BS 8541-5:2015

BSI Standards Publication

Library objects for architecture, engineering and construction —

Part 5: Assemblies – Code of practice

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Contents

Summary of pages
This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 16, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 8541 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 March 2015. It was prepared by Technical Committee B/555, *Construction design, modelling and data exchange*. A list of organizations represented on this committee can be obtained on request to its secretary.

Relationship with other publications

BS 8541 comprises six parts as follows:

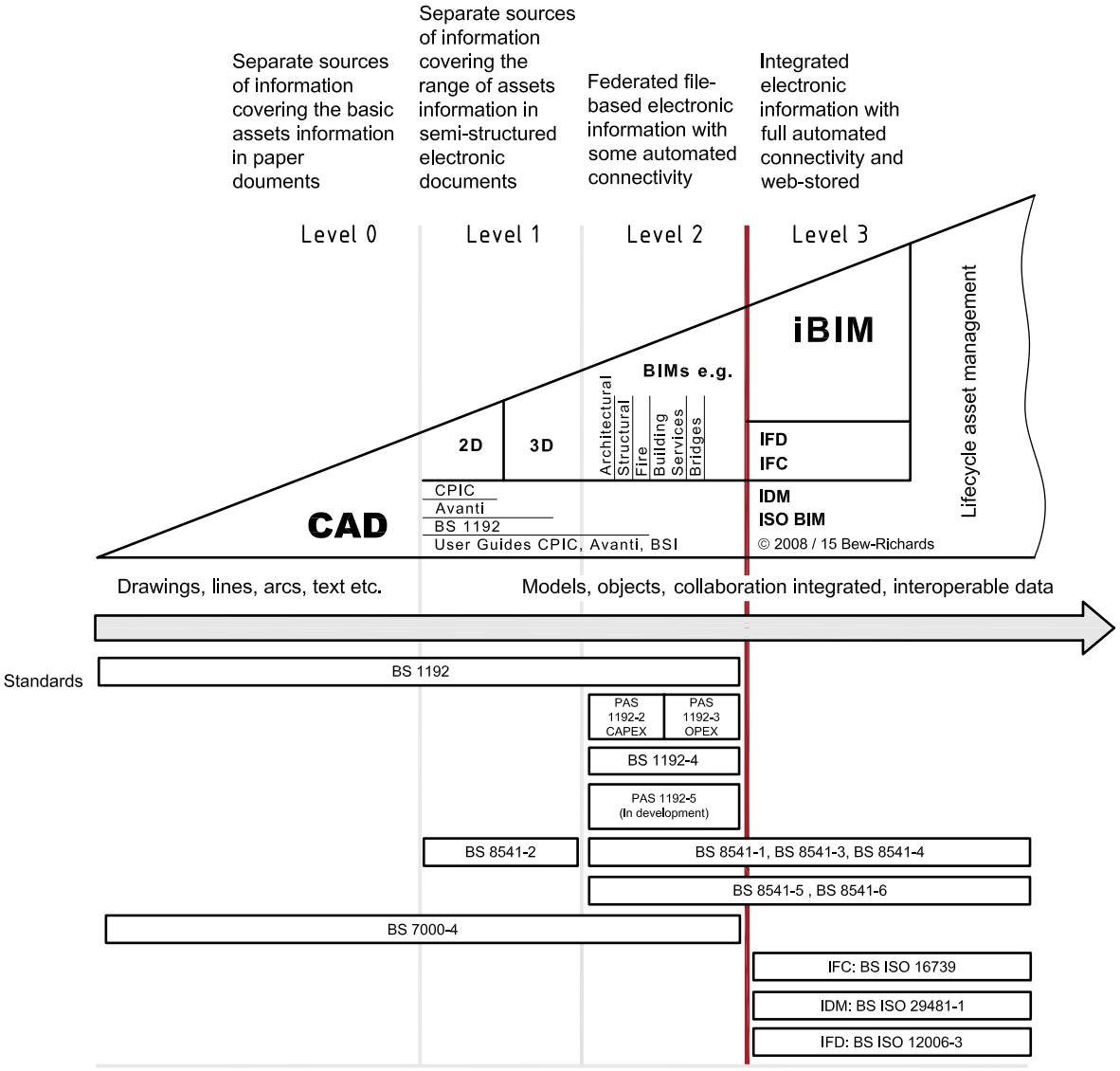
- Part 1, *Identification and classification*
- Part 2, *Recommended 2D symbols of building elements for use in building information modelling*
- Part 3, *Shape and measurement*
- Part 4, *Attributes for specification and assessment*
- Part 5 (this part), *Assemblies*
- Part 6, *Product and facility declarations*

