Dive Deep into Revit Steel Connections and Advance Steel Export/Import/Sync Workflow

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Speaker

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Agenda

- Design to Fabrication
- Installation and Prerequisites
- Steel connections workflow
- Best practices for steel connections and the extension
- Steel connections outlook
- Connection exchange with Advance Steel
- Best practices for Advance Steel extension

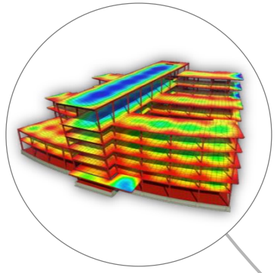
Key learning objectives

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

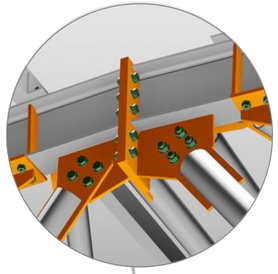
- Understand the best practice for the new and intelligent steel connections in Revit
- Learn how to distinguish between Revit and Advance Steel for steel connections, and know when to use which software
- Learn the exchange of connections and approval information with Advance Steel
- Learn how to use the latest workflow for steel building with Autodesk software

Design to Fabrication

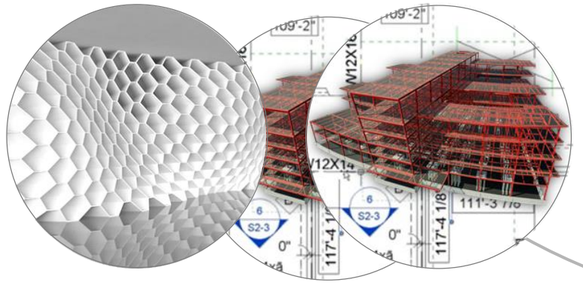
Structural Analysis

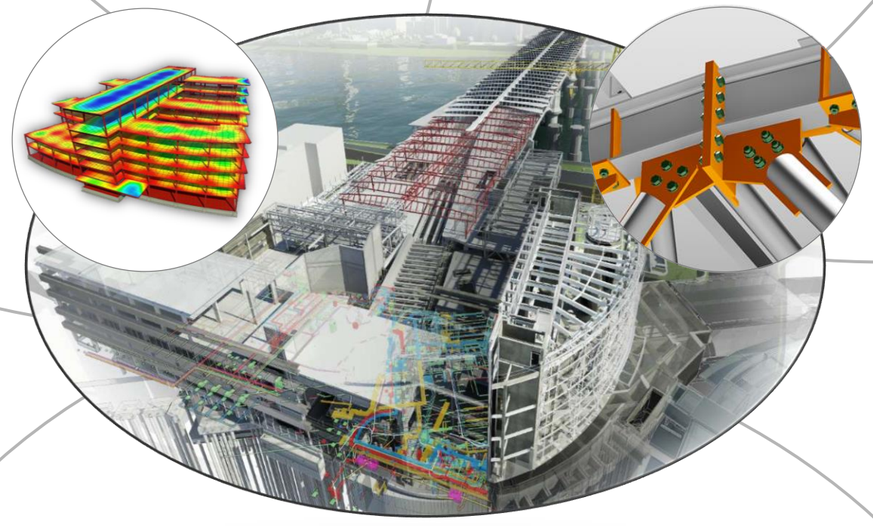


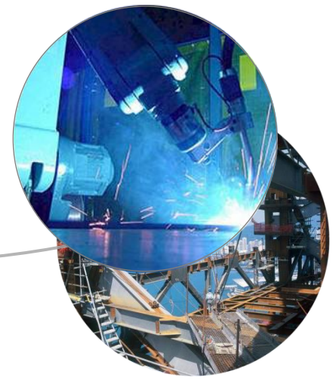
Detailing



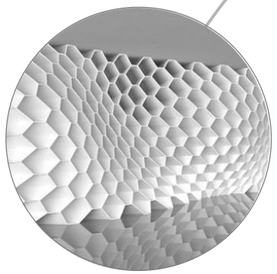
Fabrication







Conceptual Design



Operations & Maintenance

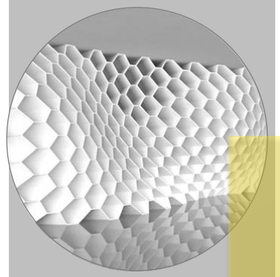
BIM Project

AUTODESK.

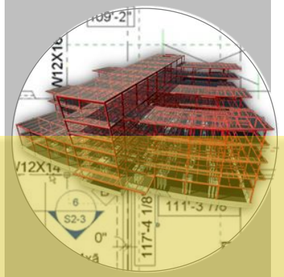
Project flow from Design to Construction

