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Our Ref: DfT/DEG/CST/06-02-08/01

06 February 2008

The Railways (Interoperability) Regulations 2006:

UK Noise TSI Critical Error derogation for the measurement of pass-by-noise for third rail electrified vehicles

Following discussions with your organisation and the wider rail community, we confirm that the European Commission and the European Railway Agency recognise that the Noise TSI contains a specification for pass-by noise testing (see clauses 4.2.1.1 and 4.2.2.4.) which does not give sufficient consideration to the UK specific requirement for the testing of third rail electrified rolling stock. Specifically, the behaviour of the rolling stock DC rail shoe on third rail electrified networks. Noise emissions are measured in accordance with prEN ISO 3095:2001 with deviations stated in Annexes A1.3 and A1.4. This specification is regarded as an error because the testing criteria are incompatible with the operational requirements of current and new third rail electrified rolling stock within the UK. These issues are the subject of further investigation by the Agency and the output of that investigation will be considered in the drafting of the revised Noise TSI. Recognising that the revised document is not likely to be publicly available for some time, the national solution given within Annex I (for the UK) should be applied.

Yours sincerely,



Peter Browne

Annex I

UK specific case solution

In view of the unique conditions associated with the testing of noise emissions from DC electrified rolling stock within the UK, it is proposed that these vehicles be tested for compliance with the Noise TSI pass-by-noise requirement, but on operational lines, where the effects of the overall railway track structure are also considered. To support investigations by the Commission, the Contracting Entity is asked to forward the results from these tests to the Department for record purposes.

Background

Pass-by noise emissions are largely dominated by rolling noise from the wheel-rail interaction of rolling stock at speeds of between 50km/h and 200km/h. Vibration and excitation of the wheels and track stem from their combined roughness at the interface. Studies show that each track component has its own vibration response and so precise measurement conditions are defined within the Conventional Rail Noise TSI to minimise the influence of the track structure and to enable the rolling stock to dominate the generation of the emitted noise levels. For these reasons, measurements are made along trackwork with the optimal (Reference) track vibration decay rates (stiffness) and a maximum average value of rail head roughness. To ensure that railway vehicles with high levels of rolling noise are excluded from the future European fleet, the Conventional Rail Noise TSI specifies a maximum pass-by noise emission level.

Figures 1 - 3 show the results from measurements of the average rail head roughness and track vibration decay rates across parts of the national railway network. The measurement data is compared against the rail head roughness and track vibration decay rate levels specified within the Conventional Railway Noise TSI. Typically, the average UK rail head roughness levels are high and substantially above those values given within the specification. The average track vibration decay rates are comparable to the Noise TSI levels. In essence, the results show that the application of pass-by-noise measurements to the UK track structure will not prevent compliance with the Noise TSI. Despite the noise emissions from the UK track environment the example data given below demonstrates the capacity of the Member State to meet the maximum noise emission levels specified within the Conventional Rail Noise TSI while using the specifications, track quality and high rail head roughness levels typically associated with operational lines.

For example purposes, pass-by-noise measurements were applied to the Electrostar Class 377, disc-braked rolling stock along the operating line in Southern England:

3.1 Example site data: Operating line in Southern England

- Measurement position: 12m from track CL
- LpAeqTp @ 80 km/h, 7.5m from track CL: 78 dB(A)
- TSI limit for EMUs: 81 dB(A)
- Despite the higher rail head roughness, results show the EMU is TSI-compliant

