

GOVERNMENT OF INDIA - MINISTRY OF RAILWAYS
RESEARCH DESIGNS & STANDARD ORGANISATION
Manak Nagar, LUCKNOW-226011

No. TM/HM/11 6-KBC-600

Dated: 20-07-1998

The General Manager (Engg./Works),

- i) Central Railway, CST-Mumbai-400 001.
- ii) Eastern Railway, Fairlie Place, Calcutta-700 001.
- iii) Northern Railway, Baroda House, New Delhi-110 001.
- iv) North Eastern Railway, Gorakhpur-273 001.
- v) Northeast Frontier Railway, Maligaon, Guwahati-781 011.
- vi) Southern Railway, Park Town, Chennai-600 003.
- vii) South Central Railway, Rail Nilayam, Secunderabad-500 371.
- viii) South Eastern Railway, Garden Reach, Calcutta-700 043.
- ix) Western Railway, Churchgate, Mumbai-400 020.
- x) South Western Railway, Bangalore-560 002.
- xi) North Central Railway, Allahabad-211 001.
- xii) North West Railway, Jaipur-302 001.
- xiii) East Coast Railway, Bhubaneswar-751 001.
- xiv) East Central Railway, Hazipur-844 101.
- xv) West Central Railway, Jabalpur-482 001.

Sub: Provisional Speed Certificate for Ballast Cleaning
Machine KBC-600 (KERSHAW).

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1.0 Ballast Cleaning Machine (KERSHAW-KBC-600) is an on-track machine designed to excavate and screen the caked up ballast, throw away the ballast muck and put the clean ballast back into the track. The excavator wheels and cutting chain are one of the most important features of this machine. These excavate the ballast and the excavated ballast is then led to the vibratory screen with the help of conveyors. The cleaned ballast from there is put back in to the track. The spoils muck are discharged on the either side of the track by the waste conveyor. The machine travels on its own power. Alternatively, it can also be attached as last vehicle in the train formation.

2.0 Based upon design features of M/s KERSHAW (USA), KBC-600 Ballast Cleaning Machine (as per diagram no. TM/ 9708) with maximum axle load of 20 t may be permitted provisionally to run at maximum speed of 40 kmph when running on its own power and 30 kmph when running in train formation as a dead vehicle, subject to the following conditions:-

3.0 TRACK

3.1 The track shall be to a minimum standard of 90R rails on sleepers laid to M-4 density and ballast cushion of 200mm. which may consist of atleast 75 mm clean and the rest in caked up conditions on compacted and stable formation.

3.2 For track of lower standard than that mentioned above, the Chief Engineer concerned shall decide the maximum permissible speed. When the Chief Engineer considers that the road bed is not compacted or there is improper damage, he may suitably restrict the maximum permissible speed depending on the local conditions. In this connection, Rly.Bd's letter no.65 WDO/SR 26 dated 19-20-10-1966 may be seen.

3.3 The maximum permissible speed on curves shall be decided on the basis of existing provisions of the Indian Railways Permanent Way Manual 1986.

3.4 Maximum speed on Points and Crossings shall be restricted to 10 kmph as per para 1227 of the Indian Railways Permanent Way Manual 1986.

4.0 BRIDGES

4.1 For clearance in regard to bridges, refer to standard design of girders, slabs, pipes, culverts, piers and abutments etc. issued by RDSO for BGML, RBG and MBG 1987 standard loading.

4.2 All other designs of superstructure and sub-structure are to be examined under the directions of Chief Engineer concerned and certified by him in terms of current IRS Bridge Rules, Steel Bridge Code, Bridge Sub-structure and Foundation Code etc. read with up-to-date correction slips.

5.0 GENERAL

5.1 All the permanent and temporary speed restrictions in force and those imposed from time to time due to track, bridges, curves, signalling and interlocking etc. shall also be observed.

5.2 When the machine is being moved in either on its own power or hauled in a train, it shall be ensured that all the protruding parts are withdrawn and suitably locked.

