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CONSTRUCTION INFORMATION CENTRE

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Why make classification based on international standards?

A status on CCS and CoClass, and examples of how findings are taken up by other industries (infrastructure, shipbuilding and airplanes)

ICIS DA, Cologne, June 2018

Gunnar Friborg, Molio, June 18th 2018

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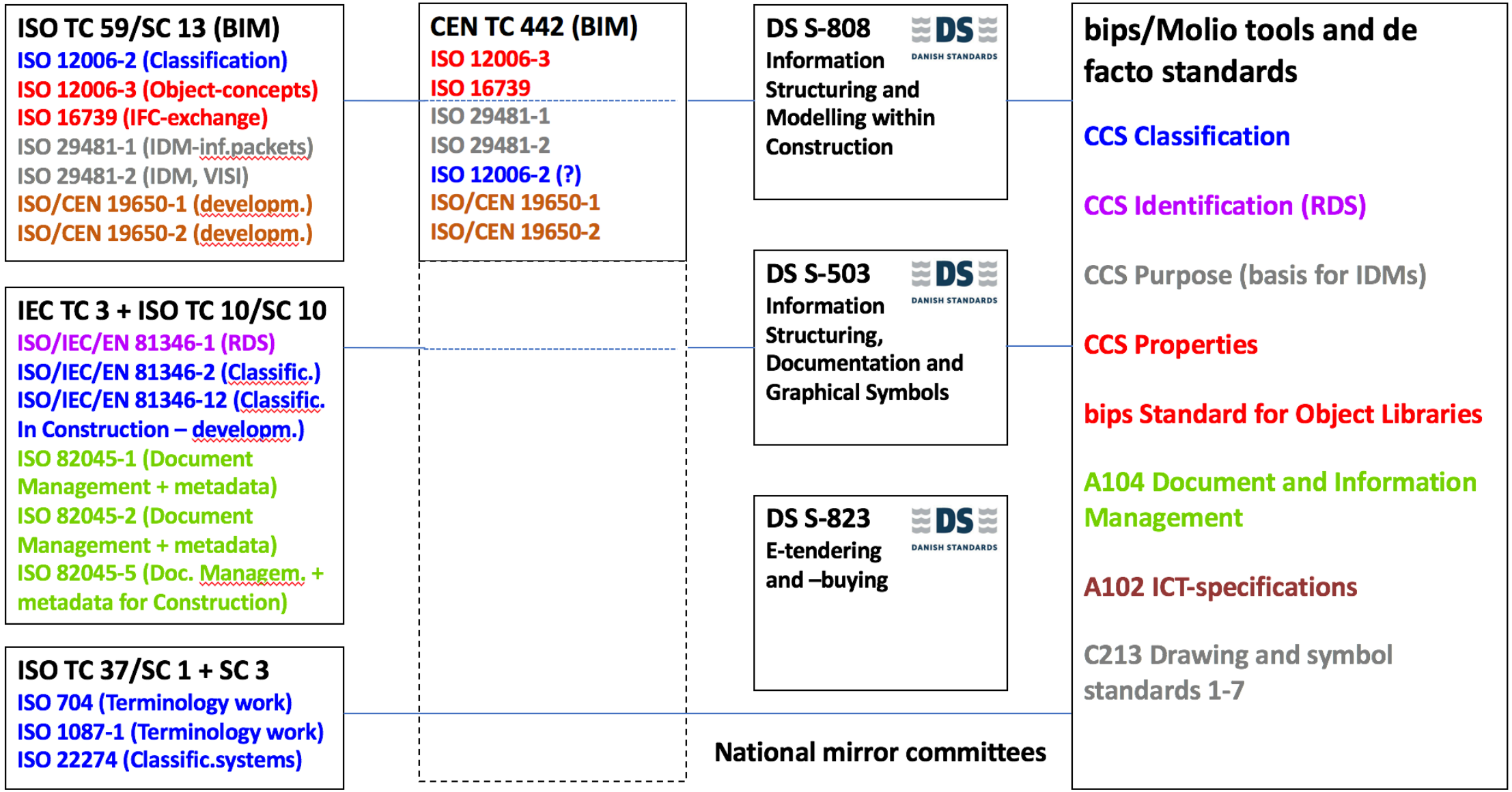
Agenda

