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Building construction - Organization of information about construction works - Part 2: Framework for classification and breakdown structures (ISO/DIS 12006-2:2024)

Hochbau - Organisation des Austausches von Informationen über die Durchführung von Hoch- und Tiefbauten - Teil 2: Strukturen für die Klassifizierung und die Gliederung (ISO/DIS 12006-2:2024)

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Part 2: Framework for classification and breakdown structures

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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).

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).

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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 59, *Buildings and civil engineering works*, Subcommittee SC 13, *Organization of information about construction works*.

This third edition cancels and replaces the second edition (ISO 12006-2:2015), which has been technically revised.

ISO 12006 consists of the following parts, under the general title *Building construction — Organization of information about construction works*:

— *Part 2: Framework for classification*

— *Part 3: Framework for object-oriented information*

Annexes A and B of this document are for information only.

Introduction

0.1 Background

This part of ISO 12006 was first produced when there was little international standardization of classification systems for the built environment. Now, IEC/ISO 81346 and several national classification systems have been developed, for example, in North America, Scandinavia, and the UK, that implement the 2001 and 2015 editions. Lessons learned in these implementations have been applied in this third edition.

This part of ISO 12006 has also been revised to take into account developments in information technology (notably building information modelling) and construction procurement. It has been extended and definitions have been refined to better serve all industry sectors, including building, civil engineering, infrastructure and process engineering. It continues to serve traditional information technologies and procurement methods.

0.2 The need for standardization

Building information modelling and modern forms of procurement require that object groupings to be used. Information management and building information modelling, in particular, is about exchange of information of all types throughout the asset life cycle, including delivery and operational phases and between participants and applications. This is also the case for cooperative forms of procurement. For this exchange to be successful, a complete and consistent approach to object classification is required. This part of ISO 12006 is intended to facilitate this exchange.

Information types include geometrical data, functional and technical data, and cost and maintenance data amongst others. The asset lifecycle runs from inception to eventual deconstruction. Participants include clients and owners, designers, authorities, constructors, end users, and operators. Applications include modelling, specification, product information, and cost information systems.

Overarching principles for classification and breakdown structures are also needed for different international and national reporting, so that quantities and values are defined according to the same principles and are comparable. These values and quantities can be related to sustainability and financing.

While national classifications that implement this part are still likely to differ in their detail (for example, due to differences in construction, culture and legislation), mapping between them can be aided if they are using the same overarching classification and breakdown structure frameworks. This, in turn, can help with international project work (with participants from many countries), and with development of applications intended to be used internationally.

0.3 Breakdown structures and classification structures

Information structuring is critical to the delivery of the information purposes. Information purposes can be expressed in terms of desired outcomes as use-cases, or in terms of specific outputs as documentation. The purpose of information structures including breakdown structures and classification structures is to organize concepts hierarchically thereby supporting cataloguing and grouping information and sharing unambiguous meaning (semantic interoperability) throughout the information and asset lifecycles.

The purpose of a breakdown structure is to organize the decomposition of the domain to support naming of instances, way-finding and search paths and the management of capacity and performance within a given context by making distinctions between types of objects.

The purpose of a classification structure is to organize similar types of objects to support searching, sorting, matching and retrieval.

0.4 Types of structures

According to ISO 22274, classification and breakdown structures can be enumerative, faceted, or a combination of enumerative and faceted.

Enumerative classification systems attempt to list all possible groupings within their defined area of applicability. They are in many cases represented using hierarchies. A complete enumerative classification system is often very complex in nature and its basic principles of development can be difficult to identify.

Faceted classification systems allow the assignment of multiple classifications to an object. An object can be characterized by any combination of the groupings from the facets. By using a combination of enumerative and faceted classification, the higher levels of the classification system can follow an enumerative approach to narrow down the areas of applicability of the individual groupings to a manageable size. At the lower level, faceted approaches are applied to clearly specify the nature of the concepts contained in the leaf groupings of the classification system.

This document defines a reference breakdown structure for the built environment supported by definitions and a set of requirements for partial breakdown structures and classification tables. It does not propose the implementation of a schema or data model.

