CES321959

DISTRUPTIVE APPROACH TO INFRASTRUCTURE THROUGH AUTOMATION AND PROJECT EXCELLENCE

Mantas Smidtas
Innovation and Technology leader
Ramboll AS

Learning Objectives

- Get insight into how to accelerate the path to project excellence using a disruptive approach to infrastructure automation
- Learn how to dramatically innovate and improve design efficiency to achieve a quality-assured project execution
- Learn how to apply advanced project configuration by using advanced parametric modeling capabilities
- Learn how to improve your customer interaction with advanced data visualization and business intelligence

Description

In this class, we'll demonstrate how to accelerate your journey toward a lifetime customer engagement model through automation, collaboration, and applied business intelligence. We'll demonstrate the transition to connected BIM (Building Information Modeling) for infrastructure through a seamless design automation process. We'll provide a compelling and augmented demonstration on a real-life infrastructure data set using a disruptive approach to automation. Our techniques and workflow include high-end existing modeling conditions, interdisciplinary design combined with Dynamo, Inventor software, Revit software, and Civil 3D applications—and data collection and representation through an innovative dashboard solution, including BIM 360 integration and collaboration. Attendees will be exposed to leading practices and get inspired about how to dramatically innovate and improve design efficiency to achieve a quality-assured project execution and, ultimately, an improved customer experience.

About the Speaker

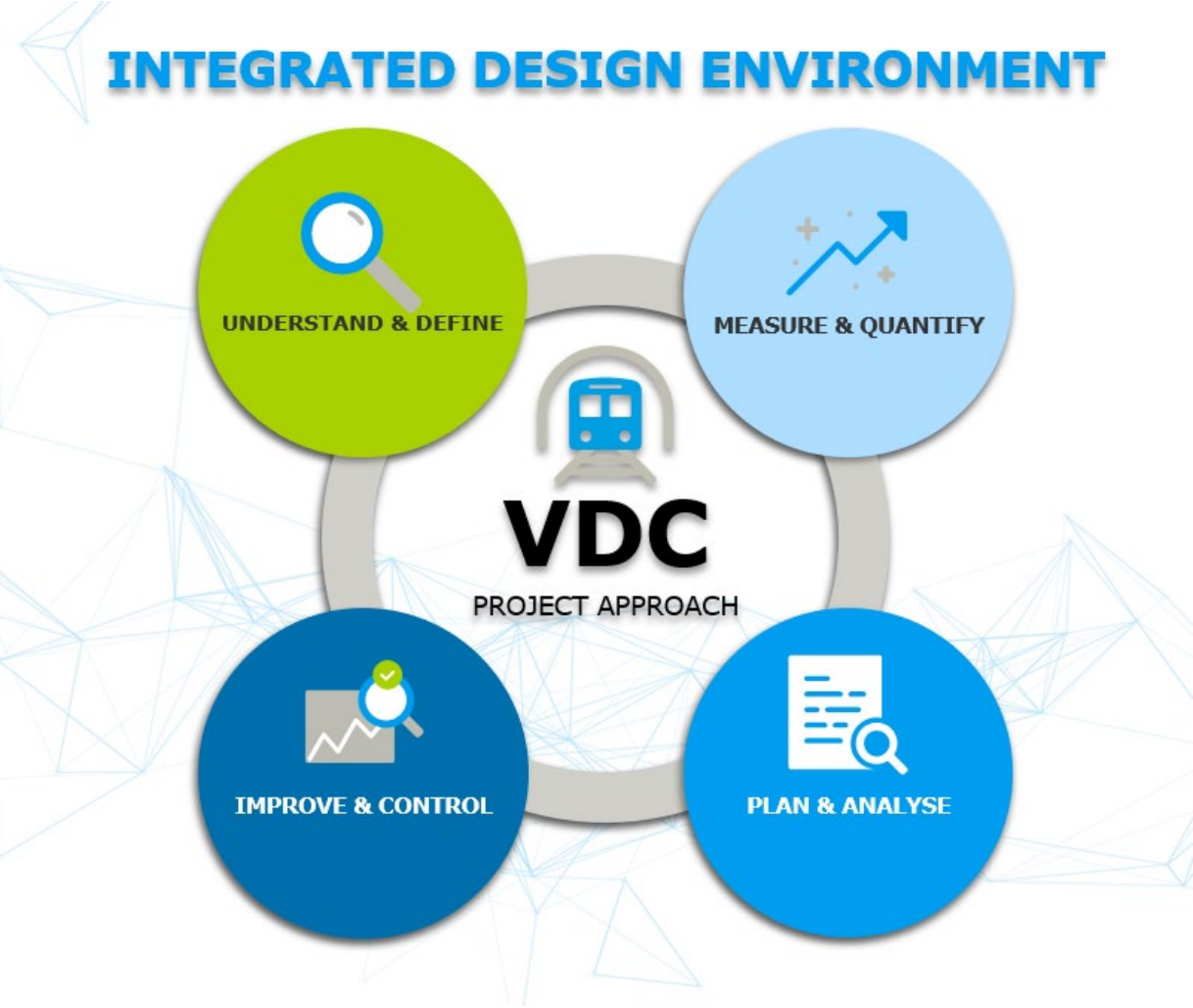
Technology and Innovation Leader at Ramboll with more than 10 years progressive experience across a board of varied industry segments. Deeply working with Innovation Development and Innovation Integration in to the company work process. Leading various software development teams, working with data management and data flows, conceptualization and visualization, identification of value in working process. I have proven ability to combine vision, ingenuity, and strong business acumen with well-developed project management and leadership qualities to support go-to-innovation effort and product integration.

