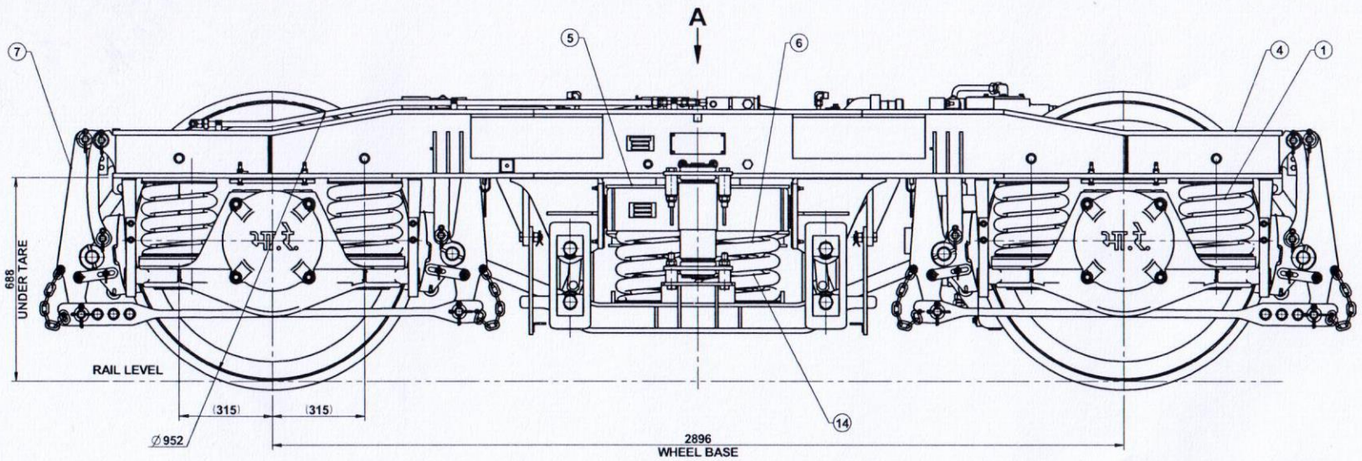
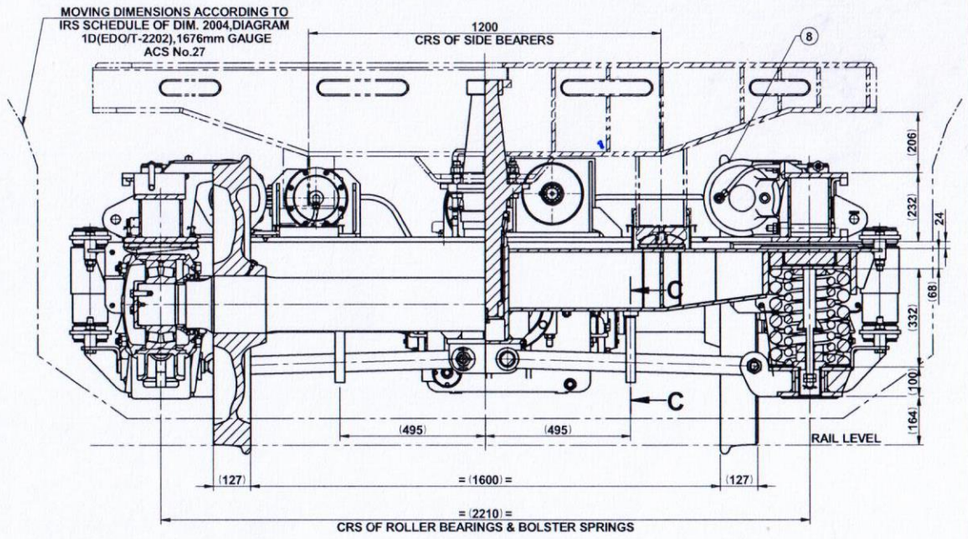
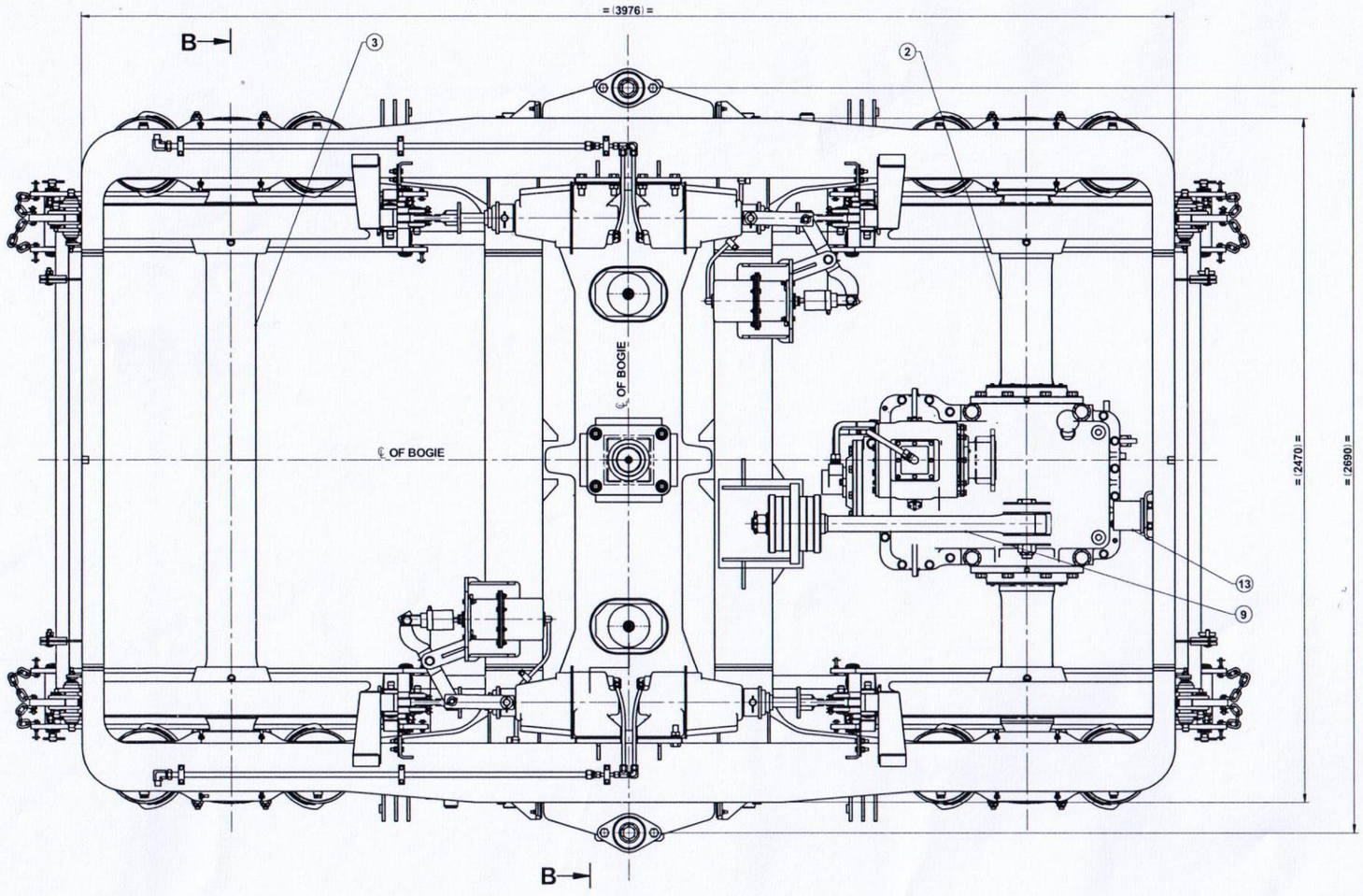
DRG. NO. SNSK4909