BS 8541-1, BS 8541-3 and BS 8541-4 document best practice for the development and application of construction library objects to support Building Information Modelling (BIM) based design, standardization, specification and construction processes. See BS 8541-1 and Figure 1.

BS 8541-2 documents best practice for the use of 2D symbols for construction objects. BS 8541-5 and BS 8541-6 document best practice for the transmission of assemblies of construction objects and for the transmission of formal product declarations of product performance.

The IFC standard (BS ISO 16739) includes recommendations for the association of sets of attributes to objects. The use of the IFC standard can be supplemented by using UK-specific recommendations, such as are referenced in BS 1192-4:2014, Clause **7**.

Figure 1 **Core maturity model**



NOTE The BIM reports and an updated Roadmap are maintained by BI/555[1)].

Use of this document

As a code of practice, this part of BS 8541 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 8541 is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

1) http://shop.bsigroup.com/bim [viewed: 24-3-2015]

The word "should" is used to express recommendations of this standard. The word "may" is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word "can" is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Contractual and legal considerations

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

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

Introduction

The use of assemblies is rising in response to client interest in reusable design elements, and in design for manufacturing and assembly ("dfma"), and in better facility management of assets.

Assemblies might represent standard configurations intended for reuse between projects, products intended for off-site manufacture, and examples of products in context or other reusable design configurations. Assemblies might have internal connections and potential connections into the overall design.

The transmission of information about assemblies is different from that about facilities or individual products, especially when both the overall assembly and the constituent parts have significance in the management of the design, construction and use. In particular, attention might switch between the overall assembly and the constituent parts, which might affect processes such as material take-off.

Examples where assemblies are used include:

Design:

- predesigned aspects and complex system solutions;
- repetitive building types and cumulative design knowledge; and
- standard design configurations (such as space with equipment)

Construction:

- prefabrication and items manufactured off site;
- recommended details and connections; and
- layered constructions and layered sets

Operations:

- engineered-to-order solutions;
- standard furniture schedules; and
- asset groupings.

1 Scope

This part of BS 8541 gives recommendations covering the transmitting of assemblies of construction library objects for use throughout both the "project" and "in-use" life cycle stages. It applies to the provision of generic objects and manufacturers' specific products. It is intended to ease the communication between parties whether or not they are contractually related.

It also gives recommendations for the application of assemblies in integrated BIM working. It defines the level of information appropriate for specific uses such as:

- specification, comparison and selection;
- coordination;
- take-off; and
- asset management.

This part of BS 8541 builds on Part 1 and complements Parts 2 to 4.

NOTE 1 Testing is by compliance with these earlier parts, with additional rules implied by the specific requirements.

BS ISO 16739 IFC and IFCXML are used as example formats with reference to BS ISO 10303-21 (STEP physical file) and ISO 10303-28 (XML representation). COBie examples are included.

NOTE 2 Concepts reflected in the COBie sheet names are capitalized, such as Component and Type. See BS 1192-4 for definitions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 8541-1, *Library objects for architecture, engineering and construction – Part 1: Identification and classification – Code of practice*

BS 8541-2, *Library objects for architecture, engineering and construction – Part 2: Recommended 2D symbols of building elements for use in building information modelling*

BS 8541-3, *Library objects for architecture, engineering and construction – Part 3: Shape and measurement – Code of practice*

BS 8541-4, *Library objects for architecture, engineering and construction – Part 4: Attributes for specification and assessment – Code of practice*

3 Terms and definitions

For the purposes of this part of BS 8541, the following terms and definitions apply.

