



AUTODESK UNIVERSITY 2015

10451L

Start to Finish: Complete BIM Workflow with Infrastructure Design Suite

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Learning Objectives

- Starting for use InfraWorks 360, AutoCAD Civil 3D, AutoCAD Map 3D, 3ds Max and Navisworks;
- Understand Bridge Module and Civil Structure
- Understand Civil View extension
- Understand the power of BIM workflow with Infrastructure Design Suite

Description

Learn how to implement step-by-step a complete Building Information Modeling (BIM) workflow for infrastructure design. The steps you will learn will include using InfraWorks 360 software for conceptual design; using AutoCAD Civil 3D software with Bridge Module and recall of Subassembly Composer software for detailing design; managing expropriation with AutoCAD Map 3D software; importing a bridge into Revit software for detailing design; building high-quality render with the importation of an AutoCAD Civil 3D software model into 3ds Max software with Civil View extension; building a coordination model with Navisworks software; and making a clash detection and time liner. This class is designed to make people understand the power of Infrastructure Design Suite software.

Your AU Experts

Salvatore Macri' received his BS in environmental engineering at the Politecnico of Milano in 2001. He is Senior BIM Specialist for Infrastructure in Intercad SA with particular focus for Autodesk Infrastructure Design Suite. He worked as Subject Matter Expert (SME) for translation in Italian of InfraWorks 360 (2015) and development of Italian Country Kit for AutoCAD Civil 3D 2015 with particular attention to create subassembly element and definition of C3D Style Object. Before to start in Autodesk reseller partner he was CAD Manager and Designer in Engineering companies. Prior to join in Engineering firms was GIS Specialist and Surveyor. [Contact Salvatore Macri](#)

Daniele Serretti is Senior GIS Specialist with particular focus on AutoCAD Map 3D. He is working in GIS markets about 15 years. Prior to join in Intercad SA he was IT specialist and trainer for CAD/CAM application in some manufacturing companies. [Contact Daniele Serretti](#)

Stefano Toparini works as a solution engineer for Autodesk, Inc., in Italy. With almost 30 years of experience in the IT world, Stefano has worked in many areas, including software development, system integration, database technologies, geographic information systems and visualization. [Contact Stefano Toparini](#)

Data Set Organization.

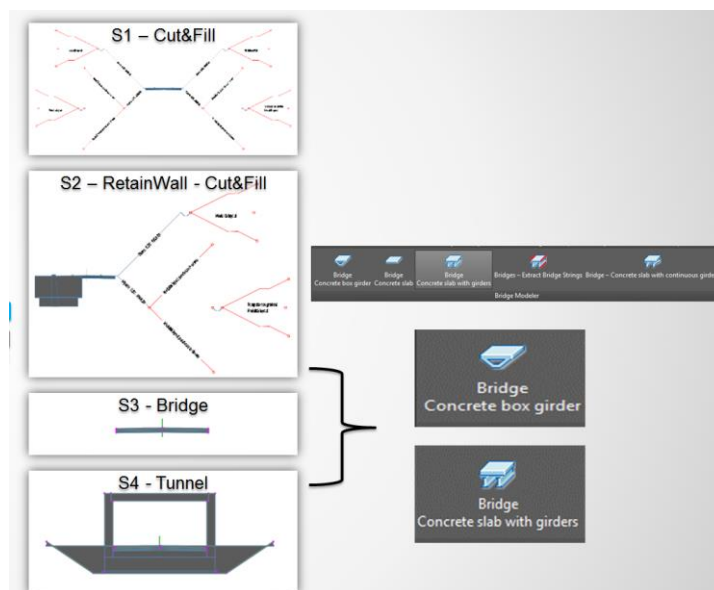
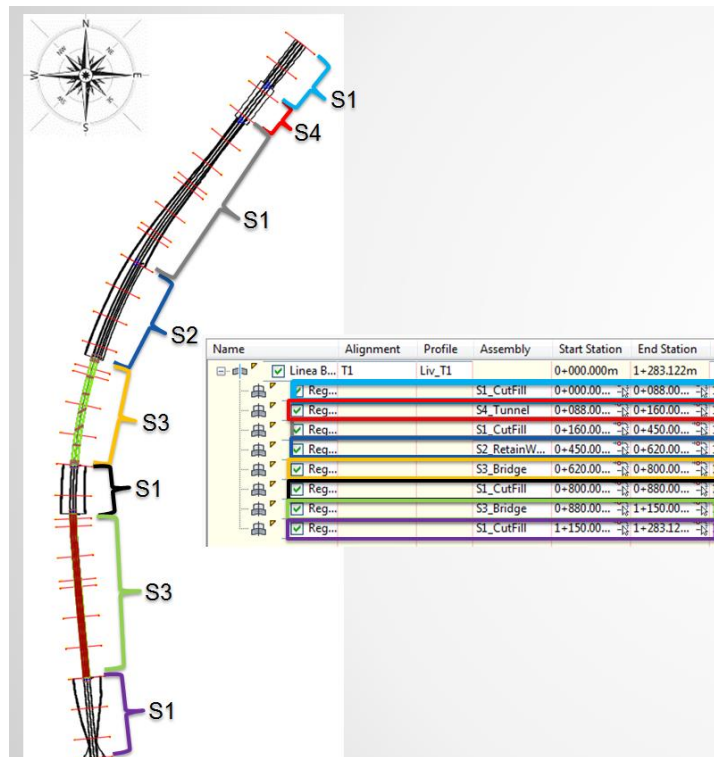
Data set are divided in different folder, each for every step of workflow. For use all data, please copy "AU_CL10451-L" folder in your root C:\.

