INTERNATIONAL STANDARD

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Building construction — Organization of information about construction works —

Part 2: Framework for classification of information

Construction immobilière — Organisation de l'information des travaux de construction —

Partie 2: Plan type pour la classification de l'information

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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 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 12006 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12006-2 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 13, *Organization of information about construction works.*

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

— *Part 2: Framework for classification of information*

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

Annex A of this part of ISO 12006 is for information only.

0 Introduction

0.1 The status quo

At present there is little international standardization of classifications for construction. The construction industries of individual countries, even adjacent countries, have tended to remain separate because of differences of culture and legislation, and each has developed its own methods of arranging information. National classifications can be difficult to change and there may seem insufficient reason to do so.

The most widely used classifications are work sections (mainly for specifications) and elements (mainly for cost analysis). They are also the most widely varied, not only in their itemization and structure but also in the range of other purposes to which they are put. There are other classifications, potentially just as important, which have not yet been used to the same degree, e.g. construction products and properties/characteristics.

0.2 The need for standardization

Modern information systems for the construction industry, whether local or networked, need to handle data of many different types, e.g. geometrical data, technical properties, cost data, maintenance data, for use within different applications such as CAD, specification, product information and cost information systems. All these data and the relations between them need to be defined and structured in such a way that the stored information is consistent and reliable within and between the different applications.

0.3 Other work of relevance

The following groups specifically address the issue of computerized exchange of data.

— ISO/TC 184, *Industrial automation systems and integration*, SC 4, *Industrial data* (STEP – Standard for the Exchange of Product model data). STEP is a standard for computer-interpretable representation and exchange of product data. Exchange of information has been initiated between those working in TC 184/SC 4 on the Building Construction Core Model (BCCM) and TC 59/SC 13 for co-ordination of basic construction information concepts.

— UN/EDIFACT with its regional organizations, e.g. EBES (European Board for EDI Standards) and PAEB (Pan American EDIFACT Board). Groups concerned specifically with the construction industry are, at a global level, JM7 AEC and, at a European level, EBES EEG05 (EBES Expert Group 05 AEC), the latter working within the European user group EDIBUILD.

— ISO/TC 59/SC 13 has started work on a framework for object-oriented information exchange in the construction industry.

— ISO/TC 10/SC 8 has produced ISO 13567-1, ISO 13567-2 and TR 13567 on the organization and naming of layers for CAD.

— IAI (International Alliance for Interoperability) is an international body which is developing Industry Foundation Classes, an industry standard for holding and exchanging digital data.

Building construction — Organization of information about construction works —

Part 2: Framework for classification of information

1 Scope

This part of ISO 12006 defines a framework and a set of recommended table titles supported by definitions, but not the detailed content of these tables. It is intended for use by organizations which develop and publish classification systems and tables on a national or regional basis.

This part of ISO 12006 applies to the complete life cycle of construction works, including design, production, maintenance and demolition, and to both building and civil engineering.

It identifies classes for the organization of information and indicates how these classes are related.

This part of ISO 12006 lists the tables which are recommended to be developed and used to classify the members of each class according to particular views or principles of specialization and gives examples of entries which might occur in these tables.

It does not provide a complete operational classification system. Classification tables may vary in detail to suit local needs.

2 Terms and definitions

For the purposes of this part of ISO 12006, the following terms and definitions apply.

2.1
object
any part of the perceivable or conceivable world

2.2
construction object
object of importance to the construction industry

2.3
construction result
construction object which is formed or changed in state as the result of one or more construction processes utilizing one or more construction resources

EXAMPLES Office building, installed reinforcement bar, ventilation system, bridge, asphalt surface, enclosed space.

NOTE 1 A construction result need not have a physical existence; e.g. a “designed” office building is a construction result, even though it has not yet been constructed; similarly a “demolished” office building is a construction result, even though it no longer has a physical existence.

NOTE 2 A manufactured “reinforcement bar” is a construction resource until it has been acted upon by a construction process, after which it becomes a construction result. In other words an installed “reinforcement bar” is a construction result, but a “reinforcement bar” in storage in a manufacturer's warehouse is a construction resource.

2.4
construction entity
independent material construction result of significant scale serving at least one user activity or function

EXAMPLES Building, bridge, road, dam, tower, sewer, museum (if a single structure), sports field, sewage settlement tank, cycleway.

