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Maintenance and repair of concrete structures: —

Part 2:
Assessment of existing concrete structures

Élément introductif — Élément central — Élément complémentaire

Entretien et réparation des structures en béton —

Partie 2: Évaluation des structures en béton existantes

FDIS stage

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Foreword

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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 document 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).

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This document was prepared by Technical Committee~~-~~ ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 7, *Maintenance and repair of concrete structures*.

This second edition cancels and replaces the first edition (ISO 16311-2:2014) which has been technically revised.

The main changes are as follows:

— ~~—~~Prediction ~~of Clause 7 is~~has been added~~.~~ as Clause 7.

— ~~—~~Some terms and definitions ~~are~~have been revised.

— ~~—~~Some figures ~~are~~have been revised.

A list of all parts in the ISO 16311 series can be found on the ISO website.

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~~www.iso.org/members.html.

Introduction

Assessment of an existing concrete structure identifies and defines areas of distress, and verifies structural performance based on the evaluated condition of the structure. It includes the whole process from defining the work through the investigation, evaluation, verification, prediction, and registration to the final report. This is necessary as a basis for the design of the repair and the preparation of procedures to preserve or extend its remaining service life.

The report, concluding the assessment, includes a description of the structure, the investigation, the results of condition assessment, the verified structural performance, the expected future development and a short presentation of possible repair principles and methods, including appropriate cost calculations. A detailed planning and design of the repair work (repair or rehabilitation project specification) is not part of the assessment, see ISO 16311-~~-~~3.

This document gives the requirements for assessment of concrete structures, including a framework for the assessment, a format for documentation of the condition assessment with assessed condition level and consequence level, and a format for documentation of the performance assessment with verified specific structural performance.

This document is primarily based on the principles given in ISO 13822. ISO 13822:2010, Annex ~~-~~ B has a detailed flowchart, included as ~~Figure 1~~Figure 1 in this document.

Maintenance and repair of concrete structures —

Part 2:
Assessment of existing concrete structures

1 Scope

This document describes general requirements and procedures for the assessment of concrete structures.

The assessment can be initiated under the following circumstances, but not limited to:

a) a) an anticipated change in use or extension of design service life;

b) b) structural deterioration due to time-dependent actions such as corrosion of reinforcement, fatigue, etc.;

c) c) safety and/or serviceability check (e.g. for earthquake and increased traffic actions) as required by authorities, insurance companies, owners, etc.;

d) d) structural damage by accidental actions. (See (see ISO 2394)).

This document does not cover

— — qualification of personnel;

— — contractual matters;

— — health and safety requirements for the protection of workers during the investigation and testing.

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 2394, *General principles on reliability for structures*

ISO 13822:2010, *Bases for design of structures — Assessment of existing structures*

ISO 16311-1, *Maintenance and repair of concrete structures — Part 1: General principles*

ISO 16311-3, *Maintenance and repair of concrete structures — Part 3: Design of repairs*

ISO 16311-4, *Maintenance and repair of concrete structures — Part 4: Execution of repairs*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13822, ISO 16311-1 and the following apply.

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

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

— ~~—~~IEC Electropedia: available at ~~https://www.electropedia.org/~~https://www.electropedia.org/

3.1
accidental action
action that is unlikely to occur with a significant value on a given structure over a given reference period

Note 1 to entry: Accidental actions are in most cases of short duration.

3.2
~~**assessment**~~
~~set of activities performed in order to verify the reliability of an existing structure for future use~~

~~[SOURCE: ISO 13822:2010]~~

~~**3.3**~~
condition
status of a structure or a structural member at a given time

3.~~4~~3
condition level
expression of the condition of a structure or a structural member, compared to a reference level

3.~~5~~4
condition registration
survey and collection of information to define the condition of a structure or structural member

3.~~6~~5
consequence level
expression of seriousness of consequences related to a defined reference level

3.~~7~~6
damage
unfavourable change in the condition of a structure that can affect structural performance

3.~~8~~7
defect
fault~~,~~ or deviation from the intended level of performance of a structure or its parts

3.~~9~~8
deterioration
process that adversely affects the structural performance, including reliability over time due to

— ~~—~~naturally occurring chemical, physical or biological actions,

— ~~—~~repeated actions such as those causing fatigue,

— ~~—~~normal or severe environmental influences,

— ~~—~~wear due to use, or

— improper operation and maintenance of the structure

3.109
direct action
assembly of concentrated or distributed mechanical forces acting on a structure

3.11
environmental action
assembly of physical, chemical, or biological influence which maycan cause restraint effects or deterioration to the materials making up the structure, which in turn maycan adversely affect its serviceability, restorability, and safety

3.1210
inspection
conformity evaluation by observation and judgement accompanied as appropriate by measurement, testing or gauging

Note 1 to entry: For structures, this evaluation consists of actions collecting information on the current state of a structure through observation and simplified non-destructive or destructive testing supplemented with materials and structural testing, as required.

3.1311
maintenance
class of maintenance depending on importance, service life, environmental conditions, maintainability of the structures, etc.

[SOURCE: ISO 16311-1:2014]

3.13
risk
combination of the probability or frequency of occurrence of an event and the magnitude of its consequences

3.1412
service life prediction
generic methodology which, for a particular or any appropriate performance requirement, facilitates a prediction of the service life distribution of a building or its parts for the use in a particular or in any appropriate environment

[SOURCE: ISO 15686-2:2012]

3.15
symptom
indicator for the condition of a structure or structural member, based on one or more characteristics

3.1613
visual inspection
inspection of a structure by visual observation in the preliminary investigation for its assessment

4 Framework of assessment

4.1 General

The overall assessment procedure shall comply with ISO 13822 and include the following main parts according to ~~Figure 1,~~Figure 1, which is a general flowchart copied from ISO 13822:

— ~~—~~objectives of assessment;

— ~~—~~scenarios;

— ~~—~~preliminary assessment;

— ~~—~~detailed assessment;

— ~~—~~reporting results of assessment;

— ~~—~~judgement and decision;

— ~~—~~intervention.

A site visit is recommended prior to initiating the assessment.

4.2 Personnel

An assessment shall be performed by qualified personnel.

NOTE National requirements on qualification for personnel can apply.