
**Buildings and constructed assets —
Service life planning —**

Part 3:
Performance audits and reviews

*Bâtiments et biens immobiliers construits — Prédiction de la durée de vie —
Partie 3: Audits et revues des performances*



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS

© ISO 2002

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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.ch
Web www.iso.ch

Printed in Switzerland

Contents

Page

Foreword.....	iv
Introduction.....	v
1 Scope	1
2 Conformance.....	1
3 Normative references.....	1
4 Terms and definitions.....	2
5 General audit requirements and responsibilities.....	3
5.1 General.....	3
5.2 Audit stages	4
5.3 Roles	5
5.4 Auditor appointment.....	7
5.5 Audit quality control.....	8
6 Implementing the audit	8
6.1 Audit plan	8
6.2 Documentation.....	9
6.3 Changes to project information	10
6.4 Audit records	10
6.5 Audit reports	10
6.6 Executing audits at each stage.....	11
7 Service life performance reviews.....	18
7.1 Internal review procedures.....	18
7.2 Planning the review	19
7.3 Implementing the review.....	19
7.4 Recording the review	19
Annex A (informative) Audit guidance.....	21
Annex B (informative) Review guidance.....	28
Annex C (informative) Checklists and proformas.....	30
Bibliography.....	37

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 3.

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 part of ISO 15686 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15686-3 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 14, *Design life*.

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

- *Part 1: General principles*
- *Part 2: Service life prediction procedures*
- *Part 3: Performance audits and reviews*

Annexes A, B and C of this part of ISO 15686 are for information only.

Introduction

Buildings and constructed assets require care from the initial proposals through to design, construction, operation, maintenance and disposal, to ensure they meet the required level of performance. ISO 15686-1 and ISO 15686-2 explain the principles of designing an appropriate service life for different types of constructed assets, components and assemblies. This part of ISO 15686 deals with measures to ensure that the life care of a constructed asset is considered through each stage of decision making from project conception and initial briefing, through design and construction, to occupancy and eventual disposal and reinstatement of the site.

This part of ISO 15686 provides a choice between formal independent audits carried out at key project stages (clauses 5 and 6); and service life performance reviews carried out alongside existing internal project review procedures (clause 7). The advantages of formal external audits can include greater independence and objectivity as well as access to wider experience of auditing procedures. Service life performance reviews benefit from greater familiarity with the specific project and the potential to integrate certain review procedures with other project validation procedures such as designers' quality management system checks.

NOTE There is also scope for integrating service life performance audit and review procedures within a project, such that the documented outcomes of the review process form the inputs into the audit process at a given project stage. The review then becomes the primary means of ensuring effective service life planning and the audit function is limited to that of verifying the outcomes of the review process (see Figure 1).

