Welcome to a guided tour in
CoClass

June 2018

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Swedish Building Centre
1600 mm! Inside measures! #(
Now we and our computers talk CoClass!
Finally we have a common language!
Now we and our computers talk CoClass! Finally we have a common language!

What is needed?

- Software implementation
- Identification
- Properties
- Data format (IFC)
- Article data (ETIM, GTIN)
- FM system
We get different information structure at each delivery.

We store the information differently in each system.

We can’t coordinate.

We don’t have the information.

We don’t know which information is correct.

We can’t extract statistics.

We can’t find the information.

We misunderstand each other.
Islands of Automation in Construction

After the ice period 10,000 years ago the land is still slowly rising and exposing new terrain never before stepped on by man.

The challenge is to build bridges between the islands while new islands are constantly appearing.

15 Jul 2000 © Matti Hannus

http://www.vtt.fi/cic/hannus/islands.html
Better communication in construction and maintenance can save us about €6 billion annually.

Source: Svensk Byggtjänst/Industrifakta
The parties in the project BSAB 2.0 CoClass
Values

- Digital
- Joint
- Entire built environment

CoClass

- Whole lifecycle
- International
- Future-proof
Hello Klas Eckerberg

Good to have you here. Welcome to explore CoClass, the new Swedish classification system. All object tables except for Work result are available in English.

You will find background information and the theoretics behind it here.»

Questions and answers on CoClass»

Notifications

2018-04-16 03:30 Ny

Table Construction entity is now available on version 2.2

About the new version: We have made adjustments according to maintenance meeting 4/2018. We would like to thank all of you for your input using Comments on the website. A few codes were adjusted this time.
We have continued the work of adding a picture per object.

CoClass Premium

You are getting access to Premium for a period of time, completely free of charge! Premium is designed for those who want to do more than simply view CoClass. Secure continued access to Premium now!
Model data for different uses

Maintenance activity
Clean when needed with lukewarm water and dish soap. No tools needed for access.

Properties
- **Size:** 250
- **Air flow:** 202 l/s
- **Sound level:** 30 dB(A)
- **Colour:** faint gray RAL 7037

Identification
=J1001.JJ2003.RNB05010

Classification
RNB Regulating damper

Air distribution system no 01 > Extract air distribution system no 03 > Regulating damper type 05 no 010
## Model data: connection to resources

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class code</td>
<td>NCB</td>
</tr>
<tr>
<td>Class name</td>
<td>Wall covering</td>
</tr>
<tr>
<td>Length</td>
<td>2400</td>
</tr>
<tr>
<td>Thickness</td>
<td>12,5</td>
</tr>
<tr>
<td>Material</td>
<td>gypsum</td>
</tr>
<tr>
<td>Type</td>
<td>gypsum board, normal (ISO 520)</td>
</tr>
<tr>
<td>Work result</td>
<td>KBC.3211</td>
</tr>
<tr>
<td>Type Id</td>
<td>G1*</td>
</tr>
<tr>
<td>Resource definition (bSDD and others)</td>
<td>gypsum board</td>
</tr>
<tr>
<td>Article type (ETIM and others)</td>
<td>EC003143</td>
</tr>
</tbody>
</table>
From model to product delivery

**GTIN** 7318931920902
Base 1 pice 25,9 kg 2,88 m² 75,00 SEK / pice 26,04 SEK / m²

**GTIN** 7318931920896
Top 40 pice 1037 kg 70,00 SEK / pice 24,30 SEK / m²

**GLN** 7332968000017
Base 1 pice 26,04 SEK / m²

**GLN** 7332968000017
Top 40 pice 24,30 SEK / m²

**GTIN** 7318931920902
Base 1 pice 25,9 kg 2,88 m² 75,00 SEK / pice 26,04 SEK / m²

**GTIN** 7318931920896
Top 40 pice 1037 kg 70,00 SEK / pice 24,30 SEK / m²

**In stock:** 29

**In stock:** 1234

**Top**
- **GTIN:** 7318931920902
- **GLN:** 7332968000017
- **Thickness (mm):** 12,5
- **With (mm):** 1200
- **Length (mm):** 2400
- **Edge short side:** Cutting edge
- **Edge long side:** Strengthened straight edge
- **Lenght (mm):** 2400
- **With (mm):** 1200
- **Thickness (mm):** 12,5

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- **GTIN:** 7318931920896
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**NCB Wall covering**
- **GTIN:** 7318931920902
- **GLN:** 7332968000017
- **Thickness (mm):** 12,5
- **With (mm):** 1200
- **Length (mm):** 2400
- **Edge short side:** Cutting edge
- **Edge long side:** Strengthened straight edge
- **Lenght (mm):** 2400
- **With (mm):** 1200
- **Thickness (mm):** 12,5