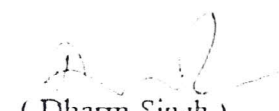
5.3 The design of machine infringes clause 22 of chapter IV (A) of BG Schedule of Dimensions 1929 as reprinted in 1973, as the maximum distance apart between any two adjacent axles is higher than 11890 mm. Care should be taken to ensure that the Points are not inadvertently operated below the wheels of this machine.

5.4 The design of the machine infringes clauses 2(ii), 17, 21(b) and 22 of chapter-IV (A) of BG- Schedule of Dimensions 1929 as reprinted in 1973 vide details as per Annexure-I. However, the profile of the Ballast Cleaning Machine (KBC-600) is within the normal profile of MMD(BG) 1973 of SOD. Necessary condonation is required to be obtained from the Rly Board for the above infringements by the concerned Railway before placing the machine on track.

5.5 The machine shall be last vehicle when running in train formation. Competent staff machine staff, who can apply the machine brakes in case of train parting, shall escort the machine while running in train formation.

5.6 The provisional speed certificate will be reviewed in the light of operating experience with these machines.

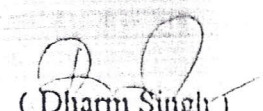
Encls: i) Annexures- LII & III
ii) One drawing no. TM/9708


(Dharm Singh)
c/c for Director General TM.

Copy to:

- i) The Secretary (Engg.), Rly Board, Rail Bhavan, New Delhi-110 001, for information.
- ii) The Secretary (Mech.), Rly Board, Rail Bhavan, New Delhi-110 001, for information.

Encls: i) Annexures- I, II & III
ii) One drawing no. TM/9708


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c/c for Director General TM.

ANNEXURE - 1

Details of Infringements to Schedule of Dimensions - 1929 as reprinted in 1973.