Contents

Integrated Design Environment

What is it?

An Integrated Design Environment (IDE) is an workflow that facilitates solution development. In general, an IDE is a graphical user interface (GUI) - based on parametrization which helps for engineer to building project design trough VDS project approach.



So, what is Virtual Design Construction?

Virtual Design and Construction (VDC) is the management of integrated multi-disciplinary performance models of design-construction projects, including the product (i.e., facilities), work processes and organization of the design - construction - operation team in order to support explicit and public business objectives.

To make it happen we need:

- Understand and Define
- Measure and Quantify
- Improve and Control
- Plan and Analyse

Questions to Consider

To understand why we need this we need to ask our self the following questions:

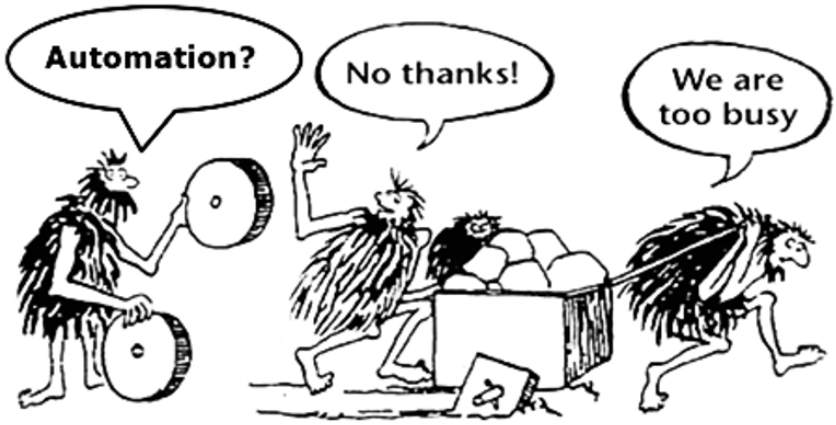
- Where?
- Why?
- Who?
- How?
- What?
- When?

We know that different disciplines facing different problems, so we need to make sure that everyone in Ramboll are on the same Level, same BIM Maturity. We need to make sure that all disciplines can deliver the same level of detail.

We need to understand difference of information mapping and information flow between disciplines in the projects.

We know, to be competitive we need to listen and understand our client's needs. With our experience and expertise, we should be able to propose the best solution for our clients.

This picture explains a lot.
To be innovative is not that easy, sometimes too early, sometimes too late. Sometimes too fast or too slow.