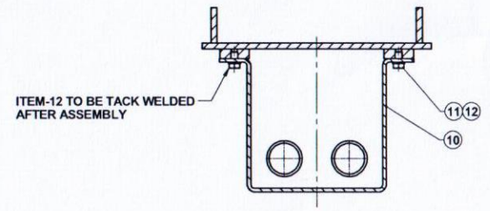




SECTION B-B
90°



VIEW A



SECTION C-C
(1:5)

SUBMISSION NO: 26
21 APR 2021

NOTE:

1. FOR SUSPENSION DIAGRAM REFER DRAWING No. SNSK4874.
2. FOR OPEN TOLERANCES & SURFACE FINISH VALUES REFER DRG No. ICF/STD-9-0-001.
1 3. GALVANISING TO IS:1573 TO SERVICE GRADE No-2 OF TABLE-2.
4. BOLSTER HELICAL SPRINGS TO DRG. NO: SNSK4908.
5. DAMPERS [DOUBLE ACTING HYDRAULIC SHOCK ABSORBERS] TO DRG. NO: ICF/SK-0-5-015, ITEM-2.

ITEM No.	DWG No.	SIZE	DESCRIPTION	No. OFF	MATL & SPECN
14	SNSK4874	A2	SUSPENSION DIAGRAM FOR 8W RBMV	1	
13	SV/DPC3 0-0-002	A1	FIXING ARRGT OF STOPPER FOR FINAL DRIVE	1	
12	98903050	*	SPRING WASHER B12	4	IS:3063-1994
11	-	*	HEXAGONAL HEAD SCREW - IS:1363 (PART-2)/ISO: 4018-M12x20L-4.6	4	IS:1363 (PART-2)
10	DC/EMU/M 0-5-011	A3	SAFETY STRAP	2	
9	SNSK4185	A1	TORQUE ARM FIXING ARRGT.	1	
8	DMU/DPC7- 3-2-702	A1	BOGIE BRAKE PIPING & PARKING BRAKE ARRGT	1	
7	EMU/M 3-2-064	A1	BOGIE BRAKE ARRGEMENT	1	
6	DMU/DPC -0-5-001	A1	BOGIE BOLSTER SUSPENSION ARRGT.	1	
5	DMU/DPC 0-4-001	A1	BOGIE BOLSTER ARRANGEMENT	1	