3.1 assembly
partial model where both the overall assembly and the constituent parts are managed during design, construction or use, and the constituent parts are located relative to the overall assembly

NOTE See Figure 2 and Figure 3.

Figure 2 **The assembly relationship**

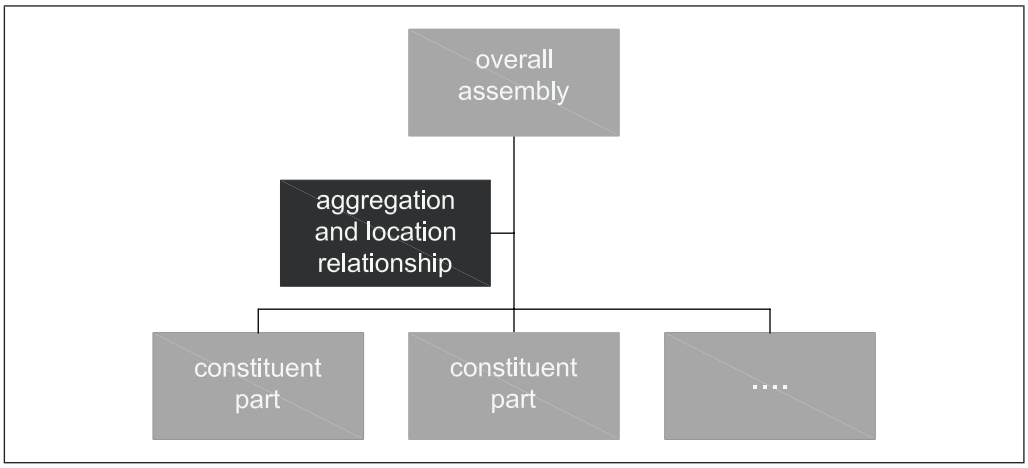
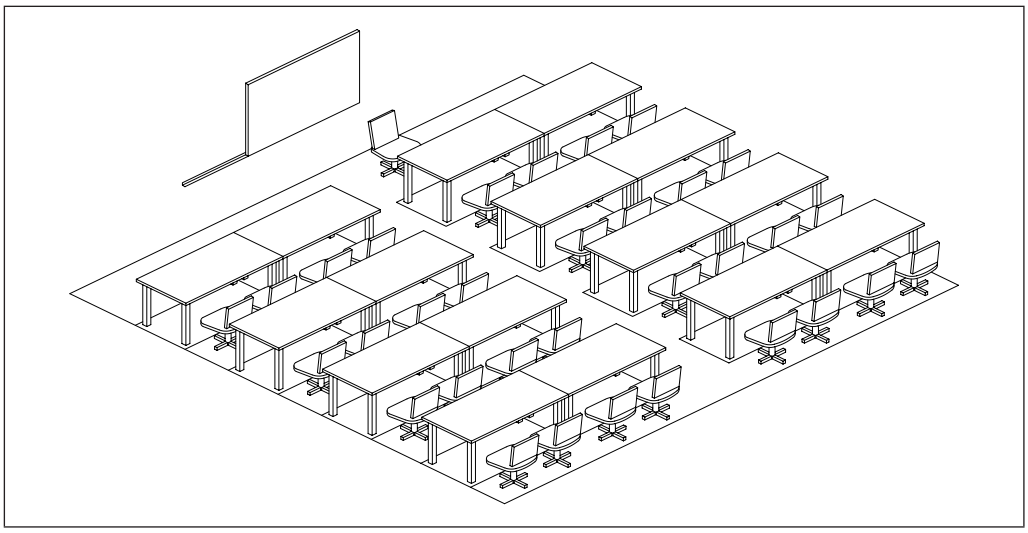


Figure 3 **An assembly is a Type within a construction object library and a Component (occurrence) within a Facility model**



4 Assembly related processes

NOTE This clause gives recommendations for the process involved in the preparation and use of assemblies.

