INTERNATIONAL STANDARD

ISO 13315-4

First edition
2017-03

Environmental management for concrete and concrete structures —

Part 4: Environmental design of concrete structures

Management environnemental du béton et des structures en béton —
Partie 4: Conception environnementale des structures en béton

Reference number
ISO 13315-4:2017(E)

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 8, *Environmental management for concrete and concrete structures*.

A list of all the parts in the ISO 13315 series can be found on the ISO website.

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Introduction

Environmental management is essential for properly estimating the negative and positive environmental impacts brought about by a construction project in order to reduce the environmental burden and create environmental benefits. Environmental considerations for a structure, in particular, are to be carried out at the design stage and be integrated with conventional structural design and durability design. To this end, standardization of the design procedure for environmental design becomes a necessity.

ISO 14040 stipulates the principles and framework of lifecycle assessment (LCA) for the environmental management of products and services. However, it is somewhat difficult to apply this to structures with extremely long lifecycles, such as infrastructures and building structures.

The use of concrete, a key construction material, accounts for a particularly large part of the environmental impacts related to construction projects. If the environmental impacts related to a concrete structure are accurately dealt with to achieve environmental design, this can enable a dramatic reduction in the environmental burden for the construction project as a whole and increase the environmental benefits. Therefore, a method of environmental design specifically for concrete structures is essential and led to the development of this document.

In the environmental design of a concrete structure, appropriate specifications for materials and structural details are established based on LCA. ISO 13315-1 stipulates the principles of environmental consideration for concrete and concrete structures while ISO 13315-2 stipulates the system boundaries necessary for carrying out LCA and the inventory data to be acquired.

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Environmental management for concrete and concrete structures —

Part 4:
Environmental design of concrete structures

1 Scope

This document provides the general framework, principles and requirements for carrying out an environmental design of concrete structures, based on a lifecycle assessment (LCA) method or other appropriate methods.

This document is applicable to single concrete structures, as well as concrete structure complexes.

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 13315-2, *Environmental management for concrete and concrete structures — Part 2: System boundary and inventory data*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13315-1, ISO 13315-2, ISO 14040 and ISO 14050, and the following apply.

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

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

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

3.1
client briefing
document which specifies at any point in time the relevant needs, aims and resources of the client and user, the context of the project and any appropriate design requirements

3.2
durability design
design of a structure in which durability is considered

3.3
environmental design
design of a structure in which environmental impacts are considered

[SOURCE: ISO 13315-1:2012, 3.6]

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3.4
structural design
design of a structure in which structural performances including safety, serviceability, restorability, structural integrity and robustness are considered

4 Framework of environmental design

Figure 1 illustrates the positioning of environmental design in the entire design of concrete structures.

The environmental design of a concrete structure shall be carried out integrally with structural design and durability design and be in harmony with the landscape and surrounding environment.

Environmental design includes client briefing, setting of environmental performance requirements, design, estimation of retained environmental performances, verification and documentation.

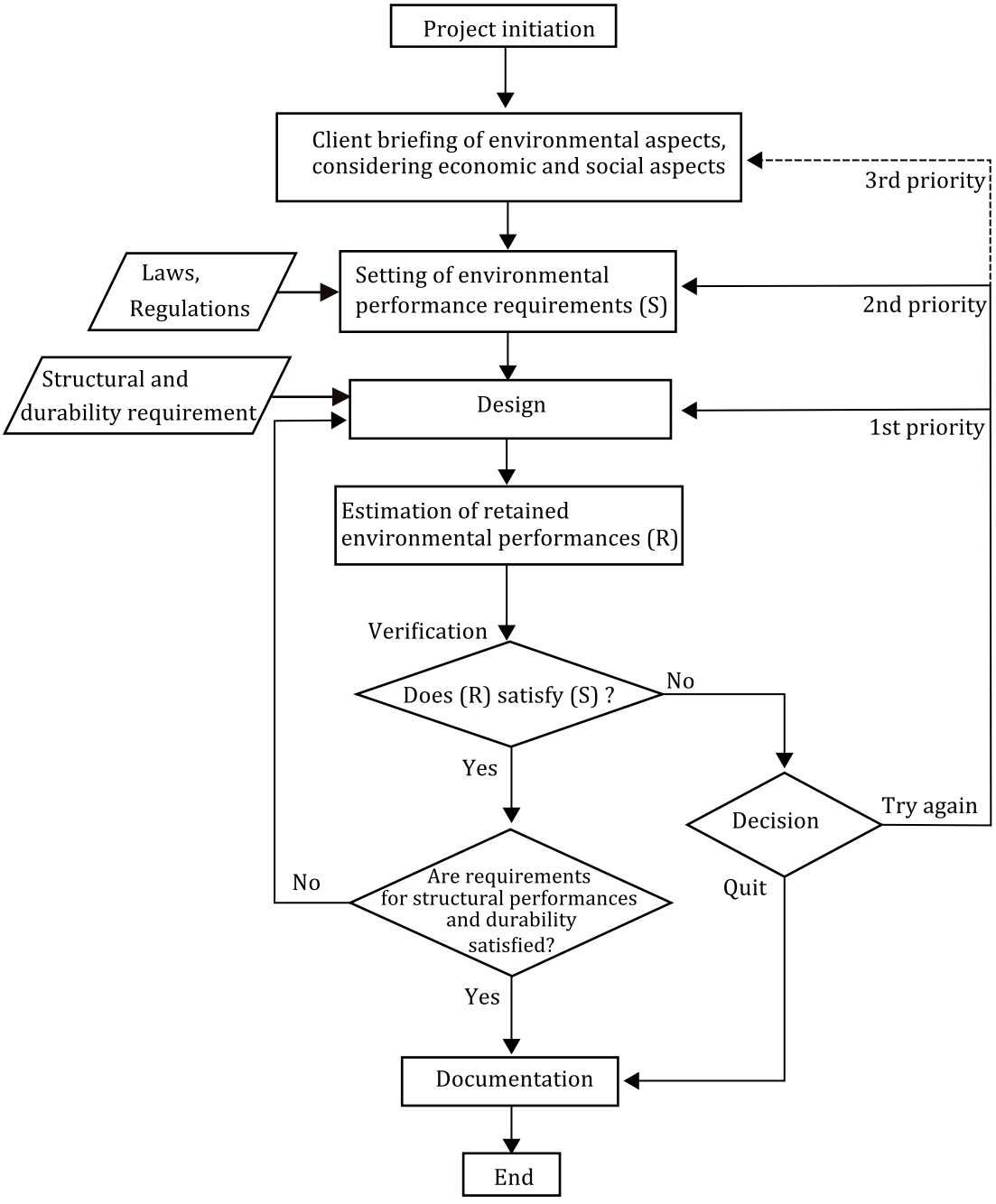


Figure 1 — Environmental design of concrete structures

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