4	SV/DPC3 0-3-001	A1	BOGIE FRAME ARRANGEMENT	1	
3	SV/DPC 0-2-003	A1	ROLLER BEARING ARRGT [NON-POWERED AXLE]	1	
2	SV/DPC 0-2-001	A1	ROLLER BEARING ARRANGEMENT [POWERED AXLE]	1	
1	DHM/DPC 0-1-001	A1	AXLE BOX GUIDE ARRANGEMENT	1	

FOR RDSO APPROVAL

8-W RAIL BORNE MAINTENANCE VEHICLE-INDIAN RAILWAYS
RAILWAY BOARD'S CONTRACT No: 2018/TRACK-III/MC/13(i) DATED:28.08.2019
TENDER NO. TM-1817 DATED 22.02.2019.
SPECIFICATION NO. TM/HM/RBMV-422 OF 2018

SUBMISSION No.:
DATE:

ECN. NO.	REV.	DESCRIPTION	DATE	INTL.
10755	01	NOTES UPDATED	06.04.2021	KVA

DR.	RAM	
TRCD.		
DES.	GAS	
CHD.	KVA	
APD.		

BOGIE GENERAL ARRANGEMENT FOR POWERED BOGIE OF 8W RBMV

SCALE	1:10
DATE	23.01.2021
DRG. NO.	SNSK4909
REV	01

SAN ENGG. AND LOCOMOTIVE COMPANY LTD.
BANGALORE - 560 048

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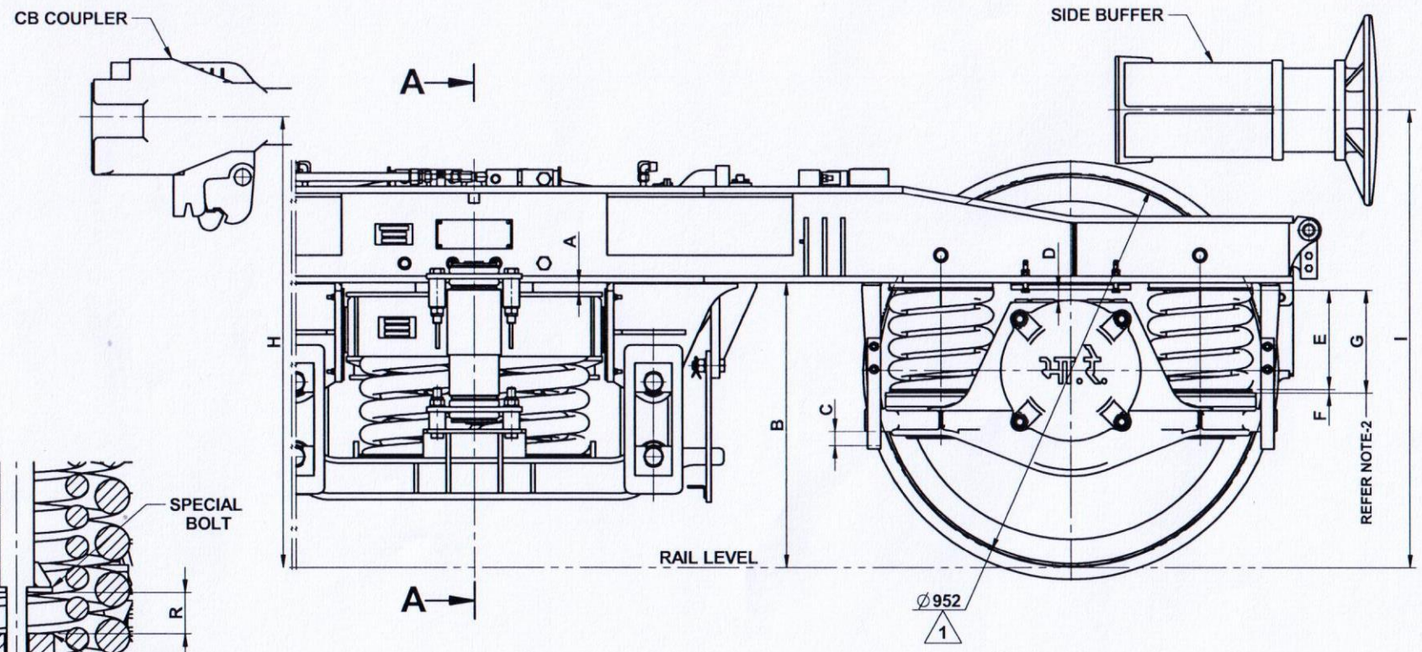
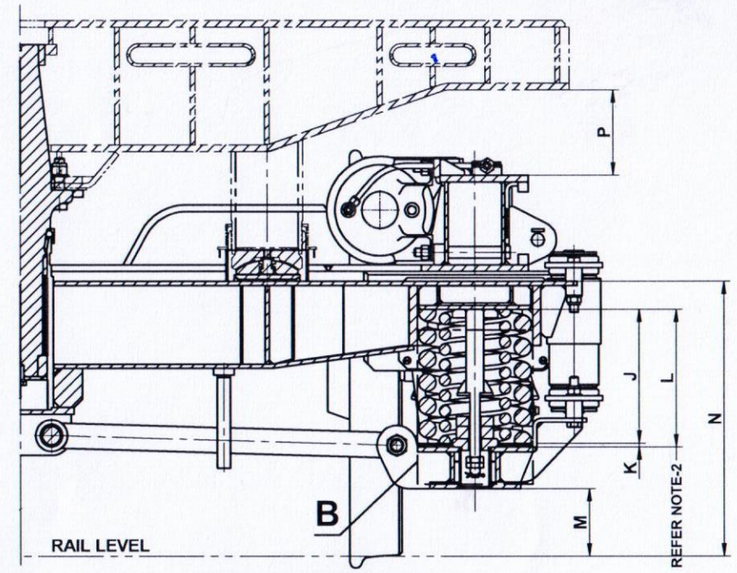
3) WORK TO COARSE/MEDIUM/FINE TOLERANCES OF IS : 2102 FOR DIMENSIONS WITHOUT TOLERANCE.
4) DO NOT SCALE, IF IN DOUBT PLEASE ASK.
5) * INDICATES NO SEPARATE DRAWINGS.