Design | **Fabrication** | **Construction**

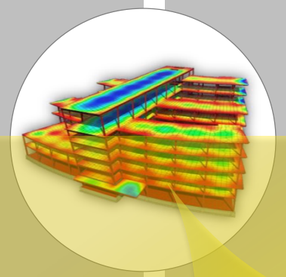
Conceptual Design



Structural Design

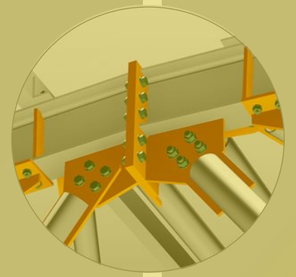


Simulation



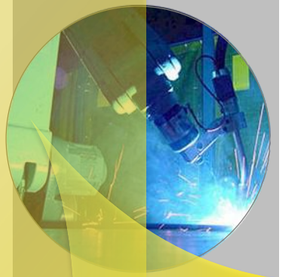
Code Check

Fabrication Model



Shop Drawings

Production



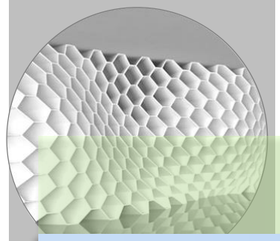
Installation

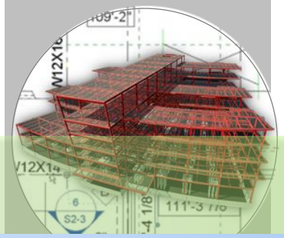
Accurate Design

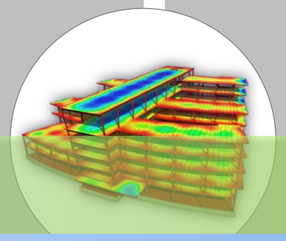
Fabrication Readiness

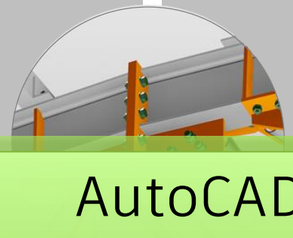
Structure | Product Positioning

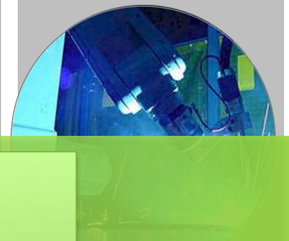
Design				Fabrication			Construction
Conceptual Design	Structural Design	Simulation	Code Check	Fabrication Model	Shop Drawings	Production	Installation









