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Australian Standard®

Evaluation of human exposure to whole-body vibration

Part 2: Continuous and shock-induced vibration in buildings (1 to 80 Hz)

This Australian Standard was prepared by Committee AV/10, Vibration and Shock - Human Effects. It was approved on behalf of the Council of Standards Australia on 8 May 1989 and published on 10 December 1990.

The following interests are represented on Committee AV/10:

Association of Australian Acoustical Consultants
Australian and New Zealand Environment Council
Australian Coal Association
Confederation of Australian Industry
Construction and Mining Equipment Association of Australia
CSIRO, National Measurement Laboratory
Department of Defence
Department of Minerals and Energy, N.S.W.
Federal Chamber of Automotive Industries
Railways of Australia Committee
Royal Institution of Naval Architects
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The Workcover Authority, N.S.W.

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PREFACE

This Standard was prepared by the Standards Australia Committee on Vibration and Shock—Human Effects. It is identical with and has been reproduced from ISO 2631/2—1989, *Evaluation of human exposure to whole-body vibration* — Part 2: *Continuous and shock-induced vibration in buildings* (*1 to 80 Hz*).

For the purposes of this Australian Standard, the ISO text should be modified as follows:

(a) Substitute a point (.) for a comma (,) as a decimal marker.

(b) The references to other publications should be replaced by references to Australian Standards:

Reference to International Standard		*Australian Standard*	
ISO		AS	
2631	Evaluation of human exposure to whole-body vibration	2670	Evaluation of human exposure to whole-body vibration
2631/1	Part 1: General requirements	2670.1	Part 1: General requirements

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Evaluation of human exposure to whole-body vibration

Part 2: Continuous and shock-induced vibration in buildings (1 to 80 Hz)

0 Introduction

Structural vibration in buildings can be detected by and affect the occupants in many ways. The quality of life can be reduced just as can the working efficiency.

This part of ISO 2631 offers guidance on the application of ISO 2631-1 to human response to building vibration. This part of ISO 2631 is also intended to encourage the uniform collection of data on human response to building vibration.

No guidance is given on complaint levels from occupants of buildings subject to vibration or to any acceptable magnitudes or limits of building vibration, but this part of ISO 2631 does contain weighting curves for human response to vibration of buildings.

1 Scope and field of application

Primarily with respect to annoyance of human beings subject to building vibration, this part of ISO 2631 is limited to the following considerations:

a) continuous vibration;

b) intermittent vibration.

The state of the art on transient (impulsive) vibration is presented in annexes A and B.

General guidance is given on human response to building vibrations and weighting curves of frequency response for equal annoyance of humans are included together with measurement methods to be used.

Consideration is given to the time of the day and the use made of the occupied space in the building, whether workshop, office, residential, hospital operating-theatre or other critical area.

Acceptable magnitudes of vibration are not stated in this part of ISO 2631 since these cannot be specified rigidly and depend upon specific circumstances. Tentative guidance is given in annex A on the magnitude of vibration at which adverse comment may begin to arise. In cases where sensitive equipment or delicate operations impose more stringent criteria than human comfort, the corresponding more stringent values should be applied.

Adjustments and variances may be allowed for short-term engineering works (for example foundation excavation and tunnelling) where good public relation practices are followed and prior warning is given.

This part of ISO 2631 is not intended to provide guidance as to the likelihood of structural damage to buildings or injury to occupants of buildings subject to vibration, as defined in ISO 2631-1.

This part of ISO 2631 is concerned only with tactile perception and does not take into account auditory perception of reradiated sound.

2 References

ISO 2041, *Vibration and shock - Vocabulary.*

ISO 2631-1, *Evaluation of human exposure to whole-body vibration — Part 1: General requirements.*

ISO 5805, *Mechanical vibration and shock affecting man — Vocabulary.*

3 Characteristics of building vibration

3.1 Direction of vibration

As a building may be used for many different human activities, for example standing, sitting, lying or a combination of all three, vertical vibration of the building may enter the body as either *z*-axis, *x*-axis or *y*-axis vibration, as shown in figure 1.

The measured vibration should normally be referred to the appropriate axis. If it is not clear which direction is appropriate, it may be more convenient to consider the combined curve as explained in 4.2.3.

3.2 Multi-frequency vibration

There is evidence from research concerning the building environment to suggest that there are summation effects for vibration at different frequencies. Therefore for the evaluation of building vibration with respect to the annoyance and comfort effects on occupants, overall weighted vibration values are preferred, as described in ISO 2631-1. A suitable weighting curve for investigation is described in 3.5.