0.5 Relationship to other standards

This document addresses breakdown and classification structures whereas ISO12006-3 identifies a data structure for a data dictionary capable of relating concepts using terms relevant to multiple contexts. ISO 22274 implements content previously proposed as Part 1 of this series. ISO 704 provides criteria for the definition of concepts.

Annex B illustrates a number of implementations of this document including ISO 81346 series with diagrams developed from figure 2 and keys to name the included tables. ISO16739-1 is illustrated as a data schema.

0.6 Relationship to earlier versions of this document

This version of ISO 12006:

a. Considers the whole life cycle of the built environment, removing the prefix 'construction' from concepts with wider a.

b. Distinguishes breakdown structures from classification structures.

c. Refines the previous figure 1 (now figure 2) and table 1 to focus on non-abstract concepts.

d. Addition of zones, uncertainty and information purpose whilst maintaining the list of recommended classification tables and annex listings example.

e. Refines the definitions according to the intensional principal described in ISO 704.

Building construction — Organization of information about construction works —

Part 2: Framework for classification and breakdown structures

1 Scope

This part of ISO 12006 defines a framework for the development of built environment classification systems. The framework is a breakdown structure supporting the spatial, physical, process aspects along with relevant resources and support This framework provides a set of recommended classification table titles for a range of information object groupings according to particular views, e.g., by form or function, supported by definitions. It shows how the object groupings classified in each table are related, e.g., in a building information model.

This part of ISO 12006 applies to the complete life cycle of assets, including briefing, design, documentation, construction, operation and maintenance, demolition and possible reuse of assets or components. It applies to both building and civil engineering works, including associated engineering services, landscaping and its natural environment. It is intended for use by organizations which develop and publish such classification systems and tables, which can vary in detail to suit local needs. When this part of ISO 12006 is applied in the development of local classification systems and tables, then harmonization between them will be facilitated.

The management of the built environment above the level of complex, entities and project/programmes (for example geographic catchment areas, asset portfolios, functional requirements and organizational activity) are outside the scope of this document.

This part of ISO 12006 does not provide the content of the tables, though it does give examples.

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 22274, *Systems to manage terminology, knowledge and content — Concept-related aspects for developing and internationalizing classification systems*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE 1 The definitions are arranged in the following order: structure, objects, spatial aspects, physical aspects, process aspects, resource aspects and supporting aspects.

NOTE 2 In the definitions, terms that are defined elsewhere within this clause are shown in *italics*.

NOTE 3 Examples are given in Annex A.

3.1 Structures

3.1.1
information structure
classification system
hierarchy of named groupings used to organize information for sorting, comparisons and matching, sorting and retrieval

Note 1 to entry: a hierarchy need not be a tree but, with multiple links, can be a directed network (polyhierarchy), for example if an occurrence is a member of several groupings.

Note 2 to entry: ISO 22274 defines classification system to include both breakdown and classification structures.

3.1.2
breakdown structure
meronomy
decomposition hierarchy
framework for efficiently controlling aspects of the process, physical and spatial objects of the built environment

[SOURCE: ISO 27026:2011, 3.1.1; ISO 10795:2019(en), 3.30 [Modified]]

Note 1 to entry: a breakdown structure comprises a hierarchy of named dissimilar groupings organized by whole-part or other extrinsic associations such as ‘contains’, ‘bounds’ , ‘enables’, ‘serves’ or ‘specifies’

Note 2 to entry: Clause 5 provides a reference breakdown structure and discusses partial breakdown structures

3.1.3
classification structure
taxonomy
specialization hierarchy
exhaustive set of mutually exclusive categories to aggregate objects at a pre-prescribed level of specialization for a specific purpose

Note 1 to entry: a classification structure comprises a hierarchy of named similar groupings organized by type-of relationships based on intrinsic properties

Note 2 to entry: Clause 6 provides requirements for the development and application of classification structures

[SOURCE: ISO 17115:2007, 2.7.1; ISO/TS 22558:2019, 3.3, modified - data replaced with objets]

3.2 Objects

3.2.1
object
any part of the perceivable or conceivable world

Note 1 to entry: An object is something abstract or physical toward which thought, feeling, or action is directed.

Note 2 to entry: Previously ‘construction object’

3.2.3
built environment
built asset
managed environment
infrastructure
artificial aspect of the environment

Note 1 to entry: The built environment can be viewed spatially as a collection of spaces and/or physically as a collection of components and/or as process as a collection of tasks.

