
**Maintenance and repair of concrete
structures —**

**Part 3:
Design of repairs and prevention**

Entretien et réparation des structures en béton —

Partie 3: Conception des réparations et prévention



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Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Minimum considerations before repair and prevention design.....	2
4.1 General.....	2
4.2 Initial risk assessment.....	2
4.3 Assessment of defects and their causes.....	3
5 Strategies for maintenance, repair, and prevention.....	4
5.1 General.....	4
5.2 Options.....	4
5.3 Factors.....	4
5.4 Choice of appropriate strategy.....	5
6 Basis for the choice of specific repair and prevention design principles, strategies, remedies, and methods.....	6
6.1 General.....	6
6.2 Repair remedies and methods of maintenance, repair, and prevention.....	6
7 Properties of products and systems required for compliance with repair and prevention remedies.....	8
8 Design documentation requirements.....	9
9 Compliance with health, safety, and environmental requirements.....	9
10 Competence of personnel.....	9
Annex A (informative) Design of repairs and prevention.....	10
Bibliography.....	22

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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 7, *Maintenance and repair of concrete structures*.

ISO 16311 consists of the following parts, under the general title *Maintenance and repair of concrete structures*:

- *Part 1: General principles*
- *Part 2: Assessment of existing concrete structures*
- *Part 3: Design of repairs and prevention*
- *Part 4: Execution of repairs and prevention*

Introduction

The repair and prevention of defects and deterioration in concrete structures requires complex design work. This part of ISO 16311 defines the design principles, strategies, remedies, and methods for preventing accelerated deterioration and the repair of concrete structures that have suffered or may suffer damage or deterioration. It gives guidance on the choice of repair design principles, strategies, remedies, methods, and selection of products and systems which are appropriate for the intended use.

This part of ISO 16311 identifies key stages in the repair process:

- the need for assessment of the condition of the structure;
- the need for identification of the causes of deterioration;
- evaluating the options for repair and prevention, and decision-making;
- the selection of the appropriate remedies for repair and prevention;
- the selection of methods;
- the definition of properties of products and systems;
- the specification of maintenance requirements following repair and prevention.

This part of ISO 16311 does not deal with matters related to structural design and the verification of structural performance in both deteriorated and repaired condition. The information related to the deteriorated condition is presented in ISO 16311-2.

This part of ISO 16311 contains an [Annex A](#) which provides guidance and background information on the normative text.

Maintenance and repair of concrete structures —

Part 3: Design of repairs and prevention

1 Scope

This part of ISO 16311 defines basic considerations and decision-making for the specification of repair and prevention remedies, and management strategies for reinforced and unreinforced concrete structures using products and systems specified in other International Standards or Technical Specifications. This part of ISO 16311 covers only atmospherically exposed structures, and buried or submerged structures, if they can be accessed.

This part of ISO 16311 specifies repair and prevention design principles, and strategies for defects and on-going deterioration including, but not limited to:

- a) mechanical actions, e.g. impact, overloading, movement caused by settlement, blast, vibration, and seismic actions;
- b) chemical and biological actions from environments, e.g. sulfate attack, alkali-aggregate reaction;
- c) physical actions, e.g. freeze-thaw, thermal cracking, moisture movement, salt crystallization, fire, and erosion;
- d) reinforcement corrosion;
- e) original construction defects that remained unaddressed from the time of construction.

The execution of maintenance and repairs is covered in ISO 16311-4.

Further background information on the scope of this part of ISO 16311 is given in [Annex A](#).

2 Normative references

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

ISO 14040, *Environmental management — Life cycle assessment — Principles and framework*

ISO 14044, *Environmental management — Life cycle assessment — Requirements and guidelines*

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

ISO 16311-2, *Maintenance and repair of concrete structures — Part 2: Assessment of existing concrete structures*

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

ISO 22965-1, *Concrete — Part 1: Methods of specifying and guidance for the specifier*

3 Terms and definitions

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