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भारत सरकार - रेल मंत्रालय  
अनुसंधान अभिकल्प और मानक संगठन  
लखनऊ - 226 011

Government of India-Ministry of Railways  
Research Designs & Standards Organisation  
Lucknow - 226 011

No. SD.WAG9.11

Dated 25-10-2005

The General Manager (Engg.),

1. Central Railway, Chhatrapati Shivaji Terminus, Mumbai-400001.
2. Eastern Railway, Fairlie Place, Kolkata-700001.
3. Northern Railway, Baroda House, New Delhi-110001.
4. Southern Railway, Park Town, Chennai-600003.
5. South Central Railway, Rail Nilayam, Secunderabad-500071.
6. South Eastern Railway, Garden Reach, Kolkata-700043.
7. Western Railway, Churchgate, Mumbai-400020.
8. North Central Railway, Hasting Road, Allahabad-211001.
9. East Coast Railway, Chandrashekharpur, Bhubaneswar-751023
- 10..East Central Railway, Hajipur-844101.
11. South Western Railway, Hubli-580023.
12. West Central Railway, Jabalpur-482001.
13. South East Central Railway, Bilaspur-495004.

Sub: Speed Certificate for final maximum permissible speed of WAG9 class  
of electric locomotive.

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WAG-9 class of locomotives with Co-Co bogies are imported locomotives from M/s. Bombardier Transportation, Switzerland (earlier Adtranz, Switzerland). The outline of the WAG-9 locomotive is as per drawing no. SKEL-4357. The axle load of the locomotive is  $20.5 \pm 2\%$  t.

1.1 To establish the speed potential of the locomotive, detailed oscillation trials were conducted on Rourkela-Jharsuguda section of South Eastern Railway upto maximum test speed of 110 km/h. The trial results as contained in RDSO's Report No. MT-81 (April, 1997) indicate satisfactory riding characteristics of the WAG9 loco on the tangent track, station yard and upto a speed conforming to 75mm cant deficiency on curved track. Accordingly, speed certificate for operation of single or double headed WAG9 locomotive has been issued for operation upto a maximum speed of 100 km/h vide this office letter of even no. dated 28.5.1997.

1.2 In view of recent instructions issued by Railway Board vide letter no.2005/CE-I/BR-III/1 dated 7-6-2005 regarding dispersion of Braking forces on Bridges and provision of tractive effort limiting feature on WAG9 locomotive for double headed operation, the above mentioned speed certificate has been reviewed.

2. Based on the above and review by RDSO / Railway Board, it is certified that operation of single or double headed WAG-9 class of locomotives may be permitted up to a maximum speed of 100 km/h, subject to the following conditions:-

## 2.1 Track:

- 2.1.1 The track shall be to a minimum standard of 52 kg rails on sleepers to M+7 density and depth of ballast cushion below sleepers of 250 mm, which may consist of at least 100 mm clean and the rest in caked up condition, on compacted and stable formation.
- 2.1.2 For track maintained to lower standard than that mentioned above, the Chief Engineer concerned shall decide the lower maximum permissible speed on the basis of maintenance condition. In this connection, Railway Board's letter No. 65/WDO/SR/26 dt 19/20-10-1966 may be seen. When the Chief Engineer considers that road bed is not compacted or there is improper drainage, he may suitably restrict the maximum permissible speed depending upon the local conditions.
- 2.1.3 The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual-1986.

## 2.2 Bridges:

- 2.2.1 The clearance refers to bridges with standard design of girders, slabs, pipe culverts, piers and abutments etc. issued by RDSO for BGML, RBG & MBG-1987 standard loadings.
- 2.2.2 All other designs of superstructures and sub-structures are to be examined under the directions of the Principal Chief Engineer concerned and certified safe by him in terms of current IRS Bridge Rules, Steel Bridge Code, Concrete Bridge Code, Arch Bridge Code, Bridge Sub-structures and Foundation Code etc. read with upto-date correction slips.
- 2.2.3 For single headed operation with CC train load, track on bridges and approaches of BGML span of 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m, 19.4m and 25.6m (all effective) and RBG spans 1.0m, 1.5m, 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m and 6.9m (all effective) 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 Principal Chief Engineer concerned.
- 2.2.4 For double headed operation with CC train load, track on bridges and approaches of BGML span of 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m, 13.1m, 19.4m, 25.6m, 31.9m, 47.3m, 63.0m and 78.8m (all effective) and RBG spans 1.0m, 1.5m, 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m and 6.9m, 10.0m, 13.1m, 25.6m, 31.9m and 47.3m (all effective) 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 Principal Chief Engineer concerned.