EXAMPLE towns, drainage

3.2.4
natural environment
non-artificial aspect of the environment

EXAMPLE hills, rainfall

3.3 Asset related

3.3.0
asset
item, thing or entity that has potential or actual value to an organization

[SOURCE: ISO 55000:2014, 3.2.1, modified - The notes to entry have been removed.]

3.3.1
complex
construction complex
site
set of entities serving intended to serve a common function or user activity

Note 1 to entry: a complex is intended to serve at least one function or user activity within a geo-spatial boundary.

Note 2 to entry: See A.9. Previously 'construction complex'

EXAMPLE Airport, Motorway, Hospital. An airport, business park, motorway. e.g., an airport typically is composed of the entities such as runway, control tower, terminal building, aircraft hangar, etc. A business park typically is composed of a number of buildings, access roads, and landscaping (each an object in its own right). A motorway from A to B typically is composed of service stations, the motorway pavement, bridges, embankments, landscaping, etc.

3.3.2
zone
spatial extent that has characteristics that distinguishes it from other spatial extents

Note 1 to entry: Characteristics can relate to regulations, purposes, or functions.

Note 2 to entry: Zone can be part of, as well as an aggregation of, other spatial extents such as spaces.

Note 3 to entry: Zones need not be mutually exclusive, so spaces can be assigned to multiple zones. Zones therefore can serve rather than be part of the complex.

Note 4 to entry: Zones can be hierarchical, if the common factor is amenable to disaggregation

Note 5 to entry: the set of spaces in a Zone need not be contiguous

Note 6 to entry: See A.15

EXAMPLE access zone, fire safety zone, climate zone, smoking area, quiet zone.

3.3.3
space
built space
location
area
spatial extent defined physically or notionally

Note 1 to entry: identified spatial extent in 2 or 3 dimensions having a common purpose or other property, defined physically or notionally

Note 2 to entry: A space can be defined by activity, bounds or work extent.

Note 3 to entry: See 5.2.1 and A.10 . Previously 'construction space' or 'activity space'

EXAMPLE Traffic lane, bedroom, room defined by floor, ceiling, and walls, footpath, power-line corridor defined by natural forest.

3.3.4
entity
construction entity
facility
building
structure
independent unit of the built environment with a characteristic form and spatial structure, intended to serve at least one function or user activity

Note 1 to entry: An entity is intended to serve at least one function or user activity. It is recognizable as a physically independent object even though a number of entities might be seen as parts of a particular complex. Ancillary works such as access roads, landscaping, service connections, can be regarded as part of an entity or if the ancillary works are of sufficient scale, they can be regarded as entities in their own right.

Note 2 to entry: See A.9. Previously 'construction entity'.

EXAMPLE bridge, hotel, car park

3.3.5
element
functional system
system
construction element
set of components with a characteristic function, form or position

Note 1 to entry: ISO 81346 uses 'object with characteristics which predominantly represents an overall inherent function'

Note 2 to entry: Components can be part of one or more elements and need not be contiguous. Elements therefore serve an entity rather than be part of the entity.

Note 3 to entry: Elements can be hierarchical, with higher level functions being disaggregated into lower-level (technical) systems. a single technical system (such as a wall system) can satisfy several elements or many technical systems can satisfy a single element (such as a security system)

Note 4 to entry: The concept of element is used in a broad sense, not linked to any specific domain or discipline.

Note 5 to entry: See A.11. Previously 'construction element'

EXAMPLE Load-bearing system, roof system, wall system, HVAC system, drainage system, electrical system, communication system, transportation system, planting system, landscape system, window system, suspension system, hinge system, fan system.

3.3.6
component
material or manufactured item used as a constituent in an assembled product, technical system or plant

Note 1 to entry: A component is generally incorporated in a permanent manner in an entity. Otherwise, this would be an aid (3.6.2). Components can initially be resources.

Note 2 to entry: See A.3. Previously 'construction product'

EXAMPLE a lighting pole, a door, a beam

3.3.6.1
technical system
element or system defined by its providing a coherent technical solution enabling one or more *elements*

Note 1 to entry: ISO 81346 uses 'object with characteristics which predominantly represents a coherent technical solution with an inherent function'