DY.CEE-DCF

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S.No 91

No SV AC-EMU (Retro-AS) 06 Nov 2000

General Manager (Engg.),

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Sub: ***Final speed certificate for operation of BG – ICF – ac EMU motor and trailer coaches fitted with pneumatic suspension (retrofitment at the secondary stage) at a speed of 100 kmph.***

The existing coil spring suspension system of ac EMUs in Calcutta region has not been found adequate for the present pay load conditions witnessed during peak hours in recent years. Accordingly, RDSO has developed air bag suspension (Pneumatic suspension) to replace coil spring suspension, at the secondary stage of the ac EMUs. The bogies have been suitably modified to enable retrofitment of pneumatic suspension. Pneumatic suspension can sustain heavy loads without undergoing heavy deflection. In other words, spring height is maintained under diverse load conditions. The problems of hitting bogie side frame etc will therefore, be eliminated. In addition, the ride quality will also be better. Common pneumatic suspension has been designed for motor and trailer coach bogies.

1.1 In pursuance of the above objective, necessary modifications were carried out in ac-EMU driving and trailer coach so as to fit pneumatic suspension at secondary stage in their bogies. General arrangement of modified ICF bogies is given in the following drawings.

i) Motor coach - AC/EMU/M/ASR-0-0-001;
ii) Trailer coach - AC/EMU/T/ASR-0-0-001.

In order to prove worthiness of these modified vehicles, detailed oscillation trials and confirmatory runs were conducted upto a maximum test speed of 110 kmph on Howrah-Barddhaman mainline section of E.Rly. Results of these tests as contained in RDSO Report no.MT-255 indicate acceptable riding behaviour of test coaches in both empty and loaded (SDCL) condition upto a maximum test speed of 110 kmph

2. Based on the above, it is certified that ac-EMU coaches having ICF bogies retrofitted with pneumatic suspension may be permitted to operate upto maximum speed of 100 kmph over mainline and sub-urban sections on Indian Railways where ac EMU stock is permitted subject to the following conditions:

2.1 **Track.**

2.1.1 The track shall be to a minimum standard of 52Kg rails on sleepers to M+7 density and depth of ballast cushion below sleepers of 250mm, which may consist of at least 100mm clean ballast and the rest in caked up condition, on compacted and stable formation.

2.1.2 For track of lower standard than that mentioned above, the Chief Engineer concerned shall decide the maximum permissible speed In this connection, Railway Board's letter No.65/WDO/SR/26 dated 19/20-10-66 may be seen When the Chief Engineer considers that the road bed is not compacted or there is improper drainage, he may suitably restrict the maximum permissible speed depending on 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 in regard to bridges refers to standard design of girders, slabs, pipes, culverts, piers, abutments etc. issued by RDSO for BGML, RBG and MBG-1987 standard loading.

2.2.2 All other designs of superstructures and sub-structures are to be examined under the directions of the Chief Engineer concerned and certified safe 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.

2.2.3 The clearance is subject to the following parameters of the above unit:

i)	Maximum axle load (MC)	= 20t.
ii)	Maximum axle load (TC)	= 16.25t.
iii)	Maximum tractive effort (MC)	= 15.35t.
iv)	Maximum braking force (MC)	= 1.364 t/axle.
v)	Maximum braking force (TC)	= 1.1193 t/axle.
vi)	C.G. height above rail level not exceeding	= 1830mm.

2.3 **Signalling:**

The provision of GR, SR, SEM and all extant instructions issued from time to time shall be complied with.

2.4 **Traction Installation**

2.4.1 The OHE shall have swivelling type of cantilever having the tension in the conductors regulated automatically with a presag of 50/100mm. The presag is on contact wire for a span of 72m, proportionately less for smaller spans.

2.4.2 At locations where porcelain section insulators are installed on main line within one third of the span immediately after the OHE structure and the runners are in trailing direction, the maximum speed can be 120 kmph. At all other locations, where porcelain section insulators are installed, the speed shall be limited to 80 kmph.

2.4.3 In addition to above, the CEE may impose any temporary 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 an ac-EMU train rake, coaches fitted with ICF bogies having retrofitted pneumatic suspension at secondary stage can be permitted to be intermixed with coaches having standard ICF all coil bogies for regular passenger service.

2.5.2 It shall be ensured that ICF bogies having retrofitted pneumatic suspension shall be maintained as per following pamphlets.

i) Pneumatic secondary suspension - CMI no.9802;
ii) Remaining items -- As per technical pamphlets already applicable for Standard ac-EMU stock.

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

2.5.4 The profile of the proposed 3660mm (12.0') wide ac EMU stock fitted with the pneumatic suspension (retrofitment at secondary stage) is exactly similar to existing 3660mm EMU coaches and is within maximum moving dimensions to RDSO Sk.76180 . The existing EMU coaches have been running in the Calcutta Sub-urban area for the past many years.

(Pratap Srivastava)
Exec. Director/Stds(Carriage)

Encl: Nil.

copy to - 1. The General Manager (Mech/Elect.), E.Rly., Fairlie Place, Calcutta-700001.
2. The General Manager Mech/Elect.), N.Rly, Baroda House, New Delhi-110001.
3. The General Manager (Mech./Elect.), S.Railway, Chennai-600003.
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Encl: Nil.