- The importance of using standards
- Standards used and influenced by CCS and CoClass development
- The impact of using standards

Stating the importance of standards

- **In essence, a standard is an agreed way of doing something** – at best it's a future oriented set of rules and methods based on well tested practice and technology.
- **Standards are the distilled wisdom of people** with expertise in their subject matter, who should know the needs of the organizations, the companies, and the users they represent.
- **Standards are knowledge to be applied. They are powerful tools** that can help drive innovation, increase collaboration and productivity, and facilitate trade.
- **The use of standards can make organizations and tools more successful** and people's everyday work and lives easier, safer and healthier – providing better quality and using fewer resources.
- **The construction sector is a loose organization of many parties – not one factory. We need common standards to harvest the benefits of our BIM investments.**
- **To be able to make ICT (and BIM) work, and to do integrated BIM, we need common language, common information structure, and interoperability.**

International standards related to bips/Molio tools and standards



Standards used for development of CCS and CoClass

CCS Classification and Identification has its origin in international standards:

ISO 12006-2:2015	Framework for classification
ISO 704:2009	Terminology work
ISO 22274:2013	Aspects for developing classification systems
EN / IEC / ISO 81346-1:2009	Structuring principles and reference designations
EN / IEC / ISO 81346-2:2009	Classification of objects and codes for classes
buildingSMART	IFC properties and property sets and bSDD

Standards which are influenced by CCS and CoClass

ISO 12006-2:2015	Framework for classification (rev.)
ISO 704:2009	Terminology work
ISO 22274:2013	Aspects for developing classification systems
EN / IEC / ISO 81346-1:2009	Structuring principles and reference designations
EN / IEC / ISO 81346-2:2018	Classification of objects and codes for classes (*rev.*)
buildingSMART	IFC properties and property sets and bSDD
ISO 81346-12:2018	Buildings and building services (*new standard*)

Does use of standards make an impact? … status:

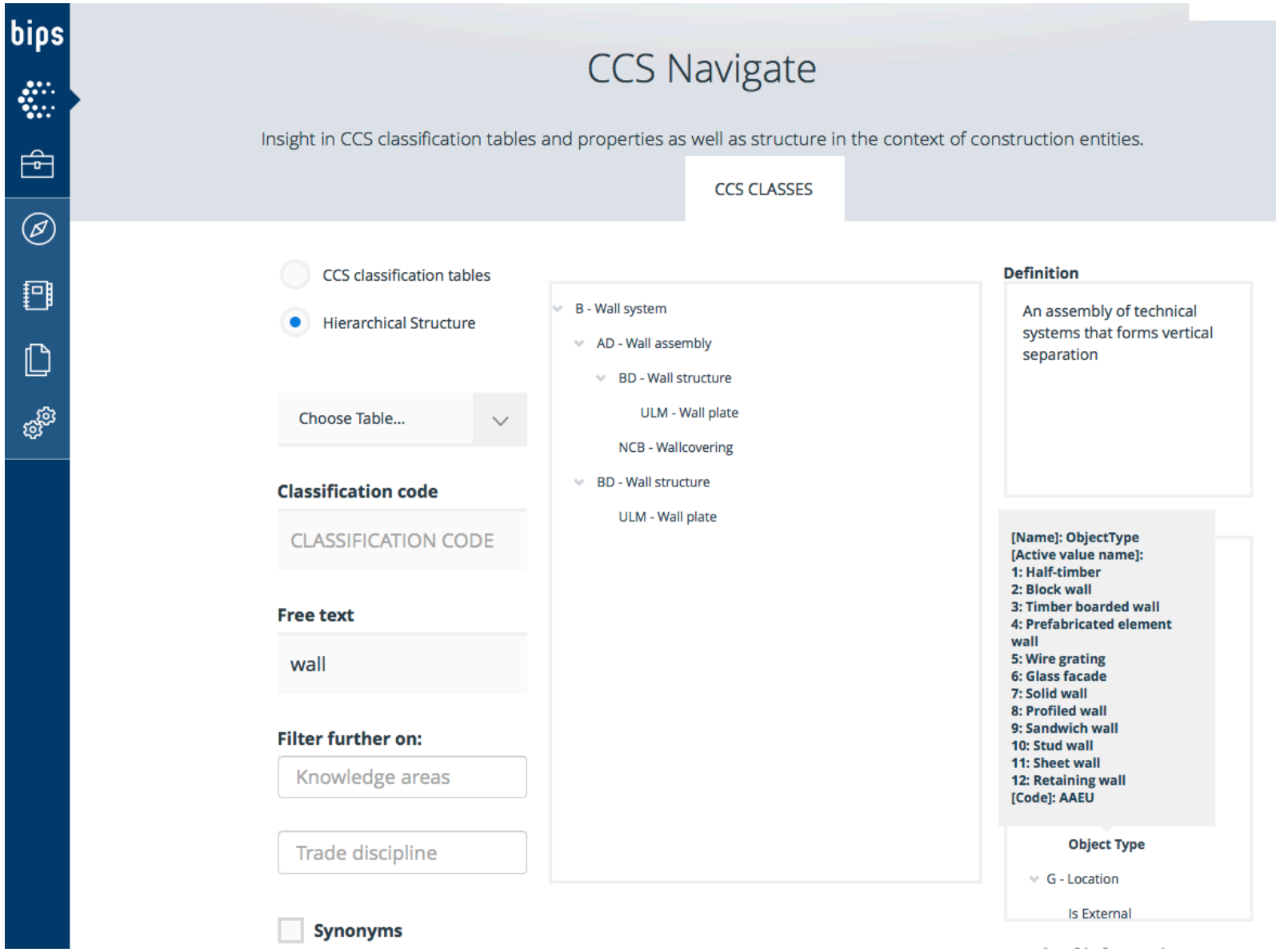
CCS Classification and Identification development was from the beginning focused on BIM and being object-oriented, and to be based on international standards. This has secured:

- **Cross sector application and user possibilities** – construction, infrastructure, offshore, manufacturing industry and other production sectors.
- **Better ICT implementation** – attractive to BIM SW-developers and –vendors for global marketing (defined syntax for coding based on standards).
- **Open CCS structure, database-tables and APIs** – apps for concepts and classification tables, for coding and code-readers, defined objects with properties.
- **And it's well coordinated with buildingSMART IfcObjects and RLOM.**
- **CCS is now implemented in 24 ICT/BIM-tools in DK.**

CCS Navigate

CCS embraces:
- Classification
- Terms and definitions
- Identification
- Element types
- Properties
- Rules of Measurement
- Level of Information

CCS is now being implemented in all Molio Tools:
- Cost estimation tool
- Legislation information
- Specifications



