



भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011
EPBX (0522) 2451200
Fax (0522) 2458500

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



AMENDMENT No. 2 To PROVISIONAL SPEED CERTIFICATE

No.	TM/HM/11/57/RGM 96	Date	As Signed
-----	--------------------	------	-----------

(A) महाप्रबन्धक (इंजीनियरिंग),

1. मध्य रेलवे, छत्रपति शिवाजी 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, मालीगौव, 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 तट रेलवे, रेलवे कॉम्प्लेक्स, 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 लि0 पाँचवा तल, प्रगति मैदान मेट्रो स्टेशन बिल्डिंग कॉम्प्लेक्स नई दिल्ली-110 001

Sub:	Amendment No.2 to Provisional Speed Certificate of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" supplied by M/s Loram, USA.
------	---

Ref:	i) Provisional Speed certificate no. TM/HM/11/57/RGM 96 dated 14.02.2023. ii) CCRS letter No. Q.12011/12/2023-24- त.वि. dated 16.11.2023.
------	--

Provisional Speed Certificate of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" supplied by M/s Loram, USA had been issued vide reference above (i). Vide letter referred (ii) above, CCRS has raised the observation regarding speed of machine and suggested to amend the Para 3.4.1 & 3.6.2 in the speed certificate. The proposal has been examined and decided to issue an Amendment No. 2 with following modifications to Provisional Speed Certificate.

- i) The maximum permissible speed of Rail Grinding Machine (RGM-96 Stone) is 60kmph instead of 65kmph wherever mentioned in the Provisional Speed Certificate.

ii) Para 3.4.1 & 3.6.2 is amended as follows:-

3.4.1	Before initiating the operations of the Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" supplied by M/s Loram, USA, 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.
3.6.2	The profile of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" supplied by M/s Loram, USA infringes clause 9 of Chapter IV (A) of Indian Railways Schedule of Dimensions (BG) Revised, 2004. Railway Board has condoned these infringements vide their letter No. 2022/CEDO/SD/RS/02 dated 19.02.2022. However, the profile of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" supplied by M/s Loram, USA does not infringe any clause of Chapter IV (D) of Indian Railways Schedule of Dimensions (BG) Revised, 2022.

ENCLOSURES:/ संलग्नक:

i)	CCRS letter No. Q.12011/12/2023-24- त.वि. dated 16.11.2023
----	--

Digitally Signed by Nitin

Mehrotra

Date: 28-11-2023 17:21:38

Reason: Approved

(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 दूरसंचार)
 - 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, मालीगौव, 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 कॉम्प्लेक्स, 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. सी.जी.एम (यांत्रिक / विद्युत / इंजी / यातायात / संकेत एवं दूर संचार) डेडीकेटेड फ़ेट कोरीडोर कॉर्पोरेशन ऑफ़ इण्डिया लि० नई दिल्ली-110001.

ENCLOSURES: / संलग्नक:

i)

CCRS letter No. Q.12011/12/2023-24- त.वि. dated 16.11.2023.

(Signed)

(नितिन मेहरोत्रा)

कार्यकारी निदेशक मानक / चालन शक्ति



नागर विमानन मंत्रालय
(रेल संरक्षा आयोग)

GOVERNMENT OF INDIA
MINISTRY OF CIVIL AVIATION
(COMMISSION OF RAILWAY SAFETY)

फैक्स / Fax-0522-2233095, 2233087
E-mail : chiefcom@rediffmail.com
N.E.Rly. 31-140, N.Rly. 23-290

पूर्वोत्तर रेलवे, मं.रे.प्र. कार्यालय परिसर
16, अशोक मार्ग, लखनऊ-226001

N.E. Railway, DRM OFFICE CAMPUS
16, Ashok Marg, Lucknow-226 001

संख्या-Q.12011/12/2023-24-त.वि.

दिनांक-16.11.2023

सेवा में,
महानिदेशक
अनुसंधान, अभिकल्प एवं मानक संगठन,
मानक नगर, लखनऊ।

Sub: Introduction of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder (Transportation code RGMRG196) supplied by M/s Loram, USA upto maximum speed of 65 kmph when running on its own power as well as when running in train formation over Indian Railways and over routes of Eastern & Western Dedicated Freight Corridors of DFCCIL.

