The new Workflow for Bridge Design with InfraWorks, Inventor, Civil 3D and Revit

Stéphane BALMAIN
Tech. Sales Specialist – AEC, Structure & Construction - Autodesk

Vincent Fredon
Tech. Sales Specialist – AEC, Infrastructure - Autodesk

Learning Objectives
- Learn how to use InfraWorks, Inventor, Civil 3D, Revit and Autodesk Structural Bridge Design together
- Discover the new bridge design workflow
- Learn how to apply some tips and tricks to be more productive
- Learn how to better communicate with an in-context visualization of the bridge project

Description

This session is about the new BIM workflow for bridge design with InfraWorks, Inventor, Civil 3D, Revit and Autodesk Structural Bridge Design.

InfraWorks has become the Autodesk center tool for bridge design in realistic context. You can easily and quickly design any bridge proposition. Structural parts of the bridge are automatically pre-designed according to each span. With InfraWorks, you can perform line girder analysis in the cloud.

You can download the structural analysis file to perform structural analysis with Autodesk Structural Bridge Design.

Customized parametric bridge parts can be created and modified with Inventor and added in InfraWorks. This workflow gives a lot of freedom to create any kind of bridge.

Civil 3D will help to optimize alignment and profile, earthworks and gradings.

InfraWorks bridge can be sent to Revit with a BIM dynamic link. You can design reinforcement in Revit and create shop drawings.

Tunnel can be designed with a similar BIM workflow.
Stéphane Balmain
Structural Engineer Autodesk

Stephane BALMAIN has over 10 years’ experience in the construction field. After his M.Sc. Degree in Structural Engineering of Mining School of Ales and a specialization in Reinforced Concrete (CHEBAP), he joined SNC Lavalin in Nice in 2003. Due to his passion for computer science and analysis, he joined Robobat in 2005 as product manager for concrete. Since 2008, Stephane is a BIM technical specialist on structure and construction in Autodesk South Europe Team.

BLOG: [http://villagebim.typepad.com/](http://villagebim.typepad.com/)  
Twitter: @stephanebalmain
[https://www.linkedin.com/in/stephanebalmain](https://www.linkedin.com/in/stephanebalmain)

Vincent Fredon
Civil Engineer Autodesk

Vincent Fredon is an Autodesk Technical Sales Specialist in AEC for South Europe. He is an Infrastructure specialist working with all the Autodesk infra solutions and mainly AutoCAD Civil 3D, InfraWorks 360 and Navisworks. He is based in Paris. Vincent has worked 13 years for Engineering companies in the Infrastructure domain. He then moved to an Autodesk VAR (GraphLand) where he has been Trainer and Consultant for various enterprises and projects (road, rail, energy…) on different software and BIM processes implementation. During the last few years, he has developed a strong expertise in meeting the needs of French civil companies. Vincent also worked on the French Civil Country Kit and the Autodesk InfraWorks 360 localization, as a contractor for Autodesk.
The goal: modelization of an existing bridge to demonstrate the new Bridge workflow with the AEC Collection

Inputs

1 - Existing bridge description in the “Declaration of Public Utility - Bypass Road Vichy – France” available on Internet: plan view and profile view.
2 - Documentation from LB7, Rector Lesage Group (girders precast manufacturer):
Model Builder

The beginning of everything is the creation of the 3D context with InfraWorks.

Topography optimization

Topography enhancement using the plan view image imported in Civil 3D with Raster Design. The Civil 3D optimized topo surface is imported in InfraWorks.
Road and Rail optimization

Road and rail enhancement with the InfraWorks tools to get a more accurate context.

Bridge predesign in InfraWorks

First Bridge model proposed by default with the InfraWorks module “Bridge Design”:
Plan view picture imported in TIFF format in the InfraWorks model:
Fine-tune of the bridge according to the picture from “Declaration of Public Utility - Bypass Road Vichy – France”. For this step, only basic InfraWorks contents are used.

**Fine-tune of gradings and roads**

To finalize the context around the fine-tuned bridge, the road under the bridge and the gradings for bridge and roads are modified to match the inputs.
Customized girders

Modification of an existing girder template in Inventor with the Infrastructure Part Shape Utilities extension to create the custom girders 3D parametric model for the project.
Customized cornices

Creation in Inventor of a new cornices 3D parametric model to add as a decoration for the bridge.
Structural analysis of the bridge

Integrated line girders structural analysis with Cloud Autodesk Structural Bridge Design (ASBD).

Download the detailed PDF report and the Autodesk Structural Bridge Design file. Run an advanced analysis with Desktop Autodesk Structural Bridge Design (military convoy…).
Bridge model open in Revit for documentation and rebar

- Civil 3D Terrain surface published in BIM 360 and linked to Revit
- Documentation in Revit
- Update workflow between InfraWorks and Revit
- Rebar design in Revit
Excavation workflow
Create excavation for piles foundation with InfraWorks
Modelization of the detailed excavation for piles foundation in Autodesk Civil 3D

Construction planning in Navisworks
Use the Timeliner in Navisworks to link the model and the phases of the planning and create an animation of the construction.
Application for tunnel

Similar workflow is available for tunnels.