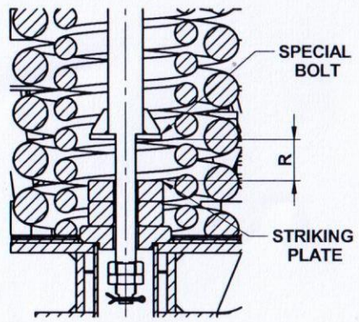
DRG. NO. SNSK4874

FOR PROTOTYPE ONLY





SECTION A-A



DETAIL B (1:5) △2

SUSPENSION DATA

TYPE OF VEHICLE	VEHICLE END	LOAD	BOGIE FRAME-BOLSTER CLEARANCE A	BOGIE FRAME HEIGHT FROM RAIL LEVEL B	AXLE BOX SAFETY STRAP CLEARANCE C	△1 CROWN CLEARANCE D	PRIMARY SPRING HEIGHT E	THICKNESS OF CR [REFER NOTE-1] F	△1 NUMBER OF CR / VEHICLE -	AVAILABLE SPACE [REFER NOTE-1] G	COUPLER HEIGHT H	BUFFER HEIGHT I	SECONDARY SPRING HEIGHT J	△1 THICKNESS OF CR [REFER NOTE-1] K	△1 NUMBER OF CR / VEHICLE -	AVAILABLE SPACE [REFER NOTE-1] L	LS BEAM HEIGHT FROM RAIL LEVEL M	BOLSTER HEIGHT FROM RAIL LEVEL N	BODY BOLSTER CLEARANCE P	△2 SECONDARY SUSPENSION CLEARANCE R	TEST LOAD / BOGIE [TON]
8W RBMV	STAFF END	TARE	$24^{\pm5}$	$688^{\pm5}$	$35^{\pm5}$	26^{+3}_{-0}	240^{+3}_{-2}	8	16	$248^{\pm3}$	1105^{+0}_{-10}	1105^{+0}_{-10}	324^{+5}_{-3}	8	8	$332^{\pm3}$	$164^{\pm5}$	$664^{\pm5}$	$206^{\pm3}$	50	20.94
		GROSS	$49^{\pm5}$	$675^{\pm5}$	$48^{\pm5}$	13^{+5}_{-0}	227^{+3}_{-2}	-	-	$235^{\pm3}$	1067^{+8}_{-5}	1067^{+8}_{-5}	299^{+5}_{-4}	-	-	$307^{\pm3}$	$151^{\pm5}$	626^{+8}_{-5}	$181^{\pm3}$	25	27.98
	STORE END	TARE	$24^{\pm5}$	$688^{\pm5}$	$35^{\pm5}$	26^{+3}_{-0}	241^{+3}_{-2}	7	16	$248^{\pm3}$	1105^{+0}_{-10}	1105^{+0}_{-10}	326^{+5}_{-3}	6	8	$332^{\pm3}$	$164^{\pm5}$	$664^{\pm5}$	$206^{\pm3}$	50	20.48
		GROSS	$52^{\pm5}$	$674^{\pm5}$	$49^{\pm5}$	12^{+5}_{-0}	227^{+3}_{-2}	-	-	$234^{\pm3}$	1063^{+8}_{-5}	1063^{+8}_{-5}	297^{+5}_{-4}	-	-	$304^{\pm3}$	$150^{\pm5}$	622^{+8}_{-5}	$178^{\pm3}$	22	28.44

