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No. MC/LHB/COACH

Date: 31.03.2016

महाप्रबन्धक (इंजीनियरिंग),
उत्तर मध्य रेलवे, हास्टिंग रोड, इलाहाबाद - 211 001.

Sub: Speed Certificate for operation of Rajdhani Express and similar trains comprising maximum 21 numbers of LHB AC (EOG) variant coaches including two LHB AC Generator Vans hauled by single WAP5 Locomotive on Palwal (PWL) - Agra Cantt. (AGC) section at a maximum speed of 130 kmph, Agra Cantt. (AGC) - Lalitpur (LAR) section at a maximum speed of 130 kmph and on Lalitpur (LAR) - Bina (BINA) section at a maximum speed of 120 kmph of North Central Railway on track maintained to C&M-I (Vol.-I) standard.

Ref: North Central Railway letter no. Mech/751/Pt-XXIII/LHB dated 22.02.2016.

- 1.0 Indian Railways had signed a contract with M/s LHB Germany for supply of 24 nos. all metal lightweight high-speed BG AC coaches along with transfer of technology. These LHB coaches are fitted with CBC and FIAT bogies to 16.25 t axle load capacity with disc brake arrangement. These coaches have been designed with overall dimension to RDSO Sketch.96077 to operate up to a maximum speed of 160 kmph.
- 1.1 LHB AC EOG Chair car has undergone detailed oscillation trials up to test speed of 180 kmph on Palwal-Mathura section of Northern Railway & North-Central Railway on track maintained to C&M-I, Vol.-I standard. The test results of trials as contained in RDSO Report no. MT-240, exhibit satisfactory riding and stability behavior, upto test speed of 180 kmph on track maintained to C&M-I, Vol.-I standard. The LHB AC Generator Van has undergone detailed oscillation trials up to test speed of 145 kmph on Palwal-Mathura section of Northern Railway & North-Central Railway and from 145 kmph upto 180 kmph on Ghaziabad-Tundla section of North-Central Railway on track maintained to C&M-I, Vol.-I standard. The test results of trials as contained in RDSO Report no. MT-274 and MT-282 respectively. The test results of these trials exhibit satisfactory riding and stability behavior, upto test speed of 180 kmph on track maintained to C&M-I, Vol.-I standard. Based on the results, a speed certificate for regular operation of LHB AC chair cars and LHB AC Generator Vans at a maximum speed of 160 km/h on track maintained to C&M-I Vol.-I standard have been issued vide RDSO's letter no. MC/LHB/Coach dated 19.3.2003 followed by partial amendment dated 27.2.2004 and amendments dated 18.11.2014 & 20.12.2014 for LHB AC (EOG) Chair Car and RDSO letter no. MC/LHB/COACH dated 20.3.2003 followed by partial amendment dated 27.2.2004 and amendments dated 18.11.2014, 20.12.2014 & corrigendum no. 01 dated 08.01.2015 to Amendment no.02 for LHB Generator Van.

The revised final speed certificate for operation of BG EOG type LHB AC Chair Car & LHB AC Generator Van fitted with FIAT bogies upto maximum speed of 160 kmph on track maintained to C&M-I Volume-I standard, has also been issued vide RDSO's letter nos. MC/LHB/Coach dated 08.04.2015 after incorporating concerned amendments as desired by CRS Northern Circle.

- 1.2 RCF has built AC 2-Tier (LWACCW), AC First Class (LWFAC), AC First cum AC-2 Tier (LWFCWAC), AC Hot Buffet Car (LWCBAC), BG LHB AC EOG variant Broad Gauge coaches confirming to RDSO's drawing no. 96077 fitted with Fiat bogies. These Coaches have been built to the state of art technology and provided with disc brakes and CBC. CCRS was approached for granting dispensation for conduct of trials on the basis of similar

