

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

Sustainability in buildings and civil engineering works — Design for disassembly and adaptability — Principles, requirements and guidance

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of ISO 20887:2020.

The UK participation in its preparation was entrusted to Technical Committee B/558, Sustainability of construction works.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 580 94772 8

ICS 91.040.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 29 February 2020.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

First edition
2020-01

Sustainability in buildings and civil engineering works — Design for disassembly and adaptability — Principles, requirements and guidance

*Développement durable dans les bâtiments et ouvrages de génie
civil — Conception pour la démontabilité et l'adaptabilité —
Principes, exigences et recommandations*



Reference number
ISO 20887:2020(E)

© ISO 2020

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Decision-making framework	7
4.1 General.....	7
4.2 Developing the client brief.....	7
4.3 Design strategies.....	8
4.3.1 General considerations.....	8
4.3.2 Durability considerations.....	9
4.4 Levels and scope of analysis.....	9
4.4.1 General.....	9
4.4.2 Systems.....	10
4.4.3 Elements.....	10
4.4.4 Component or assembly.....	10
4.4.5 Subcomponent.....	10
4.4.6 Material.....	10
5 Principles of design for disassembly and adaptability	11
5.1 General.....	11
5.2 Adaptability principles.....	11
5.2.1 General.....	11
5.2.2 Versatility.....	11
5.2.3 Convertibility.....	12
5.2.4 Expandability.....	13
5.3 Disassembly principles.....	13
5.3.1 General.....	13
5.3.2 Ease of access to components and services.....	14
5.3.3 Independence.....	14
5.3.4 Avoidance of unnecessary treatments and finishes.....	16
5.3.5 Supporting re-use (circular economy) business models.....	16
5.3.6 Simplicity.....	18
5.3.7 Standardization.....	18
5.3.8 Safety of disassembly.....	19
6 Documentation and information	20
6.1 General.....	20
6.2 Design details.....	20
6.3 Material constituents and manufacturers.....	20
6.4 Connection detailing.....	20
6.5 Data digitisation.....	21
6.6 Information transfer and management.....	21
7 Continuing implementation of Dfd/A	21
7.1 General.....	21
7.2 Product and component suppliers.....	22
7.3 Construction.....	22
7.4 Handover/commissioning.....	22
7.5 Use stage.....	22
7.6 Refurbishment.....	22
7.7 End-of-life/decommissioning.....	23
7.8 Education and capacity building.....	23

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

Annex A (informative) Feasibility assessment of design for disassembly options for elements or components/assemblies	24
Annex B (informative) Developing end-of-life scenarios	27
Annex C (informative) Measuring performance	30
Bibliography	34

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 17, *Sustainability in buildings and civil engineering works*.

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.

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

Introduction

Applying the principles of design for disassembly and adaptability (DfD/A) to the service life planning of buildings and civil engineering works can make a positive contribution to sustainable development. While service life planning is a design process that seeks to ensure that the service life of a constructed asset will equal or exceed its design life, design for disassembly and adaptability is a strategy to optimize both the service life and the design life. The strategy does not suggest overbuilding to meet a vast number of unknowns that a constructed asset might encounter.

Introducing aspects of design for disassembly can be used to reduce and/or prevent waste and increase resource efficiency by encouraging alternative considerations at the project definition phase. The application of adaptability concepts and principles can minimize the need for unnecessary removal and new construction, by repurposing or modifying constructed assets to renew their service life, and result in constructed assets that are able to accommodate a larger variety of uses. From a broader perspective, the recovery and subsequent reuse or recycling of disassembled construction materials and components will support the evolving concept of a circular economy.

The design and construction industry has often trusted/depended upon traditional assembly methods, products, and processes that typically do not consider deconstruction. As such, during a renovation or demolition project, products and materials are often not easily salvaged for reuse, recycling or energy recovery, and therefore, become waste that is landfilled.

Incorporating DfD/A concepts early in the planning and design phase will increase the likelihood that activities during the stages of use, maintenance (including repair, replacement, refurbishment), and end-of-life (e.g., disassembly, reuse, recycling, disposal) will be conducted more efficiently from a total resource perspective (i.e., time and associated costs, labour costs, materials, and energy).

Design for disassembly devises explicit methods, prior to construction, for optimal recovery of specific products and materials without damaging either that which is being removed or surrounding components. The adaptability aspects of DfD/A support the continued use of constructed assets by allowing for and accommodating substantial change (e.g., demographics, social, economic, and technological conditions and physical surroundings and needs) within an existing or expanded physical asset. Designing for adaptability means designing for both present and future uses, encouraging the use of phased developments and matching supply with demand in a timely fashion. The decision to use these methods is usually considered in conjunction with the investment rate of return over time and risk.

Successful application of DfD/A principles will require their integration into the early phases of a project, when it is still cost-effective to do so. Implementation of DfD/A will require compromises and trade-offs to make choices that can be constrained by factors such as technical complexity, lack of resources and time, risk of obsolescence and limited information on costs or relative environmental burdens over the total life cycle. Therefore, it is important that all parties involved in the design, product supply, construction, commissioning, operation and decommissioning aspects have sufficient knowledge and understanding to implement the intended results. Designers have the major role in considering DfD/A to facilitate the best technical, economic and environmental opportunities. Clients often drive the design team to consider and implement DfD/A elements within a project. The supporting supply chain, including product suppliers, constructors, facility managers and those decommissioning constructed assets also need to adapt their approaches to optimize the design intentions which relate to DfD/A.