WEIGHT PERTICULARS IN TON	
TARE WEIGHT OF VEHICLE	56.961
WEIGHT OF POWERED BOGIE	7.77
WEIGHT OF BOLSTER	0.5
UNSPRUNG MASS / POWERED BOGIE	3.999
NORMAL PAYLOAD	15
OVERLOAD	NIL
TOTAL PAYLOAD	15
GROSS WEIGHT OF VEHICLE	71.961

SUBMISSION NO: 26
21 APR 2021

FOR RDSO APPROVAL

NOTE:

△2 1. THICKNESS OF PACKING / CROWN PLATE : 17mm [12mmx1 + 5mmx1].
2. AXLEBOX SPRING TO DRG No: EMU/M-0-1-024.
BOLSTER SPRINGS TO DRG No: SNSK4908.

8-W RAIL BORNE MAINTENANCE VEHICLE-INDIAN RAILWAYS
RAILWAY BOARD'S CONTRACT No: 2018/TRACK-III/MC/13(i) DATED:28.08.2019
TENDER NO. TM-1817 DATED 22.02.2019.
SPECIFICATION NO. TM/HM/RBMV-422 OF 2018

SUBMISSION No.:	
DATE:	

ECN. NO.	REV.	DESCRIPTION	DATE	INTL.
10755	02	DETAIL B ADDED [D1], COLOUMN 'R' ADDED IN SUSPENSION DATA [D8], NOTES UPDATED.	08.04.2021	KVA
10698	01	WHEEL DIAMETER ADDED, QUANTITY OF CR/VEHICLE ADDED, TOLERANCE ON CROWN CLEARANCE CHANGED.	21.01.2021	KVA

ECN. NO.	REV.	DESCRIPTION	DATE	INTL.

DRN.	RAM
TRCD.	
CHKD.	GAS
APPD.	KVA

SUSPENSION DIAGRAM FOR 8W RBMV

SCALE	1:10
DATE	21.09.2020

SAN ENGG. AND LOCOMOTIVE COMPANY LTD.
BANGALORE - 560 048

DRG. NO. SNSK4874 REV 02

A2

आज़ादी का अमृत महोत्सव

भारत सरकार Government of India
रेल मंत्रालय Ministry of Railways
रेलवे बोर्ड Railway Board

भारत 2023 INDIA

(E-File No. -3338970)

No. 2020/M(C)/202/6(MTM) New Delhi, Date: 31.10.2023

ED/Carriage
RDSO, Lucknow

Sub: Allotment of transportation code for 8-wheeler Rail Borne Maintenance Vehicle (RBMV) supplied by M/s SAN Engineering and locomotive Co. Ltd. Bangalore.

Ref: i. RDSO letter no. MC/RBMV/SAN dated 25.01.2023.
ii. RDSO letter No. MC/RBMV/SAN Dated 06.10.2023.

Vide letter under reference i and ii above, RDSO has submitted that the proposed layout drawing No. SNSK 4713 (Rev. 4) for 8 wheeler Rail Borne Maintenance vehicle (RBMV) supplied by M/s SAN Engineering & locomotive Co. Ltd. Bangalore has been examined in consultation with TMM Directorates and found in order.

Accordingly, a transportation code for 8-wheeler Rail Borne Maintenance Vehicle (RBMV) is being allotted.

Type of Coach	Transportation Code
8-Wheeler Rail Borne Maintenance Vehicle (RBMV) supplied by M/s SAN Engineering and locomotive Co. Ltd. Bangalore.	**RBMVSAN8**

For further necessary action please.

DA: As above

31/10/23

(रवि जैन)
कार्य. निदेशक / यांत्रिक इंजी./कोचिंग
रेलवे बोर्ड

C/- PED/RS/RDSO, ED/TK/M&MC/RB and GM/CMM/CRIS for kind information and necessary action.