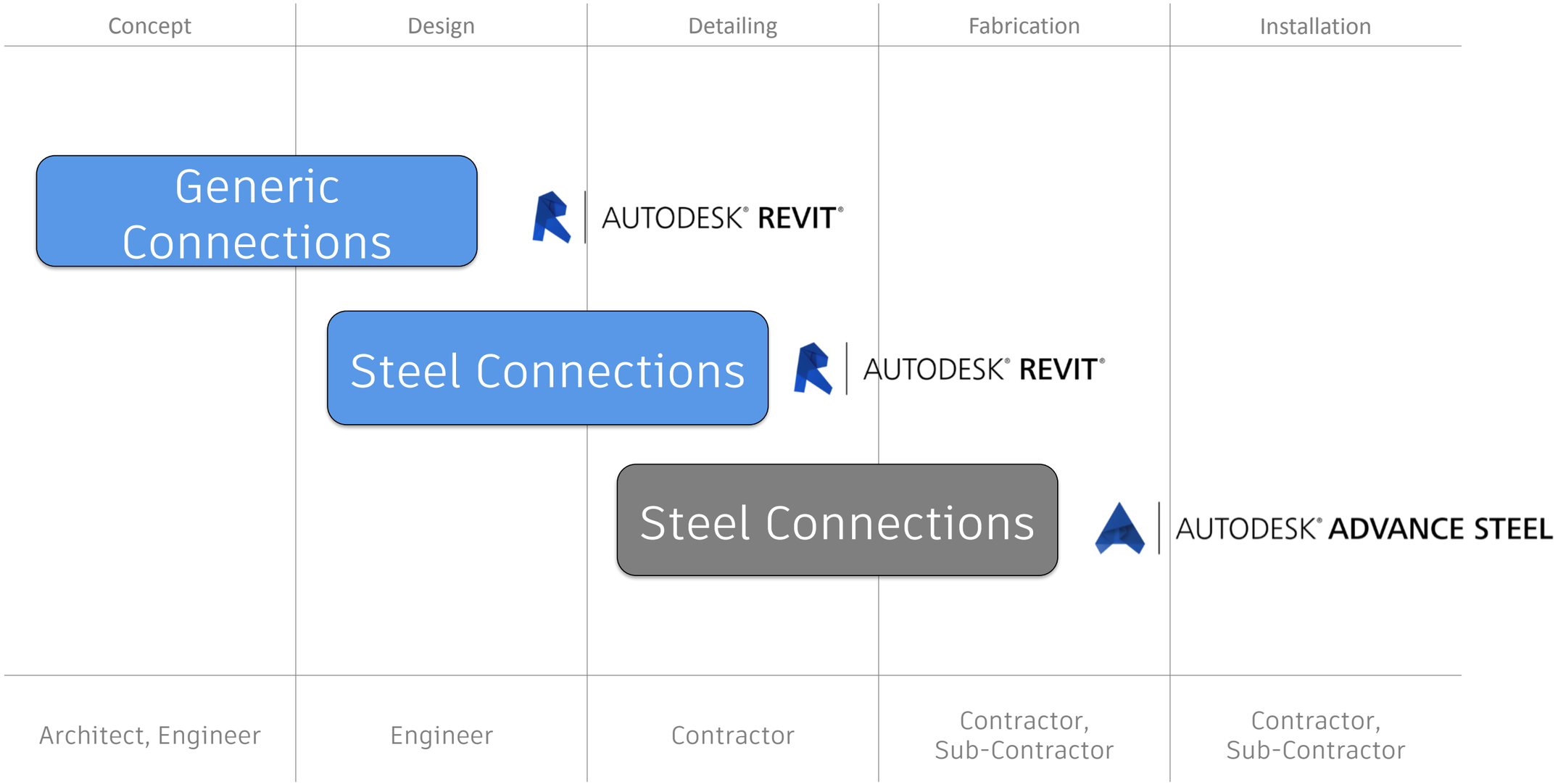


Revit
Authoring

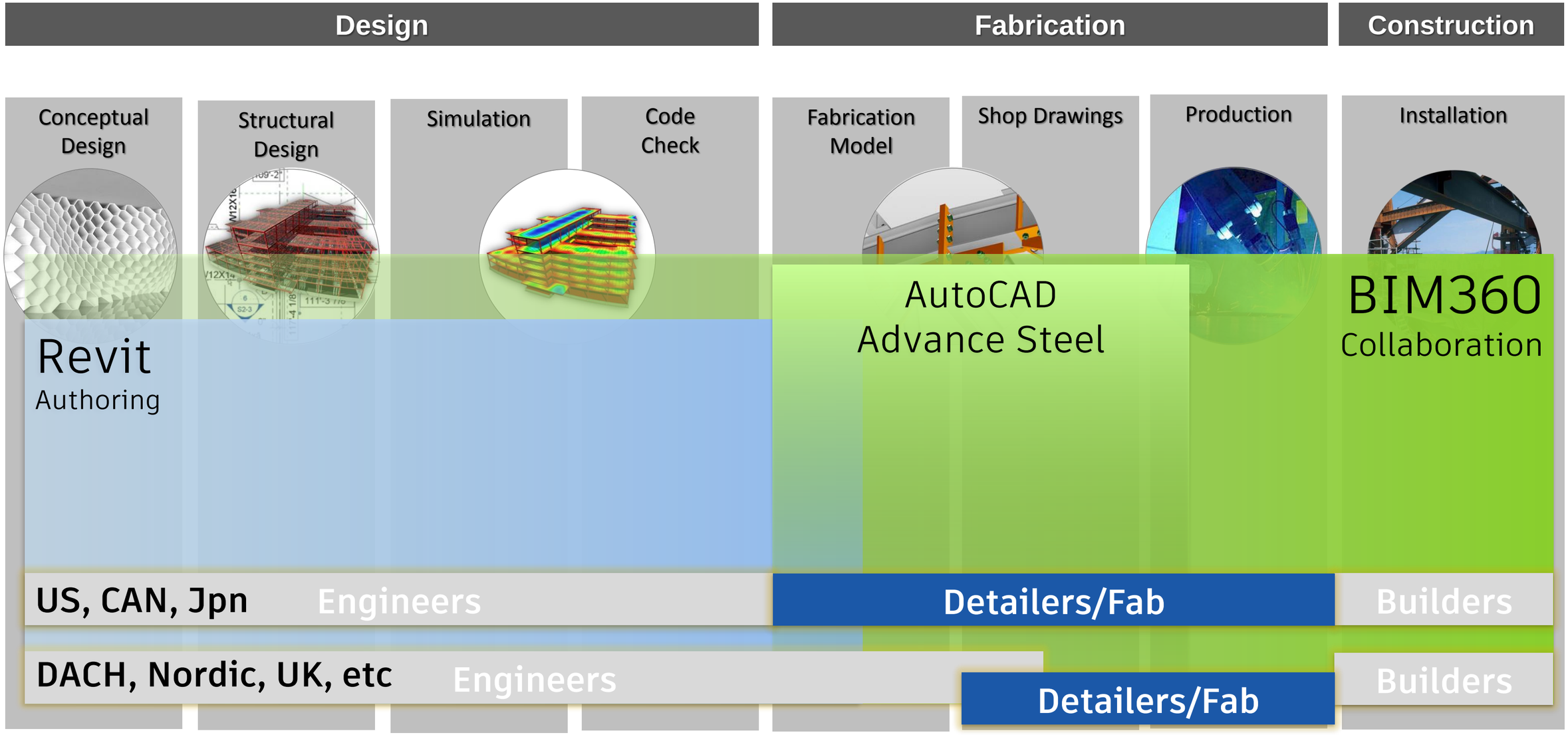
AutoCAD
Advance Steel

BIM360
Collaboration

Areas of improvement



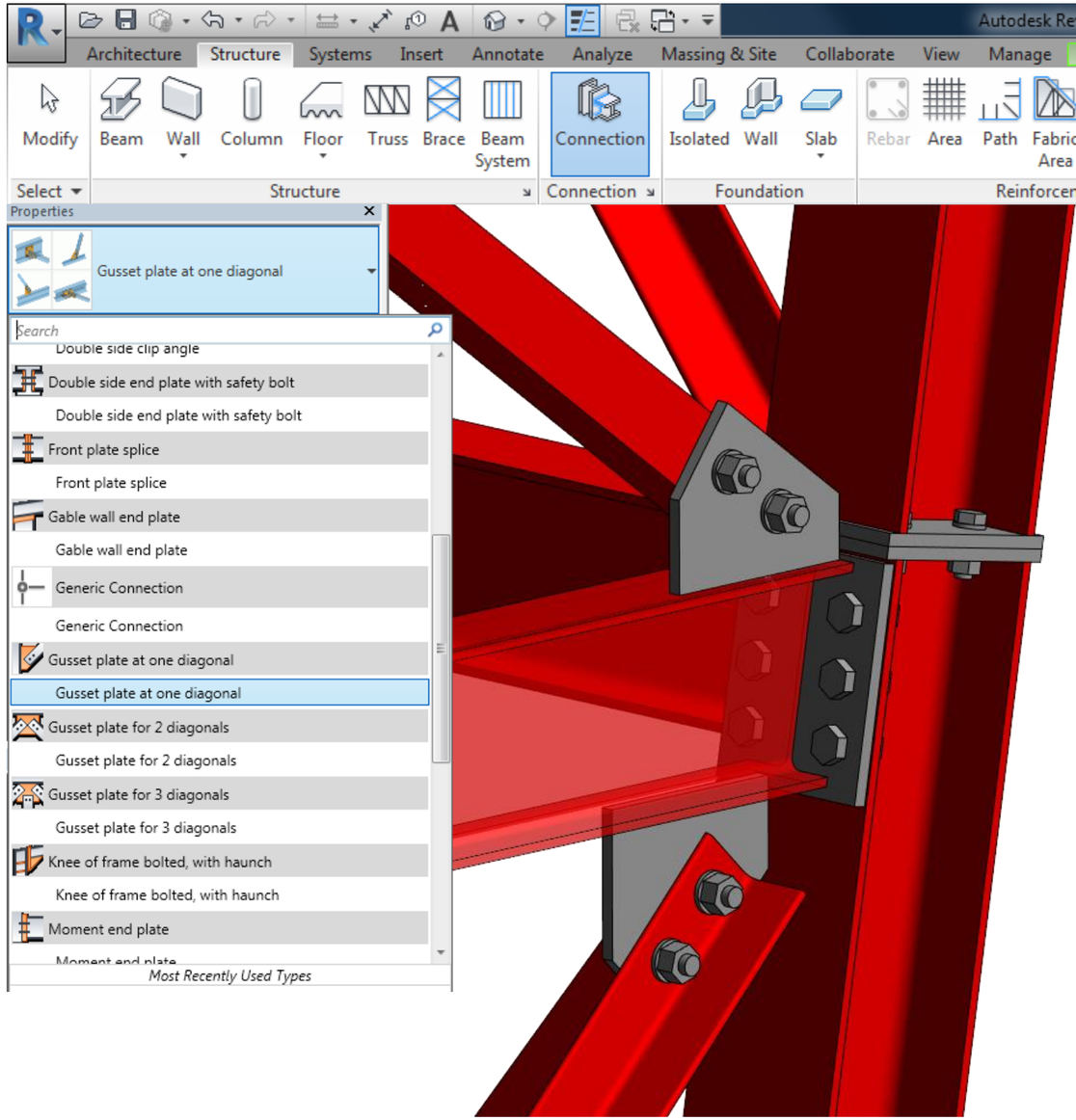
Structure | Product Positioning