suspension design and other parameter of above said coaches, being comparable to LHB EOG AC Chair cars, which had exhibited satisfactory riding up to maximum test speed of 180 kmph in accordance with report no MT-240 for track maintained to C&M-I, Vol.-I. Accordingly CCRS/Lucknow vide letter क्रू-17016/06/2013-14.त०वि० dated 05.03.2014, granted dispensation from conduct of oscillation trials for above said coaches. Based on above, the speed certificate for operation of AC 2-Tier (LWACCW), AC First Class (LWFAC), AC First cum AC-2 Tier (LWFCWAC), AC Hot Buffet Car (LWCBAC), BG LHB AC EOG variant Broad Gauge coaches has been issued up to maximum speed of 160 kmph on track maintained to C&M-I, Vol.-I standard vide letter no. MC/LHB/COACH dated 05.06.2014.

- 1.3 Coupler force and EBD trials of 18 numbers of LHB AC EOG coaches with single WAP5 Locomotive have been conducted on NDLS-CNB-NDLS section of Northern Railway and North Central Railway and the test results as contained in Report no. MT-283 (March 2001) are found within limit.
- 1.4 The Confirmatory Oscillograph Car Runs with LHB AC EOG coaches including AC generator van with WAP5 class of locomotive have been conducted on New Delhi-Agra Cantt section on high speed route of Northern railway and North Central Railway in both Up and Down directions upto a maximum speed of 150 kmph. The results are contained in RDSO's Report no. MT-496 (June 2004) and MT-573/F (March 2005) and found satisfactory.
- 1.5 The Confirmatory Oscillograph Car Runs of LHB AC EOG coaches hauled by single WAP5 Locomotive have been conducted on Agra Cantt. (AGC) – Bina (BINA) section high speed route of North Central Railway, in both up and down directions upto a max speed of 140 kmph. The test results as contained in RDSO's Report no. RDSO/2011/TG/MT-1127/F Rev.0 Amendment-Nil, dated 07.09.2011 exhibit satisfactory riding and stability behavior upto maximum speed of 140 kmph.
- 1.6 The WAP5 class of locomotives, with Bo-Bo bogies are imported from M/s. ABB, Switzerland and now are being manufactured by CLW. Outline of the locomotive is as per drawing no. SK.EL.4353. Detailed oscillation trials of WAP5 have been done at a maximum test speed of 180 km/h and results as contained in RDSO's Report No. MT-88 (June 1997) indicate satisfactory riding and stability behavior. Based on the test results of the trials, WAP5 class of locomotive has been cleared for operation at a maximum speed of 160 km/h on track maintained to standards laid down in Report No. C&M-I Vol.-I vide RDSO's letter No. SD.WAP5.11 dated 19.6.1997.
- 1.7 Track directorate vetted speed certificate based on RDSO's Report no. RDSO/2011/TG/MT-1127/F Rev.0 Amendment-Nil, dated 07.09.2011 upto maximum speed of 130 kmph on Agra Cantt. (AGC) – Lalitpur (LAR) section and upto the maximum speed of 120 kmph on Lalitpur (LAR)–Bina (BINA) section of North Central Railway vide their note no.CT/DHS/3/COACHES dated 06/2/2012.
2. Based on the above, it is certified that Rajdhani Express and similar trains hauled by single WAP5 class of locomotive having maximum 21 numbers of LHB AC (EOG) coaches including two LHB AC Generator Vans may be permitted to operate up to the maximum speed of 130 kmph on Palwal – AGC section, the maximum speed of 130 kmph on Agra Cantt. (AGC) – Lalitpur (LAR) section and upto the maximum speed of 120 kmph on Lalitpur (LAR)–Bina (BINA) section of North Central Railway respectively on track maintained to C&M-I (Vol.-I) standard, subject to the following conditions.

2.1 Track

- 2.1.1 The track shall be to a minimum standard of 52 kg rail (90UTS) rails on sleepers to M+7 density and depth of ballast cushion below the sleeper of 250 mm which may consist of at least 100 mm clean ballast and the rest in caked up condition, on compacted and stable formation & maintained to the standards as recommended in RDSO's Report no. C&M-I, Vol.-I.