No.65/WDO/SR/26 (Railway Board) New Delhi, October 19/20, 1966

To

The General Managers,
All Indian Railways.

The G.M. & Chief Engineer,
Railway Electrification project, Calcutta.

The Chief Administrative Officer,
B.B.K. Railway Projects, Waltair.

Sub: Use of new type of Rolling Stock.

.....

Use of new type of rolling stock on existing Railway systems is governed by the Rules laid down in Chapter VI of the Rules for opening of a Railway. In terms of para 5 of this Chapter, applications for use of new type of rolling stock are required to be accompanied by a certificate to be signed by the Chief Engineer and Chief Mechanical Engineer of a Railway in a form specified therein.

2. The Board wish to point out that this certificate by the Chief Engineer and the Chief Mechanical Engineer (and Chief Electrical Engineer in case of electrical stock) is a positive act of certification in regard to track and locomotive maintenance standards for the speed indicated and a statutory obligation. The Officers signing the certificate are required to decide, on the basis of their personal knowledge and experience of the maintenance conditions of the track, locomotives or rolling stock, with due regard to relevant information available and the maintenance requirements of the new type of rolling stock, as to whether the operation of the particular type of locomotive or rolling stock on the relevant section of the Railway is safe and practicable with the facilities available on the Railway system. The RDSO merely recommend the maximum speed at which locomotives and rolling stock could be permitted to run on standard track under average maintenance conditions and this recommendation is made only on the basis of design features of the particular type of locomotive, rolling stock and assessment of their suitability from oscillation and other tests conducted by the RDSO. These certificates for speed issued by RDSO are meant merely to assist the CEs and CMEs/CEEs in deciding on the speed at which these engines/rolling stock may be permitted to run on their Railway system for the maintenance conditions obtaining on their Rlys.

3. A note on the subject prepared by the DG/RDSO is enclosed herewith in quadruplicate for guidance of your officers.

4. Receipt of this letter may please be acknowledged.

Sd/-
(B.S.D. Baliga)
Director, Civil Engineering,
Railway Board
New Delhi, October 19/20, 1966.

DA: As above.

No.65/WDO/SR/26

Copy to D.G. RDSO, Alambagh, Lucknow with reference to his letter No.MRA/573 of 16.8.1966.

Sd/-
(B.S.D. Baliga)
Director, Civil Engineering.
Railway Board.

Enclosure to Board's letter No.65/WDO/SR/26 dated 19-10-66.

....

Use of new types of Rolling Stock.

The rules for use of new types of rolling stock on existing railways are laid down in Chapter VI of the Rules for Opening of a Railway. According to para 5 of this Chapter, applications for use of new type of rolling stock arerequired to be accompanied by a certificate to be signed by the Chief Engineer and the Chief Mechanical Engineer of the Railway in the form specified in para 5(a)(ii). It should be clearly understood that this certificate by the Chief Engineer and the Chief Mechanical Engineer(Chief Electrical Engineer in the case of Electrical Stock) is a positive act of certification and a statutory obligation.

2. The Chief Engineers and Chief Mechanical Engineers (Chief Electrical Engineers in the case of electric stock) are required to decide on the basis of their personal knowledge and experience of track, locomotives or rolling stock with due regard to relevant information available of track and rolling stock and their maintenance requirements, as to whether the operation of particular locomotive or rolling stock is safe and practicable with the facilities provided on the railway system. It may be emphasized that respective Heads of Departments are required to certify annually regarding the sound condition of the track and rolling stock in operation in terms of para 1522 of Indian Railway Code for Accounts department.

3. Prior to the setting up of testing facilties on the Indian Railways, the safety certificate for operation of locomotives and rolling stock was issued by the Chief Engineer and Chief Mechanical Engineers on the basis of their personal knowledge and experience and on the basis of the recommendation for speed limit by the consulting engineers, who available. With the build up of increased design and testing facilities in RDSO, due recommendation is made by RDSO on the basis of design features of particular stock and assessment of their stability from oscillation tests conducted on main line track in normal state of maintenance and not subjected to speed restriction.

4. R.D.S.O. advises the Railway of the speed at which different types of locomotive and rolling stock can be permitted to run on different track structures. This is done in two stages:

(a) preliminary speed; and

(b) final maximum speed.

The preliminary speed is based on a study of the design characteristics of the vehicle and experience of performance of similar designs in India and/or abroad. Such speed would be generally lower than the sectional maximum speed and it would not be difficult for CEs and CMEs to arrive at a decision in issuing the Safety Certificate. Further, it is up to the CEs to decide whether any particular sections or routes require the imposition of a restriction on a generally sanctioned speed. Such a decision has to be based purely on the personal knowledge and experience of the engineers of the zonal railways.

