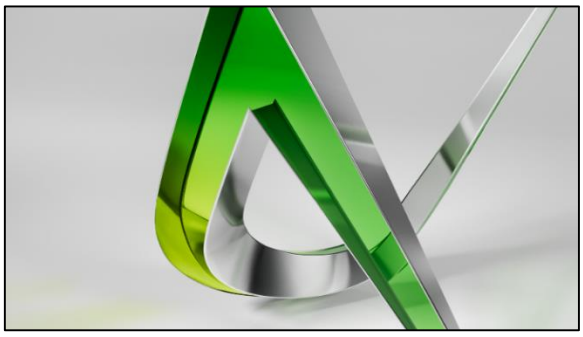
Class ID: CI11984

Case Study:

Use of InfraWorks and the Infrastructure Design Suite for a Hydropower Project in Norway



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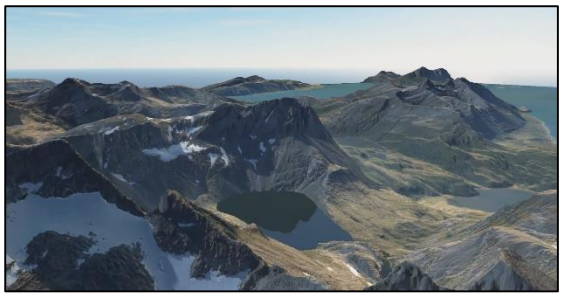
Overview:

In this case study we will present how the Autodesk Infrastructure Design Suite has been used to establish a multidisciplinary coordinating model, and we'll describe a successful workflow of how to best interact between InfraWorks, Civil 3D, Revit and Dynamo.



The SmiSto InfraWorks-model

The SmiSto Hydropower project is a complex hydropower scheme that includes a total of 20 kilometers of tunnels, four different reservoirs, several dams, creek intakes, and two different underground power stations. The lecture will focus on the advantage of using InfraWorks software from the early phase in a project through to the design phase.

We will show you how we combined highly detailed aerial laser scanning, aerial imagery and underwater surveying to set up a huge, but highly detailed InfraWorks model. We will demonstrate our developed workflow between InfraWorks, Civil 3D and Revit/Dynamo, and how we use InfraWorks to combine GIS and BIM in a common 3D model.

AUTODESK INFRAWORKS AUTODESK AUTOCAD CIVIL 3D AUTODESK REVIT Dynamo

Part 1: Introduction: Designing hydropower in Norway

We'll get you up to speed with a "Hydropower for dummies" intro, the background for the *SmiSto Hydropower project* and a brief introduction to the Norwegian Hydropower Industry.

Part 2: Establishing the InfraWorks model – collection of data

Overview:

We will show you step-by step how to establish a large but detailed InfraWorks model.

We will demonstrate our methodology to establish a detailed InfraWorks model based on various topographic information, areal imagery and available WMS services.

Demonstration tutorials:

Terrain Data
- Creation of surface from LIDAR pointcloud
- Export of surface to InfraWorks
- Terrain-import in InfraWorks
- Adding additional topographic information

Areal Imagery
- Export of imagery from GIS-software
- Import of imagery in InfraWorks

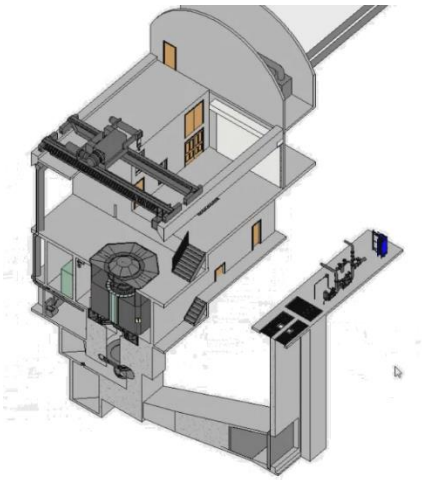
Seabed and water-surface
- Sub-surface Echo Sound mapping. (SONAR)
- Water surface Analysis

WMS and other data sources
- WMS raster export
- Example: Avalanche Hazard zones
- Existing transmission Lines (Dynamo)

Learning objectives:

- *Managing LIDAR point clouds using Civil 3D, ReCap and InfraWorks*
- *Managing large (>1 km^2) surface objects in Civil 3D and InfraWorks*
- *Merging terrain data for various sources in Civil 3D and InfraWorks*
- *Import of various GIS data into InfraWorks.*

Part 3: Use of InfraWorks in concept design phase



Overview:

The InfraWorks model is up and running. It's time to start designing!

We will give a brief introduction on how to design a Hydro Power Station inside a rock cavern, and how to design a complex system of reservoirs and tunnels.

We will demonstrate our workflow between the different software to develop the design from early concept stage and into increasingly level of detail.

Demonstration tutorials:

Concrete Structures
- Identifying and optimizing location of different structures
- Design of a simple dam in Revit
- Cutting concrete to topography in Revit

Power Station Design
- Installation of mechanical equipment
- Powerhouse design

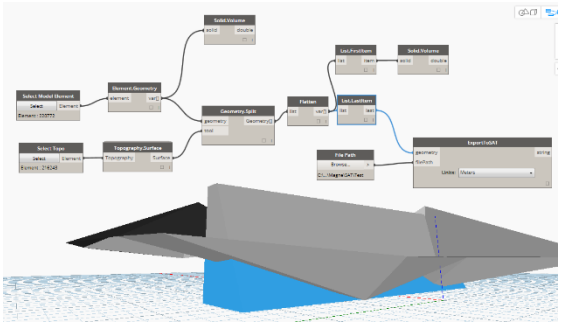
Terrain adjustments
- Designing a Rockfill tip in Civil 3D
- Updating the InfraWorks-model

Tunnel Design
- Tunnel alignments in Revit / Dynamo
- Tunnel alignments in Civil 3D / InfraWorks

Learning objectives:

- *Importing and updating design from Civil 3D and Revit into InfraWorks.*

Part 4: Detailed design and Construction



Overview:

In this part, we will go into more detail on some of the technical challenges we meet in designing a hydropower station. A variety of tailor-made components and solutions require various adaptions to common practice on how to use the different design tools.

Demonstration tutorials:

Detailed Rebar Design
- 3D-Rebar in Revit
- 3D-Rebar using Dynamo

Design Status
- Coordinating model-status
- Using Revit filters

Data sharing / construction
- IFC-export
- Solibri
- Solibri on SurfacePro

Learning objectives:

- Get an overview on how to use Dynamo to solve various challenges in Revit
- Utilizing the 3D Rebar functionality of Revit
- Get an overview over different ways of sharing your design.