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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Mechanical vibration and shock — Mechanical transmissibility of the human body in the z direction

Vibrations et chocs mécaniques — Transmissibilité mécanique du corps humain suivant la direction z

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7962 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Mechanical vibration and shock — Mechanical transmissibility of the human body in the z direction

0 Introduction

When considering the effects of shock and vibration on people the dynamic properties of the human body have to be known. One of the possible measurement techniques to assess these properties is mechanical transmissibility. The intention of this International Standard is to draw together available information on transmissibility through the human body, when it is subjected to vibration in the z direction.

1 Scope and field of application

Transmissibility through the human body is a function of three main factors:

a) the posture of the subject;

b) the direction and type of input vibration;

c) the physical characteristics of the subject.

Measurement is possible at many points, with the main areas of concern being the head, neck or shoulder and the hip. In view of the current state of knowledge in this area, standardization in this International Standard is restricted to z-axis vibration for the standing and sitting postures. Currently there is only sufficient information on the transmissibility to the head in the frequency range from 0,5 to 31,5 Hz for whole-body vibration entering the torso in the anatomical z direction through the seat (sitting) or feet (standing).

It is expected that this information on transmissibility will be used in conjunction with other data concerning the effect of vibration and impact in ergonomic design studies. Such work could include computer and analytical design of man-machine systems. It can be of use in perfecting and improving the vibration characteristics of vehicle suspension systems and seats.

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 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1 mechanical transmissibility: The complex non-dimensional ratio of the response amplitude of a system in steady-state forced vibration to the excitation amplitude at a given frequency. The ratio may be one of forces, displacements, velocities or accelerations.

NOTE — In the case of non-sinusoidal vibration, transmissibility may be computed from the motion spectra.

3.2 human transmissibility: A quantity, properly expressed as the transmissibility modulus, T, (see 3.3) describing the transfer of whole-body vibration from a point of input into the human body to defined coordinates within a designated anatomical segment.

3.3 transmissibility modulus, T: The ratio of the moduli of the motions.

3.4 phase of transmissibility, φ: The phase difference between output and input motions.

4 Human transmissibility

4.1 General

It should be noted that vibration transmissibility is a function of

a) the human body orientation, posture, and muscle tension with respect to the vibration input;

b) the mechanical coupling between the vibration input and the human body;

c) whether or not a restraint system is used, and if so the characteristics of the restraint system;

d) the human transmissibility which may affect the transmissibility amplitude but which is nearly independent of the frequency due to the response phenomenon.

Results may differ substantially from the average values shown in figure 1, which shows only typical curves. Therefore this International Standard should be used with caution.

The mechanical transmissibility of the human body can only be described provided that the reservation outlined above is borne in mind.