Application of BIM and GIS for Dutch Infrastructure assets. 

*together with a contractor*

Daan Alsem  
projectmanager Royal HaskoningDHV  

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The project: Rebuilding of the junction Joure, NL
Junction Joure: E22/A7 & A6
From roundabout......
.. to the new junction Joure 2018
Former roundabout
Client

- **Client:**
  - Province Fryslân
  - in coöperation with the municipality Joure (De Fryske Marren) and
  - Rijkswaterstaat (National Road Authority)

- **Contractor Design & Construct:**
  - Gebr. VAN DER LEE Hagestein (head office), Lelystad en Dordrecht
Open BIM: Life-cycle asset information using BIM

- Object Type Library (OTL)
- Exchange open standard (COINS)
- Information Delivery Manual requirements (IDM)
- Configuration Management DataBase (CMDB)
- GIS integration Database SE
Fragmented information exchange during life-cycle
Information exchange D&C-phase
Open-BIM exchange
Linked data

SBS system breakdown <-> OTL object Types <-> RWS-OTL (CB-NL)
OTL – Object Type Library principles

- Describes the types of physical (bridge, road) and also spatial objects (junction)

- Apply to the entire lifecycle

- Include construction, groundwork, road and hydraulic engineering and spatial (geo-)environment.
OTL

- Linked to the CB-NL Concept Library Rijkswaterstaat

- Object type data (and not the Object data)

- Data-structure NEN 2767-4:
  - Asset objects
  - Elements
  - Building parts
  - Materials
  - Defects/damage
Object Type “Fly-over”
Exchange open standard COINS

- open exchange standard for all life cycle phases, for all parties and all disciplines.

- Abbreviation: *Constructive Objects and the INtegration of processes and Systems*

COINS builds on:
- Geometry standards (IFC, DWG)
- GIS standards (GML, CityGML)
- Process standards (IDM part 2)

COINS supports:
- Systems Engineering SE
- Object type libraries OTL
- Combination of different data structures
COINS data exchange

- CAD/BIM data
- Systems Engineering Data
- Object (type) information
- Ext. Document
- GIS data
Systems Engineering information

System Breakdown Structure SBS
Data exchange IDM Information Delivery Manual

Contractor

Client Project organization

Asset Manager

IDM

Information model

Process model

Object Type Library

Open standards:
COINS, IDM, IFC, GML, CityGML

GeoBIM Amsterdam, November 24th, 2016
COINS container

**COINS-container (= zip file)**

- **BIM directory**
  - OWL based information

- **Window of Authorisation directory**
  - not used so far in Joure

- **Documents directory**
  - File-based geometry (drawings), certificates, documents, reports
Configuration Management Database

Documents

Geometry

OTL specifications
GIS/CMDB integration
BIM Joure today:

- Finalize BIM model (3000 objects)…

- First delivery COINS container…
Evaluation of approach

1. Currently only as a contractual duty, not beneficial in the project construction phase
2. BIM protocol should have been used from the project start
3. The OTL and COINS use of the client is not yet mature
4. Tooling developed for the project, no standard tooling available yet
5. It is possible to exchange the information at each delivery
6. while using your own BIM
Developments:

- TC/TF 442 “BIM” CEN

- CEDR research programme: “Asset Information using BIM” since September 2016 by the consortium INTERLINK
CEDR & INTERLINK

- Research study to the development of an European Road OTL and open exchange standard (2016-2018)

- On three pillars:
  - Technical Specs
  - Standardisation body
  - Acceptance in practice

- Based on:
  - Reliable data
  - Proper datastructure
Consortium: INTERLINK:

- Research institute TNO (The Netherlands)

- Engineering and asset management consultants
  - Roughan & O’Donovan Consulting Engineers ROD (Ireland)
  - Royal HaskoningDHV (The Netherlands)

- ICT consultants and software companies
  - AEC3 (Germany)
  - Vianova Systems (Norway)
  - interactive instruments (Germany)
  - Semmtech (The Netherlands)
  - planen-bauen 4.0 (Germany) national BIM implementation body
... junction Joure work in progress.....