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Grundläggande dimensioneringsregler för bärverk – Tillståndsbedömning av befintliga bärverk

Bases for design of structures – Assessment of existing structures

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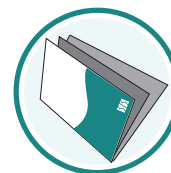
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Denna standard ersätter SS-ISO 13822:2008, utgåva 1.

The International Standard ISO 13822:2010 has the status of a Swedish Standard. This document contains the official English version of ISO 13822:2010.

This standard supersedes the Swedish Standard SS-ISO 13822:2008, edition 1.

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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 13822 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 13822:2001), which has been technically revised, including the addition of a new Annex I, the associated change to the Foreword and with some minor editorial changes.

Introduction

The continued use of existing structures is of great importance because the built environment is a huge economic and political asset, growing larger every year. The assessment of existing structures is now a major engineering task. The structural engineer is increasingly called upon to devise ways for extending the life of structures whilst observing tight cost constraints. The establishment of principles for the assessment of existing structures is required because it is based on an approach that is substantially different from design of new structures and requires knowledge beyond the scope of design codes. This document is intended not only as a statement of principals and procedures for the assessment of existing structures but also as a guide for use by structural engineers and clients. Engineers can apply specific methods for assessment in order to save structures and to reduce a client's expenditure. The ultimate goal is to limit construction intervention to a strict minimum, a goal that is clearly in agreement with the principles of sustainable development.

The basis for the reliability assessment is contained in the performance requirements for safety and serviceability of ISO 2394. Economic, social and sustainability considerations, however, result in a greater differentiation in structural reliability for the assessment of existing structures than for the design of new structures.

Bases for design of structures — Assessment of existing structures

1 Scope

This International Standard provides general requirements and procedures for the assessment of existing structures (buildings, bridges, industrial structures, etc.) based on the principles of structural reliability and consequences of failure. It is based on ISO 2394.

It is applicable to the assessment of any type of existing structure that was originally designed, analysed and specified based on accepted engineering principles and/or design rules, as well as structures constructed on the basis of good workmanship, historic experience and accepted professional practice. The assessment can be initiated under the following circumstances:

- an anticipated change in use or extension of design working life;
- a reliability check (e.g. for earthquakes, increased traffic actions) as required by authorities, insurance companies, owners, etc.;
- structural deterioration due to time-dependent actions (e.g. corrosion, fatigue);
- structural damage by accidental actions (see ISO 2394).

This International Standard is also applicable to heritage structures provided additional considerations shown in Annex I are taken into account.

This International Standard is applicable to existing structures of any material, although specific adaptation can be required depending on the type of material, such as concrete, steel, timber, masonry, etc.

This International Standard provides principles regarding actions and environmental influences. Further detailed considerations are necessary for accidental actions such as fire and earthquake.

NOTE Fire resistance requires properties different from those for structural safety and integrity. Also fire hazards can be created by change in use. Special requirements are necessary for seismic hazards taking the dynamic action and structural response into account.

This International Standard is intended to serve as a basis for preparing national standards or codes of practice in accordance with current engineering practice and the economic conditions.

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 2394:1998, *General principles on reliability for structures*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2394 and the following apply.

NOTE See also Annex A.

- 3.1
assessment**
set of activities performed in order to verify the reliability of an existing structure for future use
- 3.2
damage**
unfavourable change in the condition of a structure that can affect structural performance
- 3.3
deterioration**
process that adversely affects the structural performance, including reliability over time due to
- naturally occurring chemical, physical or biological actions,
 - repeated action such as those causing fatigue
 - normal or severe environmental influences
 - wear due to use, or
 - improper operation and maintenance of the structure.
- 3.4
deterioration model**
mathematical model that describes structural performance as a function of time, taking deterioration into account
- 3.5
inspection**
on-site non-destructive examination to establish the present condition of the structure
- 3.6
investigation**
collection and evaluation of information through inspection, document search, load testing and other testing
- 3.7
load testing**
test of the structure or part thereof by loading to evaluate its behaviour or properties, or to predict its load bearing capacity
- 3.8
maintenance**
routine intervention to preserve appropriate structural performance
- 3.9
material properties**
mechanical, physical or chemical properties of structural materials
- 3.10
monitoring**
frequent or continuous, normally long-term, observation or measurement of structural conditions or actions

3.11**reference period**

chosen period of time which is used as a basis for assessing values of variable actions, time-dependent material properties, etc.

NOTE The remaining working life or the minimum standard period for safety of an existing structure can be taken as a reference period (see Annex F).

3.12**rehabilitation**

work required to repair, and possibly upgrade, an existing structure

3.13**remaining working life**

period for which an existing structure is intended/expected to operate with planned maintenance

3.14**repair**, verb

<of a structure> improve the condition of a structure by restoring or replacing existing components that have been damaged.

3.15**safety plan**

plan specifying the performance objectives, the scenarios to be considered for the structure, and all present and future measures (design, construction, or operation such as monitoring) to ensure the safety of the structure

3.16**structural performance**

qualitative or quantitative representation of the behaviour of a structure (e.g. load bearing capacity, stiffness) in terms of its safety and serviceability

3.17**target reliability level**

level of reliability required to ensure acceptable safety and serviceability

3.18**upgrading**

modifications to an existing structure to improve its structural performance

3.19**utilization plan**

plan containing the intended use (or uses) of the structure, and listing the operational conditions of the structure including maintenance requirements, and the corresponding performance requirements

4 General framework of assessment

4.1 Objectives

The objective of the assessment of an existing structure in terms of its required future structural performance shall be specified in consultation with the client (the owner, the authority, insurance companies, etc.) based on the following performance levels:

- a) safety performance level, which provides appropriate safety for the users of the structure;
- b) continued function performance level, which provides continued function for special structures such as hospitals, communication buildings or key bridges in the event of an earthquake, impact, or other foreseen hazard;