INTERNATIONAL STANDARD

ISO 15686-1

Second edition
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Buildings and constructed assets — Service life planning —

Part 1:
General principles and framework

Bâtiments et biens immobiliers construits — Conception prenant en compte la durée de vie —

Partie 1: Principes généraux et cadre

Reference number
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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web 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.

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 15686-1 was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 14, *Design life*.

This second edition cancels and replaces the first edition (ISO 15686-1:2000), which has been technically revised to condense ISO 15686-1 into a more generic process of service life planning and to better reflect the other parts of ISO 15686.

ISO 15686 consists of the following parts, under the general title *Buildings and constructed assets — Service life planning*:

- *Part 1: General principles and framework*
- *Part 2: Service life prediction procedures*
- *Part 3: Performance audits and reviews*
- *Part 5: Life-cycle costing*
- *Part 6: Procedures for considering environmental impacts*
- *Part 7: Performance evaluation for feedback of service life data from practice*
- *Part 8: Reference service life and service-life estimation*
- *Part 9: Guidance on assessment of service-life data* [Technical Specification]
- *Part 10: When to assess functional performance*

The following Technical Report is under preparation:

- *Part 11: Terminology*

Service life planning using IFC-based building information monitoring will form the subject of a future Technical Report (ISO/TR 15686-4).

0 Introduction

0.1 Service life planning

Service life planning is a design process that seeks to ensure that the service life of a building or other constructed asset will equal or exceed its design life. If required, service life planning can take into account the life-cycle cost(s) of the building and its life-cycle environmental impact(s). Service life planning provides a means of comparing different building options. During the project delivery phase, to ensure that the design meets the functional requirement levels, consideration of different conceptual design solutions can be used to assess the impact of design changes on the design life.

This part of ISO 15686 is intended primarily, but not exclusively, for the following user groups:

a) building owners and users;

b) design, construction and facilities management teams;

c) manufacturers who provide data on long-term performance of building products;

d) maintainers of buildings;

e) value appraisers of buildings;

f) insurers of buildings;

