



## HUMAN RESPONSE TO VIBRATION IN RESIDENTIAL ENVIRONMENTS

*(DEFRA PROJECT NANR209)*

### EXECUTIVE SUMMARY

#### MAIN OUTPUTS

Exposure-response relationships have been developed for the human response to railway and construction induced groundborne vibration in residential environments.

For a given vibration exposure expressed in currently-recommended indices, construction was found to be more annoying than rail.

An exposure-response relationship for internal sources, (e.g. the activities of neighbours, door slams and domestic machinery) could not be derived. It is suggested that annoyance from internal sources be considered on a case-by-case basis rather than as a community response.

#### COMBINED VIBRATION AND NOISE EXPOSURE-RESPONSE RELATIONSHIPS

For a given vibration exposure, reported annoyance due to vibration increases with increasing noise exposure arising from the vibration source.

Similarly, for a given noise exposure, reported annoyance due to noise increases with increasing vibration exposure.

#### MOST APPROPRIATE DESCRIPTOR FOR VIBRATION

Results indicate that further research could yield a more robust descriptor than those recommended in current standards. It is suggested that such investigations are better suited to laboratory studies than to field measurements.

Under no circumstances should the findings from this research, which has been carried out under steady state conditions, be used to predict human response when new railway lines are opened or rail services are altered substantially on existing lines.

#### FACTORS INFLUENCING REPORTED ANNOYANCE

Vibration exposure at night elicits a stronger response than exposure in the evening, and exposure in the evening elicits a stronger response than during the day.

Concern of damage to property caused by vibration has a strong influence on reported annoyance.