Building Information Modelling

« Two Political priorities of European Commission :
- *A European Green Deal for EU leadership in **circular economy**, clean technologies, and decarbonisation of energy-intensive industries.*
- *A European digital and digitalised future, at the heart of the **data economy**. »*

Ursula von der Leyen

Christian Vinson

28/01/2021

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BIM : Building Information Modelling

What's it ?

- Work method allowing reliable information to be shared via a collaborative approach throughout the phases of a construction project (design, construction, operation, demolition).
- **A method of describing and managing information related to all construction works: buildings and infrastructure.**
- A decision support process, mastery of the construction phases, assistance with management, operation and maintenance.

It's not

- a digital technology, tool or digital format, and it's not restricted to large operations.

The basic principle of BIM is to improve and make reliable the exchange of <u>required data</u> throughout the life cycle of a construction work.

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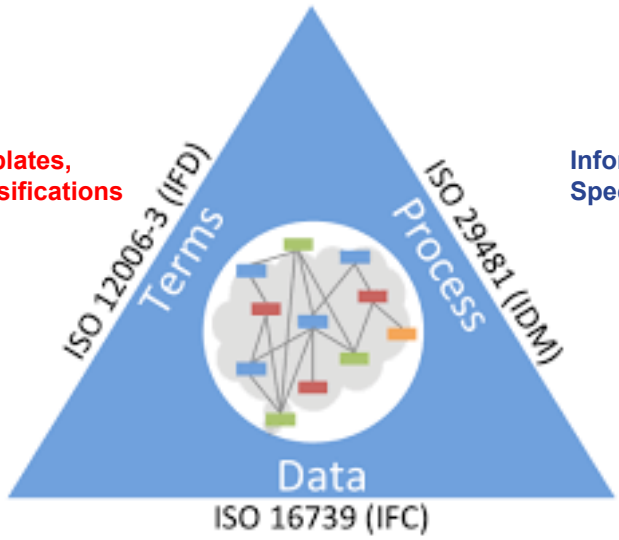
BIM : simplified representation
The buildingSMART Triangle

It's our business

Properties, Data Templates, Dictionaries and Classifications



Information Delivery Specification

Exchange information : IFC

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BIM : definitions

Properties : inherent or acquired feature of an item (colour, reaction to fire…) with an unambiguous definition.

Data templates : is a common data structure containing sets of properties (product characteristics) and their relatinships with concepts such as measures, units, values stored in a data dictionary.

Dictionaries : centralized repository of information about data such as meaning, relationships to other data, origin, usage and format.

Classifications : is a method that makes it possible to distribute a set of coordinated, organised and hierarchically arranged entities that permit the identification of the components in a construction entity.

Level of Development (LOD) : level of definition of the digital model making it possible to define the geometry of the objects and the information attached during the different phases of a construction project.

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Significance of unambiguous definition of property

It's very important that all stakeholders speak the same language, and that each property is defined unambiguously with a unique identification and reference to a standard or technical reference document

IFC → Thermal Transmittance

OMNICLASS → Thermal Resistance

AUTODESK. Revit® → Thermal Conductivity

NBS → Thermal Transmittance

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BIM : key standards

Classifications	**EN ISO 12006-2**	Building construction - Organization of information about construction works - Framework for classification
Dictionaries	**EN ISO 12006-3**	Building construction - Organization of information about construction works - Framework for object-oriented information
Properties	**EN ISO 23386**	Building information modelling and other digital processes used in construction - Methodology to describe, author and maintain properties in interconnected data dictionaries
Data templates	**EN ISO 23387**	Building information modelling (BIM) - Data templates for construction objects used in the life cycle of built assets - Concepts and principles