Ref.: (i) RDSO's letter No. TM/HM/11/57/RGM96, dt. 17.10.2023
(ii) RDSO's Provisional Speed Certificate no. TM/HM/11/57/RGM96, dt. 14.02.2023 and its Amendment no. 1 dt.20.09.2023

Vide Ref. (i), DG/RDSO has approached this office for recommending sanction of Central Government for introduction of subject rolling stock up to a maximum speed of 65 kmph when running on its own power as well as when running in train formation over Indian Railways and over routes of Eastern & Western Dedicated Freight Corridors of DFCCIL on the basis of PSC under Ref (ii).

Statutory inspection of the subject rolling stock was carried out by CCRS on 06/11/2023 at Safdarjung Railway Station, Northern Railway, New Delhi. CCRS in his Inspection Report has mentioned few measures which require action to be taken by RDSO/Board/Zonal Railway prior to introduction of the proposed rolling stock. Copy of CCRS Inspection Report is enclosed.

In view of the above, RDSO is requested to furnish **comments/clarifications/proposed action on Para 2 and 3 of the Inspection Report** for further processing of the case at this end.

DA: as above

Ahmad
Nadeem
Siddiqui

Digitally signed
by Ahmad
Nadeem Siddiqui
Date: 2023.11.16
10:14:49 +05'30'

अहमद नदीम सिद्दीकी
उप रेल संरक्षा आयुक्त (यांत्रिक)
कृते मुख्य रेल संरक्षा आयुक्त



भारत सरकार
नागर विमानन मंत्रालय
(रेल संरक्षा आयोग)

GOVERNMENT OF INDIA
MINISTRY OF CIVIL AVIATION
(COMMISSION OF RAILWAY SAFETY)



मुख्य रेल संरक्षा आयुक्त कार्यालय,
पूर्वोत्तर रेलवे, मं. रे. प्र. कार्यालय परिसर,
16 -अशोक मार्ग, लखनऊ - 226001

O/o Chief Commissioner of Railway Safety
N.E Railway, DRM Office Campus,
16- Ashok Marg, Lucknow - 226001



Inspection Report of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" conducted on 06/11/2023 at Delhi Safdarjung Station, Northern Railway

1. RDSO vide letter no.TM/HM/11/57/RGM 96 dt. 17.10.2023 has submitted a proposal for operation of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder", supplied by M/s LORAM, USA, upto a maximum speed of 65 Kmph in both cases i.e. when running with own power and in a train formation as dead vehicle, by Zonal Railways and DFCCIL. This application has been submitted based on RDSO's Provisional Speed certificate (PSC) no. TM/HM/11/57/RGM 96 dt. 14.02.2023 and its Amendment No. 1 dt. 20.09.2023.

I inspected the rolling stock stationed at Safdarjung Railway Station, Northern Railway, New Delhi on 06/11/2023. Dy.CRS/Mechanical/LKO, CE/TMC/NR, ED/TM/RDSO, Director/TM-VI/RDSO & other officials of RDSO and Zonal Railway accompanied me during the inspection.

Based on the inspection of rolling stock and the documents submitted by the RDSO, the subject rolling stock is recommended for sanction of Central Govt. subject to compliance of the conditions as mentioned in Para 2 & 3 below:

2. Measures to be taken before introduction of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder":

- a. Dead man's handle /vigilance control device similar to what is available in MEMU/EMU & locomotive should be provided in both control cars.
- b. A DG set has been provided in camp coach for power backup during camping of machine staff. Fire safety measures such as Fire Detection Cum Suppression system as provided in LHB Pantry Car & Power Car should be provided
- c. Fire safety measures such as Fire Detection System as provided in LHB AC coaches should also be provided in the camp coaches
- d. Camera with recording facility has been provided in Front Control Car. Video recording was checked during inspection and it was found that video was highly zoomed-in. Also the recorded volume was low and not clear. In view of that camera may be refocused suitably and volume level may be increased.
- e. Railway Board should issue suitable guidelines regarding training to be imparted to the operator (private person) & the qualification of the Railway staff accompanying the machine for calling out the signals & rendering other assistance during operation & movement of the machine.
- f. All the requisite items to be used in case of accident or other emergency like detonators, scotch block etc. as prescribed in various Codes & Manuals shall be kept in the driving cab of the machine.
- g. The sun shed visor provided over the lookout glass of accompanying Railway Staff is so placed that it hampers the signal view. It may be suitably replaced to provide a clear view of the signal.
- h. Utility electronic items like refrigerator, washing machine were kept in DG set room. These items should be placed at any other suitable location