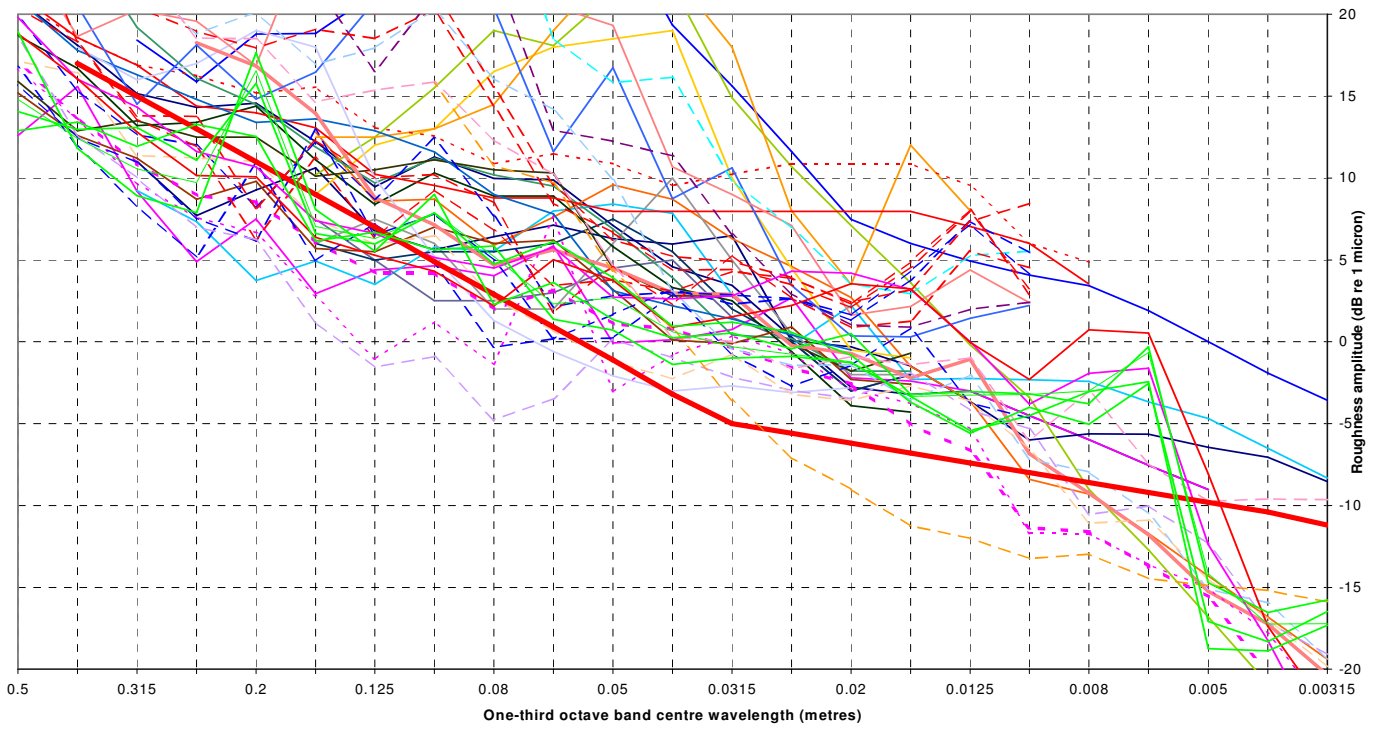


Figure 1 Graph comparing the average rail head roughness levels across parts of the UK railway network with the maximum levels specified for the reference track within the Conventional Rail Noise TSI (Data Source EC NOEME Project)