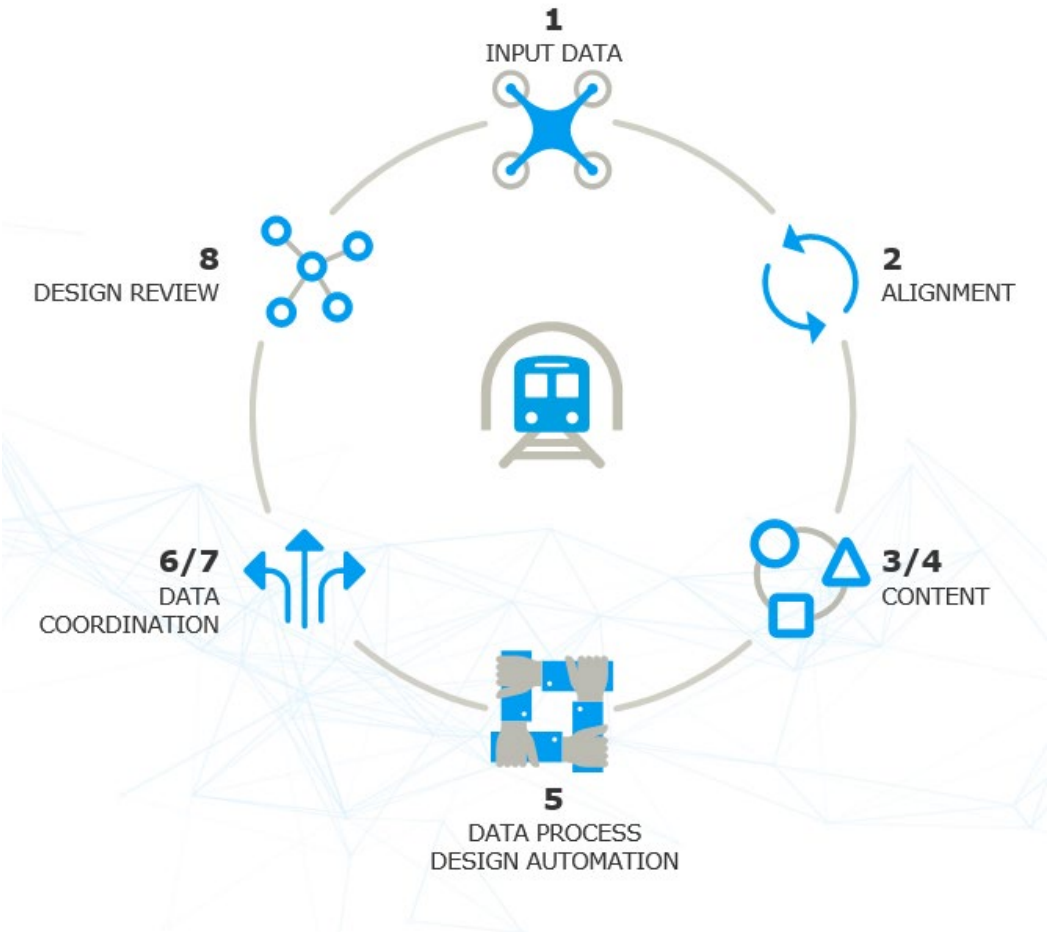
New Projects – New Challenges

The Project “Hensetting – Ostfoldbanen” become a case because:

- We have five different areas needs to be designed.
- We need to run similar design process for all five different locations.
- We need to use the cycle process to be able to improve project design.
- Requirements from Client regards the model was very ambitious.
- Many different disciplines need to be aligned.
- Short period from project award to kick-off.

We developed a new life cycle process

- Data Input – we know that data can be different from different sources.
- Alignment – we need to find the best way to align these different inputs and make sure that all these inputs are ready for automation.
- Content – important parts for automation process.
- Design Automation.
- Data Coordination.
- Design Review.