Signature

- i. First Aid kit has been provided with machine. The contents of the first aid may be approved by a Railway Doctor.
- j. It shall be ensured that staffs working with machine wear protective gear such as Helmets, goggles. Reflective jackets, mask, industrial shoes etc. during operations of Track Machines
- k. Any inflammable material shall not be permitted on the machine. Also, movement of any train with inflammable material shall not be permitted on the adjacent line where grinding work is being carried out.
- l. Proper facilities for diesel and water filling at machine sidings shall be made available.
- m. Maintenance manual of RGM, wagon (water tank), camp coaches supplied by OEM shall be reviewed & approved by RDSO and thereafter issued to the maintenance staff.
- n. Track machine operators must also be properly trained in the operation of Grinding Machine before issue of "Competency Certificate" and record of training imparted to them be kept.
- o. RDSO has proposed operation of proposed rolling stock upto a maximum speed of 65 kmph when running with own power and in a train formation as dead vehicle on the basis of Provisional Speed Certificate. As per latest issued Policy Circular-6, operation of track machines can only be permitted upto a maximum speed of 60 kmph only. In view of this, relevant Para of the Provisional Speed Certificate may be suitably amended.
- p. With reference to Para 3.4.1 of the Provisional Speed Certificate dt. 14.02.2023, it may be confirmed that maintenance of the machine shall be done by the Mechanical Department of DFCCIL. Otherwise, Para may be suitably amended.
- q. As per Para 3.6.2 of the Provisional Speed Certificate dt. 14.02.2023, Railway Board has condoned infringement of Clause 9 of IRSOD 2004. This Para may be amended in reference to latest issued IRSOD (Revised) 2022.

3. Measures for future improvement of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder":

- a. There is no PA system for communication between Front Control Car and Rear Control Car. PA system to be provided for effective communication between operators in both the Control Cars
- b. Driver's cab camera with recording facility & voice logger as provided in Front Control Car may also be provided in Rear Control Car.
- c. As the production of ICF coaches has been discontinued and the spares for maintenance of ICF coaches may not be readily available in future, the camp coaches in future machines may be of LHB make
- d. Signal exchange light (signal flashing scheme) similar to Vande Bharat for exchanging signal may be provided in the proposed rolling stock.
- e. Oscillation Trial of the track Machine may be conducted & Final Speed Certificate (FSC) issued to utilize its full speed potential.
- f. Console provided for ALP in the Front Control Car may be redesigned for easy & quick approach to Emergency Brakes & horns button.

4. Details of Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder":

- a. Rail Grinding is done to re-profile the railhead taking into consideration the profile of the wheel for optimisation of the rail wheel contact band and thereby making rail wheel interaction favourable. This is expected to increase the life of the rail and the wheel, apart from reducing the rate of generation of defects in the rails.
- b. Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" and camp coaches are manufactured at BEML, Bangalore and supplied by M/s. LORAM, USA



as per M/s. LORAM, USA's GA Drawing No. 248516 REV B. It is a self-propelled Rail Grinding machine and is used for grinding of track. Rail Grinding Machine consists of one Control Car, four Grind Cars, one Water Tank Wagon and two Camp Coaches. The consist of Rail Grinding Machine has been shown in the M/s. LORAM, USA's GA Drawing No. 248516 REV B.

It is having maximum axle load 21.40 t, 21.16 t, 20.32 t and 16.25 t for Control Car, Grind Cars, Water Tank Wagon and Camp Coaches respectively. The wheel diameters of Control Car, Grind Cars, Water Tank Wagon and Camp Coaches are 920mm, 1000mm, 1000mm and 915mm respectively. The bogie suspension arrangement is as per following drgs:

(i)	Control Car	:	M/s Ganz Drg No. 1977-1000-100
(ii)	Grind Car	:	RDSO Drg. No WD-04078-S/1
(iii)	Water Tank Wagon	:	RDSO Drg. No. WD-04038-S/2
(iv)	Camp Coaches	:	M/s. BEML Drg. No 812-80011ALT.2

The design speed of machine is 80 kmph when running on its own power and 100 kmph when running in train formation as last vehicle and as a dead vehicle.