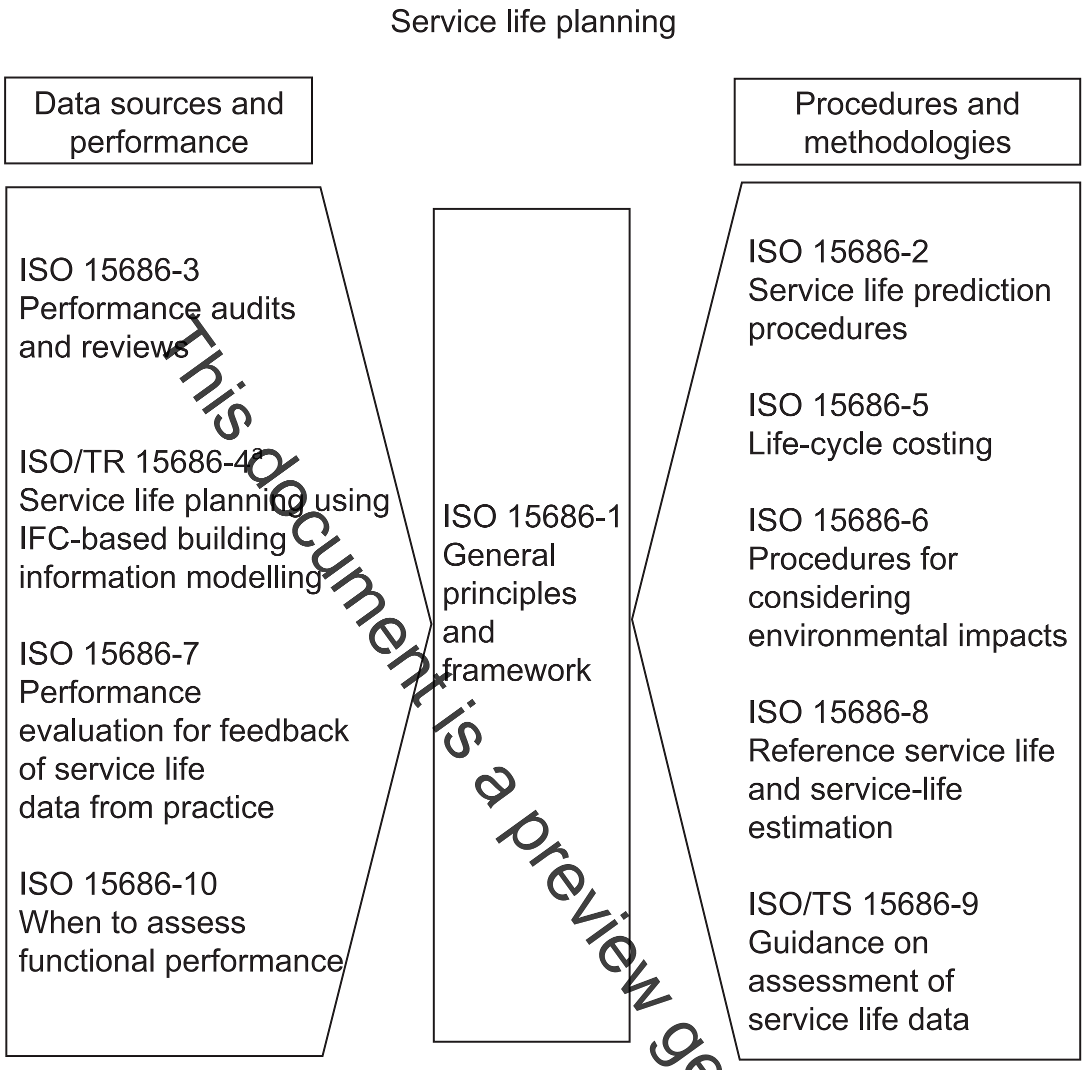
g) technical auditors of buildings;

h) developers of building product standards;

i) clients, funders, and sponsors of buildings.

By requiring an estimate or prediction of how long each component of a building will last, service life planning aids the making of decisions concerning specifications and design detailing. Also, when the service life of the building and its components are estimated or predicted, life-cycle cost and maintenance planning and value engineering techniques can be applied, reliability and flexibility of use of the building can be increased, and the likelihood of early obsolescence can be reduced.

Figure 1 indicates how the parts of ISO 15686 are intended to relate to each other and their associated topics.



[a] Under development.

Figure 1 — Relationships between the parts of ISO 15686 and the service life planning of buildings

0.2 Structure of ISO 15686

This part of ISO 15686 specifies the general principles of service life planning of a building or other constructed asset and presents a framework for undertaking such service life planning. These general principles can also be used to make decisions on maintenance and replacement requirements. This part of ISO 15686 serves as a guide to other parts, including general principles to be applied. Together, they provide requirements and guidance on the estimation or prediction of the service life of a building's components, which contribute to the service life of the building.

ISO 15686-2 specifies principles and procedures that facilitate service life predictions of building components. It provides a general framework, procedures and requirements for conducting and reporting such studies, but does not describe specific test methods. It may also be used as a checklist for assessing completed service life prediction studies.

ISO 15686-3 is concerned with ensuring the effective implementation of service life planning audits and reviews. It describes the approach and procedures to be applied to pre-briefing, briefing, design, construction and, where required, the life care management and disposal of buildings to provide reasonable assurance that measures necessary to achieve a satisfactory performance over time will be implemented.

ISO/TR 15686-4 is under development and will describe the data required to undertake service life estimation. This is primarily intended to define the data relating to service life that may be required in computer models. The formatting of such data for inclusion in calculation of models is expected to be presented in accordance with ISO 12006 (all parts).

