INTERNATIONAL STANDARD

ISO 9996

First edition
1996-12-15

Mechanical vibration and shock — Disturbance to human activity and performance — Classification

Vibrations et chocs mécaniques — Perturbation de l'activité et du travail des individus — Classification

Reference number
ISO 9996:1996(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9996 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Subcommittee SC 4, *Human exposure to mechanical vibration and shock*.

Annex A of this International Standard is for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@isocs.iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

Introduction

An important criterion for writing standard guidelines for the measurement and evaluation of human exposure to low-frequency oscillatory motion, mechanical vibration or shock is to prevent mechanical disruption and physiological impairment of human volitional activity and skilled task performance by the impressed force or motion.

Vibrational forces and oscillatory motion can reduce the ease and efficiency of human sensorimotor and cognitive activity and task performance in two main ways. First, there can be direct (and usually instantaneous) mechanical disruption or interference at the interface or point of contact between human beings and their task or activity, that is, at the stage of sensory input or motor output involved in performance of the task. Second, there can be gradually progressive or time-varying impairment of performance, affecting both efficiency and safety. Such time-dependent effects may as a general rule be presumed to be associated with a degree of alteration of the physiological state induced by the motion or vibration stress. Unlike direct, mechanically induced disruption of activity, physiologically mediated effects may exhibit any or all of the following features:

a) latency (i.e. the effect may take some time to become manifest following the onset of the stimulus);

b) a threshold (minimum average mechanical stimulus level required to provoke the effect);

c) adaptation or habituation (lessening of an adverse effect with the passage of time in the maintained provocative environment); and

d) persistence for a while after the provocative stimulus has abated or ceased.

Relative motion or vibration of the perceived surroundings as well as of the person can also affect the physiological and cognitive state adversely (as indeed can illusory low-frequency motion), and hence jeopardize performance and safety.

In many circumstances, more than one of these mechanisms of interference with human action may operate at the same time. When the criterion of evaluation of human exposure to low-frequency motion, mechanical vibration, or shock is the preservation of unimpaired activity, task performance, or safety, the relative weighting applied to standard guidelines for the evaluation of human exposure to vibration or shock expressed as functions of frequency, acceleration and exposure time must necessarily vary with circumstances and with the type of activity or task being performed in the mechanical environment.

This page intentionally left blank

Mechanical vibration and shock – Disturbance to human activity and performance – Classification

1 Scope

This International Standard lays down a simple classification of motion- and vibration-sensitive human activity and task performance. The classification includes, and is intentionally limited to, volitional human activity and task performance known or presumed to be disturbed, degraded or disrupted by continuous, intermittent, transient, or repetitive oscillatory motion or vibration (including shock motion) of human beings, components of their task, or their surroundings. This classification applies only to volitional human activities and tasks, interference with which by motion or vibration is presumed to be mediated by direct mechanical intrusion, physiological (non-injurious) changes in the person affected, or reversible sensory impairment, distortion, or conflict caused by the motion or vibration.

It does not extend to activity or performance reduction associated with disability due to motion- or vibration-related injury. This International Standard is intended specifically to be an aid in the formulation of standard guidelines for the evaluation of human whole-body exposure to mechanical vibration and shock in the frequency range 0,1 Hz to 80 Hz, when optimization of human activity and task performance in the mechanical environment is the main criterion of evaluation.

NOTE 1 This International Standard also provides definitions of specialized terms, not defined in other standard vibration and shock vocabularies, that find a particular use in human biodynamics relating to task performance. It therefore supplements the biodynamical vocabulary in ISO 5805.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2041:1990, *Vibration and shock — Vocabulary*.

ISO 5805:—[1)], *Mechanical vibration and shock — Human exposure — Vocabulary*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 2041 and ISO 5805 and the following definitions apply.

3.1 human volitional activity:

Any consciously directed human action that is performed electively, i.e. for a purpose or in a manner that is not immediately essential to the performance of a specific task in hand, or that is not required of the person by virtue of his essential presence in a situation or function in a system as a human operator.

1) To be published. (Revision of ISO 5805:1981)