

CCIC Public Seminar, Tallinn | 2022-12-15



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# CCI Use in Denmark

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Molio is the unifying knowledge center for the Danish construction industry. It is the industry's common and independent place for the development and establishment of common tools, standards and knowledge.

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# Development of CCI being a part of the Danish BIM practice

- **Requirement of BIM use for public clients established 2007**
  - Governmental projects first, then Regional and Municipality projects
  - Modelling, classification and identification and exchange of data and data for operation and maintenance was to be required by clients
- **Development of CCI took place from 2011-2015 (the cuneco-project)**
  - Focus on BIM usability, digital handling, *objects with properties*
  - Focus on collaboration between all parties in the *full lifecycle of assets*
  - CCI development has been *based on international standards* for terminology, classification, and for systems engineering (the 81346-series) – also used in other industrial sectors
  - CCI has been developed *complementary to IFC* (buildingSMART)
  - Goal: To establish *a common language* as the basis for a digital practice

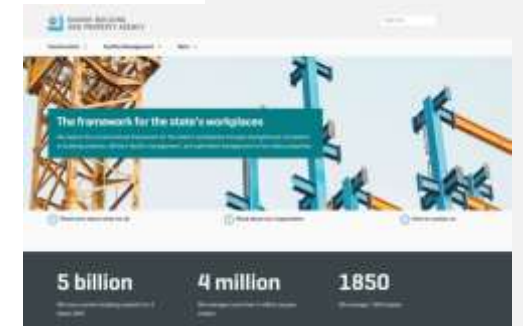


Revised 2013



# The implementation of CCI in the Danish BIM practice

- **Implementation was from the beginning focused on the digital practice, the software use and the operation period of the assets**
  - CCI (and the former Danish version CCS) is now implemented and supported in a lot of software
  - A majority of all public funded projects are now requiring CCS or CCI
  - Many clients have adopted CCI for their operation and maintenance
- **Having established the object classes the implementation now focuses on related topics**
  - Getting standardized properties and usable data templates for these based on international and European standards (ISO 23386 and ISO 23387) to digitize and handle product information according to CPR
  - Sustainability – handling of complex information to perform simulations and analysis (LCA) and record the materials and chemicals used for buildings (the logbook)



