

ICS 17.160

CCS J 04



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 33521.31-2023

**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**

Issued on: March 17, 2023

Implemented on: October 1, 2023

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
Introduction	
1 Scope	1
2 Normative references	1
3 Terms and Definitions	1
3.1 Building coupling loss	2

foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules for Standardization Documents" drafting.

This document is part 31 of GB/T 33521 "Ground-induced structure-induced noise and ground-borne vibrations from mechanically vibrating track systems".

GB/T 33521 has issued the following parts.

--- Part 1. General;

--- Part 31. On-site measurement guidelines for the evaluation of human exposure in buildings;

--- Part 32. Measurement of the dynamic properties of the earth.

This document is equivalent to ISO /T S14837-31.2017 "Ground-induced structure-induced noise and ground-borne vibration generated by mechanical vibration track system

Part 31. Guidelines for field measurements for the assessment of human exposure in buildings.

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

In recent years, my country's railway and urban rail transit have developed rapidly, and their operation will generate ground-borne vibration and/or ground-induced structural noise (especially

Especially in urban areas), it may have adverse effects on the work, life and sleep of people

in adjacent buildings, so accurate and standardized

Assess the impact of ground-borne vibration and/or ground-induced structural noise, and take appropriate mitigation measures. GB/T 33521 is to guide my country's track

The basic standards for the evaluation of ground-induced structural noise and ground-borne vibration generated by the system, and the ground-induced structural noise and ground-borne vibration

Methods and guidelines for field measurements, laboratory measurements, parameter estimation, model predictions, etc. GB/T 33521 consists of the following parts constitute.

--- Part 1.General. The purpose is to give basic guidelines for predictive models to ensure their applicability to target tasks and their methods

consistency.

--- Part 31.On-site measurement guidelines for the evaluation of human exposure in buildings. The purpose is to provide ground-induced structure-borne noise and ground-borne

A guide to methods for field measurements of vibrations for comparison and development of empirical models.

--- Part 32.Measurement of the dynamic properties of the earth. The purpose is to give the testing and estimating methods of geodynamic parameters, through understanding

The geological properties and bedding structure are used to obtain the noise and vibration transfer functions of the earth.

This document standardizes and unifies the on-site measurement of human exposure to ground-induced structural noise and ground-borne vibration in buildings generated by track systems.

Quantitative methods are used to facilitate measurement comparison and provide guidance for on-site measurement.

Ground-induced structures created by mechanically vibrating track systems

Noise and ground-borne vibrations - Part 31.Inside buildings

Guidelines for Field Measurements for Human Exposure Assessment

1 Scope

This document provides standardized guidance for field measurements of ground-induced structure-borne noise and ground-borne vibration for comparison and future development

empirical model. At the same time, in order to ensure the reliability of the evaluation of human exposure in residential buildings, the basic requirements and practice of measurement are also provided.

experience.

There are many reasons for conducting on-site measurements of ground-induced structure-induced noise and ground-borne vibrations from rail system operations, such as

From complaint investigation to prediction model validation, diagnosis and research as detailed in 7.2 of GB/T 33521.1-2017. In this document, consider

Two evaluation ranges were considered.

a) Scope 1 is the basic measurement of floor vibration and noise in building rooms to evaluate human exposure to ground-borne and ground-induced vibrations.

Structured noise. The two accuracy classes are.

1) basic measurements with the lowest precision;

2) The measurement with reduced uncertainty has better reproducibility and is more suitable for prediction.

Ground-induced structure-borne noise is concerned with noise radiated by vibrations of building components in a room such as floors, walls, and

It is represented by an acoustic quantity and a vibration quantity. Identifying ground-induced structured noise (which, unlike airborne noise, may also exist) requires

Simultaneously measure noise and vibration. However, only vibration measurement is required in the case of very low frequency vibration (below 10Hz~16Hz). Ga

Rattles can also be caused by vibrations, which can come from building components or furniture. This document does not describe the characteristics of this phenomenon, but

Record presence when it occurs.

Note. In some cases, Scope 1 is measured on the ground outside the building (to solve the inaccessible indoor measurement or to comply with national regulations), although usually

Measurements within buildings are preferred.

b) Scope 2 is the vibration evaluation measurement transmitted to the building, including the vibration measurement at or near the foundation of the building, and the vibration measurement of the building

Vibration measurements of the ground near objects to estimate building coupling losses and building transmissibility.

This document does not deal with source characterization measurements in the vicinity of

the track (on the ground or in tunnels).

Requirements were specified to obtain a consistent minimum data set across surveys to allow comparison of data from different sites.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, dated references

For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

this document.

GB/T 3222.2-2022 Description, Measurement and Evaluation of Acoustic Environmental Noise Part 2.Determination of Sound Pressure Level (ISO.1996-2.

2017, IDT)

GB/T 33521.1-2017 Ground-induced structure-induced noise and ground-borne vibration generated by mechanically vibrating track systems - Part 1.General

Then (ISO 14837-1.2005, IDT)

3 Terms and Definitions

The following terms and definitions defined in GB/T 33521.1-2017 apply to this document.