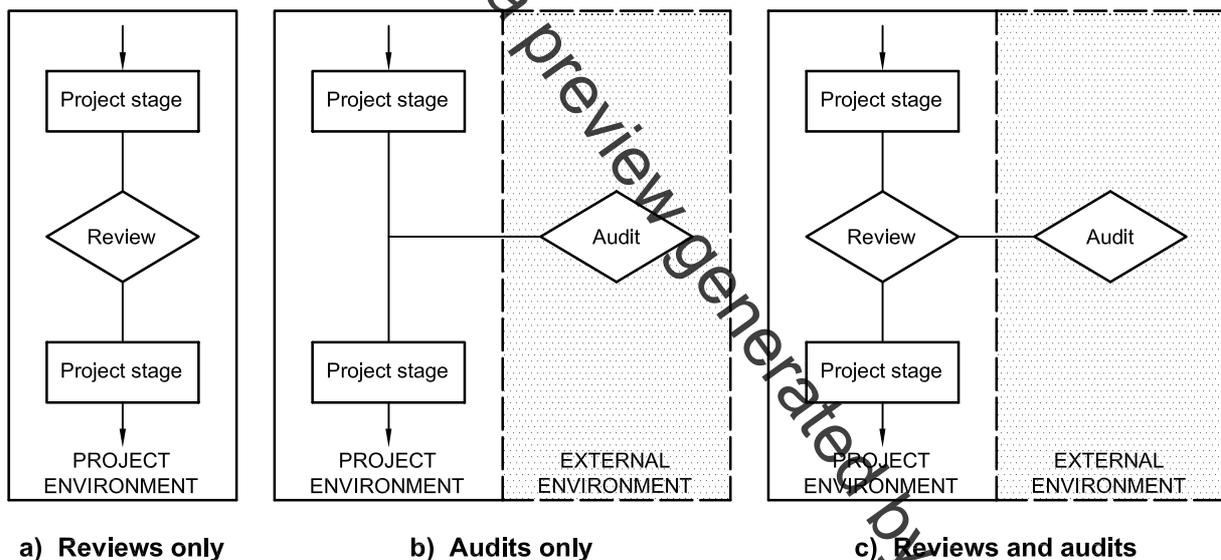


Figure 1 — Three models for integrating performance audits and reviews into the procurement process

Both service life performance audits and reviews emphasize the pre-briefing, briefing and design stages of a construction project. It is the far-reaching decisions made at these early stages that affect what is built, the way it is constructed, its commissioning and operation, how it should be maintained and the options for dealing with the structure at the end of its life cycle. It has been found that more than 50 % of building failures can be traced back to the brief and to information passed on in, or missing from, the design and specification details that the constructor receives. Other failures can result from poor construction, inadequate commissioning, unsuitable use of the building, and inadequate life care. The service life performance audit and review process includes a means of checking back in these later stages to ensure that the original intentions are followed.

Auditing is a key management tool for ensuring that stated objectives are met. Procedures have been established for auditing quality management systems (ISO 19011) and for environmental auditing (ISO 14010, ISO 14011 and ISO 14012). Many of the techniques described here are similar to those used for quality and environmental auditing and there is an opportunity in service life performance audits and reviews to combine procedures in specific circumstances.

A service life performance audit or review of the pre-briefing stage and of the project brief should reveal where client requirements for service life are missing or inadequately defined. The requirements can then be defined before work starts on the detailed design. An audit or review of the detailed design will report on nonconformities, i.e. where the design does not meet the requirements of the brief. The design can then be amended, or the requirements redefined, before construction.

Further audits or reviews of the construction, commissioning, and future operation, refurbishment, adaptation and disposal of the constructed asset can be undertaken to ensure that the required service life performance is not compromised by such activities.

Figure 2 summarizes the main topics covered in this part of ISO 15686.

