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**Mechanical vibration and shock -- Human exposure --
Biodynamic coordinate systems**

机械振动与冲击 人体暴露 生物动力学坐标系

(English Translation)

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Foreword

This standard was drafted in accordance with the rules of GB/T 1.1-2009 and GB/T 20000.2-2009 given.

This standard uses the translation method identical with the international standard ISO 8727:1997 "Mechanical vibration and shock human exposure biodynamic Coordinate System".

Correspondence between the consistency of the standards of international documents and normative references of the following documents.

--- GB/T 14777-1993 geometric orientation and direction of movement (neq ISO 1503. 1977)

this standard by the national mechanical vibration, shock and condition monitoring Standardization Technical Committee (SAC/TC53) and focal points.

This standard was drafted. Jilin Academy of Safety Science and Technology, Beijing Institute of Technology, Beijing Institute of Labour Protection, Hangzhou love Instrument Co., Ltd. China.

Introduction

On many occasions biodynamic and human vibration engineering applications, the mechanical input or response should be determined according to specific orthogonal coordinate system (force or movement) of origin, the magnitude and direction. Biodynamic coordinate requirements in the human body or may be associated with the anatomical coordinate system of the external reference Within the structure determination of origin. Applications include human exposure to vibration and impact evaluation, functional location and orientation of biodynamic instrument system Between precisely defined input to the human body and its parts or bio-dynamic model of local force and motion, as well as discipline biodynamic data or between more professional.

In order between different individuals (or between repeated measurements of the same individual), and between the human body model or measured data and standards Body or local data to allow comparison between the mechanical input limits, it is necessary to adopt origin has been identified, and the solid radiographic Phase or stereotactic method can determine (and therefore skeletal) at anatomical landmarks, and thus directed anatomical coordinate system. This standard reflects such a basic principle. its origin particularly against the use of inaccurate or defined in the structure of the heart and other soft motion in the coordinate system. solution Precise definition of the coordinate system sectional Studies on biological dynamics is important because all measurements should ultimately biodynamic and human skeletal anatomy Related.

Mechanical vibration and shock human exposure Biodynamic coordinate system

1 Scope

The standard provides for the measurement of biological dynamics, as well as references in preparing the relevant standards of human exposure to mechanical vibration and shock accurate description Anatomical coordinate system and the basic center coordinates. The standards set forth in the local coordinate system anatomy suitable for the head, neck root (head and neck system Driving point), pelvis and hands. For other local coordinate system skeletal anatomy establish appropriate, this standard specifies general principles. The standard Quasi provisions biodynamic coordinate system applicable to affect the body's linear rotational vibration and shock measurements and descriptions and reference system.

Note 1: Although these anatomical coordinate system is defined for the body, but the application of

knowledge of comparative anatomy, which also applies to non-human primates, or those Skeletal anatomy recognizable compared to other animal species radiography associated with human anatomy.

Note 2: When you need to coordinate other regional anatomy. (eg arm, wrist, leg or foot), these should be based on the coordinate system and the corresponding anatomical standardization original it is determined, and may be recommended in subsequent revisions of this standard.

Note 3: The standard recognizes that the definition and application of biodynamic coordinate related men and women, there is no difference between the skeletal anatomy. In addition, in determining child when children and for ethical biodynamic research, non-human mammal anatomy coordinates the development, testing and assessment, and the same applies to in principle.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 15619-2005 human exposure mechanical vibration and shock Vocabulary (ISO 5805:1997, IDT) ISO 1503. 1977 Geometrical orientation and direction of movement (Geometricalorientationanddirectionsofmovements)

3 Biodynamic coordinate system

When the collection, conversion, analysis, reporting, description, comparison or evaluation of human mechanical vibration and shock caused by the input data and the human body structure and system when the system response and, if feasible, should be the standard biodynamic coordinate system.

Note 1: biodynamic coordinate system can be based on the coordinate system-level orientation in inertial space (see Figure A.1 and A.2). This may be inertial reference system Ball centered, the basic or standard axial direction of gravity is located, or substantially the center of its interest in the origin of the force transmitted to the body or sports Contact surface (or some structure here is completely directed rigidly connected). Such as basic center coordinates according to the vehicle, workplace or laboratory Structure, vibration or shock directly affect human sources, such as mechanical vibrations vibrating tools or equipment, or research, motion simulator or shock loading Set to determine. In order to study and evaluate the biodynamic coordinate system for the instrument itself can provide a separate external reference coordinate system structure used to define people on or human in vivo inertial measurement.

Note 2: geometrically speaking, any particular posture of the human body can be regarded as fully object oriented (see Figure A.3).

Note 3: (for example, roughly defined in the human body can move freely deformed or amorphous or pliable soft tissue or surface coordinate system anatomy using origin Coordinates in the heart or

hip center) interfere with the biological kinetic data or obtain accurate comparison, therefore deprecated. Full defined in this standard Anatomical coordinate origin located stereotactic radiographic or determinable (including tactile) bones clearly marked place, and thereby determine the party to. In addition, the coordinate system is also suitable for mechanical simulation of non-human mammal body and human (dummy or mannequin) comparing biodynamic.