RGM is capable of following Rail Grinding operations:

- Plain track,
- Tracks in tunnels,
- Track on bridges with or without guard rails (without removing guard rails),
- Track on platform lines,
- Curves (without check rails).

c. **Front Control Car (FCC)**- The Front Control Car is the leading end of the machine when moving forward. Grind Car-I is connected to the rear of the control car. This car provides the tractive effort to move the machine. FCC comprises of following systems –

- The grinding and driving controls
- Electrical traction system
- Rail profile measurement system
- Air compressor system
- Water storage tanks (Belly tank- 15000 litres & Above deck- 5000 litres)
- Two water cannons
- PLC Unit
- Cameras provided for front track visibility.

d. **Grind Car**- The rail grinder is composed of four grind cars referred to as Grind Car 1, Grind Car 2, Grind Car 3 & Grind Car 4. Each grind car has a workroom, 12 stone grind buggies and Engine Generator with a fuel tank, hydraulic pump that supplies power to the grind buggies and grind modules, and dust collection system. The workroom is located on the front of the Grind Car and the dust collector is located at the rear of the Grind Car. Each Grind Car has a Cummins QST 30 diesel engine that drives a 900kW generator. A water spraying assembly (Tie & Ditch Spray) provided in the front of Grind Car (GC)-1 front & rear side of Grind Car (GC)-4.

e. **Water Wagon**- The water car provides most of the water storage for this machine. The water car is the sixth car in the machine consist; it is located between grind car 4 and the camp car2. The water car contains a water tank, water pump. The water tank can be filled with a maximum of 55000Ltr of water.



- f. **Camp Coach-** The Camp Coach & Camp car with rear controls in Rail Grinding Machine (RGM-96 Stone) consist have been manufactured as per M/s BEML'S Drawing Nos. SK.No.4497 ALT.1 & SK.No.4498 ALT.1 and the bogie Suspension Argt. Drg. No. as per M/s BEML'S 812-80001ALT.2; 812-80011ALT.2 respectively. The maximum axle load, wheel base and wheel diameter of camp coach; camp car with rear control are 16.25 t, 2896 mm and 915mm respectively. The design speed of Camp Coach is 105kmph when running in train formation as a dead vehicle.

There are two camp cars in the machine. They contain a kitchen, dining room, lavatories, sleeping quarters and a control room. Camp coach-1 also consists of Rear Control Cabin having travel console for travelling, cameras and monitors for rear view and (Rail Profile Measurement System) RPMS system.

g. Safety features and other Items:

- a. **Heat detection system:** A Heat Sensor (Linear Heat Detector) is installed in the engine area of all Grind Cars (GC). In case of detection of excessive heat, a yellow caution message appears at the bottom of the HMI Screen of operator's console.
- b. **Flame Detector Sensor-** An Ultrasonic and infrared fire detection device is also installed for detection of flames and abnormal temperature surge. If possible flames are detected; a yellow caution message banner appears at the bottom of the HMI screen. If a fire is detected, a blinking red Urgent message banner appears at the bottom of the HMI screen.
- c. **RTD (Resistance Temperature Detector) sensors** are provided in buggies, which continuously detect the temperature (during grinding). Whenever, temperature rises more than the set value, it gives alarm on the HMI screen.
- d. **Train Alert Buttons:** A train alert warns personnel of an approaching train. The Train Alert warning buttons activate the train alert warning system when pressed. The train alert siren and strobe lights are activated for 05 seconds after that they automatically shut down.
- e. **Emergency Stop (E-Stop):** The Machine E-Stop button is hard-wired to electronic components. When the button is pressed, an electronic interlock is generated to bypass the system's software and apply the emergency brakes; raise the grind modules; and shut down the engines, traction system, and electrical power (except backup power to the lights, Train Alert, and radios)
03 nos. of Machine E-Stop buttons have been provided in RGM. 01 in Rear Control Car 02 are in Front Control Car.
- f. **Engine Emergency Stop:** This button is available locally on the Engine controller panel of all Grind Cars, it stops the engine in case of emergency.
- g. **Traction system shutdown button:** It is available locally on the Traction system control panel in the FCC. It can be used to cut off the traction so that the machine cannot be moved during maintenance.
- h. **Grinding system lift/stop:** This button is present in the operator left console and can be used to lift the grinding system in case of emergency.
- i. **Emergency stop button on Air Compressor:** This button is present on the T1 microprocessor controller of the air compressor for emergency use.
- j. **Fire Extinguishers** – 23 nos. of Fire Extinguishers (02/04 kg capacity) of DCP type are available at different locations of the proposed machine RGI-96 to deal with any accidental fire condition.
- k. **Cameras:**

Camera systems send video feeds to the video monitor in the control cab.