Steel Connections for Autodesk Revit®

Autodesk Revit® 2017

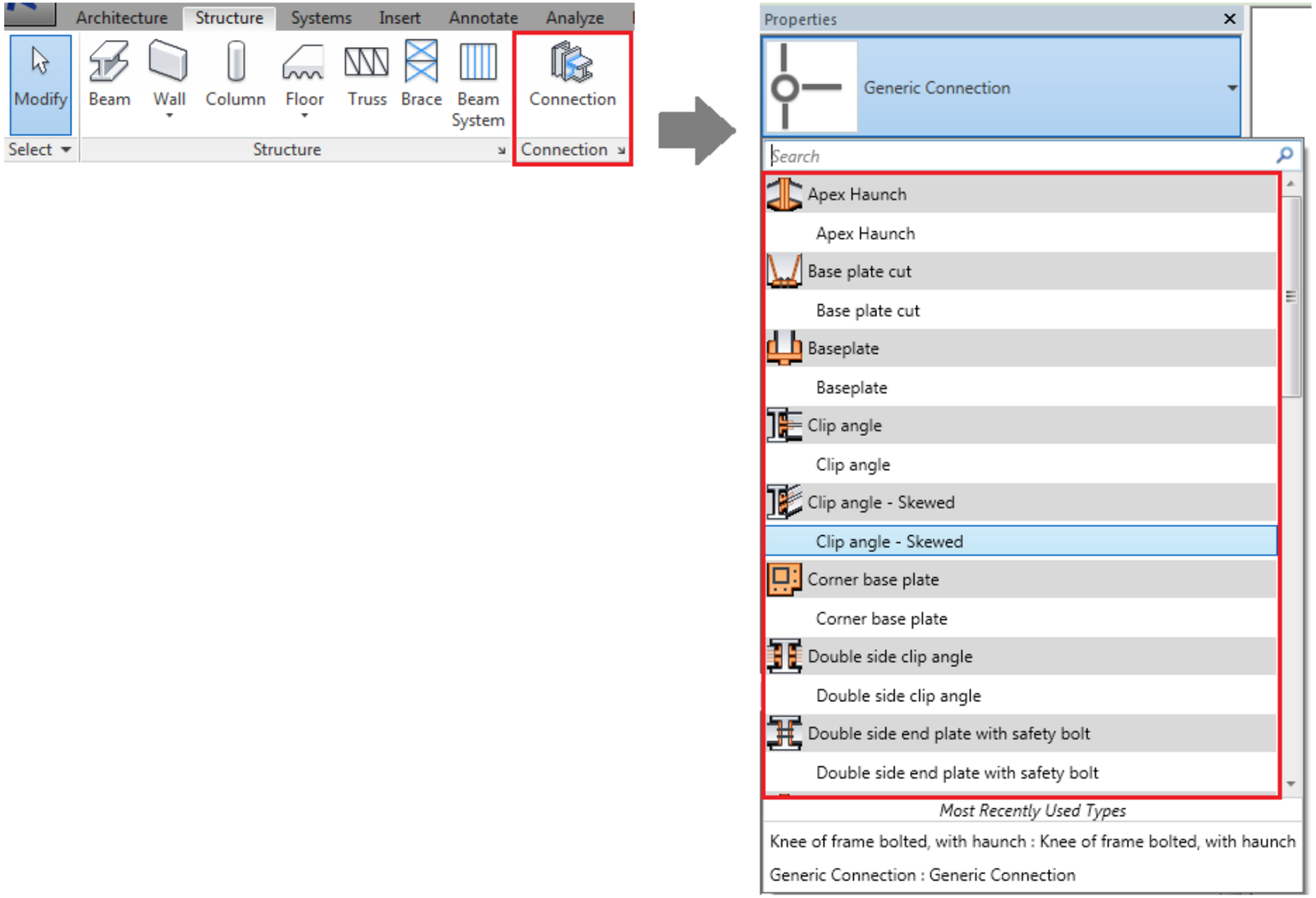
- Parametric steel connections
  - Built-in steel connection design engine based on US and European codes.