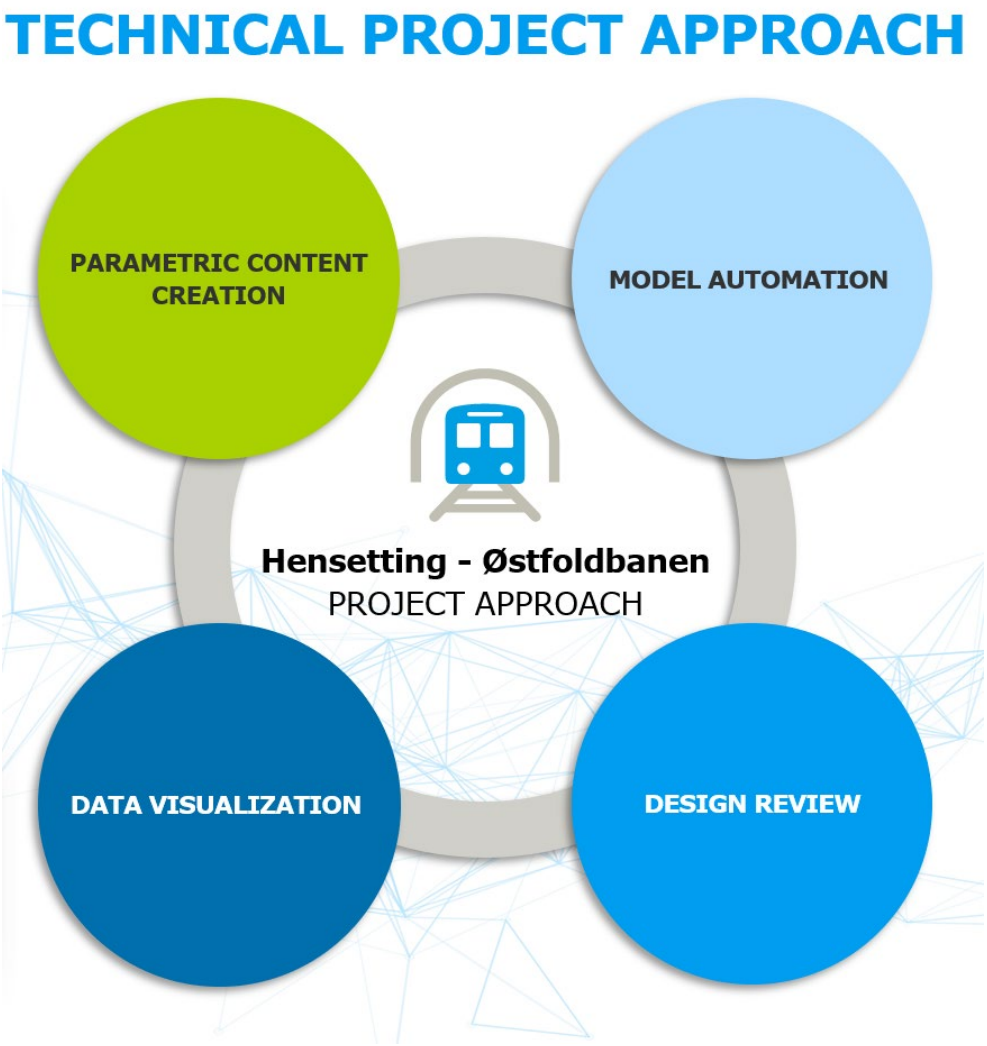
New Workflow

Technical Project Approach

And we and up with the result we have today:
We become with the same VDC project approach, just now we call this H-O technical project approach.

We still have the same fore element:

1. Parametric Content Creation
2. Model Automation
3. Design Review
4. Data Visualization

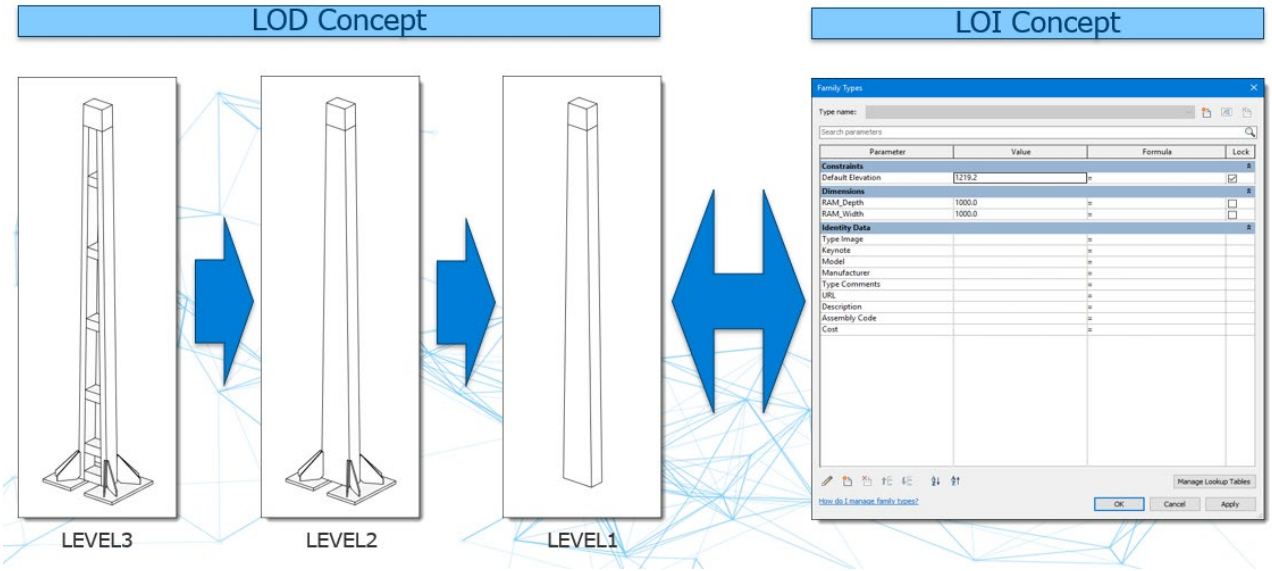


Parametric Content Creation

We designed LEVEL OF DETAILS versus LEVEL OF INFORMATION concept. Imagine if you can have the same content for different project levels.

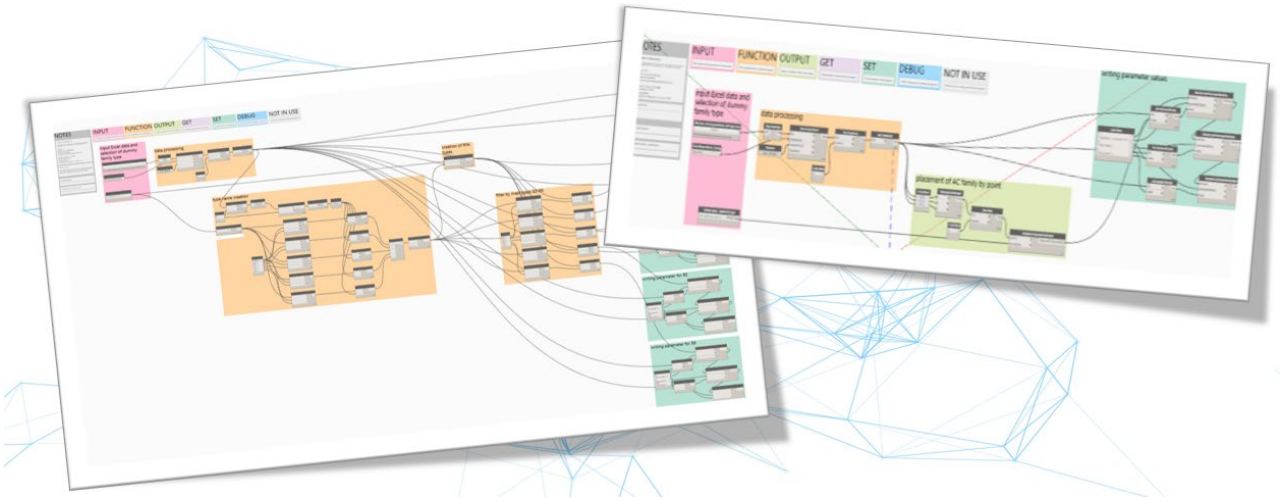
- Level1 – For early phase design
- Level2 - Detailed design
- Level3 – Construction phase