NOTE A construction entity is the basic unit of the built environment. It is recognizable as a physically independent construction even though a number of construction entities might be built as parts of a particular construction complex. Ancillary works such as access roads, landscaping, service connections, may be regarded as part of a construction entity. Conversely, when ancillary works are of sufficient scale they may often be regarded as construction entities in their own right.

2.5
construction complex
two or more adjacent construction entities collectively serving one or more user activity or function

EXAMPLES Airport, sewage treatment works, business park, port, motorway, shopping and sports complexes.

NOTE A construction complex can be analysed and the construction entities that go to make it up, identified; e.g. an airport typically is composed of the construction entities runway, control tower, terminal building, aircraft hangar, etc. A business park typically is composed of a number of buildings, access roads and landscaping (each a construction entity in its own right). A motorway typically is composed of service stations, the motorway pavement, bridges, embankments, landscaping, etc.

2.6
construction entity part
solid (as distinct from liquid or gaseous), material part of a construction entity, having physically delineated boundaries

EXAMPLES Wall, door, door handle, wash basin, road surface, bridge pier, pipeline valve, light switch, roof, heating system, sluice gates.

2.7
element
construction entity part which, in itself or in combination with other such parts, fulfils a predominating function of the construction entity

EXAMPLE 1 (element): External wall, floor, roof, foundation, column, lighting system, ventilation system, culinary furnishings, sanitary equipment.

EXAMPLE 2 (predominating function): Space enclosing, supporting, servicing, furnishing.

NOTE 1 For practical purposes, such as when carrying out a cost analysis of a construction entity, it is vital that elements be defined as exhaustive and mutually exclusive, in order to ensure that each part is counted once and only once. Where an element contributes to more than one of the predominating functions of the construction entity, such as an internal wall that provides support as well as enclosing space, for the purposes of an element table one of these must be designated the “characteristic” predominating function. By “characteristic” is meant “generally the most significant”.

In the case of internal walls of buildings “space enclosing” may be chosen because not all such walls provide structural support and, during the early stages of design, it may not be known whether a wall will be load-bearing or not. Conversely, it may be considered advantageous to regard load-bearing and non-load-bearing internal walls as distinct elements, the first being classified under the predominating function “supporting” and the second classified under “space enclosing”.

NOTE 2 An element is fundamentally different from a construction entity part; e.g. when constructing a classification table for construction entity parts, the objects listed below are likely to be defined as types of “wall”. However, their characteristic functions (given in parentheses) are quite different. Therefore when constructing a classification table for elements, they will not be grouped together.

— Wall forming external boundary of building (enclosing habitable space).

— Under-building wall (supporting the building, as part of foundations).

— Manhole wall (part of drainage system).

— Retaining wall (achieves a change of level on a site).

— Garden wall (encloses or divides areas of the site).

2.8
work result
construction result achieved in the production stage or by subsequent alteration, maintenance or demolition processes

NOTE 1 Such results are identified by one or more of the following: the particular skill or trade involved; the construction resources used; the part of the construction entity that results; the temporary work or other preparatory or completion work which results.

EXAMPLES (Installed) reinforcement for concrete, (laid) brickwork, (installed) ventilation duct, (applied) asphalt surface, (erected) scaffolding, (constructed) temporary site accommodation.

NOTE 2 A work result may form a permanent material part or parts of a construction entity, or it may be "enabling", i.e. necessary to enable the construction entity itself to be constructed. There are two types of enabling work results: temporary work results (e.g. scaffolding and temporary roads) and non-material work results (e.g. snow clearing).

2.9
designed element
element for which the work result(s) have been defined

EXAMPLES Wall of gypsum board fixed to timber studs, wearing course (of a road) of rolled asphalt.

2.10
space
three-dimensional, material construction result contained within, or otherwise associated with, a building or other construction entity

NOTE 1 A space may be bounded physically or notionally.

EXAMPLES Room, corridor, atrium, cleared zone (at an airport), roadway, square, working space around a machine, swimming pool.

NOTE 2 One of the key properties of a space is the nature of its boundaries; e.g. a room is a space which is bounded on all sides by solid elements, whereas a working space around a machine is often not bounded by solid elements on any sides (other than a floor), but will have notional boundaries.

NOTE 3 Another key property of a space is the function or user activity it is intended to serve. Spaces are often named according to this intended or actual function/user activity, e.g. office space, operating theatre, sports hall, boiler room, garden.

NOTE 4 Traditionally the concept of space has mainly been applied to buildings, but it is often applied to other types of construction entity.

2.11
construction process
process which transforms construction resources into construction results

EXAMPLE 1 Broad classes — design, production, maintenance, demolition.