# CCI implementation in Infrastructure projects in DK

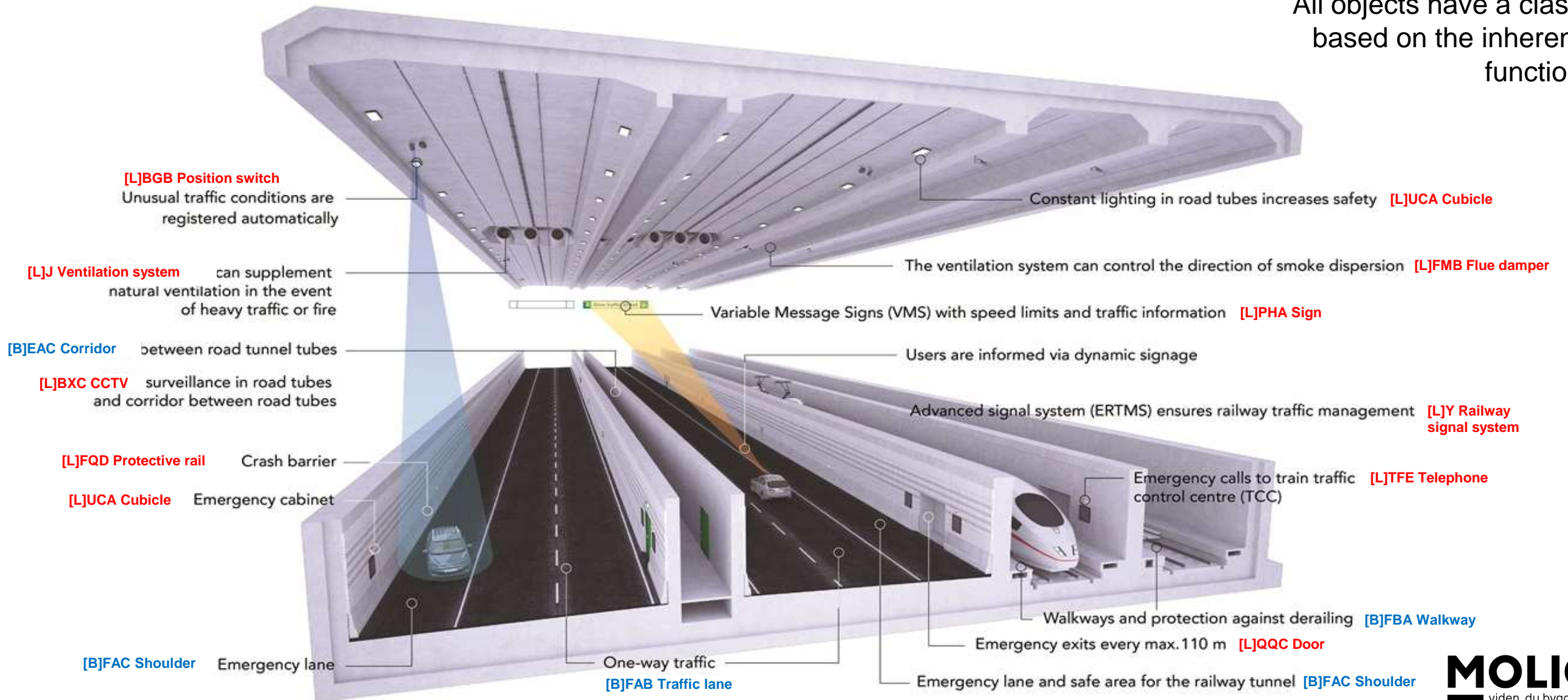
- **Molio cooperates with the infrastructure group, BIM Infra.dk about projects with CCI**
  - The Danish Road Directorate – The Nordhavn Tunnel in Copenhagen, highways in Funen and Jutland and the new Storstrøm Bridge
  - Banedanmark – Danish Railroad Directorate
  - Sund & Bælt – the larger bridges and tunnels in Denmark
  - Femern connection – the tunnel between Denmark and Germany, a part of Sund & Bælt for future maintenance
  - Copenhagen Metro – the four metro lines – one under construction and one under planning
  - Copenhagen municipality – at the planning stage for city infrastructure projects