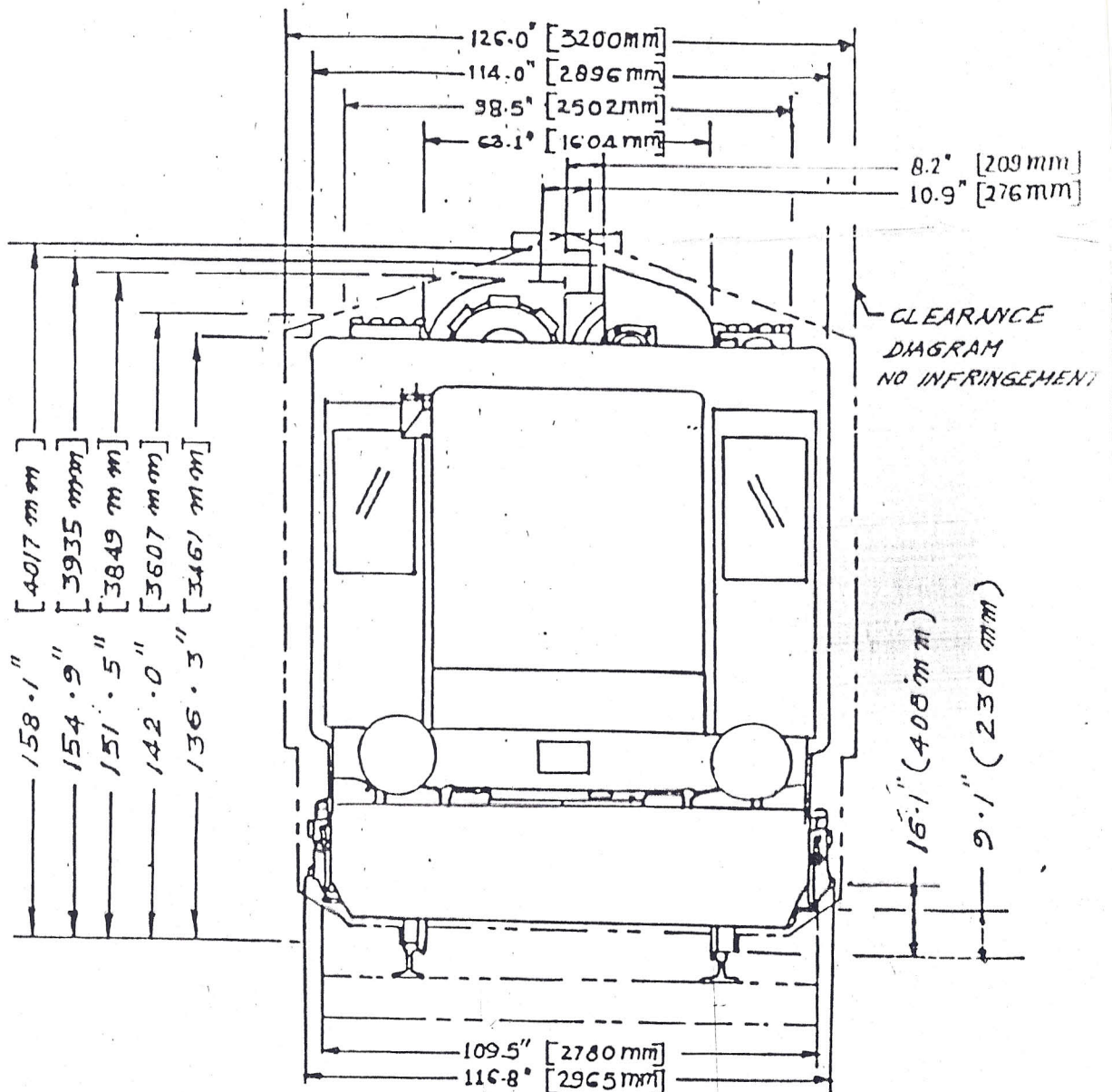
S. No.	Item of Chapter -IV(A) of SOD	Description	Dimension as per SOD	Actual Dimension in the machine	Remarks
1.	2(ii)	Minimum diameter of wheel tread measured at 63.5 mm from gauge face	914 mm	838.2 mm	The min. wheel dia is less in most of the track machines than that specified in item 2(ii) chapter IV(A) of Schedule of Dimensions - (1973). Railway Board have condoned such infringements in the past. The infringement may be condoned in this case also.
2.	17	Maximum distance apart of bogie centres.	14785 mm	15850mm	Calculations in Annexure-III may kindly be seen. Even with the increased bogie centres, there is no infringement on the curve, owing to less width of the machine at centre. So the infringement may be condoned.
3.	21 (b)	Maximum length over end buffers.	22300 mm	40120 mm	Remarks same as under item (2) above.
4	22	Maximum distance between adjacent axles.	11890 mm	13850 mm	A suitable provision has been made in the speed certificate under general clause 5.3. The infringement may be condoned.

Annexure-III

Calculation of Versine for the Ballast Cleaning Machine (KBC-600)

Degree of curve	=	10°	
Radius of curve	=	175 m	
Bogie centre	=	15860 mm	
Wheel Base	=	2000 mm	
Versine of centre	=	$\frac{15850 \times 15850}{8 \times 175000}$	= 179.5 mm
Versine at bogie	=	$\frac{2000 \times 2000}{8 \times 175000}$	= 2.86 mm
Total Versine	=	179.5 + 2.86	= 182.36 mm
Half width of the machine	=	$\frac{2965}{2}$	= 1482.25mm
Distance from centre line of the track to the side of machine	=	1482.25 + 182.36	= 1664.61 mm = 1665 mm
Maximum bogie c/c distance permitted as per schedule of dimensions (Page 42 of Chapter -IV of SOD, Item 17)			= 14785mm
Versine of the bogie	=	$\frac{14785 \times 14785}{8 \times 175000}$	= 156.14 mm
Versine at bogie	=	$\frac{1830 \times 1830}{8 \times 175000}$	= 156 mm = 2.39 mm
Width of the standard stock	is 3250 mm		
Half width of standard stock	=	$\frac{3250}{2}$	= 1625 mm
Distance from centre line of the track to end of the stock	=	1625 + 156.14 + 2.39	= 1783.53 mm say 1784 mm

Which is greater than 1665 mm.



SKETCH SHOWING SUPER IMPOSED PROFILE
OF BALLAST CLEANING MACHINE
(KBC-600) OF M/s KERSHAW.