OG9918 - Extended Structural Workflow Integration between Plant-Revit-Robot and Advance Steel

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Class summary

In this class we will explore the extended structural steel workflow between different Autodesk solutions. Create, exchange and optimize a steel structure using the power of these solutions in an integrated workflow. Design and optimize your steel structure without the need to recreate it, using the unique capabilities of the suite workflows. In this demo we will cover the interoperability between the solutions starting to create a steel structure in Plant 3D and import the structure into Revit Structure. Then exchange the structure to Robot Structural Analysis for steel optimization and update the structure, drawings and results in Revit Structure. Afterwards we will export the optimized steel structure to Autodesk Advance Steel for Structural Detailing and the creation of shop drawings. Navisworks or BIM360 Glue will be used to review the project and perform clash detection. At the end we will reference the detailed structure back into Plant 3D to complete the workflow.
Key learning objectives

At the end of this class, you will be able to:

- Learning objective 1
  - Produce early stage structural models in Plant3D
- Learning objective 2
  - Optimize and elaborate the structural model in different environments
- Learning objective 3
  - Explore the extended interoperability between different Autodesk solutions
- Learning objective 4
  - Discover the possibilities of the different Autodesk solutions
Intro: Steel Silo Design

Type of project: self bearing steel silo

Combination of steel structure, piping and mechanical
Customer Case

Actual Workflow:

- Drawings created in 2D Autocad
- Structural Analysis is done by external partner
- Mechanical equipment created in Inventor
- Sheet metal design created in Inventor
- Coordination done by using 2D drawings
Problems

Actual Workflow: Points of attention

- Decreased project times
- Projects become more complex
- Coordination with 2D drawings fails, more construction errors
- Problems during execution generate higher costs
- Less profit
Challenge

Create an optimized Workflow:

- Using Autodesk solutions
- Maximize interoperability between the solutions
- Improve coordination of the project
Goal

Create coordinated 3D models:

- Throughout the complete workflow
- Maximum control over the project
- Coordination in execution
Early Stage Structural Model in Plant 3D
Steel Structure in Plant 3D

Project Workflow:

- Actual workflow: Creation of a 3D steel structure in Plant 3D
- Export as a DWG to be used in Robot Structural Analysis
- Rework needed in Robot Structural Analysis
Steel Structure in Plant 3D

Project Workflow:

- Base Platform: Early Stage Steel Structure created in Plant 3D
- In this case based on a 3D DWG stick model from a similar previous project as a reference
Export to Advance Steel
Export Steel from Plant 3D

Project Workflow:

- Integrated exchange with Advance Steel
- New file format for steel exchange: SMLX
- Creates a steel exchange file
- SDNF is still available
Import into Advance Steel
Import Steel from Plant 3D into Advance Steel

Project Workflow:

- Integrated Import & Export in Advance Steel
- Imports the Steel Structure from Plant 3D
- With conservation of properties
Export out of Advance Steel
Export the modified Steel Structure with SMLX

Project Workflow:

- Integrated Import & Export in Advance Steel
- Export the modified Structure for Analysis or Coordination
- Workflow with Revit and Robot Structural Analysis
Possible Project Workflows
Several Bi-directional Workflows are possible

Project Workflow:

- Depends on the Project needs
- Depends of the Project organization
- Depends of the Responsibilities
Optional workflow with Revit Structure

Project Workflow:

- Create a Project Coordination Model in Revit
- Combine Multiple Disciplines for coordination
- Update and document results from Robot in Revit
- Bi-directional communication with Advance Steel
Using Revit Structure for Project Coordination

Why use Revit for Coordination:

- Powerful and easy to use
- Possible to use in an early project phase
- Multiple disciplines can be coordinated
- Dynamic with modifications
Example: dimensioning the silos in predesign
Exchange with Robot Structural Analysis
Direct exchange with Revit Structure

- Integrated workflow between Revit and Robot
- Using the Analytical model in Revit
- Bi-directional workflow
Steel analysis and optimization in Robot

- Advantage: No need to recreate the steel structure in Robot
- Elaborate the analytical model in Robot
- Analyze and optimize the structure
- Update the Revit and Advance steel project
Analytical workflow for steel optimization
Update the Revit Project
Direct from Robot to Revit Structure

- Integrated workflow in Revit and Robot
- Export the results and optimizations
- Updates the structure and documentation
Updated SMLX file from Revit Structure

- Updated Revit Project
- Export the updated steel structure
- Synchronize with the existing project
- Updated structure in Advance Steel
Exchange with Advance Steel
Graduated: SMLX interoperability with Robot

Project Workflow:

- Integrated Import & Export in Robot
- Allows Bi-directional communication
- Optimize Steel Structures in Robot
- Export results from Robot to Advance Steel
- Update the Steel Structure in Advance Steel
- EC3-Code checking based on Robot Analysis
Workflow with SMLX

- Integration of the SMLX format in Robot
- Import the Advanced Steel Structure
- Analyze and optimize the Steel Structure
Synchronize the structure in Advance Steel

- Synchronize the Optimized Steel Structure
- Import the analysis results
- Perform code checking in Advanced Steel
Connection design and Steel Detailing

- Extended detailing possibilities
- Automated Connection design
- Automated creation of shop drawings and Fabrication data
EC3 code checking in Advance Steel

- Powerful EC3 code checker
- More connections available than in Robot
- Connection design based on the Analytical results
Create Shop drawings in Advance Steel

- Create all necessary Project documentation based on the Steel Structure
- Extended Drawing Templates library available
- Version and Revision control
- Create Drawings, BOM’s and CNC files
Use Plant 3D drawings directly in Advance Steel

- Xref the equipment from Plant 3D into the Steel Project
- Use the actual Plant Design 3D information to coordinate steel design
Plate Design in Advance Steel
Plate Design in Advance Steel

- Exchange the Base Form from Revit to Advance Steel
- Create the Folded Plate in Advance Steel
Plate Design in Advance Steel

- Re-Import in Revit using the SMLX export
- The Folded Plate is correctly placed in the project
Import in Plant 3D
Replacement of the Pre-Design Steel structure

- Xref the steel structure from Advance Steel into Plant 3D
- Use the Detailed Steel Structure as reference
- Determine the Level of detail needed in the Plant 3D project
Coordination with Navisworks
Project Coordination in Navisworks

- Bring together all the Project Information
- Coordinate and make Interference detection
- Track interferences back in the Project files
Interference Check

- Check all disciplines against each other
- Track interferences
- Report and Coordinate
Switch Back

- Find the correct object
- Direct tracking in the Project files
- Report and Coordinate
Switch Back with Revit

Switchback of Clash Detections to Revit or AutoCAD
New option: Reference Navisworks Files

- Link NWC files into your project for Coordination
- Not possible to use them in Clash Detection for Advance Steel
Collaboration in the cloud
BIM 360 Glue

- Collaboration in the cloud
- Perform Clash control and detection in the cloud
- On site availability of Project Documentation and Information
Extended optional workflow
Insert your Project in Infraworks for presentations