5. It is, however, necessary to keep a watch on the performance of vehicles permitted on such preliminary speed limit to gather experience for guidance in determination of the final maximum speed both by RDSO and Railways the former taking this aspect into account along with the review of the oscillation test, and the latter while issuing the certificate for the final maximum speed. The final maximum speed is determined by the RDSO on review of the oscillation tests generally conducted for new designs and on confirmation of the suitability of the stock from the point of view of strength of track and bridges, although such investigation is made even at the initial stage of design. The oscillation trials are conducted with a view to obtaining data relating, inter-alia, to the riding characteristics of the vehicle at the specified speeds. Such tests include aspects, such as, vertical wheel/axle load and lateral force ratio and vertical and lateral acceleration of the vehicle. The studies are aimed at assessing the possibilities of track distortion, wheel mounting, riding comforts etc. For conducting these tests, a section of main line track is selected over which there are no temporary restrictions and which is considered by the railway as being in a generally run down condition for main line standards but without speed restriction. The vehicle is tested generally for new and worn clearance conditions and also where relevant for operation in the forward or back-ward direction. The vehicle selected is one of those in average condition of normal maintenance. The tests are conducted on speeds usually 10% higher than that to which it is proposed to be certified.

On the basis of the theoretical studies and investigations of the tests as indicated and the analysis of the test results, the RDSO recommends the maximum speeds up to which a vehicle may be permitted in normal traffic operation. The certificate of the RDSO though issued by the Director Standards(Mech.) is the final result of studies conducted by the various concerned

Directorates such as Civil Engineering, Carriage and Wagon Motive Power etc. This recommendation of the RDSO is meant to be used as guidance by the CEs and CMEs of the zonal railways in formulating their own certificates to be furnished to the ACRS. It is upto Chief Engineer, Chief Mechanical Engineers and Chief Electrical Engineers to consider on the basis of their personal knowledge and experience of track locomotive and rolling stock and their maintenance requirements whether the conditions prevailing are such as to require a reduction in the speed of the vehicles in normal traffic operation.

6. In the case of certification of speeds by the CEs and CMEs up to 105 Km/hr., it is neither feasible nor it is considered necessary that any more guidance than that at present being given by RDSO should be available to them in normal cases in arriving at their conclusions in the matter of formulation of their certificates to the ACRS. In the case of operation at higher speeds, it is proposed that in addition to the data at present being furnished, copies of track recording charts of the track over which the tests were conducted would also be incorporated in the test reports and made available for reference to the CEs and CMEs. It has already been accepted by the Board that in the case of high speed track (speed above 105 km/hr) track recording would be done at intervals of about 6 months. A comparison of the track recording for the test track with the track recording of the routes over which the high speeds are to be run would be an additional guidance to the CEs and CMEs in the formulation of their certificates.

In conclusion, it may be pointed out that the statutory obligation of certification of speeds is that of the CEs and CMEs/ and CAEs of the zonal railways. In discharging these functions, the CEs and CMEs/CAEs are assisted by the RDSO. The extent of such assistance would normally depend on the speeds involved and the facilities available with the RDSO [illegible]. The procedures, at present, followed are considered satisfactory for speeds upto 105 km/hr. For higher speeds, recording of characteristics of the test track would also be made available to the zonal railways for purpose of comparison with the actual track conditions prevailing from time to time.

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involve large number of labour working with the machine. Hence, extra care is necessary as detailed below, to ensure safety of workers.

(b) Hooters should be provided on the track machines. These hooters should be used to warn the staff working on/around the track machine about approaching train on adjoining track. Remote controlled hooters shall also be deployed as an added precaution by SSE/JE/P.Way so that lookout man standing around 150 m away from the track machine can also operate the hooter to warn the staff suitably. SSE/JE/TM shall also put on the flasher light on as an added precaution till the train on adjacent line has passed the site of work.

(c) Caution order of 30 to 50 kmph with instructions to whistle freely should be imposed on the adjacent line, during the duration of block, for the safety of workmen, depending upon the site conditions and visibility.

(8) **Checking Infringement After Work -** The vertical and lateral clearance for OHE, signal post and any other structure should be checked and adjusted before clearing the block. It shall be ensured by SSE/JE (P.Way) working with track machine that there should be no infringement to signal post, OHE and any other structure as per schedule of dimensions.

708 Failure and Accidents of Track Machines

(1) **Protection in case of Breakdown -** In the event of breakdown, the track machines shall be protected as per GR 6.03 and SR there to by the machine staff, as directed by machine in-charge.

(2) **Failures in Block Section -** Failures in block sections of the track machines will be treated as accident under class 'J – Equipment failure'.

(3) **Accidents involving Track Machine -** Accidents involving track machines shall be treated as train accidents under the appropriate class and action shall be taken as per the rules in force.

