



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



MC/LHB/COACH

Date-08.04.2016

महाप्रबन्धक (इंजीनियरिंग),
पश्चिम रेलवे, चर्चगेट, मुंबई - 400020

Sub: Speed Certificate for operation of Rajdhani Express and similar trains comprising maximum 21 numbers of LHB AC EOG variant coaches including two LHB Generator Vans on Vadodra (BRC)-Nagda (NAD)-Vadodra (BRC) section of Western Railway at a maximum speed of 130 kmph on track maintained to C&M-I, Volume-I standard.

- 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 क्र. 17016/06/2013-14.त.वि. 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 Emergency Braking Distance and Full Service Braking Distance trials of 22 AC /Non AC EOG LHB coaches hauled by single WAP4 Locomotive have been conducted on MGS-GZB section of North Central Railway. The test results as contained in Report no. RDSO/2012/TG/MT-1160/F Rev.-0 dated 22.03.2012 Amendment-Nil, are found within limit.
- 1.5 The Confirmatory Oscillograph Car Runs of 21 LHB AC EOG coaches hauled by single WAP4 Locomotive & single WDP4 Locomotive have been conducted on Vadodra (BRC)-Nagda (NAD) section of Western Railway, in both up and down directions upto a max speed of 130 kmph respectively. The test results as contained in RDSO's Report no. RDSO/2016/TG/MT-1434/F Rev.0 Amendment-Nil, dated 31.12.2015, exhibit satisfactory riding and stability behavior upto maximum speed of 130 kmph.

1.6 Locomotive

- 1.6.1 The WAP4 locomotive, previously as WAP1 (5,000 hp) locomotive as shown in RDSO's sketch no. SK.DL-3031A Alt.1 has undergone detailed oscillation trials at a maximum speed of 160 kmph and the results are contained in RDSO report no. M-529 (Feb.-March 1994). Based on the results, WAP4 class of locomotive has been cleared up to a max. speed of 140 kmph on track maintained to standard as per C&M-I Vol.-I vide this office letter no. SD.WAP1.11 dt. 27.9.1994. Rly. Bd.'s vide their letter no. 93/Elect. (TRS) 440/3 dated 19.01.1995 this class of locomotive has been classified as WAP4 and accordingly, the Zonal Railways have been advised vide this office letter no. SD.WAP1.11 dated 18.4.1996.
 - 1.6.2 The WDP4 class of locomotive has undergone detailed oscillation trials up to a maximum test speed of 180 kmph on Ghaziabad-Kanpur and Tuglakabad-Agra Cantt section of North Central Railway, results of which are contained in RDSO report no. MT-326 (Jan.,2002). Based on the results of trial, WDP4 class of locomotive has been cleared for regular operation upto 160 kmph on track maintained to standards laid down in RDSO report no. C&M-I, Vol.-I vide RDSO's amended letter no. SD.WDP4.11 dated 29.12.2008.
2. Based on the above, it is certified that Rajdhani Express and similar type of trains hauled by single WAP4 Locomotive & single WDP4 Locomotive and having maximum 21 nos. of LHB AC EOG variant coaches including two nos. of LHB AC Generator Van may be permitted to operate between Vadodra (BRC)-Nagda (NAD)- Vadodra (BRC) up to the maximum speed of 130 kmph respectively.

2.1 Track

- 2.1.1 The track shall be to a minimum standard of 52 kg rail on PSC sleepers with M+7 density and depth of ballast cushion below the sleeper of 250 mm which may consist of at least 100 mm clean and the rest in caked up condition, on compact and stable formation track maintained to C&M-I, Vol.-I standard. Moreover, the instructions for the maintenance of track on high-speed route, circulated to the Indian Railways under RDSO's DO letter no. CRA/509 dated 07.7.1971 and approved by Railway Board under their letters No. 71/W6/HS/8 dated 27.8.1971 and 71/W6/HS/1 dated 21.10.1971 should also be followed.
- 2.1.2 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.

- 2.1.3 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.
- 2.1.4 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.
- 2.1.5 Zonal Railways may 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 Chapter III of IRPWM-2004 regarding permanent way renewals.