In this main folder you find several other folders containing:

- 3ds: VSP3D file exported by AutoCAD Civil 3D for work with 3ds Max and Civil View extension;
- C3D: DWG files for build and edit main corridor and Bridge configuration with AutoCAD Civil 3D included all files for export and import by Revit;
- GIS: GIS data to work with AutoCAD Map 3D and InfraWorks 360;
- IW360: InfraWorks 360 model;
- NAV: DWG file exported by AutoCAD Civil 3D and one IFC file to work with Navisworks;
- RVT: 2 different bridges in Revit format after first exportation from AutoCAD Civil 3D to Revit and vice versa;
- SAC: two PKT file of AutoCAD Subassembly Composer. One file is to create a Tunnel and the other is a Retain Wall;
- VIDEO: all Autodesk Screencast videos for each step of this session.



Data set will allow you to apply BIM workflow with Autodesk Infrastructure Design Suite for road with two bridges, one tunnel and one retain wall for total length of about 1 km and 300 meters.



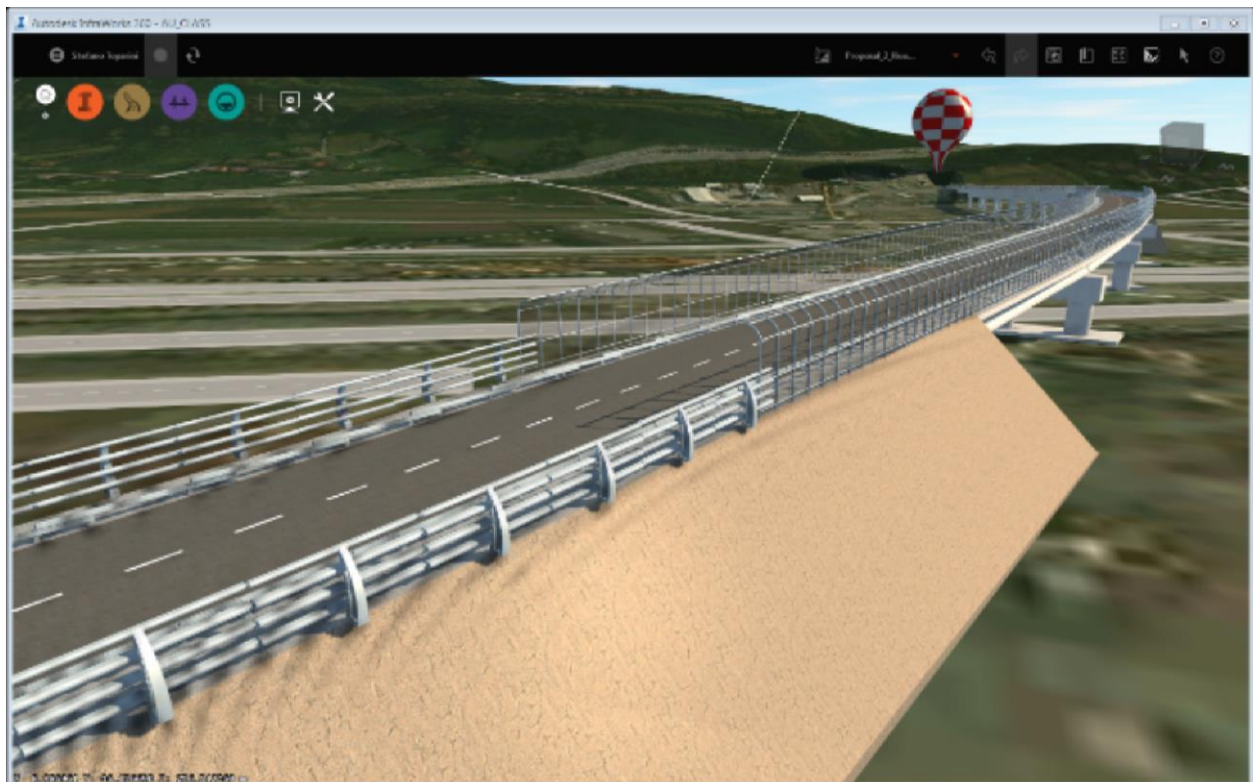
STEP 1: Infracore 360 - Conceptual Design.