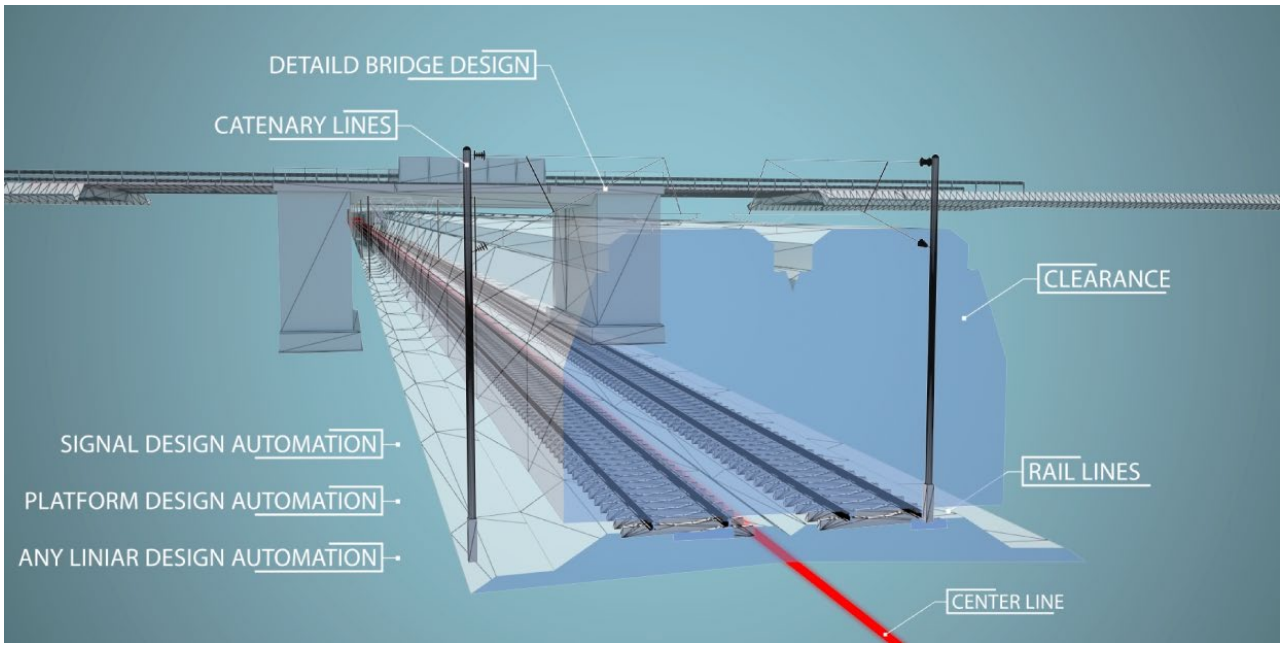
Also, we know that all this content can has same metadata information.
For our H-O project Revit and Revit Families for us was perfect tool and perfect choice to build this content libraries.
Coarse=Medium=Hight level of details gives us possibility to build level of information versus level of detail library in Revit and Dynamo for Revit.



Model Automation

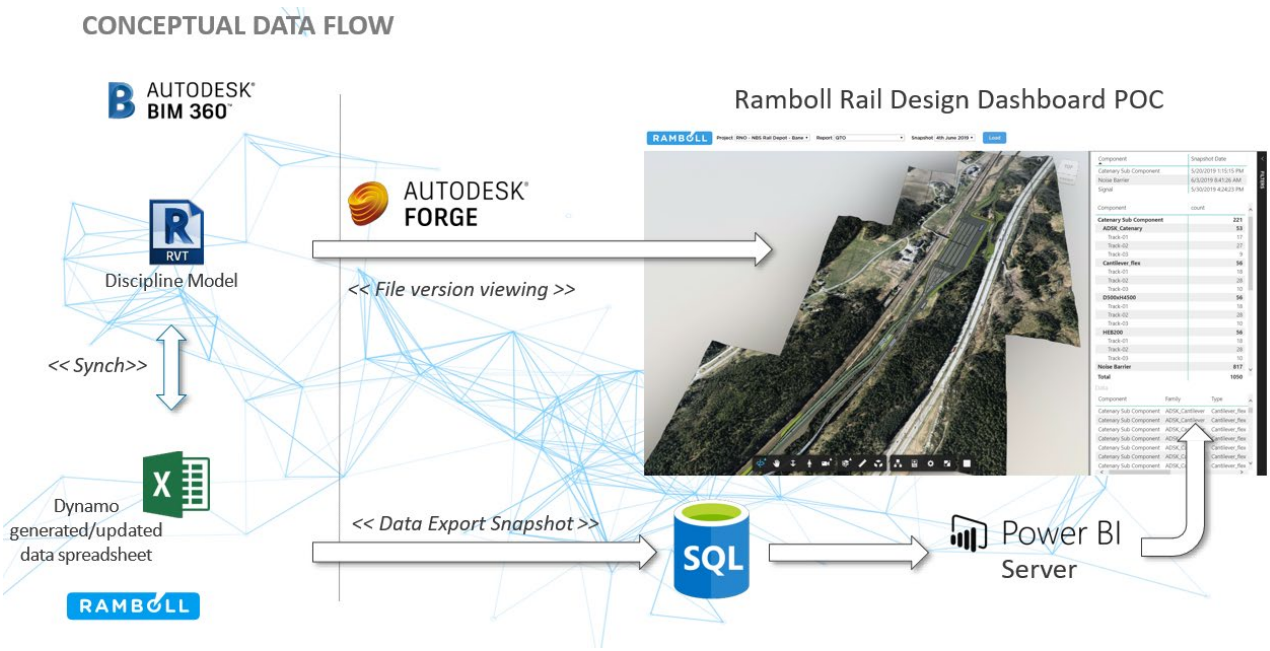
We developed dynamo - Scripts for Library and Model Automation