4.1 Preparation and publication

Information suppliers such as library providers, manufacturers, detailers and designers should prepare construction library objects representing assemblies to support the management of their subsequent design, installation and use.

Assemblies should be shared and published as other construction library objects.

4.2 Design and development

Assemblies should be incorporated into facility designs through the steps of selection, insertion or substitution and subsequent development. The process of specification, comparison and selection should be similar to any other construction library object.

Assemblies should retain their structure when incorporated, keeping both the overall assembly and their constituent parts accessible. Both the overall assembly and the constituent parts with all positioning and attributes should be:

a) visible in plans and other views;

b) scheduled in reports and tables; and

c) documented fully when mapped to and from IFC, COBie or other information exchange formats.

NOTE Where BIM authoring tools can represent assemblies it might be necessary to check that export and import functionality preserves the assembly information.

4.3 Coordination and construction

Applications should analyse either one or both levels of detail.

NOTE Unless there is clarity as to whether either one or both levels of detail are being analysed, there might be ambiguity or error in the coordination and material take-off processes.

4.4 Use in facilities management (FM)

Information about an assembly should be offered for use in facility management with both the overall assembly and its constituent parts.

NOTE Some receiving applications might not retain information about the constituent parts or the overall assembly.

5 Implementation

*NOTE The recommendations given in **5.1** to **5.3** are applicable to both product objects and generic objects, but not to template objects.*

5.1 General

Both the overall assembly and the constituent parts should be identified and have relevant groupings associated.

NOTE It might not be necessary for the overall assembly to have a symbol or shape (see Table 1), and it might not be necessary for the constituent parts to have specifying properties (see Table 2).

Table 1 **Expected content of overall assemblies**

	Identification and grouping (5.2)	**Symbol and shape (5.2.2 and 5.2.3)**	**Properties (5.2.4)**
Template objects	Not applicable	Not applicable	Not applicable
Generic objects	Tick	Optional	Tick
Product objects	Tick	Optional	Tick

Table 2 **Expected content of constituent parts**

	Identification and grouping (5.2)	**Symbol and shape (5.2.2 and 5.2.3)**	**Properties (5.2.4)**
Template objects	Not applicable	Not applicable	Not applicable
Generic objects	Tick	Tick	Optional
Product objects	Tick	Tick	Optional

5.2 Identification and grouping

5.2.1 General

As a construction library object an assembly should function within applications as a Type, and should function as a Component when inserted into Facility models. Both the overall assembly and any constituent parts should be distinct construction library objects with appropriate naming, description, authorship and classification.

NOTE 1 See BS 8541-1.

The assembly should be named and described based on the overall assembly, unless there is a dominant constituent, as when a single product shown in its context.

The applicability of the overall assembly should be clearly identified in its description.

In order to ensure accurate scheduling and selection, any classification given to the overall assembly should reflect the range of classifications of the contained parts by classifying the overall assembly at a more general level.

The overall assembly should be separable from all of the constituent parts by means of this classification(s) or other means.

NOTE 2 It might also be possible to anticipate the assignment of the overall assembly and the constituent parts to systems and zones within a facility.

NOTE 3 See BS 1192, PAS 1192-2 and PAS 1192-3 for layer naming and classification.

5.2.2 Symbols

For efficient drawing production, both the overall assembly and the constituent parts should be given symbols that do not conflict. The overall assembly should suffice as a symbol, as should the symbols on all the constituent parts.

NOTE 1 The provision of a symbol on the overall assembly is optional.

NOTE 2 See BS 8541-2 for more details.

5.2.3 Shape and measurement

For coordination, both the overall assembly and the constituent parts should be given shapes and measures that do not conflict.

Assemblies should be provided with geometric shapes to the level of detail required for recognition and coordination, but not for manufacturing.