There are two types of cameras:

- Sequence cameras - display where the grind modules should sequence when the machine is grinding.
- Travel cameras - display machine movement when the machine is in Travel mode.
- l. **Exterior Cab Lights-** (a) High Beam Headlights (b) Marker Lights (c) Low Beam Headlight (d) Strobe Light
- m. **Hand Brakes-** one each in grind car water wagon & camp coach without control panel
- n. **Water Spray Assembly:** During course of grinding, sparks are generated. To suppress these sparks RGM is equipped with Tie Sprays, Ditch Sprays, Hose Reels and Water Canon System.
- o. **Radio and Walkie Talkie** – Machine is equipped with base station radios (VHF Sets) both in front car and camp car for communication with the crew staff. Also, 08 walkie talkies are provided for the staff during grinding and maintenance activities.

5. Dust Collection:

The dust collection system captures and filters out grind dust. The airflow through this system cools the grind motors. Grind dust is drawn up through vents in the underside of the frame and ducted to the dust collection filter system at the rear of the Grind Car. The dust falls into the dust hopper and is then discharged by the dust auger. The dust auger disposal direction is controlled from the HMI computer.

The filtered air is ducted and vented out to the top of the dust collector. Indirect venting of the filtered air reduces air velocity and noise level. Venting the hot grinding dust away from the grind buggies helps keep the grind buggy area at a moderate temperature. If the pressure differential between the dirty side of the dust filters and the clean side is higher than the predetermined set point, a timed purge system provides a momentary back pressure air pulse to dislodge compacted dust from the filters.

6. Stabling the machine at siding

During the stabling of the machine at the siding it is to be ensured that

- a. The lock pins are properly secured in place.
- b. All the panels, generator and tool boxes are locked and secured.
- c. The battery isolating switch to be switched off.
- d. The manual parking brake to be applied.
- e. Wheel Skids are placed under wheels and latched with rail using chain.

7. System to avoid Metallurgical damage in RGM:

RGM is equipped with an inbuilt mechanism to stop the grinding & lift the grinding stones/carriages when the operating speed falls below a certain minimum speed to avoid metallurgical damage due to heat accumulation.

8. Power and Propulsion System:

Prime Power 1350 BHP @ 1800 RPM-

04 nos. Engine (Each in 04 Grind Cars), Make: Cummins, Model-QST30G5NR2. Priming the 900KW generators in Synchronised power @ 480V 60 Hz.

Standby Power (For overload @ 2 hours in a day) 1490 BHP @ 1800 RPM

9. Electrical Protection Equipment –

a. **Circuit Breakers-** Following circuit breakers are installed in the machine -

- i. Generator Main Circuit in each car
- ii. Grind Car Main Distribution Circuit
- iii. Traction Main Circuit
- iv. All the CB connected to bus bar



- b. **Motor Protector (MPCB)**- It is used with a 3-phase supply, 480V Motors for its protection. It is a combination of Circuit Breakers and Overload Protection.
- c. **Fuses** - A Fuse of specific current rating, is used to protect particular components from overload and short circuits.
- d. **Disconnect Switch** - Disconnect switches are available with electrical components to On or Off Electrical Power when required.
- e. **Chassis Ground**- The mainframe of machine to bogie is provided with earthing/ground cables. All the electrical lockers/boxes are grounded.
- f. **SFC (Static Frequency Converter)** - Components particularly in Camp Cars are made to operate with 50Hz frequency so SFC is used to provide them AC Electrical supply of appropriate frequency.

10. Brake System:

Proposed rolling stock is equipped Air Brake arrangement (Twin Pipe braking system), which comprises of following-

- a. **Indirect Brake**- This brake is applied on machine with coupled camping coach/wagon automatically when air pressure of BP line releases through A9 valve or due to drop in air pressure due to leakage in the system.
- b. **Direct Brake** - Direct Brake is applied when machine works individually.
- c. **Emergency/Dump Brake** - This is applied directly on the each rolling stock of the machine in the case of emergency for immediate stopping.
- d. **Parking Brake** - Hand operated brake systems are provided on each of the grinding cars for stabling.

