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Mechanical vibration — Ground-borne noise and vibration arising from rail systems

Part 31: Guideline on field measurements for the evaluation of human exposure in buildings

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National foreword

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Foreword

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TECHNICAL SPECIFICATION **ISO/TS 14837-31:2017(E)**

Mechanical vibration — Ground-borne noise and vibration arising from rail systems —

Part 31: Guideline on field measurements for the evaluation of human exposure in buildings

1 Scope

This document gives guidelines to encourage reporting of field measurements of ground-borne noise and vibration in a metric that allows international comparison and future development of empirical models. It also sets out the basic minimum requirements and good practice when taking measurements for the evaluation of human exposure in residential buildings to ensure they are reliable. While national standards or requirements based upon project-specific purposes would normally take priority, this guidance can be used where there are no particular requirements or to provide supplementary guidance. Thereby, this document provides a means of improving general quality and reporting of field measurements in a preferred format.

There are a number of reasons for carrying out field measurements of ground-borne noise and vibration arising from rail operations, from complaint investigations to validation of prediction models, diagnostics and research as detailed in ISO 14837-1:2005, 7.2. In the present document, two levels of evaluation are considered.

— Scope 1 corresponds to basic measurements of floor vibration and noise in rooms in buildings to evaluate the human exposure to ground-borne vibration and ground-borne noise. Requirements are presented under two levels of accuracy:

  a) basic measurements with minimum accuracy;

  b) measurements with reduced uncertainty, also more reproducible and more appropriate for prediction.

Ground-borne noise is noise generated by vibrating building elements (e.g. floors, walls and ceilings) in the room of interest and is therefore best expressed by both an acoustic and a vibrational quantity. Its identification as ground-borne noise (as opposed to airborne noise, potentially also present) requires simultaneous noise and vibration measurements. Nevertheless, there are also cases of very low frequency vibration (below 10 Hz to 16 Hz) where only vibration measurements are relevant. Rattle can also arise from vibration, which can be from building components or furniture. This document does not set out to characterize this phenomenon, but to note its presence when it occurs.

NOTE In some cases, Scope 1 can relate to measurements on the ground outside a building (to resolve access issues or to comply with national regulations), although measurements at the building are generally preferred.

— Scope 2 corresponds to measurements extended to evaluate the vibration immission to buildings, which includes vibration measurements at or near the building foundations and vibration measurements on ground next to the building so that the building coupling loss and building transmissibility can be estimated.

Vibration measurements near the tracks (on ground surface or in tunnels) for a proper characterization of the source are outside the scope of this document.

Certain requirements are specified in the interest of achieving a consistent minimum data set for each investigation, allowing data comparison between sites.

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