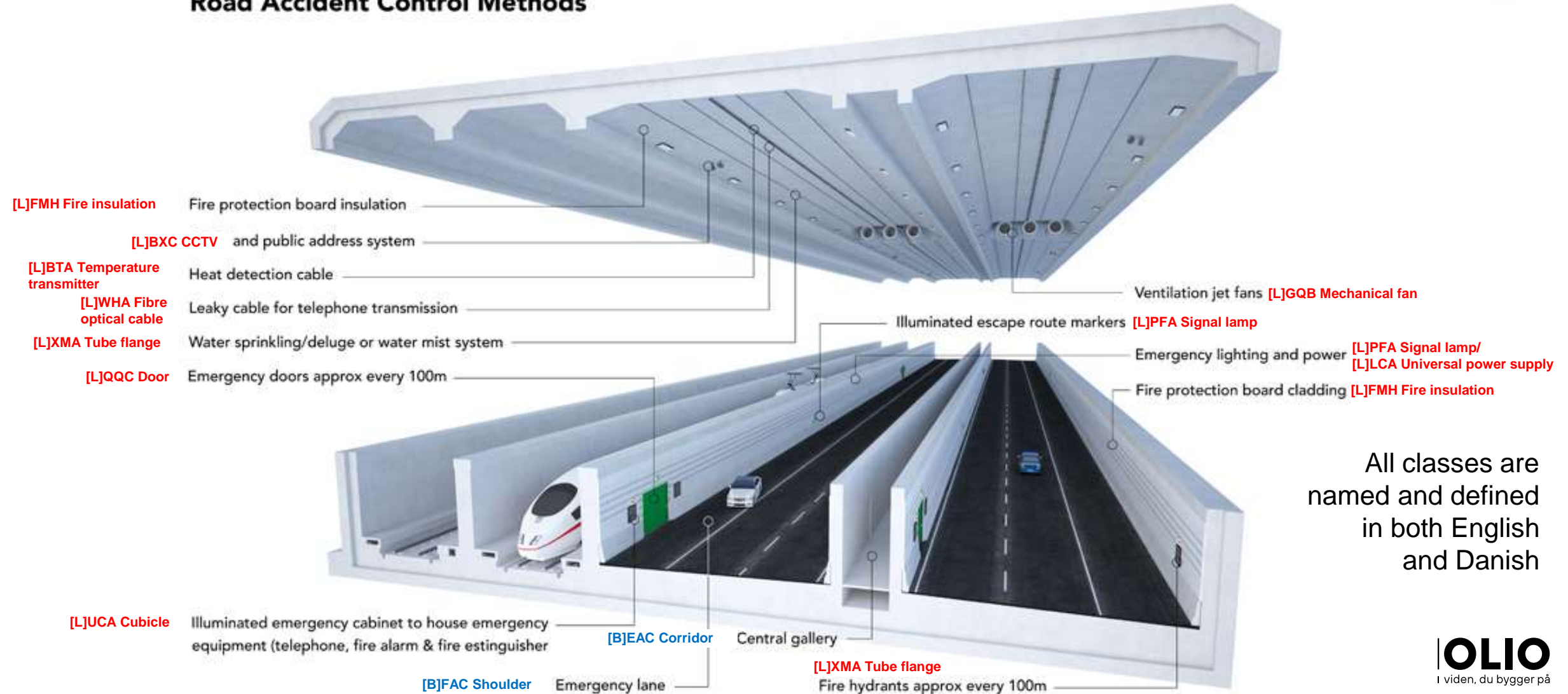
# [B] Built spaces and [L] Construction elements (example)

All objects have a class based on the inherent function



# [B] Built spaces and [L] Construction elements (example)

## Road Accident Control Methods



All classes are named and defined in both English and Danish

# Implementation takes time – relationships to business purposes, maintenance and software use shall be considered

- **Danish Ministry of Defence – Estate Agency**
  - Started with a learning program for digital management of maintenance and operation of buildings and facilities – 2 ½ years ago
  - At the moment buildings and facilities are being classified for facility management operations, planning and budgeting
  - Missing object classes in Construction entities and Construction complexes tables will be proposed to Molio for CCI additions