Any shape of the overall assembly should suffice, as should the shape on all of the constituent parts.

NOTE 1 The provision of shape on the overall assembly is optional.

Measure quantities should be applied to the constituent parts.

NOTE 2 The provision of aggregate measure quantities on the overall assembly is optional.

NOTE 3 See BS 8541-3 for more details.

5.2.4 Properties

Characteristic properties should be assigned to the overall assembly.

NOTE 1 The provision of properties on the constituent parts is optional.

NOTE 2 See BS 8541-4 for more details.

5.2.5 Composition

The constituent parts should be construction library objects (not just symbols).

NOTE 1 Objects representing spaces may also be included.

NOTE 2 Some sending and receiving applications disallow some variants of their components and/or spaces from being the overall assembly or from being a constituent part.

Assemblies should include the arrangement in space using 2D or 3D coordinates, or the arrangement in sequence using 1D coordinates to define a layered construction.

*NOTE 3 Assemblies are illustrated in **A.2** to **A.5**, **B.1**, **C.1** and **D.1**.*

*NOTE 4 Layered constructions are illustrated in **A.6**, **B.2**, **C.2** and **D.2**.*

Each constituent part should be given a defining Type or material unless it is provided only to give context to the other parts. Constituent parts that provide context should be separable by their classification or other means.

Connection markers (link points) should be provided on the overall assembly to aid setting out and the integration of mechanical systems into the overall facility.

NOTE 5 Applications might not recognize connections in assemblies.

5.3 Conformity

The overall assembly and its constituent parts should conform to BS 8541-1, BS 8541-2, BS 8541-3 and BS 8541-4.

Annex A (informative) Use cases

A.1 General

The following use cases illustrate the principles set out in **4.1** to **5.3**.

A.2 Repetitive Facility Types

Design knowledge might be presented as assemblies. Repetitive Facility Types might be designed using libraries of assemblies of materials, Types, Components and space with the aim of replacing or complementing drawings, design guides and written specifications.

*NOTE See **B.1** and **C.1**.*

A.3 Prefabricated products

The adoption of modern methods of construction, including off-site prefabrication can be supported by providing assemblies as construction library objects. The overall assembly has a key role in achieving spatial coordination and correct interfaces with the facility systems. Once installed and in use the constituent parts can be managed.

*NOTE See **B.1** and **C.1**.*

A.4 Details and connections

Generic and manufacturer details might be transmitted as assemblies. Some constituent parts might be provided as context for manufacturers' products.

*NOTE See **B.1** and **C.1**.*

A.5 Fabrication and manufacturing

Assemblies are indicative only, and provided with only sufficient detail to recognize and coordinate the objects. This part of BS 8541 does not cover the use of assemblies to control fabrication and manufacturing, where different levels of detail and specification would be required. Product attributes (such as the model number or order code) may be used to reference the detailed geometry required for fabrication and manufacture.

*NOTE See **B.1** and **C.1**.*

A.6 Layered constructions

Generic and manufacturer-suggested layered constructions might be transmitted as assemblies. Additional constituent components are provided as context for manufacturers' products.

*NOTE See **B.2** and **C.2**.*

Annex B (informative) COBie examples

NOTE 1 BS 1192-4 gives more information.

NOTE 2 Only some columns of the sheets required to exchange an assembly are shown.

B.1 Example of an assembled stair

The overall assembly and the constituent parts are fully documented as Components (Table B.1). Each assembly relationship is documented (Table B.2): the relationship is named and the overall assembly is listed under "Owning Part", and a constituent part is listed under "Owned Part". The relative placement for the named assembly relationship is documented in the coordinate sheet (Table B.3).