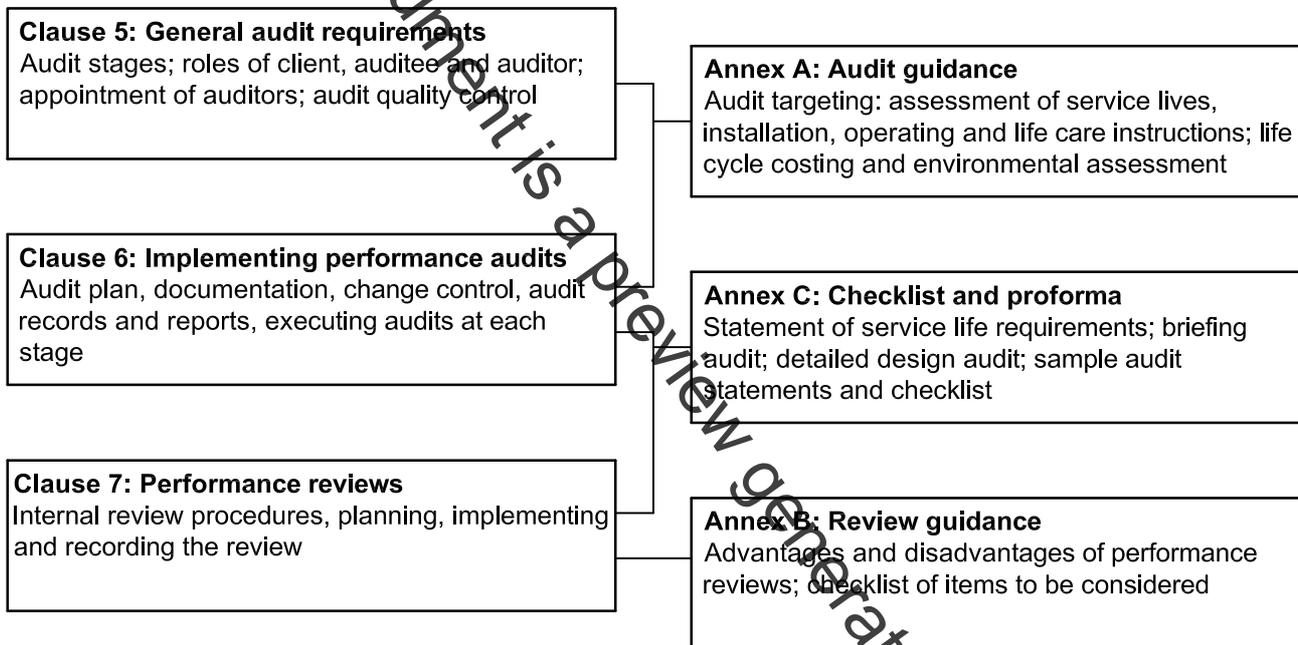


Figure 2 — Overview of this part of ISO 15686

The provisions of this part of ISO 15686 are intended primarily for

- construction clients,
- persons appointed to carry out service life performance audits (auditors),
- designers, and
- operational and maintenance personnel.

They are also relevant to the work of constructors, project managers, inspectors, asset and facilities managers, insurers and valuers.

In addition to this part of ISO 15686, six other parts are published or are in the course of preparation, as follows.

- Part 1 deals with general principles, issues and data needed to forecast service lives and provides a method for estimating the service lives of components and assemblies.
- Part 2 describes generic procedures for testing the performance of components, materials and assemblies to provide service life predictions.
- Part 4 will provide guidance on methods of presenting data and evidence to support forecasts and predictions.
- Part 5 will provide guidance on assessment of whole life costing.
- Part 6 will provide a procedure for considering environmental impacts.
- Part 7 will provide guidance on the performance evaluation and feedback of service life data from existing construction works.
- Part 8 will provide guidance on the provision of reference service life for use in the application of ISO 15686-1.

A major impetus for the production of ISO 15686 has been concern over the construction industry's need to control the cost of ownership of constructed assets, since a high proportion of the life cycle cost may be set by the time the facility is complete. In addition to reducing unnecessary expenditure, the use of ISO 15686 can contribute to the aim of "sustainable" development by promoting a less wasteful use of natural resources and to consequential protection of the environment.

This document is a preview generated by EVS

This document is a preview generated by EVS

Buildings and constructed assets — Service life planning —

Part 3: Performance audits and reviews

1 Scope

This part of ISO 15686 is concerned with ensuring the effective implementation of service life planning. 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 and constructed assets to provide a reasonable assurance that measures necessary to achieve a satisfactory performance over time will be implemented.

The cost implications of service life planning and the broader issues of sustainability (e.g. embodied energy, land use) are not developed in this part of ISO 15686.

NOTE Throughout this part of ISO 15686 the term “constructed asset” is used to include buildings; infrastructure works such as roads, bridges and pipelines; structural works such as communications masts; and other engineering works such as power stations and chemical plants.

2 Conformance

Conformance with this part of ISO 15686 requires service life performance audits to be undertaken in accordance with clauses 5 and 6 and/or reviews to be carried out in accordance with clause 7. It shall be stated in all relevant documentation which of these clauses applies. Audits or reviews of the pre-briefing, briefing and detailed design stages of a project are the minimum “core” activities that shall be carried out whenever compliance with this part of ISO 15686 is required prior to construction. Further audits or reviews of the initial design, construction, commissioning, operation, alteration and/or disposal of the facility are discretionary but, where carried out, shall conform with this part of ISO 15686.

3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15686. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 15686 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 15686-1:2000, *Buildings and constructed assets — Service life planning — Part 1: General principles*

ISO 19011, *Guidelines for quality and/or environmental management systems auditing*