- Model accuracy
- Complete design intent with standard connections
- Connections code check
- Communication enhancements



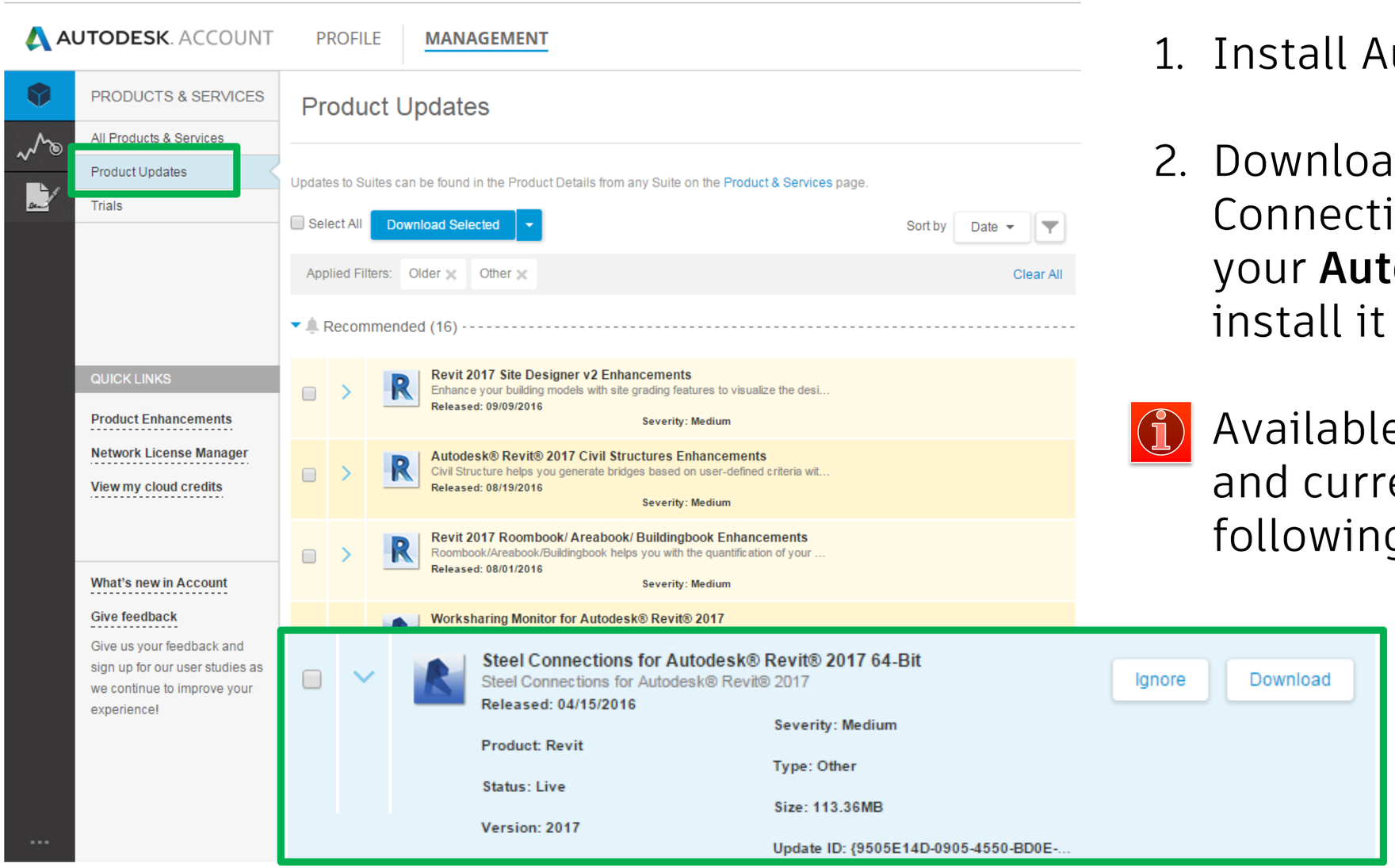
Better coordinated designs and documentation that extends to fabrication