- 2.1.2 The track maintenance shall be in accordance with the recommendations contained in RDSO Report no. C&M-I, Vol.-I. In this connection, the instruction for the maintenance of track on high-speed routes circulated to the Railways under RDSO's DO letter no. CRA/509 dated 07.7.1971 and approved by Railway Board vide their letters No. 71/W6/HS/8 dated 27.8.1971 and 71/W6/HS/1 dated 21.10.1971 shall also be followed.
- 2.1.3 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, Railway Board's letter No. 65/WDO/SR/26 dated 19/20.10.1966 may be seen. When the Chief Engineer considers that the roadbed is not compacted or there is improper drainage, he may suitably restrict the maximum permissible speed, depending upon the local conditions.
- 2.1.4 The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual second reprint 2004.
- 2.1.5 Wherever conditions warrant on account of corrosion on rail/weld collar, wear of rail, cupping in the welds etc. necessary precautions should be taken for fish plating/joggle fish plating of the rail/weld.
- 2.1.6 The welds shall be protected by joggled fish plates as per provisions of Para 6.4 and Para 8.14 of USFD Manual and Para 6.3 of AT welding manual and other policy instructions of Railway Board. Maintenance of rail & rail joints shall be ensured as per Para 250 & 251 of IRPWM. 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.
- 2.1.7 (i) Replacement of existing loose heel switches by fixed heel curved switches laid on PSC sleeper layout with CMS crossings with adequate arrangements for designed geometry of turnouts shall be ensured. Turnouts with TWS shall be preferred on such routes.
(ii) Preferably improved SEJ should be provided on such routes.
(iii) Improvement on track geometry parameters on the route of operation of the coaches/trains shall be carried out.
(iv) The curves shall have to be suitable realigned and proper transition length shall be provided.
(v) All level crossings shall be manned.
- 2.2 Bridges**
- 2.2.1 The clearance refers to bridges "Standard Spans" with standard design of girders, slabs, pipe culverts, piers and abutments, etc. issued by RDSO for BGML, RBG & MBG-1987 standard loadings. However, the bearings of span 76.2 meters (clear) designed for BGML standard loading as per RDSO's drg. no. BA-11154 should be strengthened by providing two additional anchor bolts.
- 2.2.2 Superstructures and bearings of "Special Spans" (designed and constructed by zonal railways based on site requirements) including all Arches and sub-structures of all bridges (all standard Spans & Special Spans) shall be examined under the directions of the Chief Bridge Engineer concern and certified safe by him in terms of current Indian Standard Codes with up to- date correction slips.
- 2.2.3 The above clauses have been arrived considering bridges are in physically sound condition. In case the bridges are not in satisfactory physical condition, necessary speed restriction to be imposed by concern Chief Bridge Engineer of Zonal Railway.
- 2.2.4 Location of bridges on which speed restrictions are imposed shall be notified by the Railways and incorporated in the working timetable.

2.2.5 This clearance is subject to the following parameters of locomotives and LHB AC EOG variant coaches:

(A) For Locomotives:

| S. No. | Description | WAP5 |
|--------|----------------------------------|-----------------------|
| 1. | Max. axle load | 19.5 ± 2%t |
| 2. | Max. tractive effort | 26.3 t |
| 3. | Max. braking force at rail level | 16.3 t |
| 4. | Max. CG height from rail level | Not exceeding 1830 mm |

(B) For LHB AC EOG Variant Coaches:

i) AC First Class Coach (LWFAC)

Maximum Axle Load : 16.25t
 Maximum Braking Force at Rail Level : 5.8t
 CG height above rail level : Not exceeding 1830 mm

ii) AC First cum AC-2 Tier (LWFCWAC)

Maximum Axle Load : 16.254t
 Maximum Braking Force at Rail Level : 5.8t
 CG height above rail level : Not exceeding 1830 mm

iii) AC 2-Tier Sleeper Coach (LWACCW)