CCS Implementation Videos on YouTube

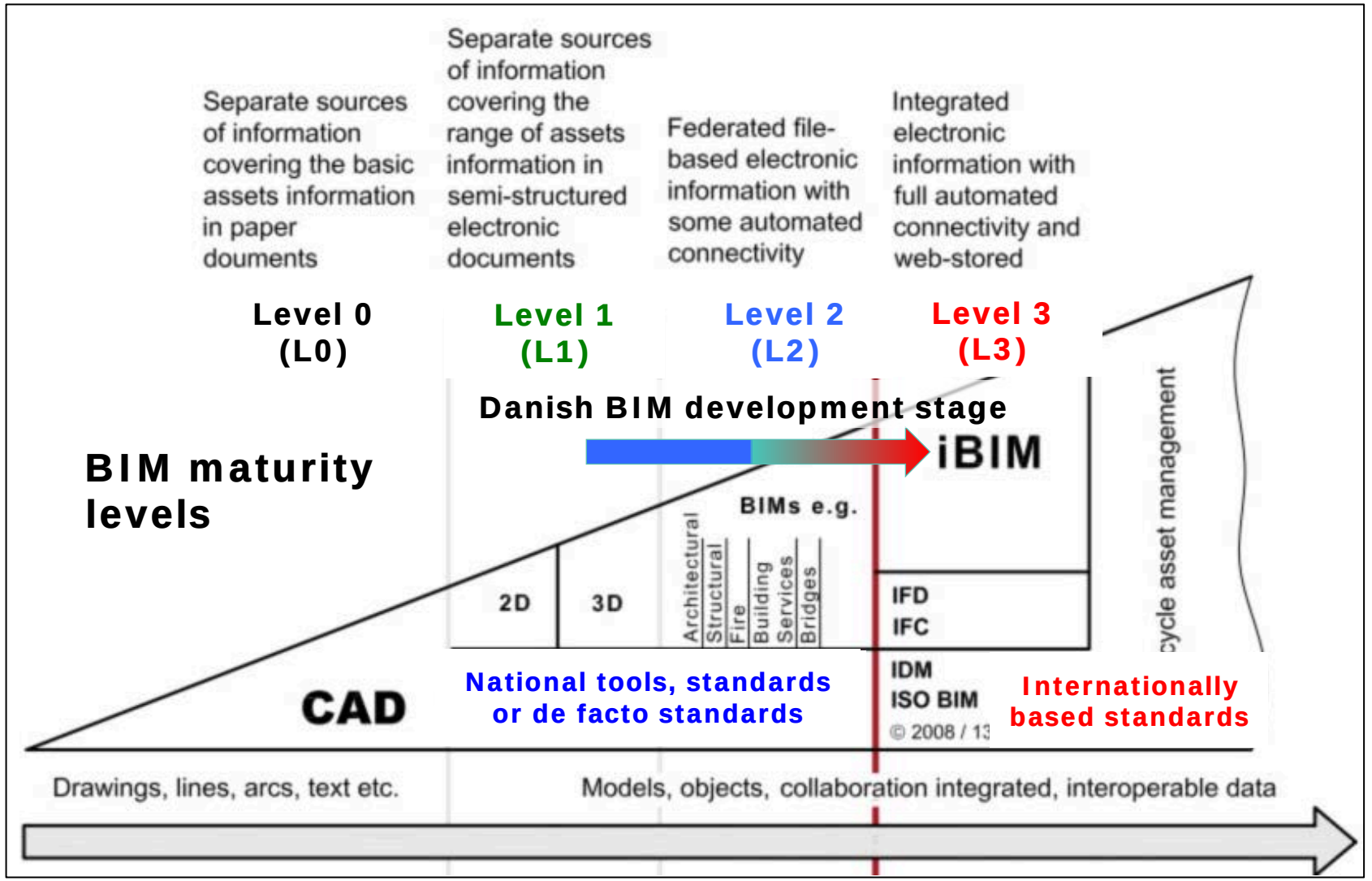
- **Digital demands of the client with CCS**
- **CCS classification and identification**
- **Automatic CCS coding**
- **Software communicates via CCS**
- **Consistency in project documents using CCS**
- **Quantities and measurement rules**
- **NCC and digitalisation in the building industry**
- **The manufacturer and digitalisation**
- **Delivery and operation with the help of BIM and CCS**

https://www.youtube.com/results?search_query=bips+kanal+ccs+in+practice

DK BIM development levels according to UK-model

It is said, that to be able to do *Level 3 BIM* or *integrated BIM* (iBIM) we need

- Common structuring and language, the semantics (bSDD, classification…)
- Use of widely accepted standards (ISO BIM standards)
- Making data interoperable (IFC, Property Data)



Has there been an interest in CCS and 81346-principles?

