



Appendix 13.2

TRAFFIC VIBRATION



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Traffic vibration is a low frequency disturbance producing physical movement in buildings and their occupants. Vibration can be transmitted through the air or through the ground. Airborne vibration from traffic can be produced by the engines or exhausts of road vehicles and these are dominant in the audible frequency range of 50-100 Hz. Ground-borne vibration is often in the 8-20 Hz range and is produced by the interaction between rolling wheels and the road surface.

Ground-borne vibration can be measured in terms of Peak Particle Velocity (PPV). For vibration from traffic, a PPV of 0.3 mms^{-1} measured on a floor in the vertical direction is considered likely to be perceptible and structural damage to buildings can occur when levels are above 10 mms^{-1} . The level of annoyance caused will also depend on building type and usage.

DMRB HD 213/11 adopts 0.3 mms^{-1} as the threshold criterion for traffic induced vibration, either where the PPV is predicted to rise above this level or where existing vibration above this level is predicted to increase.

DMRB HD 213/11 notes (in paragraph 3.22) that PPVs in the structure of buildings close to heavily trafficked roads rarely exceed 2 mms^{-1} and typically are below 1 mms^{-1} . Normal use of a building such as closing doors, walking on suspended wooden floors and operating domestic appliances can generate similar levels of vibration to those from road traffic.

Older roads that experience a high traffic flow, are likely to have an uneven surface due to deterioration over time. As new highway constructions are required to improve the road surface, the level of road traffic ground-borne vibration is likely to be reduced as the effects of potholes and cracks are eliminated. Furthermore, DMRB HD 213/11 states *“no evidence has been found to support the theory that traffic induced vibrations are a source of significant damage to buildings...Such vibrations are unlikely to be important when considering disturbance from new roads and an assessment will only be necessary in exceptional circumstances”*. Consequently, ground-borne vibration at receptors as a result of operational road traffic from the Proposed Scheme is considered unlikely to be significant and has therefore been excluded from this assessment.