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

GB/T 14124-2024

Replacing GB/T 14124-2009

**Mechanical vibration and shock - Vibration of fixed structures -
Guidelines for the measurement of vibrations and evaluation of
their effects on structures**

(English Translation)

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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 replaces GB/T 14124-2009 "Mechanical vibration and shock - Vibration measurement of buildings and its impact on buildings" Evaluation Guidelines.

Compared with GB/T 14124-2009, in addition to structural adjustments and editorial changes, the main technical changes of this document are as follows.

- Changed the scope of application (see Chapter 1, Chapter 1 of the 2009 edition);
- Added "Terms and Definitions" (see Chapter 3);
- Changed the classification and requirements of vibration source related factors to be considered (see Chapter 4, Chapter 3 of the 2009 edition);
- Changed the requirements for the impact of site conditions (see 5.5, 4.4 of the 2009 edition);
- Added the basic requirements for measuring peak quantities in "Measurement Quantities" (see Chapter 6);
- Changed the sensor selection when measuring low-frequency and small-amplitude signals (see 8.2, 6.2 of the 2009 edition), instrument signal-to-noise ratio correction the

provisions on the following aspects (see 8.3, 6.3 of the 2009 edition) have been added, and the requirements for different categories and parameters of instruments and meters have been added (see 8.4);

--- Changed the provisions on the number of sensors in buildings of different heights and lengths (see 9.1.3, 7.1.1 of the 2009 edition), as well as the measurement equipment Requirements for mass relative to the structure being measured (see 9.2.2, 7.2.1 of the 2009 edition);

--- Deleted the provisions on data analysis methods (see 8.3 of the 2009 edition);

--- Added the requirements for measurement duration (see 10.3);

--- Deleted the requirements for preliminary assessment and preliminary detection (see 9.2.1 and 9.2.2 of the 2009 edition);

--- Changed the provisions for the test frequency and damping accuracy of the measurement system (see 11.2, 9.2.4 of the 2009 edition), as well as the requirements for on-site monitoring Relevant requirements (see 11.3, 9.2.3 of the 2009 edition).

This document is equivalent to ISO 4866:2010 "Mechanical vibration and shock - Measurement of vibration of fixed structures and their effects on structures".

Guidelines for impact assessment.

Introduction

The necessity of structures to withstand vibration has become a consensus, and structural integrity, reliability, and environmental compatibility need to be considered in the design.

and the protection of historic buildings.

Vibration measurements on structures are performed for a variety of purposes.

a) Problem identification. Vibration levels in the structure have been reported to be causing problems for occupants and equipment, so it is necessary to determine whether

Note the structural integrity.

b) Control Monitoring. An organization has determined the maximum allowable vibration levels, which should be measured and reported.

c) Documentation. Dynamic loads are determined in the design, and measurements are made to verify the predicted response and provide new design parameters (using Environmental excitation or imposed loads. For example, strong motion sensors can be installed to indicate whether the earthquake response will affect the usability of the structure).

d) Diagnostics. Where it has been determined that vibration levels require further

investigation, measurements are taken to provide information for vibration reduction measures (another this diagnostic method determines the structural state through the response to environmental excitation or external loads. For example, under severe loads such as earthquakes, after).

Based on these different purposes, various measurement systems of varying complexity need to be deployed in different types of surveys.

Many interested parties require technical guidance on the best methods for measuring, describing and evaluating the effects of vibration on structures.

It is applicable to existing structures that are exposed to different types of excitations, and also to new structures built in environments where vibration sources may be significant.

The effects of vibrations can also be determined analytically.

Although this document can be used to evaluate the relative severity of structural vibrations, it cannot be considered as acceptable or unacceptable levels.

Nor is economic and social aspects considered, which are left to the discretion of national regulators.

Mechanical vibration and shock Vibration of fixed building structures Guide for the measurement of vibrations and the assessment of their effects on structures

1 Scope

This document specifies the principles for vibration measurement and data processing when evaluating the effects of vibration on structures. This document does not cover vibration excitation.

The source of excitation determines the dynamic range, frequency or other relevant parameters. The structural vibration impact assessment is mainly based on the structural response, using appropriate the frequency, duration and amplitude are determined by appropriate analytical methods. This document applies only to the measurement of structural vibrations and does not include air sound pressure and other pressure the measurement of force fluctuations takes into account the response to these excitations.

This document applies to all structures built above or below ground. These structures, whether in use or maintained, include buildings, structures of high value (cultural heritage), bridges, tunnels, gas and liquid facilities (including pipelines), geotechnical structures (such as dams and embankments) and fixed sea Offshore structures (such as piers and docks).

This document is not applicable to certain special structures, including nuclear power plants and dams.

The response of the structure is related to the vibration source. This document specifies the