- **Germany (DIN) proposed and has lead the development of the ISO 81346-12 application standard** but has as a country not decided to implement yet…
- **Sweden has adopted 81346-principles and CCS Classification content and extended the number of classes including also infrastructure** (road and rail) into new CoClass Swedish classification system.
- **Norway, Finland, Latvia, Belgium and France are looking into the 81346-principles**, and the CCS and CoClass results for their strategic discussions of future cooperation on classification for BIM.
- **Estonia has adopted and is implementing. Latvia has made a VR-video about the use.**
- **ISO/TC 59/SC 13** ("Home of the BIM standards") **follows and comments on the revisions and development of the 81346-series** by Liaison agreement.
- **CEN/TC 442 – "The principles might be a candidate for a harmonized European generic classification system for BIM"** – supplementing a variety of national construction classification systems – to be discussed at WG 4-meeting in Avignon late June.

Example: Australian comparison of Classification systems

Comparison of OmniClass, Uniclass, Cuneco and CoClass with reference to ISO 12006-2 and ISO 81346-12

ISO 12006-2:2015	OmniClass 2006-2013 North America	Uniclass 2015 UK	Cuneco Classification System (CCS) Denmark	CoClass Sweden	ISO 81346-12
A.2 Construction information	Table 36 Information	FI – Forms of information (Beta status)	A104 Document Management (metadata)		
A.3 Construction products	Table 23 Products	Pr – Products	Components	Components	Components (Product aspect)
	Table 41 Materials				
A.4 Construction agents	Table 33 Disciplines	Agents	A104 Document Management (metadata)		
	Table 34 Organizational roles		A104 Document Management (metadata)		
A.5 Construction aids	Table 35 Tools	TE – Tools and Equipment	Equipment		
A.6 Management	Table 32 Services	PM – Project management	A104 Document Management (metadata)		
A.7 Construction process	Table 31 Phases	Project phases (draft for comment)	A104 Document Management (metadata)		
		Regions (draft)			
		Districts (draft)			
A.8 Construction complexes		Co – Complexes		Construction complex	
A.9 Construction entities	Table 11 Construction entities by function	En – Entities	Construction entity	Construction entity	
	Table 12 Construction entities by form	Entities by form (draft for comment)			
		Ac – Activities			
A.10 Built spaces	Table 13 Spaces by function	SL – Spaces/locations	Built spaces/User spaces	Space	Spaces (Location aspect)
	Table 14 Spaces by form				
A.11 Construction elements	Table 21 Elements (includes Designed elements) (UniFormat)	EF – Elements/functions	Functional systems Technical systems Components	Functional systems	Functional systems (Functional aspect)
		Ss – Systems		Constructive (Technical) systems	Technical systems (Functional aspect)
A.12 Work results	Table 22 Work results (MasterFormat)			Production results incl. maintenance activities	
A.13 Construction properties	Table 49 Properties	Properties	Classes of Properties	Properties	
		Zz – CAD			
				Landscape information	