Table B.1 **Component**

Name	ExtObject	Description
Assembled Stair	IfcStair	Stair (overall assembly)
Assembled Stair Landing 1	IfcSlab	Landing (constituent part)
Assembled Stair Run 1	IfcStairFlight	Flight (constituent part)
Assembled Stair Run 2	IfcStairFlight	Flight (constituent part)

Table B.2 **Assembly**

Name	AssemblyType	SheetName	ParentName	ChildNames	ExtObject
Assembled Stair assembly 01	Fixed	Component	Assembled Stair	Assembled Stair Run 1	IfcRelAggregates
Assembled Stair assembly 02	Fixed	Component	Assembled Stair	Assembled Stair Run 2	IfcRelAggregates
Assembled Stair assembly 03	Fixed	Component	Assembled Stair	Assembled Stair Landing 1	IfcRelAggregates

Table B.3 **Coordinate**

Name	Category	SheetName	RowName	Coordinate XAxis	Coordinate YAxis	Coordinate ZAxis	Clockwise Rotation	Elevational Rotation	YawRotation
Assembled Stair coordinate 01	Point	Assembly	Assembled Stair assembly 01	0	0	0	0	0	0
Assembled Stair coordinate 02	Point	Assembly	Assembled Stair assembly 02	3500	0	1350	0	0	0
Assembled Stair coordinate 03	Point	Assembly	Assembled Stair assembly 03	3500	0	1350	180	0	0

B.2 Example of a layered construction

The overall construction and the constituent materials are fully documented as Types (Table B.4). Each assembly relationship is documented (Table B.5): the relationship is named, the overall assembly is listed under "Owning Part" and a constituent part is listed under "Owned Part". The thickness is documented as relative placements in the coordinate sheet (Table B.6).

Table B.4 **Types**

Name	Category	ExtObject
Concrete upper floor	L33: In situ concrete	IfcMaterialLayerSet
Concrete – Sand/Cement screed	L535: Floor screeds	IfcMaterial
Structure – Precast concrete beams	L343: Structural beams and columns	IfcMaterial

Table B.5 **Assembly**

Name	AssemblyType	SheetName	ParentName	ChildNames	ExtObject	Description
Concrete upper floor layer 01	Layer	Type	Concrete upper floor	Concrete –Sand/ Cement screed	IfcMaterialLayer	Concrete – Sand/ Cement screed: 60.
Concrete upper floor layer 02	Layer	Type	Concrete upper floor	Structure – Precast concrete beams	IfcMaterialLayer	Structure – Precast concrete beams: 150.

Table B.6 **Coordinate sheet**

Name	Category	SheetName	RowName	Coordinate XAxis	Coordinate YAxis	Coordinate ZAxis
Concrete upper floor layer 01 box-lowerleft	box-lowerleft	Assembly	Concrete upper floor layer 01	0	0	0
Concrete upper floor layer 01 box-upperright	box-upperright	Assembly	Concrete upper floor layer 01	60	0	0
Concrete upper floor layer 02 box-lowerleft	box-lowerleft	Assembly	Concrete upper floor layer 02	60	0	0

Annex C (informative) IFCXML examples

NOTE Refer to the current IFC documentation [1] and [2] for definitive information.