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	WAP4	WDP4
1.	Max. axle load	19 t	19.5 t
2.	Max. tractive effort	30.8 t	27.52 t
3.	Max. braking force at rail level	22.73 t	16.3 t
4.	CG height above 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	:	16.25t
Maximum Braking Force at Rail Level	:	5.8t

CG height above rail level	:	Not exceeding 1830 mm
iii) <u>AC 2-Tier Sleeper Coach (LWACCW)</u>		
Maximum Axle Load	:	16.25t
Maximum Braking Force at Rail Level	:	5.8t
CG height above rail level	:	Not exceeding 1830 mm
iv) <u>AC 3-tier Sleeper coach (LWACCN)</u>		
Maximum Axle Load	:	16.25t
Maximum Braking Force at Rail Level	:	5.8t
CG height above rail level	:	Not exceeding 1830 mm
v) <u>AC (EOG) Pantry Car (LWCBAC)</u>		
Maximum Axle Load	:	16.25t
Maximum Braking Force at Rail Level	:	5.8t
CG height above rail level	:	Not exceeding 1830 mm
vi) <u>Generator van (LWLRRM)</u>		
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 four aspect 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) Means for directly holding the closed switch rail to corresponding stock rail and preventing the points from being unlocked during the passage of the train (clamp lock) is required for facing point.

25Watts VHF sets shall be provided in the locomotive and guards van for communication between loco pilot, guard and adjacent station master till such time mobile train radio communication work is commissioned in the section.

2.3.6 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 will be ensured that the cantilevers in the trial section 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**

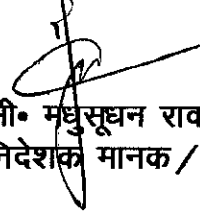
2.6.1 All the permanent and temporary speed restrictions in force and those that may be imposed from time to time due to track, bridges, curves, signaling and interlocking etc.

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 LHB Generator Van do not infringe any clause of revised IRSOD-2004 with latest addendum & corrigendum slip.
- 2.6.4 The design of WAP₄ (previously WAP1 5000 hp) locomotive infringes clauses 9 (b), 12 and 13 of Chapter IV (C) of the BG Metric Schedule of Dimensions, 1973 Reprint. Railway Board have condoned these infringements vide their letter No. 96/CEDO/SR/10 dated 10.5.1996.
- 2.6.5 The design of WDP4 locomotive infringes clauses 11 (ii), 12, 13 and 17 of Chapter IV (C) of the BG Metric Schedule of Dimensions, 1973 Reprint. Railway Board have condoned these infringements vide their letter No. 2001/CEDO/SR/18 dated 23.8.2001.

संलग्नक:

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

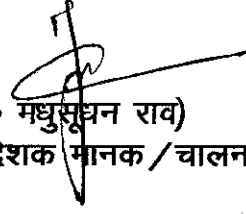

(सी. मधुसूदन राव)
कार्यकारी निदेशक मानक/चालन शक्ति

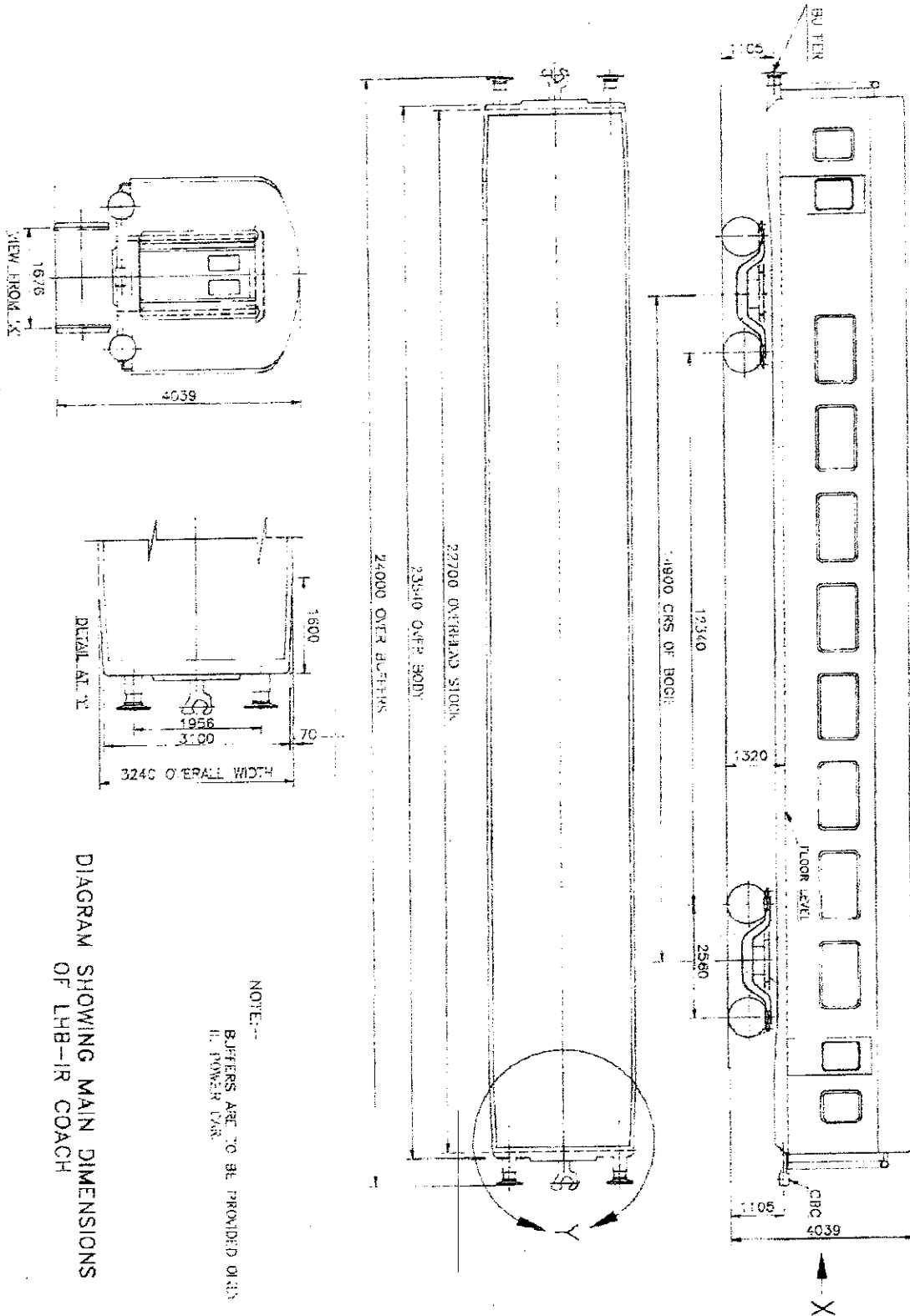
प्रतिलिपि:

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/विद्युत/ओपरेटिंग/एस एण्ड टी)
पश्चिम रेलवे, चर्चगेट, मुंबई - 400020

संलग्नक:

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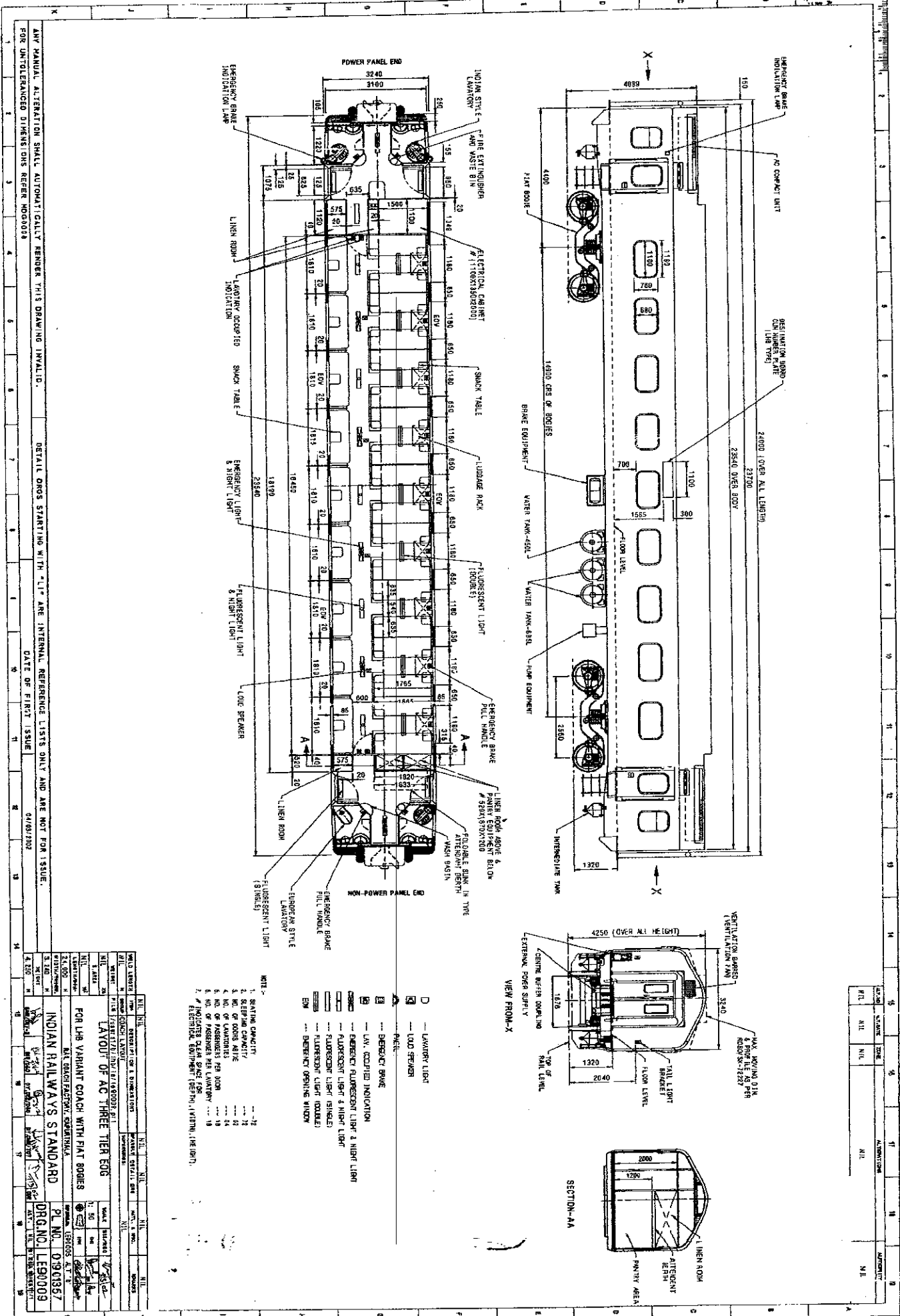

(सी. मधुसूदन राव)
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NOTE:-
 BUFFERS ARE TO BE PROVIDED ON ALL
 IN POWER CAR.

DIAGRAM SHOWING MAIN DIMENSIONS
 OF LHB-IR COACH

SKETCH--96077



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NOTE -

1. SEATING CAPACITY --- 72
2. SLEEPING CAPACITY --- 32
3. NO. OF DOOR ASIDE --- 02
4. NO. OF LAMP BAYS --- 02
5. NO. OF PASSENGER HEAD LAMP --- 18
6. NO. OF PASSENGER HEAD LAMP --- 18
7. INDICATES CLEAR SPACE FOR ELECTRICAL EQUIPMENT (DEPTH, WIDTH, HEIGHT).

NO.	DATE	BY	CHKD.	REVISION
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ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID. DETAIL DROPS STARTING WITH 'L' ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE. DATE OF FIRST ISSUE: 01/05/2002

INDIAN RAILWAYS STANDARD
 FOR LHB VARIANT COACH WITH FLAT BODIES
 LAYOUT OF AC THREE TIER EGG
 PL NO. 090357
 DRG NO. LE90009