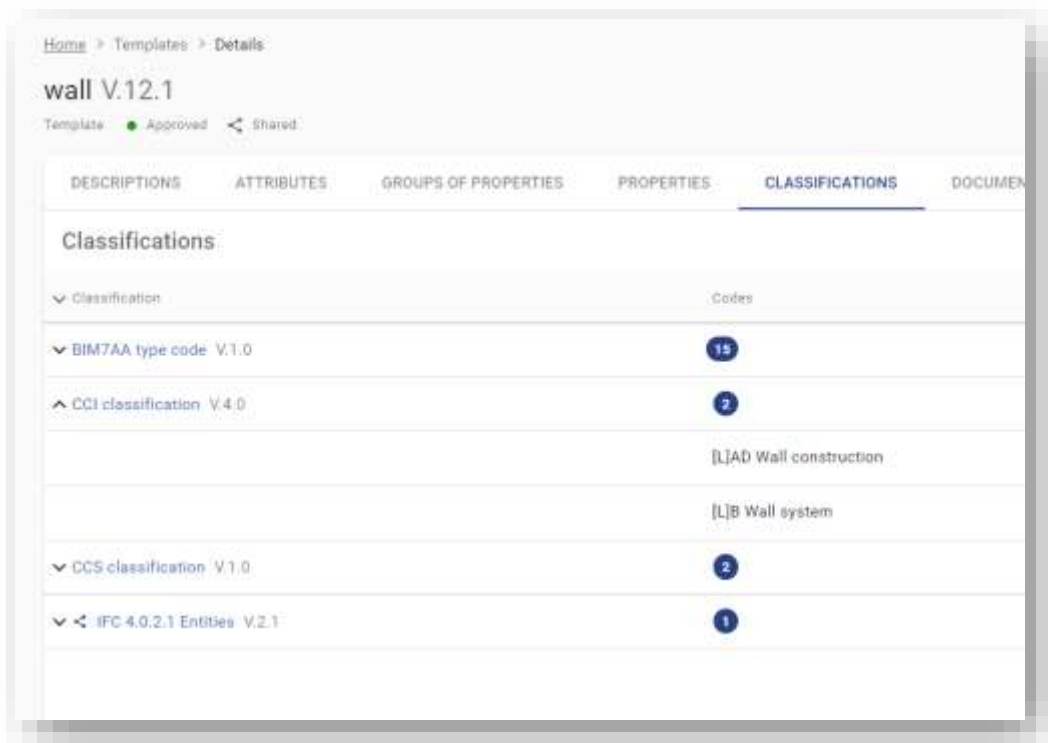




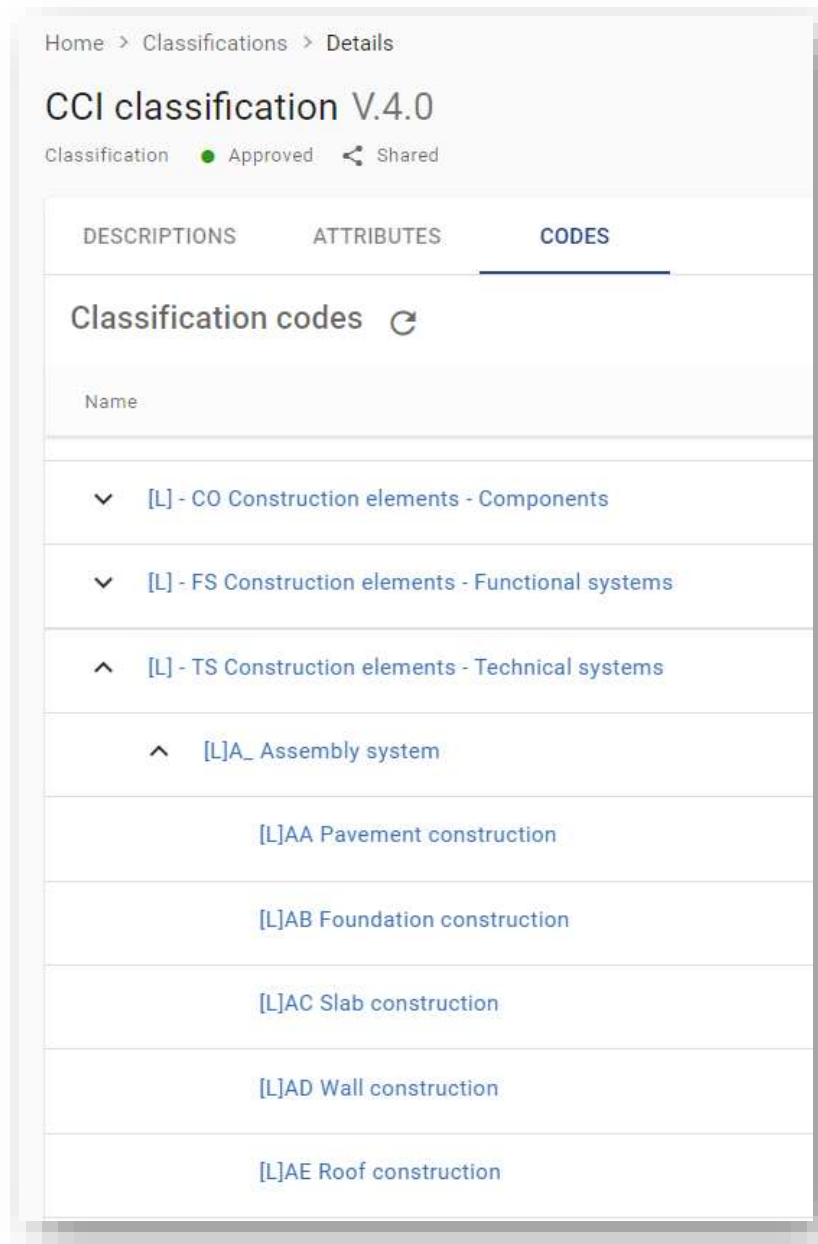
# Molio LeksiCON

## – properties and related concepts database

CCI classification imported as a classification concept in the data dictionary



CCI classification assigned to a Data template



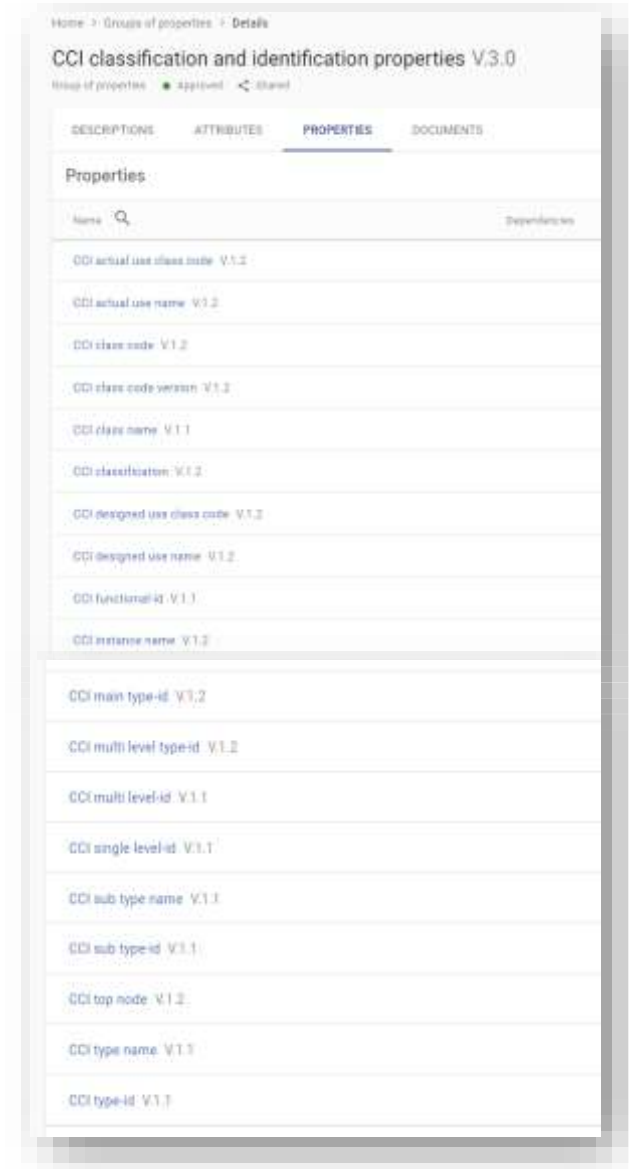
Imported CCI classification

# 23 CCI classification and identification properties in the data dictionary

Purpose: To provide standardized properties for the use of CCI classification system in the construction sector (buildings and infrastructure)



CCI type-id property



CCI properties

# Danish Context 2022 (v.1.0)

- **4 Purposes**

- Danish LOD standard
- Classification og identification
- EPD
- Operation and Maintainance

- **+ 150 Properties**

- **+ 40 Data Templates**

Danish LOD standard (defacto)





Search for Purpose...

