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Ergonomic principles related to mental workload —

Part 3:
Principles and requirements concerning methods for measuring and assessing mental workload

Principes ergonomiques relatifs à la charge de travail mental —

Partie 3: Principes et exigences concernant les méthodes de mesurage et d'évaluation de la charge de travail mental

Reference number
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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10075-3 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 1, *Ergonomic guiding principles*.

ISO 10075 consists of the following parts, under the general title *Ergonomic principles related to mental workload*:

- *Part 1: General terms and definitions*
- *Part 2: Design principles*
- *Part 3: Principles and requirements concerning methods for measuring and assessing mental workload*

A Technical Report will accompany these parts to explain to non-experts the basic concepts and how to use these parts.

Introduction

This part of ISO 10075 specifies technical information relevant in the context of constructing, evaluating and choosing measurement instruments for assessing mental workload as defined and treated in ISO 10075 and ISO 10075-2. Familiarity with the concepts discussed in these two documents is required to understand the provisions of this part of ISO 10075.

Since mental workload is a part of the total workload, users of this part of ISO 10075 should also be familiar with the concepts and provisions presented in ISO 6385.

This part of ISO 10075 aims at providing information for the development of measurement instruments, about which specifications will be required to evaluate a given procedure with regard to its usability as a measuring instrument for assessing mental workload.

This part of ISO 10075 addresses requirements for instruments measuring different aspects of mental workload, but it does not specify which instruments should be used, e.g. psychological scaling or psychophysiological methods. The choice of which instruments to use can be facilitated by the provision of appropriate information.

Ergonomic principles related to mental workload —

Part 3:
Principles and requirements concerning methods for measuring and assessing mental workload

1 Scope

This part of ISO 10075 establishes principles and requirements for the measurement and assessment of mental workload and specifies the requirements for measurement instruments. This part of ISO 10075 provides information for choosing appropriate methods and provides information on aspects of assessing and measuring mental workload to improve communication among the parties involved.

This part of ISO 10075 is intended for use mainly by ergonomic experts, for example, psychologists, occupational health specialists, and/or physiologists, with appropriate training in the theoretical background and usage of such methods, as well as in the interpretation of the results. They will find the information needed when developing or evaluating methods of mental-workload assessment.

Non-experts, e.g. employers, employees and their representatives, system managers and designers, and public authorities can find useful information for their orientation in the field of assessment and measurement of mental workload, e.g. what kinds of methods are available, which criteria are relevant in the evaluation of measurement instruments and what kind of information they should require and observe in deciding which instrument will be suitable for their purpose and which can be used.

NOTE A Technical Report on the terminology and use of this part of ISO 10075 will be available for further information for non-experts.

This part of ISO 10075 provides information on which to base a well-considered choice for an appropriate method in different situations. There are a large number of different methods available which are suitable for different purposes, situations and different levels of precision. There is a need for effective and efficient methods of measurement. The information provided in this part of ISO 10075 will allow users to evaluate the type of measurement approach most suitable for their specific purposes.

Conformance with the provisions of this part of ISO 10075 has to be provided by the documentation requirements.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6385:2004, *Ergonomic principles in the design of work systems*

ISO 10075:1991[1], *Ergonomic principles related to mental workload — General terms and definitions*

ISO 10075-2:1996, *Ergonomic principles related to mental workload — Part 2: Design principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6385:2004, ISO 10075:1991 and ISO 10075-2:1996 and the following apply.

3.1
objectivity
degree to which results gained with an instrument are independent of the person administering the instrument, analysing and interpreting the data

3.2
reliability
degree of precision to which a method or instrument is able to measure what it measures

NOTE Reliability can be assessed as homogeneity, consistency or stability of measurement, or in the case of two or more raters, as inter-rater-reliability. Reliability is closely related to generalizability.

3.2.1
homogeneity
degree to which all parts or items of a measurement procedure measure the same characteristic

3.2.2
consistency
degree to which different parts or parallel forms of a measurement instrument lead to identical results, e.g. by dividing a scale into two or more parts or applying two or more parallel forms of an instrument

3.2.3
stability
degree to which a (usually time delayed) replication of a measurement procedure leads to identical results

3.2.4
inter-rater-reliability
degree to which two or more raters produce the same results in measuring the same characteristics

3.3
validity
degree to which a method or instrument is able to measure what it is intended to measure

NOTE Validity can be assessed via concurrent validation (e.g. by agreement of results with the results of a simultaneously applied procedure known to measure the intended aspect), criterion-related validation (e.g. by establishing a relation with a relevant criterion), or factorial validity (e.g. by demonstrating that a measurement procedure assesses specific facets of a construct).

3.4
sensitivity
degree to which a method or instrument is able to discriminate between different degrees of the object of measurement, e.g. different degrees of mental strain or fatigue

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1) If revised, this International Standard will become ISO 10075-1.