Design Review

We developed Design Review Solution through BIM360 – FORGE and Power BI.
We build Dashboard solution where we manage to connect 3D collaboration model from InfraWorks with Metadata information from Revit and Civil3D through Bim360 and Forge.

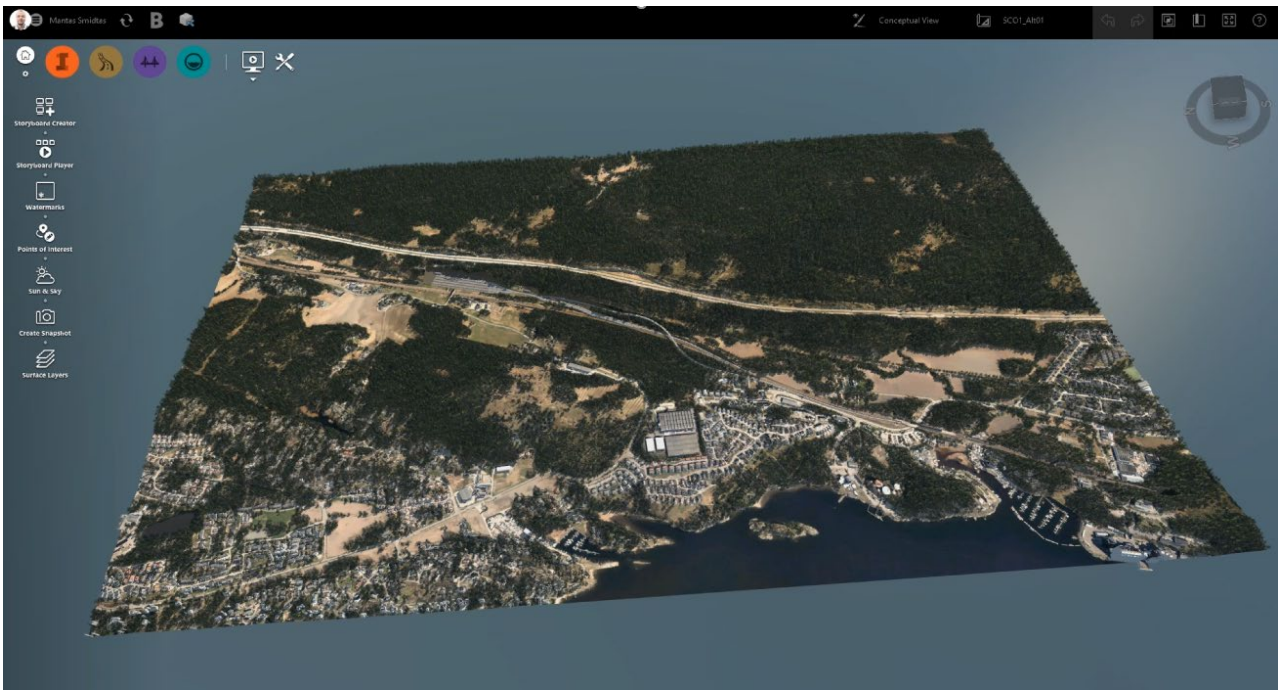


Data Visualization

With our experience in collecting data in InfraWorks we manage to combine our expertise in InfraWorks and new workflows in Design Automation.