- CES - 9.1 classification with CCS
- CES - 9.4 digital design - LOI 200
- CES - 9.1 classification with CCI
- CES - 9.1 classification with BIM7AA
- CES - 9.4 digital design - LOI 325
- CES - 9.4 digital design - LOI 400**

**EN 17412 Purpose**

**Data templates**

**EN 23386 Data template**

**Templates**

- space
- stairs
- steel beam**
- steel column
- valve
- void
- wall
- window

**Classifications and entity mappings**

**Classifications**

- IFC 4.0.2.1 Entities**
- IfcBeam
- CCS classification**
- [L]ULE Beam
- CCI classification**
- [L]ULE Beam
- BIM7AA type code**
- Mapped Properties**

**Properties**

- steel grade according to DS/EN 10025-2
- steel grade according to DS/EN 10210-1
- steel grade according to DS/EN 10210-2
- loadbearing**
- steel grade
- storey
- type name

**EN 23386 Property**

System guid: 3mmel5OFT5oOweiYqXquF0 | Created by: mnr@molio.dk

International

Full name: loadbearing

Short name:

Technical definition: indication whether the element is intended to carry loads or not

User definition:

Example: true, false

Document: [DefineHub Link](#)

**IFC 4.0.2.1 Properties, Quantities and Attributes**

Pset\_BeamCommon.LoadBearing

**Revit shared parameters**

LoadBearing - guid: f1c21480-d215-11e1-8000-00215ad4efd

LoadBearing[Type] - guid: f3f261af-d30b-44f6-b81f-107b54b2a

**Property and parameter mappings**

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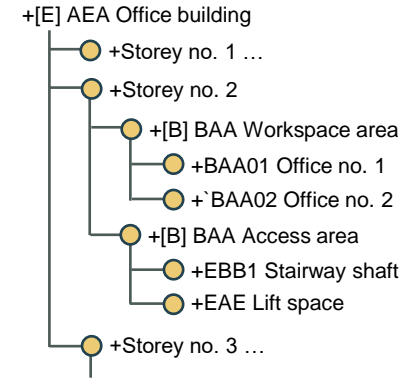


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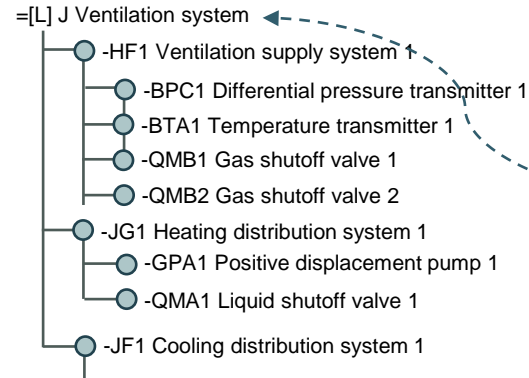
# The Digital Twin – A full Reference Model of a system-of-interest by IEC/ISO 81346-1