ISO 15686-5 specifies procedures for performing life-cycle cost analyses of buildings and their parts. These assessments take into account cost or cash flows, i.e. relevant costs (and income and externalities if included in the agreed scope) arising from acquisition through operation to disposal. This assessment typically includes a comparison between options or an estimate of future costs at portfolio, project or component level. The assessment is over an agreed period of analysis, which can be a time frame that is less than the full life-cycle of the constructed asset.

ISO 15686-6 specifies how to assess, at the design stage, the potential environmental impacts of alternative designs of a constructed asset. It identifies the interface between environmental life-cycle assessment and service life planning.

ISO 15686-7 provides a generic basis for performance evaluation for feedback of service life data from existing buildings, including a definition of the terms to be used and the description of how the (technical) performance can be described and documented to ensure consistency.

ISO 15686-8 provides guidance on the provision, selection and formatting of reference service life data and on the application of these data for the purposes of calculating estimated service life using the factor method. It does not give guidance on how to estimate either the modification part or the values of factors A to G, using the given reference in-use conditions and the object-specific in-use conditions.

ISO/TS 15686-9 gives guidance and provides a framework for the derivation and presentation of reference service life data. In response to market demand, manufacturers and producers can develop, voluntarily, service life declarations for use in service life planning, according to this part of ISO 15686 and ISO 15686-8.

ISO 15686-10 establishes when to specify or verify functional performance requirements during the service life of buildings and building-related facilities and when to check the capability of buildings and facilities to meet identified requirements using procedures for establishing scales for setting levels of functionality or assessing levels of serviceability for any type of facility and any gaps that may exist between demand and supply profiles.[1] ISO 15686-10 is applicable to the use, management, ownership, financing, planning, design, acquisition, construction, operation, maintenance, renovation and disposal of buildings and other constructed assets.

0.3 Purpose of ISO 15686

ISO 15686 is relevant to service life planning of new and existing buildings. In existing buildings, service life estimation will apply principally to the estimation of residual service lives of components that are already in service, and to the selection of components for, and the detailing of, repairs and new work.

The informative annexes to this part of ISO 15686 provide supplementary information and illustrate the use of methods specified in the normative clauses. Differences in climatic conditions and building techniques in different parts of the world require separate aspects of service life planning to be developed for specific circumstances, and to take account of locality and microclimate.

NOTE 1 The approach to service life planning presented in ISO 15686 is based on documents published by CIB and RILEM, standards published in the UK, Japan, Canada and the USA, and on practical studies carried out in many countries.

NOTE 2 In the European Community, the Construction Products Directive includes a requirement that the "essential requirements" of construction products be retained for an "economically reasonable working life", if necessary by maintenance.

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[1] International Standards for the determination of levels of functionality (demand) and levels of serviceability (supply) are the responsibilty of ISO/TC 59/SC 3.

Buildings and constructed assets — Service life planning —

Part 1:
General principles and framework

1 Scope

This part of ISO 15686 identifies and establishes general principles for service life planning and a systematic framework for undertaking service life planning of a planned building or construction work throughout its life cycle (or remaining life cycle for existing buildings or construction works).

The life cycle incorporates initiation, project definition, design, construction, commissioning, operation, maintenance, refurbishment, replacement, deconstruction and ultimate disposal, recycling or re-use of the asset (or parts thereof), including its components, systems and building services.

This part of ISO 15686 is applicable to the service life planning of individual buildings.

NOTE A series of service life plans can be used as input data to the strategic property management of a number of buildings.

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 6707-1, *Building and civil engineering — Vocabulary — Part 1: General terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1 and the following apply.

3.1
building
construction work that has the provision of shelter for its occupants or contents as one of its main purposes and is usually enclosed and designed to stand permanently in one place

3.2
constructed asset
anything of value that is constructed or results from construction operations

3.3
design life
DL
intended service life (deprecated)
expected service life (deprecated)
service life intended by the designer

NOTE As stated by the designer to the client to support specification decisions.