C.1 Assembly for an assembled stair

The assembly relationship need not be named, but the "RelatingObject" identifies the overall assembly and the "RelatedObjects" lists the constituent parts. Their positioning is represented as a separate hierarchy of local placements (not shown).

```
<IfcRelAggregates>
  <GlobalId>02hmTHpNL7EP_pcVRQIDIN</GlobalId>
  <OwnerHistory>
    <IfcOwnerHistory ref="oh1"/>
  </OwnerHistory>
  <RelatingObject>
    <IfcStair id="i224116">
      <GlobalId>02hmTHpNL7EP_pcVNQIDIN</GlobalId>
      <OwnerHistory>
        <IfcOwnerHistory ref="oh1"/>
      </OwnerHistory>
      <Name>Assembled Stair</Name>
      <ObjectType>Assembled Stair</ObjectType>
      <ObjectPlacement>
        <IfcLocalPlacement ref="i1009"/>
      </ObjectPlacement>
      <Tag>419116</Tag>
      <ShapeType>notdefined</ShapeType>
    </IfcStair>
  </RelatingObject>
  <RelatedObjects>
    <IfcStairFlight>
      <GlobalId>02hmTHpNL7EP_pcVNQIDG3</GlobalId>
      <OwnerHistory>
        <IfcOwnerHistory ref="oh1"/>
      </OwnerHistory>
      <Name>Assembled Stair Run 1</Name>
      <ObjectType>Assembled Stair</ObjectType>
      <ObjectPlacement>
        <IfcLocalPlacement ref="i1019"/>
      </ObjectPlacement>
      <Representation>
        <IfcProductDefinitionShape ref="i227882"/>
      </Representation>
      <Tag>419256</Tag>
      <NumberOfRiser>9</NumberOfRiser>
      <NumberOfTreads>8</NumberOfTreads>
```

```
      <RiserHeight>0.557</RiserHeight>
      <TreadLength>0.917</TreadLength>
    </IfcStairFlight>

    <IfcStairFlight>
      <GlobalId>02hmTHpNL7EP_pcVNQIDUQ</GlobalId>
      <OwnerHistory>
        <IfcOwnerHistory ref="oh1"/>
      </OwnerHistory>
      <Name>Assembled Stair Run 2</Name>
      <ObjectType>Assembled Stair</ObjectType>
      <ObjectPlacement>
        <IfcLocalPlacement ref="i1029"/>
      </ObjectPlacement>
      <Representation>
        <IfcProductDefinitionShape ref="i228416"/>
      </Representation>
      <Tag>419361</Tag>
      <NumberOfRiser>10</NumberOfRiser>
      <NumberOfTreads>9</NumberOfTreads>
      <RiserHeight>0.557</RiserHeight>
      <TreadLength>0.919</TreadLength>
    </IfcStairFlight>

    <IfcSlab>
      <GlobalId>02hmTHpNL7EP_pcVNQIDS8</GlobalId>
      <OwnerHistory>
        <IfcOwnerHistory ref="oh1"/>
      </OwnerHistory>
      <Name>Assembled Stair Landing 1</Name>
      <ObjectType>Assembled Stair</ObjectType>
      <ObjectPlacement>
        <IfcLocalPlacement ref="i1039"/>
      </ObjectPlacement>
      <Representation>
        <IfcProductDefinitionShape ref="i228955"/>
      </Representation>
      <Tag>419507</Tag>
      <PredefinedType>landing</PredefinedType>
    </IfcSlab>
  </RelatedObjects>
</IfcRelAggregates>
```

C.2 Example: Assembly for a layered construction

The named "IfcMaterialLayerSet" has its assembly relationship represented as an "IfcMaterialLayer" linking to the named "IfcMaterial". Their positioning is represented as the "LayerThickness" of the "IfcMaterialLayer"

```
<IfcMaterialLayerSet>
  <MaterialLayers>
    <IfcMaterialLayer>
      <Material>
        <IfcMaterial>
          <Name>Concrete - Sand/Cement Screed</Name>
        </IfcMaterial>
      </Material>
      <LayerThickness>60.</LayerThickness>
    </IfcMaterialLayer>
    <IfcMaterialLayer>
      <Material>
        <IfcMaterial">
          <Name>Structure - Precast Concrete Beams</Name>
        </IfcMaterial>
      </Material>
      <LayerThickness>150.</LayerThickness>
    </IfcMaterialLayer>
  </MaterialLayers>
  <LayerSetName> Concrete Upper Floor</LayerSetName>
</IfcMaterialLayerSet>
```

Annex D (informative) IFC examples

NOTE Refer to the current IFC documentation [1] and [2] and BS ISO 16739 for definitive information.

D.1 Example: Assembly for an assembled stair

The assembly relationship "IfcRelAggregates" need not be named. Within it the overall assembly and the list of constituent parts is provided. Their positioning is represented as a separate hierarchy of local placements.