## The Reference Model = Information Structure Aspects of a Digital Twin

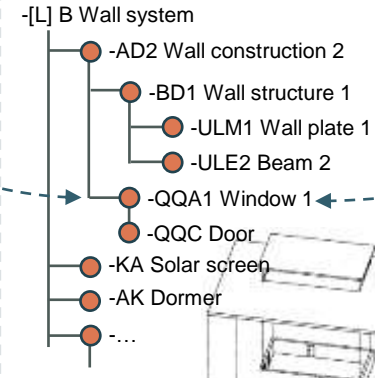
### Location view +



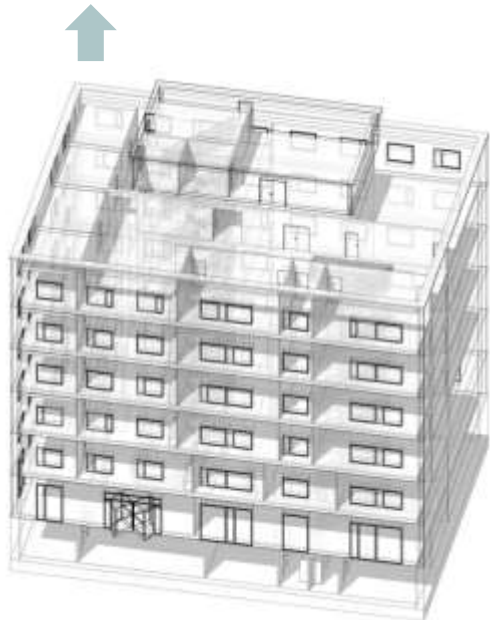
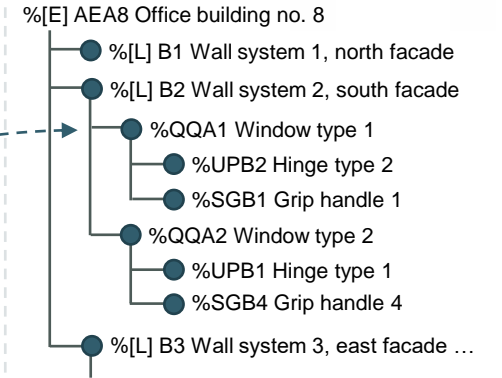
### Functional view =



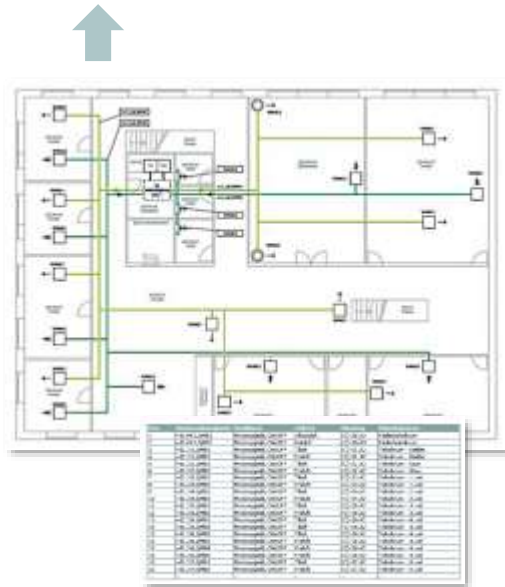
### Product view -



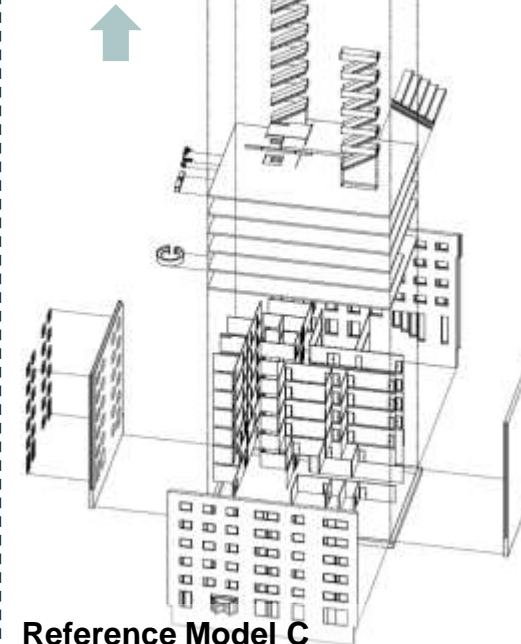
### Operations type view %



Reference Model A  
Spatial structure



Reference Model B  
Mechanical engineering



Reference Model C  
Assembly and manufacturing



Reference Model D  
Service manual





**Thank you for attending and a Merry Christmas to you**

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