EXAMPLE 2 Narrower classes — formulation of design brief, structural design, product supply, facilities operation, cleaning, applying, taking up (e.g. a road), reheating.

NOTE Each broad process may be split up into its component processes; e.g. the design process may be split up into space design, structural design and services design; the production process may be split up into production planning, product supply and work processes. Work processes may be further split up into the separate types of work such as brick walling, *in-situ* concrete construction and installation of lifts.

2.12
management process
construction process with the purpose of planning, administrating or assessing

2.13
work process
predominant construction process which results in a work result

EXAMPLES Installing reinforcement for concrete, installing ventilation ducts, applying asphalt surfaces, erecting scaffolding, repairing concrete.

NOTE "Process" is closely related to "stage", which is a period of time identified by the overall character of the processes that occur within it. There are two types of stage of interest for construction information: construction entity lifecycle stage and project stage.

2.14
construction entity lifecycle stage
period of time in the lifecycle of a construction entity, identified by the overall character of the construction processes which occur within it

EXAMPLES See 2.15: a) inception/design/production, b) use/maintenance, c) refurbishment/alteration/recommissioning, d) decommissioning/demolition.

NOTE Associated with lifecycle stages are a series of states of construction entities; e.g. a construction entity for which the design stage has not been completed is said to be in the "designed" state; a construction entity for which the production stage has been completed is said to be in the "produced" state.

2.15
project stage
period of time in the duration of a construction project identified by the overall character of the construction processes which occur within it

EXAMPLES See A.12.

NOTE A construction project can be initiated at any stage in the lifecycle of a construction entity, therefore the design stage of a project does not have to occur in the design lifecycle stage of the construction entity. Examples of stages of projects initiated at different stages in the lifecycle of a construction entity are given in a) to d).

a) Creation of a construction entity from initial concept up to occupation by its users. Project stages might include inception, design, production information, tender, construction, commissioning.

b) Maintenance/servicing of a construction entity over a given period. Project stages might include specification, tender, maintenance.

c) Refurbishment and/or alteration of a construction entity. Project stages might include inception, design, production information, tender, construction, commissioning.

d) Demolition of a construction entity. Project stages might include documentation, tender, demolition.

Construction entity lifecycle stages and project stages are thus separate concepts, both closely related to the different types of construction process.

2.16
construction resource
construction object used in a construction process to achieve a construction result

2.17
construction product
material construction resource intended for incorporation in a permanent manner in a building or another construction entity

EXAMPLES Door, window, brick, permanent formwork, electric cable, asphalt, pipe, boiler, paint, proprietary curtain walling system.

NOTE 1 A construction product may take the form of a single product, a component or a "kit of parts."

NOTE 2 It is the intended "normal" use of a construction product which is important; e.g. where a construction product (such as plywood) is used to construct temporary works (such as a security fence round a construction site), it is nevertheless a construction product (not a construction aid) because the manufacturer intends it normally to be incorporated in a permanent manner.

2.18
construction aid
material construction resource not intended for incorporation in a permanent manner in a building or other construction entity

EXAMPLES Scaffolding, temporary formwork, machines, tools, CAD system, fuel and power.

NOTE It is the intended "normal" use of the construction aid which is important; e.g. if formwork which is intended to be temporary (i.e. reusable) is left in place (either deliberately or due to unforeseen circumstances), it is nevertheless a construction aid, not a construction product.

2.19
construction agent
human participant in a construction process

EXAMPLES Bricklayer, plasterer, architect, site manager.

2.20
construction information
information used to support one or more construction processes

EXAMPLES Textbooks, specifications, drawings.

NOTE Construction information includes general reference information as well as project information.

3 Framework for classification

3.1 Basic process model

The framework is based on the following simple process model:

— construction resources are used in or required for construction processes, the output of which are construction results.

It is useful to identify the stage in the lifecycle of a construction entity at which the model is applied since this will affect the nature of the resources used, the type of the construction process and the resulting state of the construction entity. During the production stage the overall process is production of a construction entity; resources include bricks, concrete, windows, labourers and bricklayers. The overall result is the produced construction entity. During the design stage the overall process is design of a construction entity (this may be subdivided into various types of design processes). Resources include design aids (such as the computer software for CAD), the design brief, reference information and the designer. The overall result is the designed construction entity. During the maintenance stage the overall process is maintenance of a construction entity. Resources include the various replacement parts for the construction entity and the maintenance engineer and the overall result is the maintained