Maximum Axle Load : 16.25t
 Maximum Braking Force at Rail Level : 5.8t
 CG height above rail level : Not exceeding 1830 mm

iv) AC 3-tier Sleeper coach (LWACCN)

Maximum Axle Load : 16.25t
 Maximum Braking Force at Rail Level : 5.8t
 CG height above rail level : Not exceeding 1830 mm

v) AC (EOG) Pantry Car (LWCBAC)

Maximum Axle Load : 16.25t
 Maximum Braking Force at Rail Level : 5.8t
 CG height above rail level : Not exceeding 1830 mm

vi) Generator van (LWLRRM)

Maximum Axle Load : 16.25t
 Maximum Braking Force at Rail Level : 6.62t
 CG height above rail level : Not exceeding 1830 mm.

2.2.6 Specific restrictions are applicable as mentioned in relevant speed certificates of hauling single/ multiple locomotives issued by RDSO.

2.3 Signaling

- 2.3.1 Provision of GR, SR, SEM and all extant instructions issued from time to time shall be complied with.
- 2.3.2 MACLS shall be provided with two distant signals or automatic signaling. If two distant signals are provided then first distant signal shall be located at a distance of 1 km in rear of the home signal and the second distant signal at a distance of 2 kms in rear of the home signal. This stipulation shall also be applicable to the IBS and interlocked gates located in the block section.
- 2.3.3 All manned level crossing gates shall be provided with telephone communication with the nearest station.
- 2.3.4 With a view to maintained safety, the last stop signal shall not be taken "OFF" at the station unless:
- 2.3.4.1 The sections upto the stations in advance is clear, and
- 2.3.4.2 At the station in advance, the route of the train is clear, correctly set and locked for reception of train.
- 2.3.5 Following provisions are mandatory.
- i) Electrical operation of points and means for locking both switches.
 - ii) Electrical means for lock detection and independent switch detection by the respective signals.
 - iii) The interlocking between signal and points shall be by electrical or electronic means (PI/RR/SSI)
 - iv) Track circuiting of all running line from first stop from first stop signal to last stop signal.
 - v) At stations provided with central panel interlocking arrangement for verifying complete arrival of train by suitable means (Axle counter/track circuit block proving).
 - vi) All level crossing gates should be manned.

2.4 Traction Installation (Applicable when electric locomotive is used)

- 2.4.1 The OHE shall have swivelling type of cantilever having the tension in the conductors regulated automatically, with a presag of 50 / 100 mm. The presage is on contact wire for a span of 72 meter, 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 1/10th and 1/3rd of the span immediately after the OHE structure and the runners in the trailing direction the maximum speed shall be limited to 120 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 current collection beyond 100 km/h shall be made through one number pantograph fit for high-speed operation.
- 2.4.4 It is recommended that the cantilevers in the section should have BFB steady arm (RI No. 2390) with 25 mm drop bracket assembly (RI No. 2360).
- 2.4.5 In 25kV a.c. traction area, the CEE of Railway shall have to ensure that the minimum height of contact wire as stipulated in provision of Chapter -V and V-A, Electric Traction "Schedule of Dimension of 1676 gauge (BG) revised 2004" is not violated and strictly followed to ensure its safe running".
- 2.4.6 In addition to the above, the CEE may impose any temporary speed restriction on the basis of his personal knowledge and experience of the OHE and the conditions prevailing on any particular section.

2.5 Rolling Stock


- 2.5.1 Before starting the operation, Mechanical department of the concerned railway shall arrange to certify the track worthiness & safety of rolling stocks and also ensure proper maintenance of the stock. However where the maintenance of rolling stock is being done by Electrical Department, CEE will also be consulted.
- 2.5.2 The Wheel Slide Protection (WSP) device of all the coaches in the rake shall be functional at the starting station. If the WSP of any coach become defective enroute, the brake system of that particular coach shall be isolated duly insuring compliance of the instructions contained in RDSO's letter no. MC/LHB/Brake dated 05.12.2013.
- 2.5.3 The earthing arrangement on the coaches shall be maintained as per design.
- 2.5.4 The LHB AC (EOG) coaches shall be maintained as per "Maintenance manual for LHB coaches issued by CAMTECH Gwalior in year 2013.
- 2.5.5 CEE of the concerned railway shall ensure that, number of coaches in rake shall be according to the capacity of diesel-alternator set of power car and current carrying capacity of inter vehicular coupler.