- 2.2.5 Conditions for limiting tractive effort of coupled WAG9 locomotives to 60t on bridges:
- 2.2.5.1 The maximum tractive effort for the coupled WAG9 locomotives shall be limited to 60t (i.e. by activation of ZTEL switch provided on the driver's desk in the locomotives) while running over the bridges with BGML spans of 25.6m, 31.9m, 47.3m, 63.0m and 78.8m (all effective).
- 2.2.5.2 Location of bridge on which the tractive effort of WAG9 locomotives has to be restricted, shall be notified by the Railways and incorporated in the working timetable so that all operating staff is aware of the instructions.
- 2.2.5.3 Zonal Railways to certify adequacy of existing bridges for permitting rolling stock based on physical condition of bridges by keeping them under observation as considered necessary by the Principal Chief Engineer of Railway.
- 2.2.6 The substructures of bridges shall be kept under close observation, particularly in the following cases:
- 2.2.6.1 Bridges located in such section where the train may be applying brakes or may be starting such as approaches to stations, heavily graded sections etc.
- 2.2.6.2 Bridges with signs of distress.
- 2.2.6.3 Bridges with piers and abutments of strength lower than BGML/RBG. In general such bridges may be the bridges constructed prior to 1926.
- 2.2.6.4 Bridges with spans 25.6m, 31.9m, 47.3m, 63.0m and 78.8m (all effective) conforming to BGML standard should be kept under close watch during operation of coupled WAG9 locomotives for its condition monitoring by Zonal Railways. Zonal Railways should also ensure effective speed restrictions on other bridge spans as mentioned in the Speed Certificate.
- 2.2.7 The double-headed operation is not being permitted on BGML standard spans of 25.6m, 31.9m, 47.3m, 63.0m, and 78.8m (all effective) in general. However, as a temporary measure, till the guidelines issued vide RDSO's letter No. CBS/Golden/Q/Strength dated 30.12.2004 is followed, operation of double headed WAG9 locomotives be permitted, with above conditions.
- 2.3 Signalling:
- 2.3.1 Provision of GR, SR, SEM and all extant instructions issued from time to time shall be complied with.
- 2.3.2 On sections where EBD of more than 1 km is to be catered for, second distant signal or automatic signalling should be available failing which suitable speed restriction is to be imposed.
- 2.4 Traction Installation:
- 2.4.1 The OHE shall have swiveling type of cantilever having the tension in the conductors regulated automatically with a presag of 50/100 mm. This presag is on contact wire for span of 72 m, proportionately less for smaller spans.