11.Suspension System - The suspension consists mainly of a normal spring damper system which supports the structural suspension of the carriage and entire machine. These damper systems are present in every bogie existing between the axle box and the bogie. There are different types of bogies in the machine:

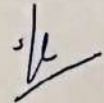
- a. **Suspension in Ganz bogie** - The machine is provided with two Ganz bogie which contains the primary and secondary suspension system. It is fitted in the Control Car of the machine.
- b. **Suspension in CASNUB Bogie**- The machine is provided with idler Casnub bogie which has a primary and secondary suspension system to absorb the jerks and vibrations of the track. It is fitted in GC-1 to GC-4 and in Water Car.
- c. **Suspension in ICF Bogie** - The machine is provided with idler ICF bogie in both camp cars for providing comfort ride to the on-board staff.

12. Block Working:

To analyse the rail wear, lost area and GQI for 96 Stone Rail Grinding Machine, the qualitative assessment of proposed machine was done on tangent track between DSJ-LPNR section on DN line between km 6/350 to 4/0. 02 observations were recorded pre and post separately (1 on left and 1 on right) and the grinder was operated at a speed of 23 kmph on a normal and sustainable basis on a 60 Kg (90 UTS) rail section, patterns used were 1-1 on Left and Right rail. It was observed that the profile of the ground rail section is not deformed after the metal removal test. Average GQI value of 98 was achieved which is considered satisfactory. Detailed Test Report is attached as Annexure-A.

13. Maintenance:

Maintenance of the machine shall be ensured by the OEM as per their manual.



14. Number of operators and allied staff for the machine:

Minimum 12 staff including 3 supervisors at a time. The machine shall be operated by OEM's staff and there will be one competent Railway staff to call out signal and perform other function.

15. Sample check of Dimensions:

I. The following sample dimensions were checked in Rolling Stock:

SN	Test Parameter	RS type	Value (in mm) as per Drawing	Measured Value (mm)
1	Maximum Vehicle Length	Control Car	19304	19315
		Grind Car	19304	19310
		Water Tank Wagon	11491	11495
		Camp Coach	21337	21330
2	Maximum Vehicle Width	Control Car	3022	3020
		Grind Car	3153	3160
		Water Tank Wagon	3191	3155
		Camp Coach	3245	3240
3	Distance between bogie centres	Control Car	13106	13200
		Grind Car	13106	13160
		Water Tank Wagon	8391	8370
		Camp Coach	14783	14800
4	Floor Height	Control Car	1629	1620
		Grind Car	1672	1620
		Water Tank Wagon	-	-
		Camp Coach	1282	1307
5	Min. clearance from rail level	Control Car	-	166
		Grind Car	-	160
		Water Tank Wagon	-	260
		Camp Coach	-	250
6	Height Of Coupler/Buffer Above Rail Level	Control Car	1031/1024	1050
		Grind Car	1065/1056	1020
		Water Tank Wagon	1105	1089
		Camp Coach	1085	1100
7	Bogie Wheel Base	Control Car	2500	2500
		Grind Car	2000	2060
		Water Tank Wagon	2000	2030
		Camp Coach	2896	2900

*All measurements were taken on track with tapes; in some cases, there may be slight variation due to accuracy of tape, levelling of track, undulation of body of the rolling stock and access to locations.

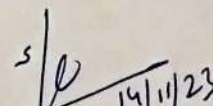
All measurements were found within limits.

II. MMD infringement:

The Rail Grinding Machine (RGM-96 Stone), Model "RGI Series 96 Stone Rail Grinder" supplied by M/s LORAM, USA infringes Clause-9, Chapter-IV(A), Schedule-I of Indian Railway Schedule of Dimensions (B.G.), Revised-2004- floor height of Control Car is 1636mm instead of 1345mm (infringement by 291mm) and floor height of Grind Cars is 1681mm instead of 1345mm (infringement by 336mm) which has been condoned by Railway Board vide letter No.2022/CEDO/SD/RS/02 dated 19.02.2022.

Some of the photographs taken during above inspection are enclosed at **Annexure-B**.

DA: as above


 (Janak Kumar Garg)
 Chief Commissioner of Railway Safety