2.6 General

- 2.6.1 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.
- 2.6.2 Attention is also invited to the note on "Preparation of Electrical Equipment of Diesel and Electric Locomotives for high speed operation" circulated with this office letter No. EL/3.3.15/WAM2/Gr.CON dated 24.12.1970 and the locomotive should be attended accordingly.
- 2.6.3 LHB AC (EOG) variant coaches and Generator Van do not infringe any clause of revised IRSOD-2004.
- 2.6.4 The pantograph of WAP₅ locomotive in locked down condition and the surge arrestors infringe the Maximum Moving Dimensions of 1929 over non-electrified sections. After removing the 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 sections, 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 Railway Board and other additional instructions issued by the Zonal Railways for the movement of ODCs. Railway Board have condoned these infringements vide their letter No.95/CEDO/SR/18 dated 14.7.1995.

संलग्नक:

- (i) RDSO Sketch 96077
(ii) RCF's drawing no. LE 90009


(सी. मधुसूदन राव)
कार्यकारी निदेशक मानक / चालन शक्ति

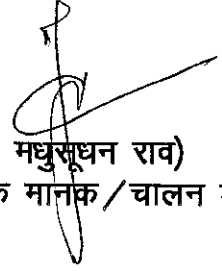
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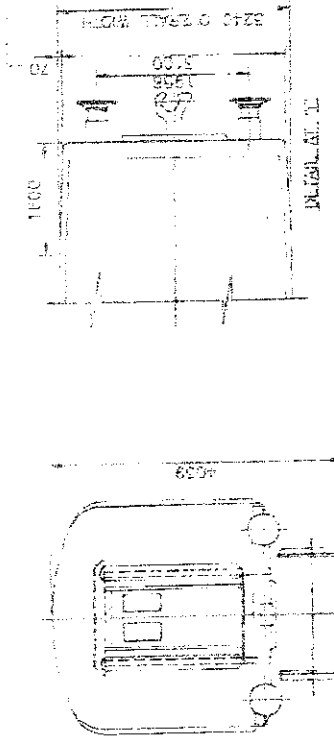
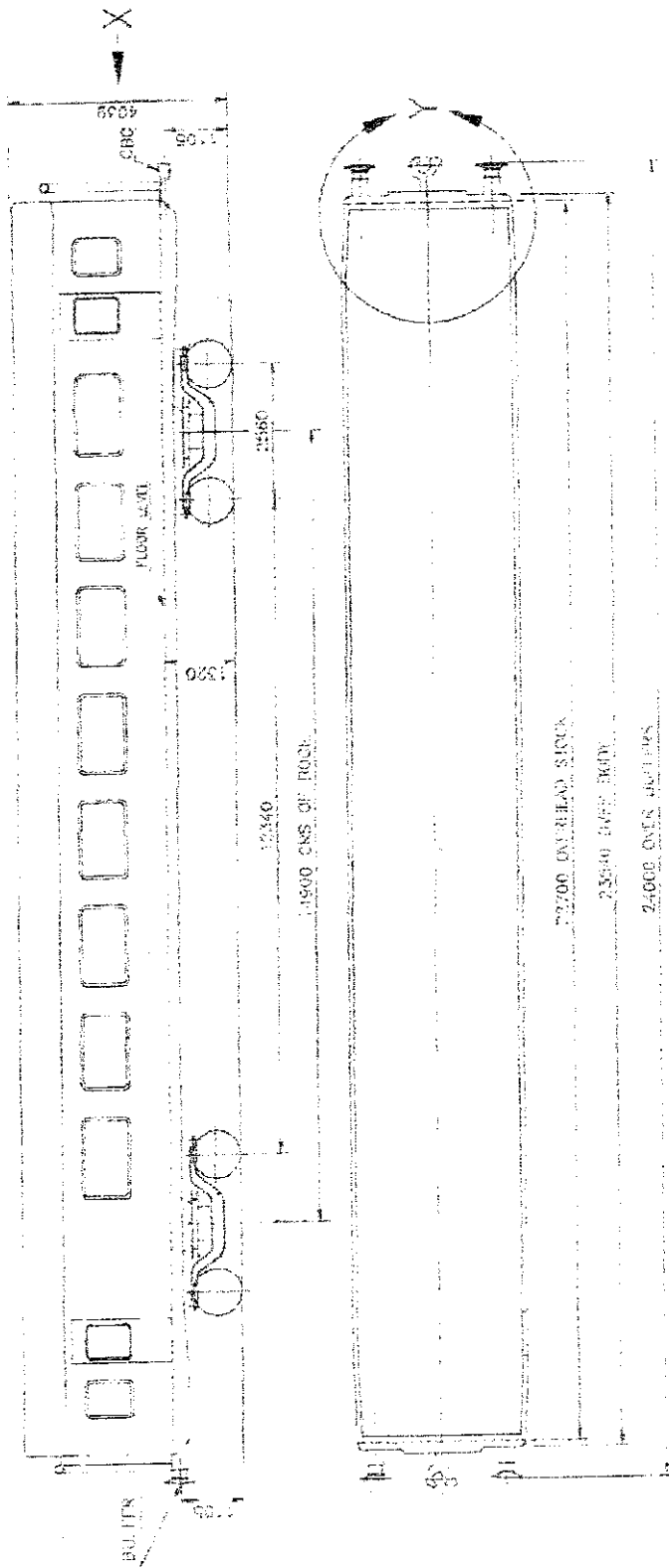
1. सचिव (यांत्रिक / इलेक्ट्रिकल / इंजीनियरिंग-जी), रेलवे बोर्ड, रेल भवन, नई दिल्ली-110 001.

