

BUILDING RESPONSE TO TRAIN-INDUCED VIBRATION PRELIMINARY INVESTIGATION

The (British Rail) Board received occasional complaints from wayside residents about vibration which they perceived in their houses and which they believed to be due to the passage of trains. The complaints were either of disturbance or damage. The Board wanted to measure the extent of the perceived vibration and compare it with published information on human response to vibration, and the rather scant data on building damage.

However, Board policy prevented measurement of the vibration of the complainant's property directly; so an alternative of estimating the house vibration levels using measurements made on the intervening railway owned land was considered. This report describes an investigation into the feasibility of this approach.

The report notes several conclusions:

- The response of the ground at frequencies above 25 Hz was affected by the presence of the house.
- At frequencies below 16 Hz for transverse and 31.5 Hz for vertical vibration the lower house wall was well coupled to the adjacent ground.
- There were substantial frequency-dependent amplifications of ground-borne vibration on the floors of the house.
- Due to the above factors it would be unwise to try to predict the internal vibration levels of a property by means of a single measurement on the ground between it and a Railway.
- The peak level of ground-borne vibration tended to increase in amplitude and frequency with increase in train speed but those trends were not regular.
- For trains passing the site, an increase in axle-loading produced higher levels of low frequency (<10 Hz) vibration.
- Future experiments would be better performed on unoccupied properties. This would permit more thorough and extensive investigation to be made.