**GPSA Gypsum board**
- **GTIN:** 7318931920896
- **GLN:** 7332968000017
- **Thickness (mm):** 12,5
- **With (mm):** 1200
- **Length (mm):** 2400
- **Edge short side:** Cutting edge
- **Edge long side:** Strengthened straight edge
- **Lenght (mm):** 2400
- **With (mm):** 1200
- **Thickness (mm):** 12,5

**Gypsum board**
- **GTIN:** 7318931920902
- **GLN:** 7332968000017
- **Thickness (mm):** 12,5
- **With (mm):** 1200
- **Length (mm):** 2400
- **Edge short side:** Cutting edge
- **Edge long side:** Strengthened straight edge
- **Lenght (mm):** 2400
- **With (mm):** 1200
- **Thickness (mm):** 12,5
Classification for the built environment
Classification principles

- Classes based on inherent function
- What the objects do "by themselves" when they become occurrences

This is an article, not a class!
Classification principles:

- Classes based on inherent function:
  - What the objects do "by themselves" when they become occurrences.

Classification principles:

- ULD Column
- UMN Horizontal rail
- UBD Post
- UAF Stake
- RUA Fence
- WPA Pipe
- ISO 12006-2 gives principles for classification
- IEC/ISO 81346-1 gives principles for reference designation
- IEC/ISO 81346-2 gives classes of components and of built space
- ISO/ISO 81346-12 gives classes of functional and constructive systems
- Object and property mapped to IFC
- Prepared for mapping to bSDD
A window is an object for controlling access or flow to a space allowing light entry only.
Class + property = flexibility

- NCC Flooring
  - finishing object of a floor

- NCC Flooring (plastics floor covering)
  - finishing object of a floor

- NCC Flooring (linoleum)
  - finishing object of a floor

- NCC Flooring (laminate)
  - finishing object of a floor

- NCC Flooring (laminated parquet)
  - finishing object of a floor

- NCC Flooring (MCC.23)
  - finishing object of a floor

- Change coating?
- Keep the class, update the property!
Type of activities will put demands on:

- Products
- Tools
- Labour
- Construction element type

Concept in ISO 12006-2

Activities

Construction complex

Operational view

Functional view

Construction entity

Operational view

Functional view

Built space

Construction element

Construction element type

Work result

Production view

Resource view

Tools

Labour

Products

Maintenance view

Maintenance activities
Concept in ISO 12006-2

Construction complex

Construction entity

Built space

Construction element:
- Functional systems
- Constructive systems
- Components

Work result

Resources

--

Single or dual family house area

Single-family house

Room

Wall system

Slab construction

Wall covering

“Layer of cardboard gypsum board on indoors walls”

Actor, gypsum board, screwdriver, drawing

KBC.3211
Activities: sleep

Construction entity: AAA Single-family house

Built space: AAA Room

Construction complex: AAA Single or dual family house area

Work result
ISO 12006-2: built space defined by construction elements

**Built space**

**Constructive systems:**
AD30 Interior wall > Wall construction with framework structure

**Functional systems:**
B20 Interior wall

**Components:**
- NCB Wall covering
- ULM Wall plate

**Construction elements:**
- Construction element
- Construction element
- Construction element
- Construction element
ISO 12006-2: resources becomes work results
Setting requirements

Construction entity: AAA Single-family house

- Rooms: number and size
- Architecture
- Material
- Energy use

Which requirements?

Built space: AAA Room

- Size
- Air change rate
- Coating
- Maintenance
- Daylight
- Electric lighting

Construction complex: AAA Single or dual family house area

- Location
- Commuting
- Outdoor environment
- Traffic
- Micro climate

...
Construction element

**Constructive systems:**
AD30 Interior wall > Wall construction

**Functional systems:**
B20 Interior wall

Insulation (frost, sound)
Material (environmental impact)
Coating
Cost
...

Structural ability
Recipe
Cost
...

Construction element

**Components:**
NCB Wall covering

Setting requirements

CoClass

Which requirements?
Asset Information Management (AIM) and Property Information Management (PIM) are integral to the process of managing assets efficiently. This diagram illustrates the integration of AIM and PIM, highlighting the flow of information and processes from planning to maintenance and utilization. The integration is facilitated by tools and software solutions such as CoClass and aff, which support the seamless management of asset information throughout its lifecycle.
# Life cycle of properties

## Information about an object

<table>
<thead>
<tr>
<th>Pre-study</th>
<th>Planning</th>
<th>Design</th>
<th>Production</th>
<th>Use</th>
<th>Decommission</th>
</tr>
</thead>
</table>

## Legend

- **Property without set value**
- **Property with set value**

### Reference designation

- **Product ID**
- **Reference designation**
- **Class**

---

1. New product ID when new instances are put into use
Lifecycle of properties

Digital objects managed throughout the life cycle needs multiple sets of properties