2. मुख्य रेल संरक्षा आयुक्त, मण्डल रेल प्रबन्धक कार्यालय, पूर्वोत्तर रेलवे परिसर, अशोक मार्ग लखनऊ-226 001
3. महाप्रबन्धक (यांत्रिक / इलेक्ट्रिकल / ओपरेटिंग / एस एण्ड टी)
उत्तर मध्य रेलवे, हास्टिंग रोड, इलाहाबाद - 211 001

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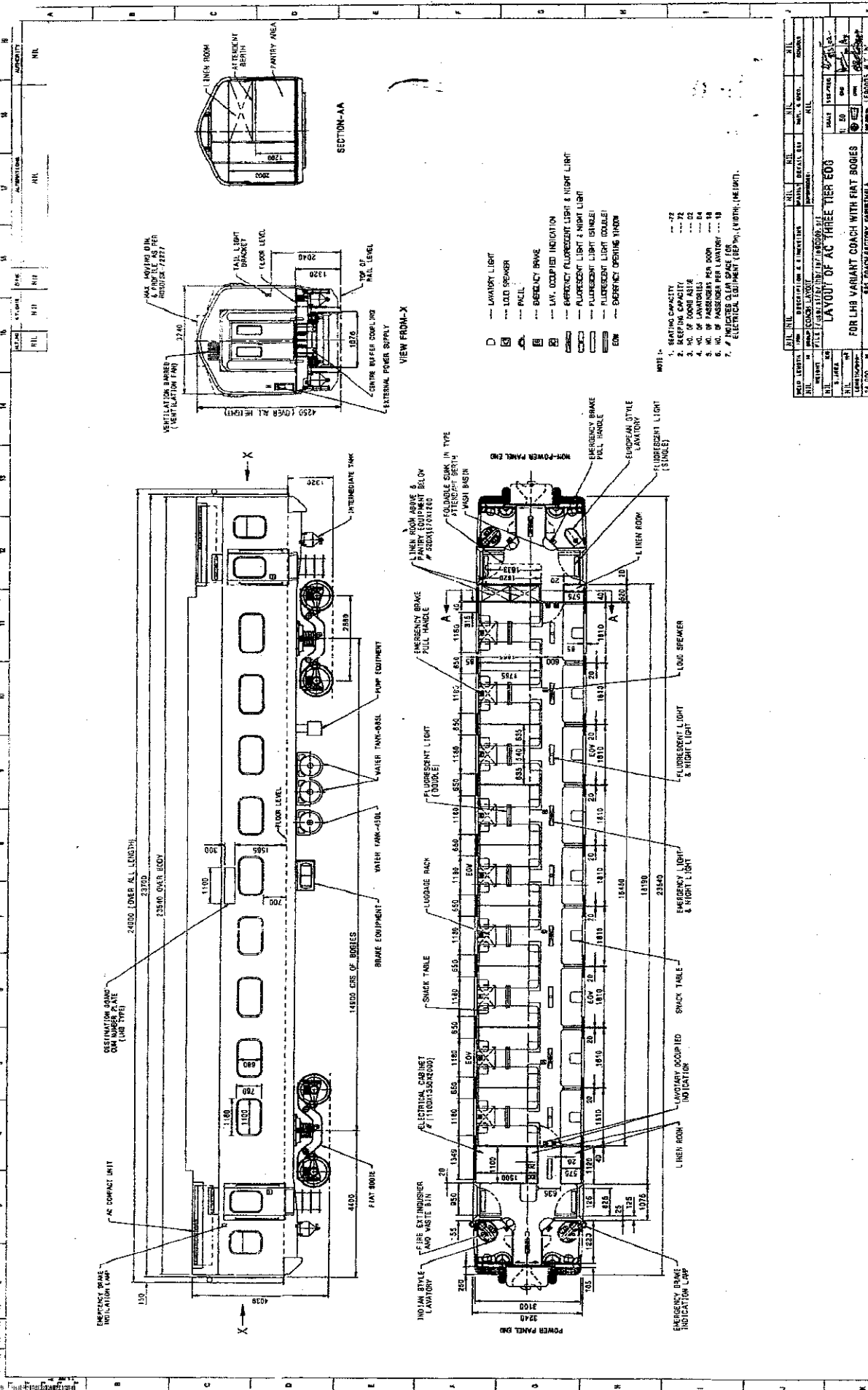

(सी. मधुसूदन राव)
कार्यकारी निदेशक मानक / चालन शक्ति



NOTE:
 BUFFERS ARE TO BE PROVIDED ON
 R POWER END.

DIAGRAM SHOWING MAIN DIMENSIONS
 OF LFB-IR COACH

SKETCH-96077



| NO. | DESCRIPTION | QTY. | REMARKS |
|-----|--|------|---------|
| 1. | SEATING CAPACITY | 72 | |
| 2. | SLEEPING CAPACITY | 02 | |
| 3. | NO. OF COACHES | 02 | |
| 4. | NO. OF LAVATORIES | 04 | |
| 5. | NO. OF PASSENGER PER DOOR | 18 | |
| 6. | NO. OF PASSENGER PER COACH | 18 | |
| 7. | NO. OF ELECTRICAL EQUIPMENT (SEPARATELY) | 18 | |

INDIAN RAILWAYS STANDARD
 FOR LHB VARIANT COACH WITH FIAT BODIES
 LAYOUT OF AC THREE TIER EOB

PL. NO. D90357
 DRG. NO. LE90009

DATE OF FIRST ISSUE: 04/07/2002
 RETAIL DROS STARTING WITH "L" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE.
 ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.
 FOR UNTOLERANCED DIMENSIONS REFER MOD0004