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 अनुसंधान अभिकल्प और मानक संगठन
 लखनऊ - 226 011
 Government of India - Ministry of Railways
 Research Design & Standards Organisation
 Lucknow - 226 011

No.MC/CB/ND

Dated: 15.09.2010

Chief Commissioner of Railway Safety
 Ministry of Civil Aviation
 Ashok Marg
 Lucknow – 226 001

Sub: Dust and Noise Level Measurements in coaches.

Ref: Dy. CRS(Mech) letter no.Q-16011/01/2009-Ta.Vi. dt.15.01.2010.

With reference to Dy. CRS's letter referred above it is informed that trials were carried out for measurement of noise and dust ingress in coaches from March to June 2010.

2. On the basis of the trials it has been established that the dust levels even at 80kmph are quite high and the average values are far in excess of the values prescribed by the CPCB (Central Pollution Control Board) for the ambient air quality. For particulate matter of size less than 10 microns (PM10), the values specified by CPCB are 100 micrograms per cubic meter for industrial areas, measured as a 24 hourly average; the corresponding values even at 80kmph are at least three times, depending on the terrain and the weather conditions. On other international rail systems, the standards for PM 10 are 150 micrograms per cubic meter, which is way below the observed values.

3. For non AC coaches, it is found that the average dust concentration almost doubles as the speed increases from 80 to 100kmph. A similar trend is observed in the dust concentrations in doorway area of AC coaches also as the speed increases from 80 to 110 kmph and higher. It therefore, seems that the dust concentration is a function of speed also, apart from weather conditions and terrain.

Further it can be concluded that:

- a) The dust levels in non AC coaches on Indian Railways are above the limits prescribed by the CPCB, even at speeds of 80kmph.
- b) As the speed increases from 80kmph to 110 kmph and more, the dust concentration almost doubles. It is therefore expected that as speed increases further from 110kmph to 120kmph and beyond, the average dust concentration is expected to rise by 15% or more upto 25%.

Further measurements and studies are recommended to conclusively predict the effect of dust ingress on the health of small toddlers and the aged people.

4. The detail report is enclosed at Annexure 1.

5. Noise level measurements were also carried out to ascertain the difference in noise levels inside non – AC coaches running at high speeds. A comparative study was done between the noise levels in AC coaches of Shatabdi Express (Train number 2003 LHB- FIAT) and the Noise level in Non AC coaches of Kashi Vishwanath Express (Train number 4258 ICF type).

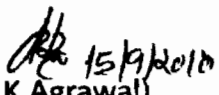
- a) In the non AC coach, as the speed increased from 80 to 110 kmph, the noise level in the middle of the coach with louvre shutter closed , increased from 76.8 Db to 80.3 Db.
- b) In the AC coach in the same location, the noise levels increased from 71 Db to 72 Db as speed increased from 80kmph to 110 kmph. As the speed increased from 110 to 120 kmph, the noise level increased to 72.7 Db, while at speed of 130 kmph, the noise level was found to be 71.1 Db.
- c) For the AC coach, the measurements were also taken in the doorway with the doors open and it was found that noise level increased from 93 dB at 80 kmph to 96 dB at 110 kmph and decreased to 94 dB at 130 kmph.
- d) Extrapolating, it can be seen that for Non AC coaches, the noise level increased by 3.5 dB for increase in speed from 80kmph to 110 kmph, while

the corresponding rise in AC coaches of LHB Fiat design was only 3dB. Moreover there was an incremental increase in the noise level of AC coaches with doors open as the speeds increased from 110kmph to 130 kmph.

6. It is therefore felt that the rise in noise levels in non AC coaches as the speed increases from 110 kmph to 130 kmph shall not be more than 1dB to 1.5 dB. However, the noise levels for both AC and Non AC coaches are well above the UIC prescribed levels of 68 dB for interiors of second class passenger coaches (in Europe these coaches are also air-conditioned, and these values are for speeds upto 160 kmph).
7. The detailed measurements are enclosed at Annexure 2.
8. As far as the effect of hot winds is concerned, it has been observed that a stationery coach tends to heat up more whereas a train running at higher speeds is cooler as more heat loss takes place due to convection because of the high velocity airflow.

This is for your information and necessary action.

DA: as above


(D.K. Agrawal)
Executive Director (Stds.) / Carriage

N.O.O. :

Copy to: EDME/Coaching: in reference to letter number 2007/M(C)/137/16
dt 20th November 2009