<table>
<thead>
<tr>
<th>Specified properties (SPE)</th>
<th>Supplied properties (SUP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Property</strong></td>
<td><strong>Property</strong></td>
</tr>
<tr>
<td>Class</td>
<td>Product-ID</td>
</tr>
<tr>
<td>Reference designation</td>
<td>Width</td>
</tr>
<tr>
<td></td>
<td>Height</td>
</tr>
<tr>
<td></td>
<td>Fire rating</td>
</tr>
<tr>
<td></td>
<td>Material</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPE</td>
<td>Specified</td>
</tr>
<tr>
<td>INQ</td>
<td>Inquired</td>
</tr>
<tr>
<td>OFF</td>
<td>Offered</td>
</tr>
<tr>
<td>CON</td>
<td>Contracted</td>
</tr>
<tr>
<td>SUP</td>
<td>Supplied</td>
</tr>
<tr>
<td>BUILT</td>
<td>Built</td>
</tr>
<tr>
<td>OP</td>
<td>Operated</td>
</tr>
<tr>
<td>DECOM</td>
<td>Decommissioned</td>
</tr>
</tbody>
</table>

Table 8, SEK Handbok 439 edition 2
Describing structures: from construction element to work result
Independent tables for construction elements  CoClass

• Combine "freely":
  • Functional systems
  • Constructive systems
  • Components
  • Properties
    • Work result
    • Material
    • Production plan
    • Quality requirements
    • …
Wall example

Construction entity

Functional systems

Constructive systems

Components

Work result

B10.AD10.ULM(ESB.22)

B10.AD10.ULM(ESC.11)

B10.AD10.ULM(ESE.21)

B20.AD30.ULM(HSD.111)

B20.AD30.ULM(HSD.113)
<table>
<thead>
<tr>
<th>Construction entity</th>
<th>Functional systems</th>
<th>Constructive systems</th>
<th>Component</th>
<th>Work result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road</td>
<td>A31 Vehicle traffic space</td>
<td>CB10 Flexible hard standing overlay</td>
<td>NCA Paving</td>
<td>A31.CB10.NCA (DCC.14111)</td>
</tr>
<tr>
<td></td>
<td>A43 Support strip</td>
<td>CB10 Flexible hard standing overlay</td>
<td>NCA Paving</td>
<td>A43.CB10.NCA (DCB.42)</td>
</tr>
</tbody>
</table>

DCC.14111 Hard surface category A of compact asphalt concrete when newly built
DCB.42 Surface course of rock dust
Information deliveries
CoClass and LOD

**G0**
- **DESCRIPTION:** Office Chair
- **WIDTH:**
- **DEPTH:**
- **HEIGHT:**
- **MANUFACTURER:**
- **MODEL:**

**G1**
- **DESCRIPTION:** Office Chair
- **WIDTH:** 700
- **DEPTH:** 450
- **HEIGHT:** 1100
- **MANUFACTURER:**
- **MODEL:**

**G2**
- **DESCRIPTION:** Office Chair
- **WIDTH:** 700
- **DEPTH:** 450
- **HEIGHT:** 1100
- **MANUFACTURER:** Herman Miller, Inc
- **MODEL:** Mirra

**G3**
- **DESCRIPTION:** Office Chair
- **WIDTH:** 700
- **DEPTH:** 450
- **HEIGHT:** 1100
- **MANUFACTURER:** Herman Miller, Inc
- **MODEL:** Mirra

(based on AEC [UK] BIMprotocol v2.0 - Component Grade)
Digital and physical life cycle

Developed from IEC/ISO 81346-1:2010

1 Pre-study  2 Planning  3 Design  4a Goods production  4b Construction  5 Use  6 Decommissioning

Decision concerning project → Requirements → Designed system

Digital model

Physical implementation

Component data (reference ID)

Product data (product ID)

Component data (reference ID)

Component data (reference ID)

Component data (reference ID)

Component data (reference ID)

Component data (reference ID)

Component data (reference ID)

Product data (produkt-ID)

Product data (produkt-ID)

Product data (produkt-ID)

Four individuals, of which one is spare

Three occurrences of the class in the system

Archives
<table>
<thead>
<tr>
<th>Prefix</th>
<th>=</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>what the construction element is intended to do, or what it actually does</td>
</tr>
<tr>
<td><strong>Use</strong></td>
<td>Designation for a individual construction elements function, and for the functional relations in a composite construction element</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>(=\text{N1.LE2}) Transportation system 1 &gt; Alarm system 2</td>
</tr>
</tbody>
</table>
"It's not enough to build the building right"
"You must also build the right building"
Thank you!

Jan-Olof Edgar
Produktchef AMA

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