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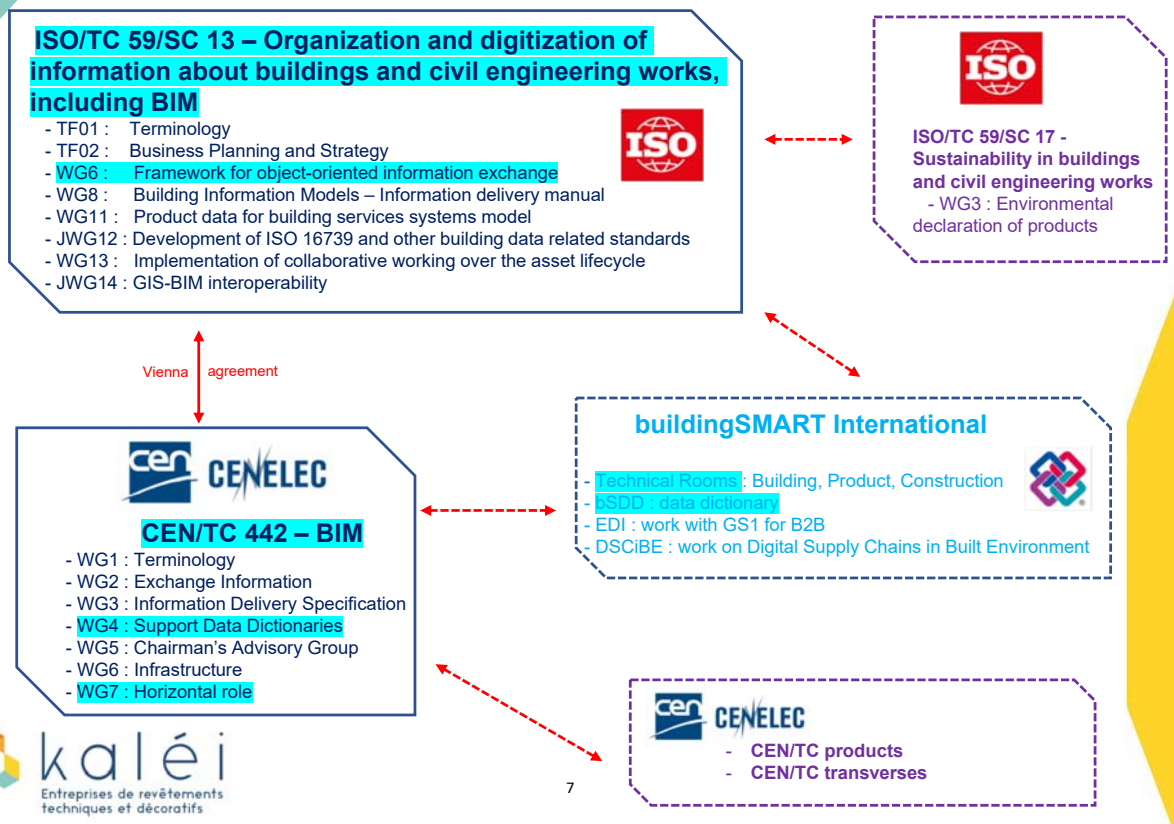
Overview of BIM standardisation



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Key issues

We see today that several standardizations projects on data (dictionaries, properties, data templates ...) **are emerging.**

- **These projects are mainly carried by digital players** (IBM, Cobuilder, ...)at CEN and ISO.
- For example, **"BIM DoP objects"** in CEN/TC442/WG4 or **"BIM EPD objects"** in ISO/TC59/SC17/WG3 (ISO/DIS 22057 current vote).

They ask **many questions about reliability** (certification) **and data protection** with the issue of **legal responsibilities** associated with it.

Other work relating to classifications is also starting to appear at CEN or ISO.

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Potential risks of these projects

☛ **We don't need to digitize our DoPs because they are useless in the act of construction.**

It is just a regulatory document that is not used by specifiers to make calculations in the act of construction.

☛ **The problem is the same for draft standards "BIM EPD objects".**

As the EPD may be different from one country to another, there would be many different "BIM EPD objects".

☛ **This type of projects presents significant risks of privatization of our technical data which can be very restrictive and very expensive.**

☛ **Also, there is an important risk of being imposed data formats that do not correspond to the specific needs and requirements of our business.**

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Proposition of actions

Building products manufacturers **are under-represented** in BIM standardization commissions**, it is therefore essential for them to participate at these commissions (**ISO, CEN and mainly national mirror committees**)** for **verify** that the data format projects in the BIM commissions **correspond to them specific needs and requirements.**

Participate in the various associations (buildingSMART, CPE, …) and the different experimentations (DSCiBE, DigiPLACE, …) working on the BIM subject.