#1008= IFCAXIS2PLACEMENT3D(#3,$,$);

#1009= IFCLOCALPLACEMENT(#1902,#1008);

#1001= IFCSTAIR('02hmTHpNL7EP_pcVNQIDIN',#1901,'Assembled Stair',$,'Assembled Stair: 204881',#1009,$,'419116',.NOTDEFINED.);

#1002= IFCRELAGGREGATES('02hmTHpNL7EP_pcVRQIDIN',#1901,$,$,#1001,(#1010,#1020,#1030));

#1017= IFCCARTESIANPOINT((0.,0.,0.));

#1018= IFCAXIS2PLACEMENT3D(#1017,$,$);

#1019= IFCLOCALPLACEMENT(#1009,#1018);

#1010= IFCSLAB('02hmTHpNL7EP_pcVNQIDS8',#1901,'Assembled Stair: 419116 Landing 1',$,'Assembled Stair: 204881',#1019,#1912,'419507',.LANDING.);

#1027= IFCCARTESIANPOINT((3500.,0.,0.));

#1028= IFCAXIS2PLACEMENT3D(#1027,$,$);

#1029= IFCLOCALPLACEMENT(#1009,#1028);

#1020= IFCSTAIRFLIGHT('02hmTHpNL7EP_pcVNQIDG3',#1901,'Assembled Stair Run 1',$,'Assembled Stair: 204881',#1029,#1922,'419256',9,8,0.558,0.919);

#1037= IFCCARTESIANPOINT((3500.,0.,0.));

#1038= IFCAXIS2PLACEMENT3D(#1037,$,$);

#1039= IFCLOCALPLACEMENT(#1009,#1038);

#1030= IFCSTAIRFLIGHT('02hmTHpNL7EP_pcVNQIDUQ',#1901,'Assembled Stair: Stair Run 2',$,'Assembled Stair: 204881',#1039,#1932,'419361',10,9,0.558,0.919);

D.2 Example: assembly for a layered construction

The named "IfcMaterialLayerSet" has its assembly relationship represented as an "IfcMaterialLayer" linking to the named "IfcMaterial". Their positioning is represented as a thickness of the "IfcMaterialLayer"

#2001=IFCMATERIALLAYERSET((#2010,#2020),'Concrete Upper Floor');

#2010=IFCMATERIALLAYER(#2011,60.,$);

#2011=IFCMATERIAL('Concrete - Sand/Cement Screed');

#2020=IFCMATERIALLAYER(#2021,150.,$);

#2021=IFCMATERIAL('Structure - Precast Concrete Beams');

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 1192, *Collaborative production of architectural, engineering and construction information – Code of practice*

BS 1192-4:2014, *Collaborative production of information – Part 4: Fulfilling employer's information exchange requirements using COBie – Code of practice*

BS 7000-4, *Design management systems – Part 4: Guide to managing design in construction*

BS 8541-6, *Library objects for architecture, engineering and construction – Part 6: Product and facility declarations – Code of practice*

BS ISO 10303-21, *Industrial automation systems and integration – Product data representation and exchange – Part 21: Implementation methods: Clear text encoding of the exchange structure*

BS ISO 12006-3, *Building construction – Organization of information about construction works – Part 3: Framework for object-oriented information*

BS ISO 16739, *Industry foundation classes*

BS ISO 29481-1, *Building information modelling – Information delivery manual – Part 1: Methodology and format*

ISO 10303-28, *Industrial automation systems and integration – Product data representation and exchange – Part 28: Implementation methods: XML representations of EXPRESS schemas and data, using XML schemas*

PAS 1192-2, *Specification for information management for the capital/delivery phase of construction projects using building information modelling*

PAS 1192-3, *Specification for information management for the operational phase of assets using building information modelling*

PAS 1192-5, *Specification for security-minded building information management, digital built environments and smart asset management* [2)]

Other publications

[1] www.buildingsmart.org [viewed: 24-3-2015]

[2] www.buildingsmart-tech.org/specifications/ifc-releases [viewed: 24-3-2015]

2) In development.

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