We created very advances collaboration model, in less time than ever before.

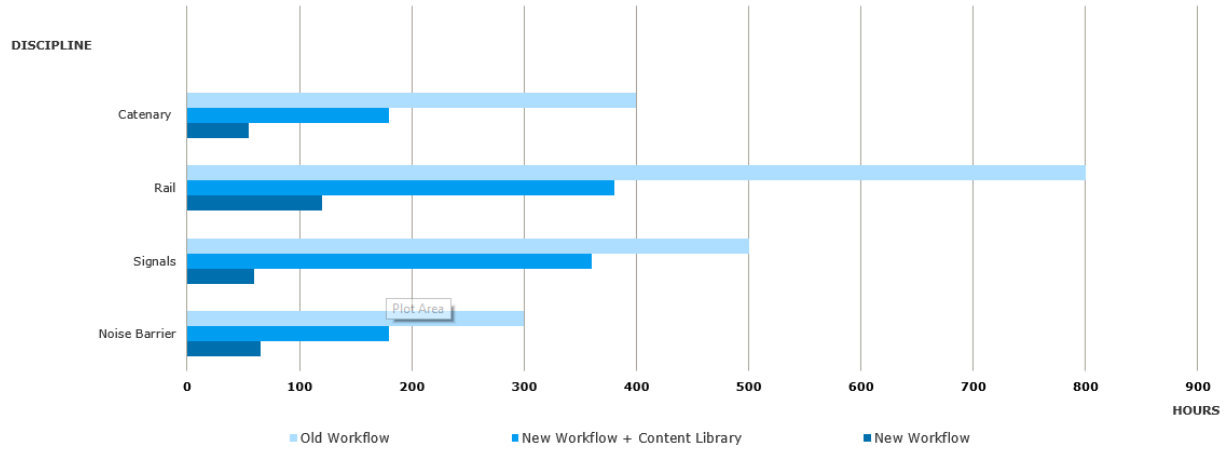
We will look at the live demonstration on H-O Project in InfraWorks.




Road
11_F_VEG_KAM_A6 - Turveg
Attributes
Function
Speed
0,0 km/h
Design Standards
AASHTO_Metric_2011
Superelevation
Lane Marking
Geometry
Length
Elevation Range
Grade Range
Grading
Material
Material/Terrain/Stone
Grading Method
Fixed Slope
Grading Limit
Various values
Cut Slope
Various values
Fill Slope
Various values
Advanced
Data Source
Sketched Feature(s)
Tag
User Data
Tooltip
Link
Lifespan
Creation Date
Termination Date
Description
Road Cross Section
0+071,037
2.0 : 1
Aspect Ratio


Road
Enter a name
Attributes
Function
Local
Speed
40,0 km/h
Design Standards
AASHTO_Metric_2011
Superelevation
Lane Marking
Geometry
Length
Elevation Range
Grade Range
Grading
Material
Material/Terrain/Stone
Grading Method
Fixed Slope
Grading Limit
Various values
Cut Slope
Various values
Fill Slope
Various values
Advanced
Data Source
Sketched Feature(s)
Tag
User Data
Tooltip
Link
Lifespan
Creation Date
Termination Date
Description
Click to start typing...
Updating model

ROI and potential of scale



Benefits

Engineering benefits

- Simplifies the way the user interacts with spaces
- Improved quality
- Engineering efficiency
- Simplifies communication between different disciplines
- Leads to design of engineering assembly

Commercial benefits

- For clients - faster design process means less expenses
- Improved customer integration
- Design automation process helps to identify and eliminate errors in early face
- Early face operations with less recourse

Operational benefits

- Easy access to the data
- Fully connected management team