Technical Data expertise is our business, it's very important that we actively participate in its digitalization

For a 1st approach it may be interesting to participate in the to the Webinar of CEN/TC442 **"Building Information modelling (BIM) supports digitalization of standards for the Construction sector,** that will take place on Monday 15 February from 14:00 to 16:30 CET.
Register here: https://cencenelec.zoom.us/webinar/register/WN_iTcjCPu9S7C77wBpWzkM7w

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Properties an Data Templates

Property
GUID : Status : Date of creation : Date of validation : Names in different languages (National and English) : Descriptions in different languages (National and English) : Reference document : Links to other properties : Links to groups of properties : Physical quantity : Data type : Method of measurement Units : …

To simplify, for us Data Templates are groups of properties

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Dictionaries

☛ **A Data Dictionary is a connection box that hosts classifications and their properties, allowed values, units and translations.**

- **The Dictionary allows linking between all the content inside the database.**
- **It provides a standardized workflow to guarantee data quality and information consistency.**

☛ **There are private dictionaries developed by service providers (Cobuilder, BIMobject …) and open-BIM dictionaries such as buildingSMART bSDD.**

☛ **Theses dictionaries must be developed according EN ISO 12006-3 and integrate properties and data templates developed according EN ISO 23386 and EN ISO 23387.**

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Main systems of classification used in construction

- **It exists two categories of classification systems:**
  - enumerative classification systems;
  - faceted classification systems.

- **Les principles are OmniClass, UniClass 2015, Uniformat 2010, UNIFORMAT II 2015 or CoClass.**

- **All the classifications must be developed according to the standard EN ISO 12006-2**

Example OmniClass classification for our floorcoverings

	Level 1	Level 2	Level 3	Level 4
OmniClass Tables	Products Table 23	Interior and Finish Products Code 23-15 00 00	Resilient Flooring 23-15 17 15	Plastic Flooring Code 23-15 17 15 13 Linoleum Flooring Code 23-15 17 15 17

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Level of Development (LOD)

The LOD Specification expands upon the LOD schema developed by the American Institute of Architects (AIA)

LOD	Definitions for floorings
LOD 100	Non-graphic information attached to model elements providing assumptions that are not distinguishable by type or material Types, layouts and locations are still flexible.
LOD 200	Generic materials by type (e.g. tile or coatings), approximate thickness represented by a single assembly. Layouts, patterns and locations are still flexible
LOD 300	Single model element by type with overall thickness that accounts for materials based on specific types
LOD 350	Individual materials are modeled as separate elements Additional non-graphic information such as manufacturer and model number may be included.
LOD 400	Individual material pattern layouts, expansion/control joints, and finish edges to be modeled as separate elements.
LOD 500	Relates to field verification and is not an indication of progression to a higher level of model element geometry or non-graphic information

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Chronology of differents projects “BIM DoP objects”

☛ **1st step : CWA 17316:2018 - Smart CE marking**

A CWA is an agreement developed by all interested parties and published by CEN with no vote. A CWA does not have the status of a European Standard. This CWA has been essentially developed by CPE and CoBuilder.

☛ **2nd step : WI00442008 - prEN 17473**

Building information modelling (BIM) — Data templates for construction objects used in the life cycle of any built asset — Data templates based on harmonised technical specifications under the Construction Products Regulation (CPR).

☛ **3rd step : NWIP**

Building information modelling (BIM) — Data templates for construction objects used in the life cycle of any built asset — Data templates based on technical specifications for construction products

- 1st scope : This document provides a methodology and process to create data templates for construction objects covered by technical specifications, including harmonised product standards (hEN) and European Assessment Documents (EAD).
- 2nd scope : **This document provides a methodology to create data templates for construction objects that are based on European product standards and technical specifications**.

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