Installation and Prerequisites

Steel connections – only after installation



Steel connections – How to get it



1. Install Autodesk® Revit 2017

2. Download Autodesk® Steel Connection for Revit® from your **Autodesk Account** & install it

Available for subscription users and currently available in the following languages:

1. US English
2. French
3. German
4. Polish

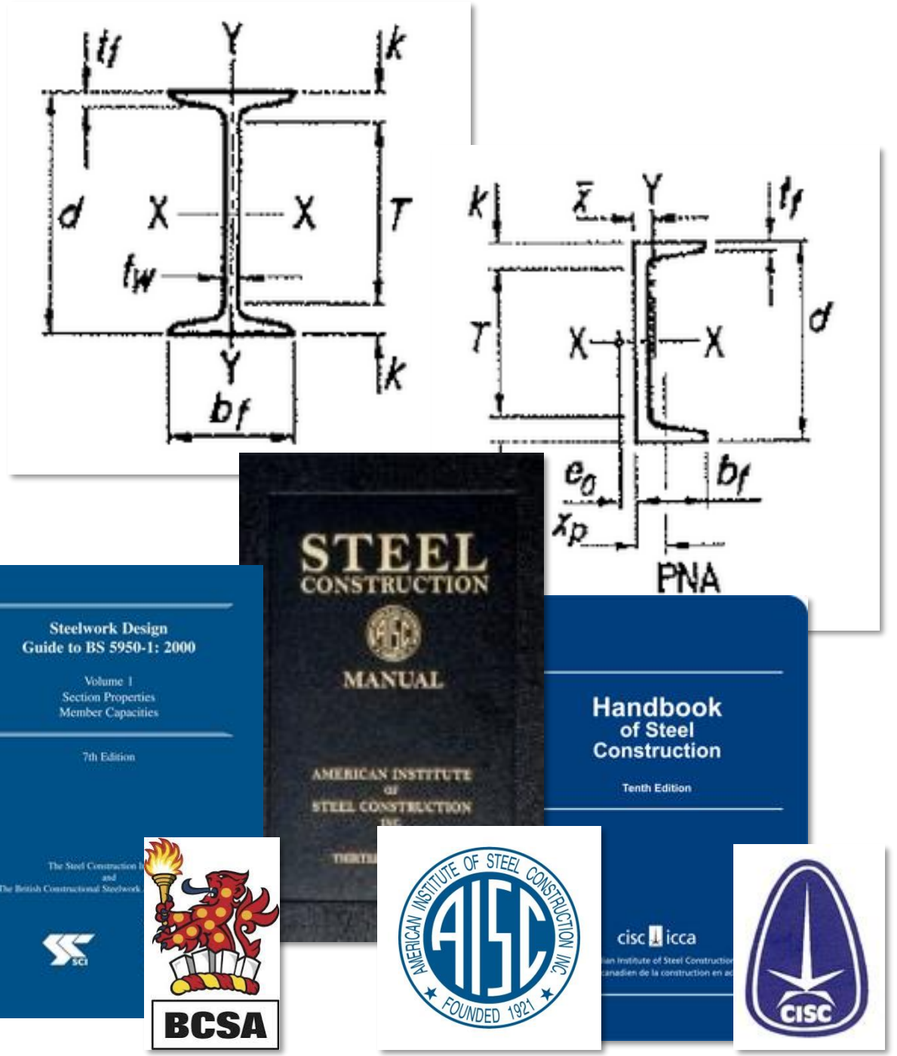
Structural engineering enhancements

Autodesk Revit® 2017

- Accurate and Consistent Steel Content
- Industry Standards compliance
- Accurate Quantities for Steel BoM
- Extended for 2017: Eurocode, ANZ, Germany, France, Poland, US, India