In this first part of the session we'll build an Autodesk Infracore 360 model for an area and then we will design a new road in it.

The dataset used in this part of the session is in the "GIS" folder and the resulting model is saved in the "IW360" folder.

Please see these videos for complete step by step instructions:

- [IW360 01 Create a new model.avi](#): new base data model creation;
- [IW360 02 Design a new road.avi](#): design of a new simple road;
- [IW360 03 Proposals and Data filtering.avi](#): creation of two different design proposals for the new road. The geometric information is loaded from an external file and for each proposal a different geometry is selected using a filter on an attribute (name of the road);
- [IW360 04 Profile and Bridges.avi](#): use of the profile view, available Roadway Design for Infracore 360 module, to control the vertical profile of the road. Two bridges are then created in specific regions of the new road using the functionalities available in Bridge Design for Infracore® 360 module;
- [IW360 05 Component Roads.avi](#): addition of new elements to the road, like sidewalk or guardrail, using the functionalities available for component roads in the latest Infracore 360 release;
- [IW360 06 Summary.avi](#): a quick recap of the data and the proposals contained in the final Infracore 360 model.



STEP 2 & 3: AutoCAD Civil 3D and Autodesk Subassembly Composer: detailed design.

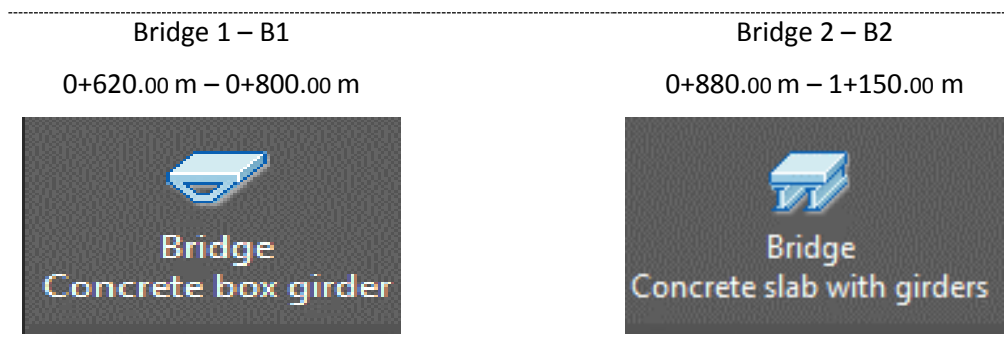
In these steps you will understand how use main tools of AutoCAD Civil 3D for import alignment design with InfraWorks 360 and build Corridor with application of custom subassembly component and extraction of quantity material. Please see these videos:

- [C3D 01 Import IW in C3D](#): importing alignment from InfraWorks 360;
- [C3D 02 BuildCorridor](#): build and manage main corridor with AutoCAD Civil 3D;
- [C3D 03 Custom SAC](#): explore Autodesk Subassembly Files and import it into AutoCAD Civil 3D;
- [C3D 04 QTO SectionView](#): create section view with example of material computation.

STEP 4: Bridge Module and Civil Structure: Bridge design from AutoCAD Civil 3D to Revit and back.

In follow steps you will learn how to use two extensions: Bridge Module for AutoCAD Civil 3D^(*) and Civil Structure for Revit^(**). These extensions allow designing of 4 different configuration of Bridge with extremely easy.