This document is intended to provide a framework of the DfD/A principles and the key issues that should be considered by the different actors, particularly designers involved in the project. It is equally important that this knowledge base is continually added to by those implementing these principles, and associated activities, for example, by knowledge sharing through the creation of case studies and associated journal articles.

This document is one in a suite of documents dealing with sustainability in construction works that includes the following, in addition to this document:

- a) ISO 15392, *Sustainability in buildings and civil engineering works — General principles*;

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

- b) ISO/TS 12720, *Sustainability in buildings and civil engineering works — Guidelines on the application of the general principles in ISO 15392*;
- c) ISO/TR 21932, *Sustainability in buildings and civil engineering works — A review of terminology*;
- d) ISO 21929-1, *Sustainability in building construction — Sustainability indicators — Part 1: Framework for the development of indicators and a core set of indicators for buildings*;
- e) ISO/TS 21929-2, *Sustainability in building construction — Sustainability indicators — Part 2: Framework for the development of indicators for civil engineering works*;
- f) ISO 21931-1¹⁾, *Sustainability in building construction — Framework for methods of assessment of the environmental performance of construction works — Part 1: Buildings*;
- g) ISO 21931-2, *Sustainability in buildings and civil engineering works — Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment — Part 2: Civil engineering works*;
- h) ISO 16745-1, *Sustainability in buildings and civil engineering works — Carbon metric of an existing building during use stage — Part 1: Calculation, reporting and communication*;
- i) ISO 16745-2, *Sustainability in buildings and civil engineering works — Carbon metric of an existing building during use stage — Part 2: Verification*;
- j) ISO 21930, *Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services*;
- k) ISO 21678²⁾, *Sustainability in buildings and civil engineering works — Indicators and benchmarks — Principles, requirements and guidelines*.

This document deals with environmental, social and economic aspects of sustainability. The relationship among the suite of documents is elaborated in [Figure 1](#).

1) Revision under preparation.

2) Under preparation. Stage at the time of publication: ISO/FDIS 21678:2020.

This is a preview of "BS ISO 20887:2020". Click here to purchase the full version from the ANSI store.

ISO/TC59/SC17	environmental aspects	social aspects	economic aspects	technical aspects	functional aspects
Principles + Civil Engineering Works, CEW (Parts 2)	ISO 15392 General principles				
	ISO TS 12720 Guideline on the application of ISO 15392				
	ISO TR 21932 Terminology				
	ISO 21929-1 Framework for the development of Indicators – Part 1: Buildings				
	ISO 21929-2 Framework for the development of Indicators – Part 2: CEW				
	ISO 21931-1 Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment – Part 1: Buildings				
	ISO 21931-2 Framework for methods of assessment of the environmental, social and economic performance of construction works as a basis for sustainability assessment – Part 2: Civil Engineering Works				
	ISO 20887 Design for Disassembly and adaptability - Principles, requirements and guidance				
	ISO 16745-1+ 2 Carbon metric of an existing building during use stage. Part 1: Calculation, reporting, communication. Part 2: Verification				
	Products	ISO 21678 Methodological principles for the development of benchmarks for sustainable buildings			
ISO 22057 Enabling use of Environmental Product Declarations (EPD) at construction works level using building information modelling (BIM)					
	ISO 21930 Core rules for environmental product declarations of construction products and services				

Figure 1 — Suite of related documents for sustainability in buildings and civil engineering works

This is a preview of "BS ISO 20887:2020". [Click here to purchase the full version from the ANSI store.](#)

Sustainability in buildings and civil engineering works — Design for disassembly and adaptability — Principles, requirements and guidance

1 Scope

This document provides an overview of design for disassembly and adaptability (DfD/A) principles and potential strategies for integrating these principles into the design process. This document provides information for owners, architects, engineers, and product designers and manufacturers to assist in their understanding of potential DfD/A options and considerations, and for other parties who are responsible for financing, regulating, constructing, transforming, deconstructing, or demolishing construction works.

This document is applicable to all types of buildings (e.g. commercial, industrial, institutional, and residential), civil engineering works (e.g., dams, bridges, roads, railways, runways, utilities, pipelines) and their constituent parts. It can be used for new construction, refurbishment and renovation, and in the design of incremental improvements in, or complete redesign of, buildings, building systems, civil engineering works, and their constituent parts.

This document also provides guidance on measuring performance regarding each DfD/A principle and related objectives.

This document is intended to be used in conjunction with and following the principles set out in ISO 15392 and the ISO 15686 series.

This document does not set specific levels of performance for the disassembly or adaptability of constructed works, however, it does include requirements that are mandatory for the implementation of specific DfD/A principles that are applicable when these principles are adopted.

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

ISO 15392, *Sustainability in buildings and civil engineering works — General principles*

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

ISO/TR 21932, *Sustainability in buildings and civil engineering works — A review of terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1, ISO/TR 21932 and the following apply.

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

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

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