Infrastructure on the move – to be integrated with construction

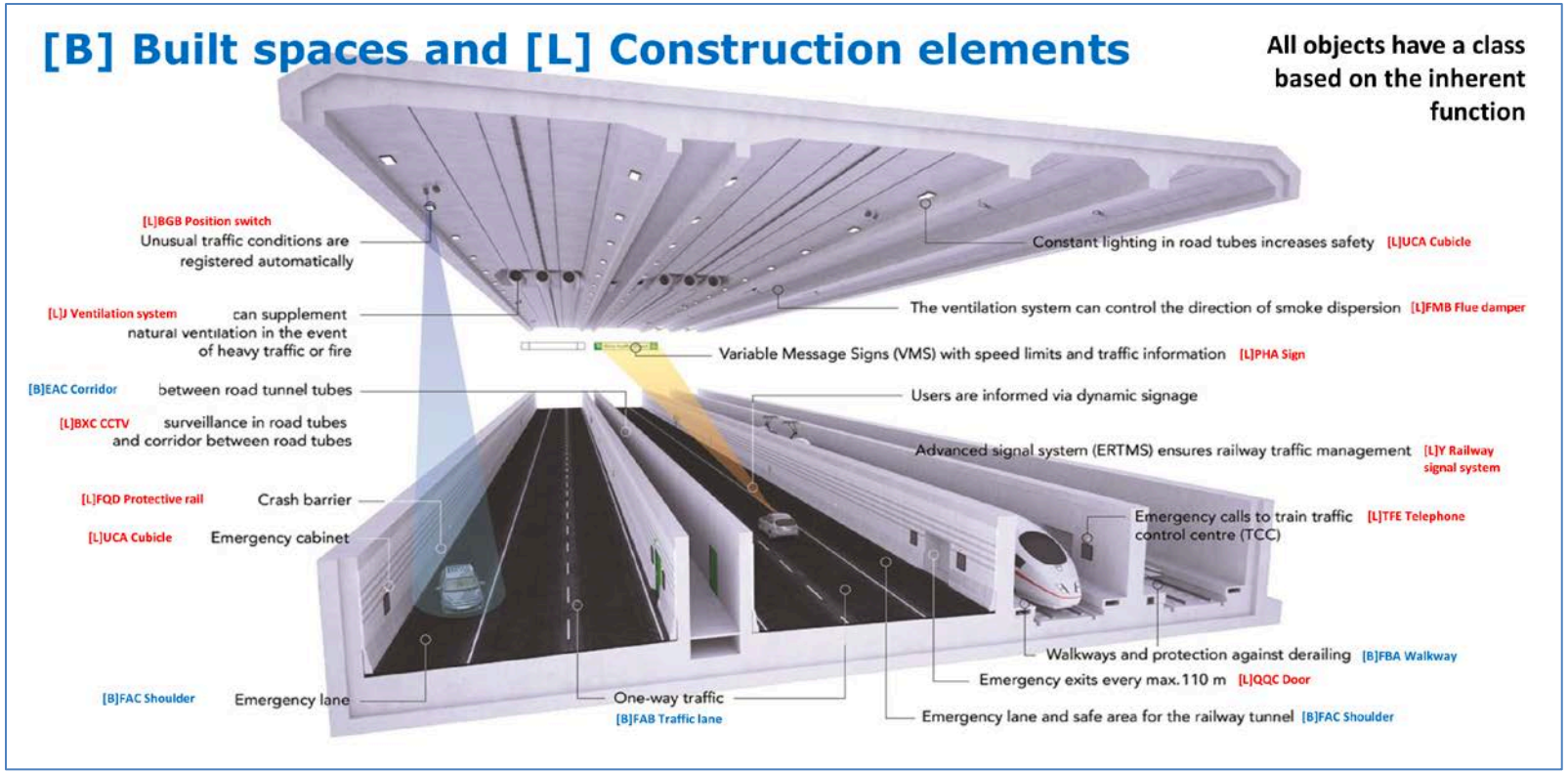
In Denmark BIM Infra.dk for road and rail is established.
A 5 year development program to borrow from and build on digital construction development.

ISO/IEC 81346-2 and ISO 81346-12 includes object classes for infrastructure.

buildingSMART INFRA

ISO TC 59/SC 13 (BIM)

CEN/TC 442 (BIM)



An example from a CCS test performed on the Fehmarn tunnel project

Infrastructure, Offshore, Maritime, Aviation…

Using the ISO/IEC 81346 Reference Designation Systems (RDS) coding and new Classification principles

Sund & Bælt – infrastructure, bridges, tunnels in DK

AIRBUS – A350 being analysed and tested for future systems engineering

SEMCO Maritime – transformer platform, North Sea

OCEANCO Yachts / De Keizer Marine Eng. – Custom super yachts

The Airbus Example

Airbus: Geometrical aeroplane modelling is perfect for

- Geometrical coordination = Collision control, Consistency control, Size and location control
- Maintenance, Visual location identification
- Education purposes
- Model simulations and studies

Airbus: General issues to be solved

- Structuring and coding across 5 production sites
- Use of different languages and terms

Airbus: There is a big need for adding an information structure for a digital information model based on

- A common language, well defined classification and identification principles (e.g. RDS)
- Structured digital information management and exchange
- Systems configuring and handling in order to develop and test the different systems of an airplane:
  - 15 Functional systems (Buildings and Infrastructure: 18)
  - 81 Technical systems (Buildings and Infrastructure: 93)
  - XXX Components (Buildings and Infrastructure: 498)