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Bases for design of structures — General requirements

Bases du calcul des constructions — Exigences générales

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 98, *Bases for design of structures*, Subcommittee SC 2, *Reliability of structures*.

This second edition cancels and replaces the first edition (ISO 22111:2007), which has been technically revised. The main change compared to the previous edition is as follows:

— the document has been made consistent with the latest edition of ISO 2394 (ISO 2394:2015).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document incorporates the general principles of structural design as set out in ISO 2394. The general requirements relevant to the design of structures given here are expressed according to the semi-probabilistic approach as presented in ISO 2394. The general requirements are based on the premise that sufficient information is available on all aspects that are needed to set target levels of reliability and for uncertainty representation to be categorized and standardized, to ensure realization of such reliability through a semi-probabilistic approach. Procedures for deriving semi-probabilistic requirements and design methods from risk and reliability approaches are provided in ISO 2394.

The general requirements for actions on structures and the material independent resistance of the structures provided in this document are expressed on the basis of related standards for all actions and structural materials relevant to the scope of application.

The main duties for standards organisations in adopting this document are:

— to set target levels of reliability;

— to provide a suitable format and a set of quantitative design parameters;

— to establish the relevant standards from which input values for actions and resistance are to be obtained.

International Standards on actions are referenced here in lieu of standards within the jurisdiction of the adopting group.

As this document is an International Standard, its scope represents general consensus for standardized procedures for the semi-probabilistic design verification requirements of structural reliability. Thus, this document is intended to promote harmonization of structural design practice. Additional requirements and procedures need to be added to provide for specific types of structures, conditions or design practice.

This document has the following aims:

— to facilitate international practice in structural design by expressing the general requirements for the basis for the design of structures;

— to obtain international standardization of the process for setting up rules for structural design, while allowing each economy to specify its own levels of structural performance, in accordance with its own needs;

— to provide a means of promoting commonality, interchangeability, consistency and comparability of structural standards developed by different economies, such that regulators, standards writers, designers and academics could then adopt such standards with confidence in their international acceptance;

— to encourage regulatory authorities in each country to describe their mandatory requirements in an internationally agreed format;

— to facilitate future coordination between the various specialist subcommittees and working groups for ISO structural standards;

— to create transparency in the process of comparison of national standards for structural design.

Annex A to Annex D provide additional guidance on the adoption of this document and its adaptation to suit the conditions and requirements of the relevant standardization organisation.

Bases for design of structures — General requirements

1 Scope

This document provides the requirements for structural design and procedures following a semi-probabilistic approach that conform to the general principles for structural reliability as stipulated by ISO 2394. The scope of requirements and procedures are accordingly limited to the design of structures for which sufficient knowledge and experience are commonly available on design and construction practice to ensure that target levels of reliability account for the nature and consequences of structural failure. Situations outside these limitations are covered by ISO 2394.

The methods that are included in this document are the semi-probabilistic limit states approaches that are proven to achieve sufficient and consistent levels of structural reliability.

This document relies on standardized procedures for the characterization of the load bearing performance of the structures within its scope. Sufficient information is needed on uncertainties of design variables and models to be able to derive semi-probabilistic design measures for verification of structural reliability within the scope of this and the related design standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 13823, *General principles on the design of structures for durability*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 General terms

3.1.1
structure
organized combination of connected parts including geotechnical structures designed to provide *resistance* (3.3.14) and rigidity against various *actions* (3.3.1)

[SOURCE: ISO 2394:2015, 2.1.1]

3.1.2
structural performance
qualitative or quantitative representation of the behaviour of a *structure* (3.1.1) (e.g. load bearing capacity, stiffness, etc.) related to its safety and *serviceability* (3.1.6), durability and *robustness* (3.1.7)