We will use two configurations:



Please see these videos:

- [C3D 05 Bridge1 Box girder](#): definition of B1 with Bridge Module in AutoCAD Civil 3D;
- [C3D 06 Bridge2 Slab with girder](#): definition of B2 with Bridge Module in AutoCAD Civil 3D;
- [RVT 01 Import B1 in Revit](#): importing B1 in Revit;
- [RVT 02 Edit B1 and Export C3D](#): editing B1 with Revit for change piers and abutment. You can also see exportation of new B1 configuration in AutoCAD Civil 3D;
- [RVT 03 Import B2 in Revit](#): importing B2 in Revit;
- [RVT 04 Edit B2 and Export C3D](#): editing B2 with Revit for change piers and abutment. You can also see exportation of new B2 configuration in AutoCAD Civil 3D.

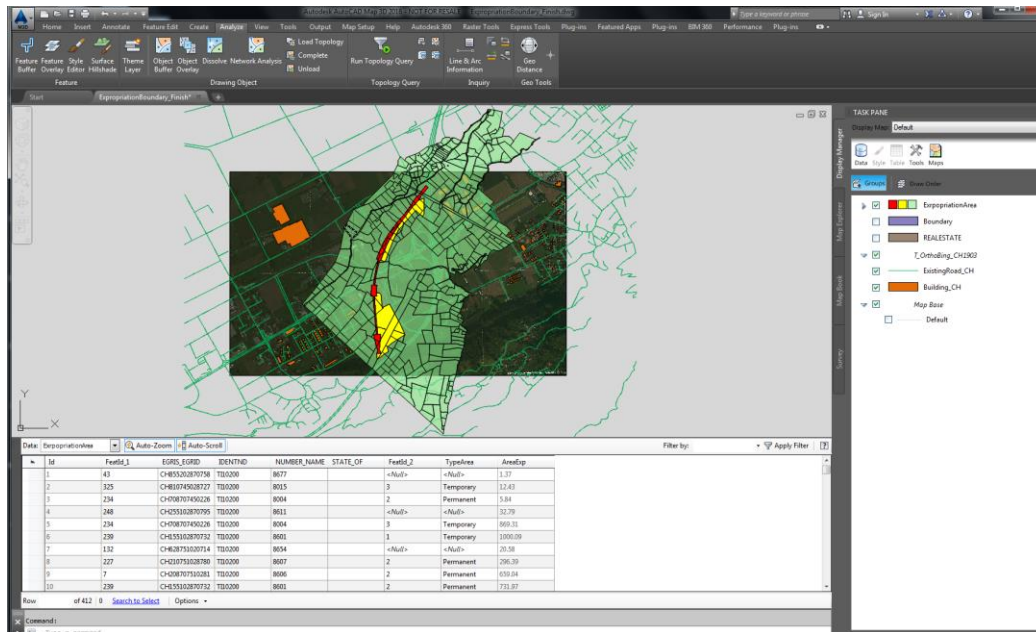
^(*): available for Autodesk Subscriber both for 2015 and 2016 version by Autodesk Account;

^(**): available for Autodesk Subscriber in Autodesk App Store.



STEP 5: AutoCAD Map 3D - Expropriation.

In this step you will use GIS data of first step to create new cartography map as base to calculate expropriation area.



The essential points are:

- Create boundary from corridor of AutoCAD Civil 3D;
- Editing previous boundary with all different part of expropriation type;
- Create cartography with GIS data;
- Export boundary from AutoCAD to SDF file;
- Apply Overlay – Union to obtain Expropriation Area;
- Create thematic Map of Expropriation Type;
- Exportation as *.csv file of area.

Please see this video:

- [M3D 01 Expropriation.](#)

STEP 6: 3ds Max and Civil View extension - Rendering for presentation.

In these steps you will continue to work with BIM workflow with same model that we already made. In particular in this chapter you will learn how it's easy to export AutoCAD Civil 3D model to 3ds Max for build render for your presentation. Please see these videos:

- [3ds 01 Export to 3ds](#): exporting corridor as vsp3d file from AutoCAD Civil 3D;
- [3ds 02 Build Render in 3dsMax](#): importing in 3ds Max and build render scene.

STEP 7: Navisworks – project management and coordination.

In these last steps you will learn how create data for Navisworks by previously steps. You can also define time liner and make clash detection to increase management and coordination of all data. Please see these videos:

- [NAV 01 Prepare Navisworks](#): definition of DWG files working with AutoCAD Civil 3D model and bridge exported by Revit.
- [NAV 02 Work With Navisworks](#): explore Navisworks model and definition of time liner and clash detection.

Conclusions

Autodesk Infrastructure Design Suite – IDS - is a powerful tool to work better and faster.

BIM methodology and IDS tools are the perfect way to be more productive and have better designs.

Enjoy BIM with IDS!