<Structural Framing Schedule - Cut Lenght>

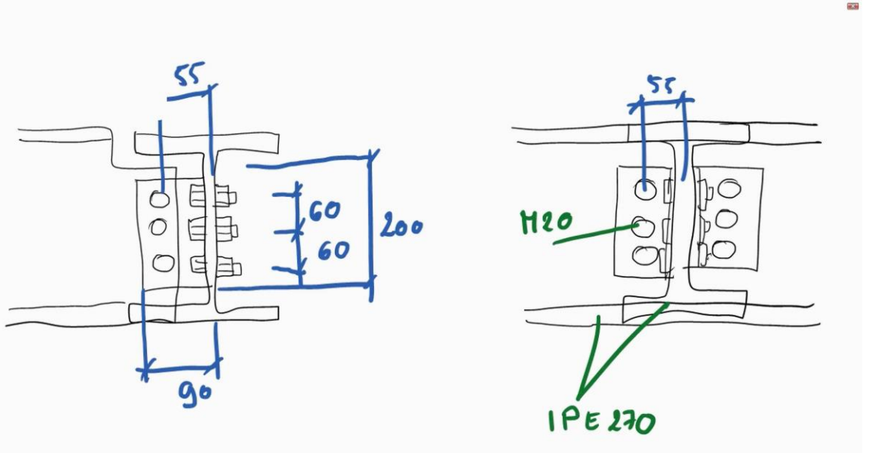
A	B	C	D	E	F	G	H	I
Mark	Type	Structural Material	Cut Length	Count	Weight o Piece	Total Weight	Surface of Piece	Total Surface
1000	UB305x165x40	Metal - Steel 43-275	4747	5	191.32 kgf	956.60 kgf	5.96 m²	29.79 m²
1001	UB203x102x23	Metal - Steel 43-275	2794	4	64.54 kgf	258.17 kgf	2.24 m²	8.97 m²
1002	UB305x165x40	Metal - Steel 43-275	2777	4	111.91 kgf	447.65 kgf	3.49 m²	13.94 m²
1003	UB203x102x23	Metal - Steel 43-275	2994	3	69.16 kgf	207.48 kgf	2.40 m²	7.21 m²
1004	UB203x102x23	Metal - Steel 43-275	2094	3	48.37 kgf	145.11 kgf	1.68 m²	5.04 m²
1005	CHS114.3x5	Metal - Steel 43-275	3020	2	40.77 kgf	81.54 kgf	1.08 m²	2.17 m²
1006	L100x100x10	Metal - Steel 43-275	4850	2	72.75 kgf	145.50 kgf	1.94 m²	3.88 m²
1007	UB305x165x40	Metal - Steel 43-275	4427	2	178.41 kgf	356.82 kgf	5.56 m²	11.11 m²
1008	UB305x165x40	Metal - Steel 43-275	4444	1	179.09 kgf	179.09 kgf	5.58 m²	5.58 m²
						2777.97 kgf		87.70 m²

