Reduce Waste in Structural Steel Fabrication with BIM

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About the speaker

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Structural Steel Design & Fabrication
10+ years of expertise in Advance Steel
Joined Autodesk in 2013
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MORE IS INEVITABLE
LESS IS A REALITY
OPPORTUNITY OF BETTER
Key learning objectives

• DISCOVER HOW STRUCTURAL ENGINEERS AND STEEL FABRICATORS ARE REDUCING REWORK THROUGH BIM

• LEARN HOW YOU CAN TURN A DESIGN MODEL INTO A READY FOR FABRICATION DETAILED MODEL

• DISCOVER HOW THE PROBLEMS CAN BE IDENTIFIED PRIOR TO FABRICATION

• UNDERSTAND HOW YOU CAN DRIVE AND AUTOMATE THE FABRICATION OFF-SITE
Discover how structural engineers and steel fabricators are reducing rework through BIM
Structural Steel Design

- Steel frame modeling
  - Structural steel families

- Detailed steel design
  - Modeling with detailed parts
    - Plates
    - Bolts & anchors
    - Welds
  - Edit tools
    - Parametric cuts
    - Parametric coping
Structural Steel Connections

- Standard steel connections
  - 125+ connections
  - Simple and complex connections
  - Available out-of-the-box in Revit 2019

- Integrated code checking
  - AISC and EC3 standards
  - Verified / Failed
  - Report
Engineering documentation

- General arrangement drawings
  - 2D and 3D views
  - Dimensions
  - Tags

- Schedules
  - Structural framing
  - Structural columns
  - Plate schedule
  - Bolt schedule
From steel design to detailing

- Advance Steel Extension
- Export the design model from Revit
- Import the design model in Advance Steel
- Material list summary in Advance Steel
Changes management

- Advance Steel Extension
  - SMLX file format
  - Export / Import / Synchronise

- Structural members & automatic steel connections

- Synchronisation dialog-box
  - Colors
  - Filter
  - Apply selected lines or all
Collaboration with BIM 360

- Cloud-based collaboration platform
- Upload & view & share project files
  - 100+ 2D and 3D file formats
  - Native DWG Advance Steel files
- Collaborate with team members
  - Markup & navigation tools
  - Issues
- Access anywhere using a web browser or mobile device
Learn how you can turn a design model into a ready for fabrication detailed model.
Connection Vault

- Displays all automatic steel connections delivered with Advance Steel
  - Different categories
  - Descriptive images
- Favorites category
  - Get your preferred connections available in a « Favorite » category in the palette
  - Add a connection
  - Remove a connection
Connection groups

- Link several connections together
  - If one changes ...
  - ... all the other connections in the group change and continue to match

- Master connection & Slave connections
  - Define a Master connection
  - Master is used as a template for other connections
  - Can be marked using the Search filter

- Connection group modification
  - Add a connection to a connection group
  - Remove a connection from a group
Library of connections

• Create your own templates for later use

• Library > Save values
  o Creates a new line with saved values
  o Possibility to give a comment with Edit button

• Use wildcard values
  o AISC 14.1 W\% - tells the library entry that this line will apply for all AISC 14.1 W sections, regardless of the section size
  o AISC 14.1 W\W21\% - adds extra filtering to the rule above. It still applies to all AISC 14.1 W sections, but it also filters those that are W21. This means that this rule will apply the connection to W21x68, W21x62, W21x101, etc.
Miscellaneous steel

• Speed up the modeling & fabrication of complex elements

• Automatic macros for creation of:
  o Straight stairs
  o Spiral stairs
  o Straight and curved railings
  o Cage ladders

• Lots of options available
  o End of handrail
  o Elbow between handrails
  o Weld site/shop
Advanced fab - specific tools

• Use tools to help
  - Easier fabrication at shop
  - Better erect at site

• Punch marks
  - Automatic (e.g. base plate joint)
  - Semi-automatic

• Specific holes
  - E.g. slotted holes
  - Possibility to define the part(s) containing the holes
Standard parts

- Leverage your library of standard parts

- Standard parts template
  - DWG file containing standard parts
  - Assign them a specific part number
  - Save into StandardPartTemplate subfolder
  - Close the DWG file

- Numbering dialog
  - Standard Part Template tab
  - Select templates to be used
  - Run the Numbering
Discover how the problems can be identified prior to fabrication
Clash check

• Prevent errors at workshop

• Avoid costly errors at the construction site

• Check for clashes at any time
  o Entire model
  o Selection set

• Tool to check if holes/bolts are too close to object edge
  o Technical checking utility
Model browser

- Home tab > Project explorer

- Browse your model
  - Select a line highlight corresponding objects in the model
  - Isolate / Show all buttons
  - Sort by single parts
  - Sort by assemblies

- Edit element properties
  - Insert / remove a column (e.g. model role)
  - Edit properties button
DEMO
Model views

• Available in the Project Explorer

• Creating model & level views
  o Limit what is on screen
  o Display relevant objects in required area

• Light bulb icons
  o Select one by one
  o Select more than one bulb icon
Visual filters

• Project explorer
  o Create a query
    ▪ Specify the search criteria
    ▪ Assign a color
    ▪ Save the query

• Example:
  o Search for columns
  o Get them colored in green
  o Run the query again at any time
Show assemblies

- Show only selected assembly
  - Advance Steel tool palette
  - Show only selected assembly
  - All visible 😊

- Center of gravity
  - Select object(s)
  - Extended Modeling ribbon
  - AutoCAD point displayed as result
Understand how you can drive and automate the fabrication off-site
Shop drawings

- Dedicated templates available OOB
  - Drawing styles
  - Drawing processes

- Separate DWG files
  - Single part drawings
  - Assembly drawings

- Drawing styles manager
  - Access to additional styles
  - Customizable styles
  - Import / export customized styles
Insert a 3D view in a drawing

• Isolate the assembly in the model
  o Quick views > Show only selected assemblies

• Place the UCS on the view
  o UCS > UCS View

• Use a dedicated drawing style
  o 1 – GA 3D View
  o 3D View – Objects selected

• Modify settings
  o Existing drawings
  o Select the assembly drawing where to insert the view
Changes management

- Document Manager
  - Update required branch
  - Select documents to be updated
  - Update or Update with revisions
  - Enter revision details

- Result
  - NC files & BOMs updated
  - Drawing file name updated with revision index
  - Drawing content updated
  - Revision clouds
  - Revision table with revision information
CNC machines & MIS software

- NC-DSTV files
  - Create NC files in DSTV format
  - DSTV = Deutscher Stahlbau-Verband

- NC-DXF files
  - Create NC files in DXF format

- Link with MIS software
  - MIS = Management Information System
  - Optimizing your steel fabrication process
Automatic nesting

- Advance Steel
  - Output > NC&DXF > DXF (Plates)

- Inventor
  - Import NC-DXF files in Inventor Nesting Utility
  - Packaging configuration with specific rectangular dimensions
  - Automatic nesting
    - optimize the use of materials in flat cutting operations
    - reduces the amount of material waste
  - Generate the tool path in Inventor HSM
    - Simulation of the tool path
    - Play button to see the 3D tool path