- 2.4.2 In case of locations where porcelain section insulators are installed on main line and lie within first 1/10<sup>th</sup> and 1/3<sup>rd</sup> of span immediately after the OHE structure and the runners are in the trailing direction, the maximum speed shall be limited to 100 km/h. At all other locations where porcelain section insulators are installed, the speed shall be limited to 80 km/h.
- 2.4.3 The Chief Electrical Engineer may impose any temporary speed restrictions on the basis of his personal knowledge and experience of the OHE and the conditions prevailing on the particular section.
- 2.5 General:
- 2.5.1 In order to limit the tractive effort of WAG9 locomotive to 30t over bridges of BGML spans of 25.6m and above (60t for coupled WAG9), the driver shall operate the Tractive Effort limiting switch provided on the locomotives while approaching the bridges. This instruction along with details of all BGML span bridges over 25.6m should be indicated in the working time table of the Railway.
- 2.5.2 For BGML span 25.6m and above (all effective), if train gets stuck upon the bridges and require tractive effort of more than 30t in WAG9 locomotive (it means that the requirement of tractive effort is more than 60t in MU operation), the driver should ask for assisting engine for banking the train in rear. These instructions should be incorporated in the working time table so that all operating staff are aware of the instructions.
- 2.5.3 All the permanent and temporary speed restrictions in force and those that may be imposed from time to time due to track, bridges, curves, signalling and interlocking etc. shall be observed.
- 2.5.4 Manned level crossing gates shall be provided with telephone communication with the nearest station as per extant instructions.
- 2.5.5 Only those locomotives will be permitted to work as multiple units on BGML span of 25.6m and above in which tractive effort limiting switch ZTEL, tractive effort meter and mechanism for recording activation of tractive effort limiting switches are fully functional. In case any of the features is not working on the locomotive, the locomotive will not be permitted to work in multiple units over such spans..
- 2.5.6 The pantograph of WAG9 locomotive in locked down condition and the surge arrestors infringe the Maximum Moving Dimensions of 1929 over non-electrified sections. After removing pantograph pan assembly and two surge arrestors, the profile will infringe the Maximum Moving Dimensions of 1929 but will be within 'X' class loco profile. For movement of the loco in non-electrified territory, pantograph pan assembly and two surge arrestors shall be removed and the movement of the loco shall be cleared by the Railway concerned as per the extant rules applicable. In non-electrified sections where Maximum Moving Dimensions of existing 'X' class locos are not permissible, the movement shall be in accordance with the instructions issued by the Railway Board and other additional instructions issued by the Zonal Railways for the movement of ODCs. Railway Board have condoned the infringements of WAG9 locomotive vide their letter no. 95/CEDO/SR/37 dtd. 13-01-1996.

- 3 This speed certificate supersedes the earlier speed certificate of even no. dated 28.5.1997.
- 4 This clearance is subject to the parameters as given in attached "Annexure".



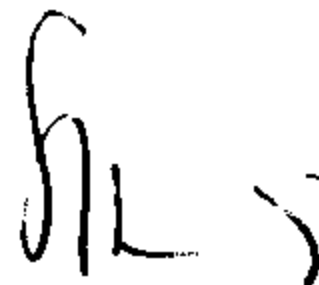
(S.K.Sinha)

Encl: Annexure

Executive Director Standards /Motive Power

Copy to:

- a) Secretary (Elect./Engg.(G)), Railway Board, Rail Bhawan, New Delhi-110001.
- b) The General Manager (Elect. Optg.)
1. Central Railway, Chhatrapati Shivaji Terminus, Mumbai-400001.
  2. Eastern Railway, Fairlie Place, Kolkata-700001.
  3. Northern Railway, Baroda House, New Delhi-110001.
  4. Southern Railway, Park Town, Chennai-600003.
  5. South Central Railway, Rail Nilayam, Secunderabad-500071.
  6. South Eastern Railway, Garden Reach, Kolkata-700043.
  7. Western Railway, Churchgate, Mumbai-400020.
  8. East Coast Railway, Chandrashekharapur, Bhubaneswar-751023
  9. North Central Railway, Hasting Road, Allahabad-211001.
  10. East Central Railway, Hajipur-844101.
  11. South Western Railway, Hubli-580023.
  12. West Central Railway, Jabalpur – 482001.
  13. South East Central Railway, Bilaspur – 495004.
- c) General Manager (Elect.), Chittaranjan Locomotive Works, Chittaranjan-713331.



(S.K.Sinha)

Encl: Annexure

Executive Director Standards /Motive Power

This clearance is subject to the following parameters of WAG9 locomotives:

1. For running of single WAG9 locomotive:

- i) Maximum Axle load = 20.5 + 2 %t
- ii) Maximum Tractive Effort = 46.9t
- iii) Maximum Braking force at rail level = 26.5t

2. For running of coupled WAG9 locomotives:

- i) Maximum Axle load = 20.5 + 2 %t
- ii) Maximum limiting tractive Effort on BGML spans = 30.0t per loco  
25.6m, 31.9m, 47.3m, 63.0m and 78.8m (all effective)
- iii) Maximum Braking force at rail level = 26.5t per loco

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