Track Decay - Lateral

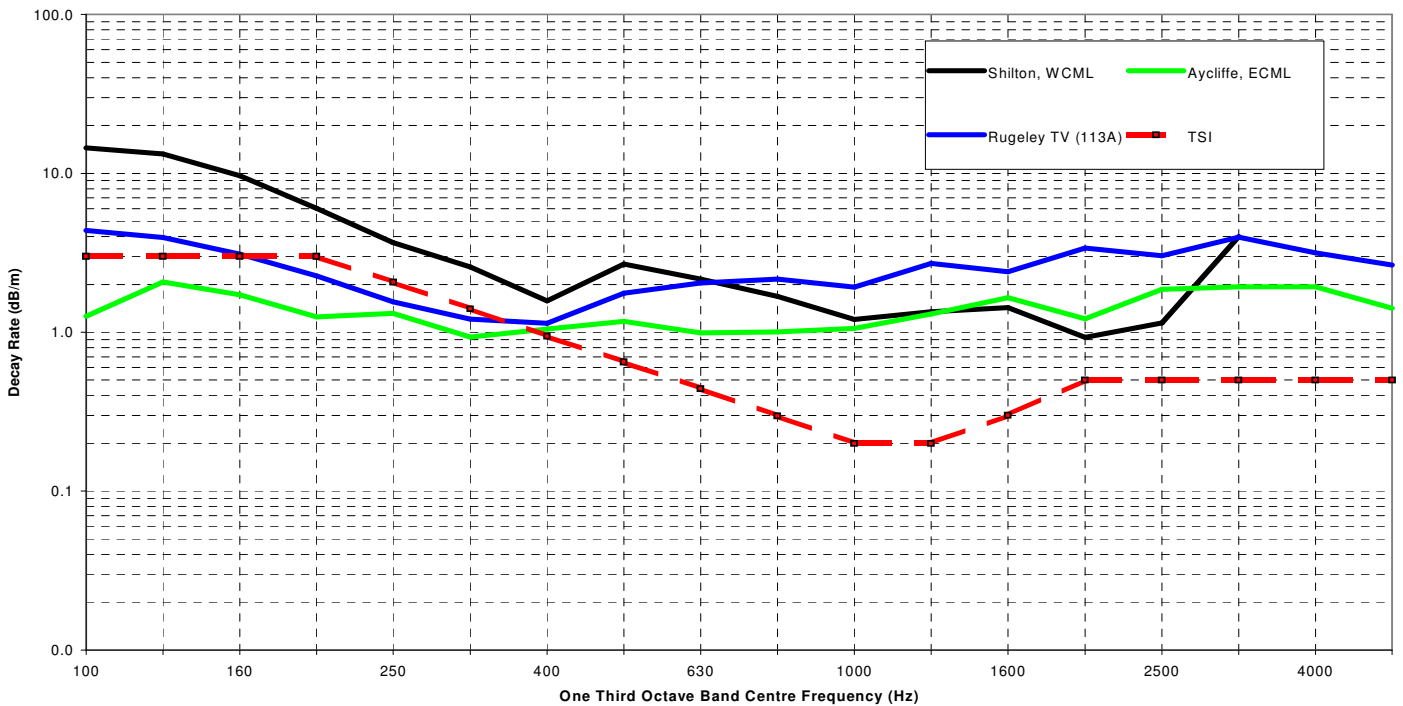


Figure 3 Graph comparing the lateral track decay rate levels across parts of the UK railway network with the minimum values specified for the reference track within the Conventional Rail Noise TSI (Data Source EC NOEME Project)

Track Decay - Vertical

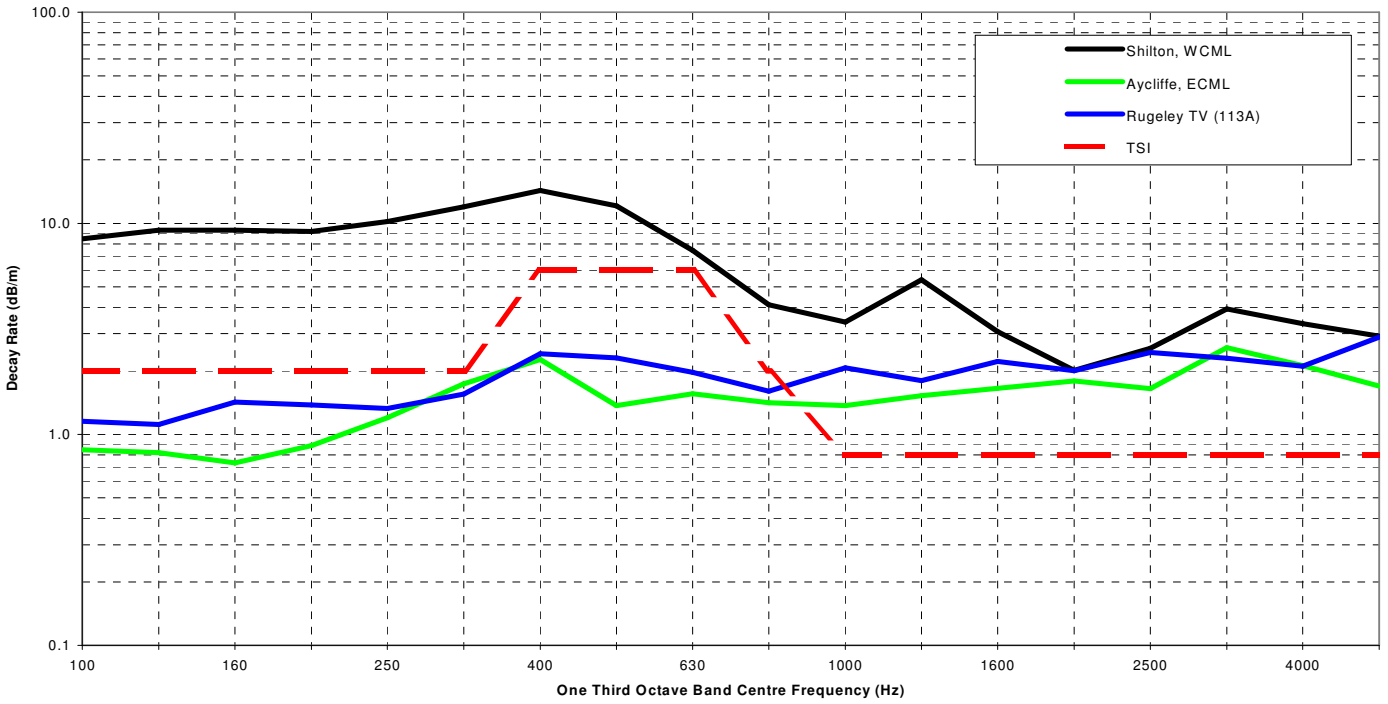


Figure 2 Graph comparing the vertical track decay rate levels across parts of the UK railway network with the minimum values specified for the reference track within the Conventional Rail Noise TSI (Data Source EC NOEME Project)