(4) **Action in case of Failure in Block -** In case of failure of track machine in block section, immediate information with details should be conveyed to the ADEN/DEN/Sr.DEN of the section and the AXEN/XEN/Dy.CE/Line/TM. SE/JE/TM should decide in consultation with SSE/JE (P. Way), the action to be taken to clear the section. They may decide to push the disabled unit to the nearest station provided the brake power is in good condition. Otherwise, intimation shall be sent to the nearest Station Master asking for a light engine to tow the unit.

(5) **Request for ART/Breakdown -** In case, SSE/JE (P. Way) and/or SSE/JE/TM feels clearance of section is going to take long time, the assistance of Road Break-down or Accident Relief Train shall be asked for immediately. Meanwhile SSE/JE/TM in-charge on the machine shall take necessary action to rectify the defect(s). SSE/JE (P. Way) shall provide all necessary assistance.

certificate. Machine competency certificate is to be issued to SSE/JE/TM by Dy.CE/TM Line or an officer authorized by him. This certificate will be issued as per proforma given in **Annexure 7.3** after ascertaining the successful completion of technical training, G & SR training and his medical fitness. The validity of this certificate will be up to the earliest expiry date of the three i.e. (i) Technical training (ii) G & SR training and (iii) PME.

For automatic block section, separate competency is required to be issued as per the practice in the Zonal Railway.

704 Safety Equipment

(1) **General** - SSE/JE/TM in-charge shall be responsible to ensure that the following equipment in working condition are available on the track machine:

(a) Two red and one green hand signal flags.

(b) Two tri-colour hand signal lamps /LED torch.

(c) Two chains with padlocks.

(d) One fire extinguisher in each cabin.

(e) Two hooters (manually controlled).

(f) Two jacks10 t.

(g) Four wooden blocks.

(h) Four crow bars.

(i) One hydraulic hand pump.

(j) Emergency pneumatic/hydraulic hose off sizes suiting to different machines (Complete with end fitting).

(k) Wire rope with close loops at both ends 2 m and 9 m long for BCM: One of each length.

(l) Machine specific equipment, if any, listed in Chapter 2, 3, 4 and 5.

(m) Ten fog signals (detonators) in a tin case.

(n) A copy of the working timetable of the section where the machine is working.

(o) G & SR book with up to date amendment slips.

(p) One 4 cell flasher light LED lamp cum flasher light (rechargeable).

(q) Two banner flags.

(r) One first aid box.

(s) Two skids.

(t) Safety helmets for all machine staff.

(u) Protective clothing, safety shoes and safety gloves.

(v) Walkie talkie with frequency of SM, Guard and Loco Pilots.

(w) Internal communication system like walkie-talkie and/or head mounted system.

(x) Track Machine Manual with up to date correction slips.

(y) Accident Manual.

(z) Tail lamp.

(2) **Head and Tail Lights –** Each track machine must be equipped with prescribed head and tail lights, marker lights and flasher lights as per GR 4.14, 4.15 & 4.16 and SRs thereof. Each machine shall display LV board/tail lamp when moving alone. While moving in conveyor coupled, the LV board/tail lamp shall be fixed on the last vehicle; in the direction of movement.

705 Rules for Operation – General

(1) **Stabling of Track Machines -** When the track machine(s) is/are stabled at a station, SSE/JE/TM in-charge shall ensure that it is clear of fouling marks and traps and necessary precautions against rolling down such as pinning down hand brakes, chaining and provision of skids; is taken in accordance with G&SR.

(2) **Shunting of Track Machines -** No track machine shall be moved between a running line and the siding/stabling line without the written permission of the Station Master on duty in the form of shunting order/shunt signals.

(3) **Machine Ready Memo -** SSE/JE/TM shall issue a written machine ready memo (as per Annexure 7.4) after necessary maintenance/repairs/schedules and Brake Power testing and other stipulated checks, if any, to on duty SM, indicating time and date, under advice to SSE/JE/P.Way deputed to work with the machine.

(4) **Movement of Track Machines -** When the track machine is required to move from one station to another station, SSE/JE/TM shall run the machine only with proper authority to proceed and all necessary permits, notices and cautions as specified in G&SR. When track machine is to move on wrong road (against the direction of traffic), the speed of track machine shall not exceed more than 25 kmph and flasher light shall be kept "ON".

(5) ***Working in Group***

(a) When more than one machine is required to work within the same block section, these machines may be allowed to move into the block section in a group under one authority as detailed in this chapter. In such situation all the track machines must leave and enter the section simultaneously one after another keeping adequate distance among them and with proper authority as detailed further in the following paras.

(b) Total number of the machines shall be clearly mentioned in the line clear/block authority message with exchange of private numbers. For