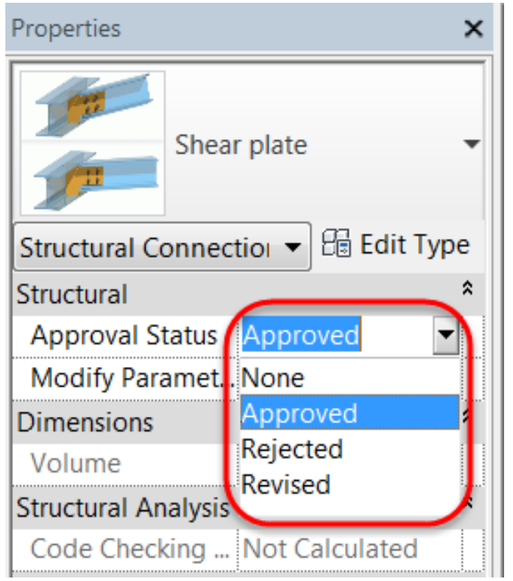


Steel connections workflow

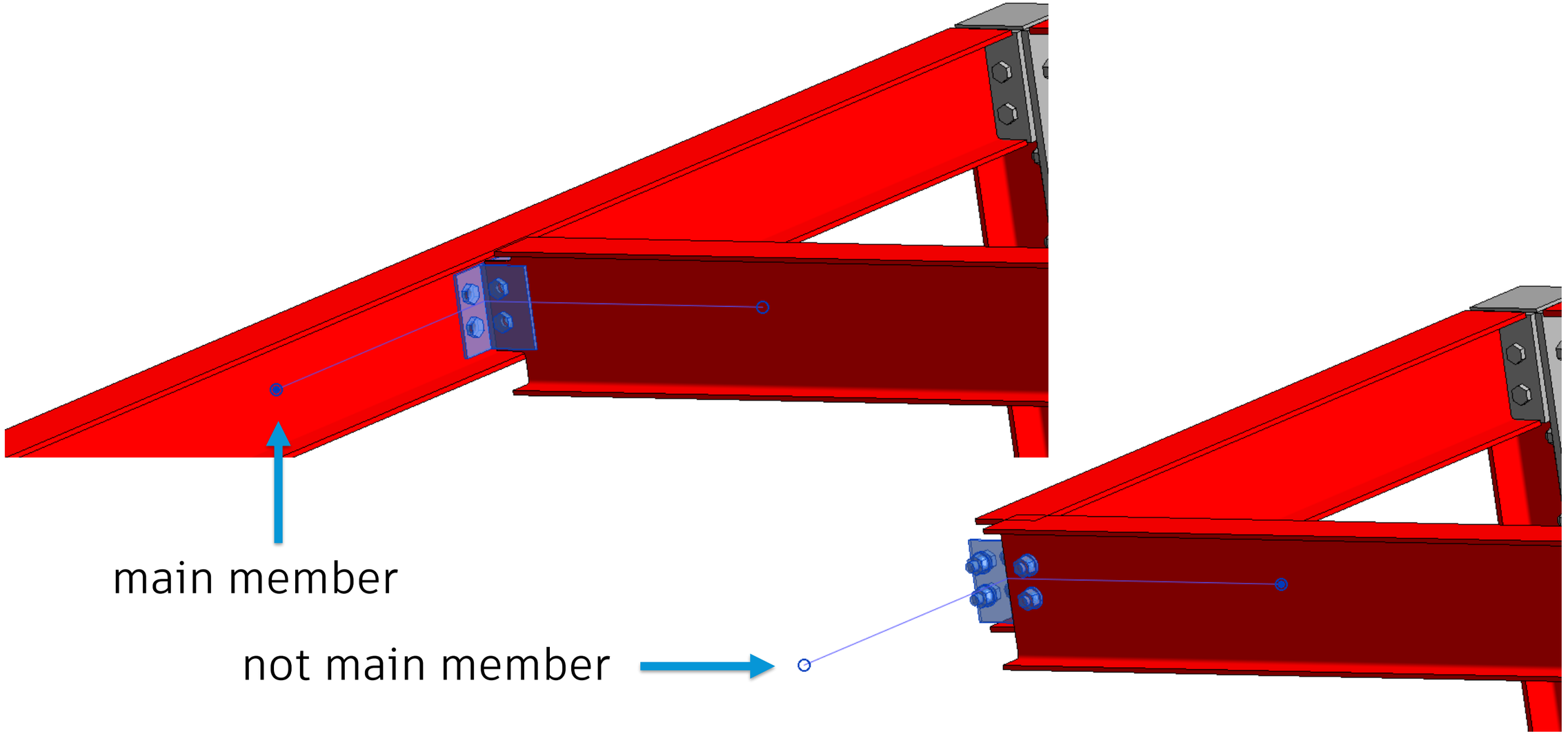
Generic connections - Explanation

- What is it?
  - It represents the connection type as a symbol
- How does it look like?
  - It displays the joined and connected elements as a circle with line segments radiating out toward the connected elements
  - The filled circle shows which connected member is the main one
  - It can be changed by picking the empty circle
- Offers the following possibilities:
  - Exchange of connection information between structural engineers & steel detailers
  - Sharing approval information





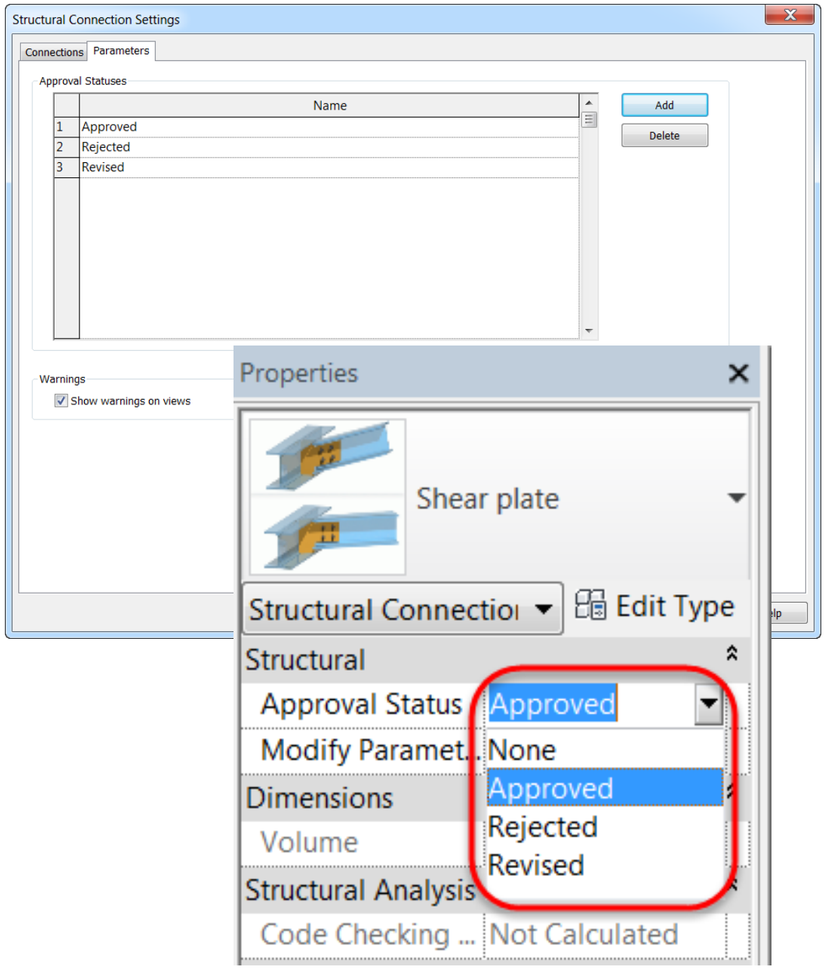
Generic connections - Explanation



Generic connections – Approval status

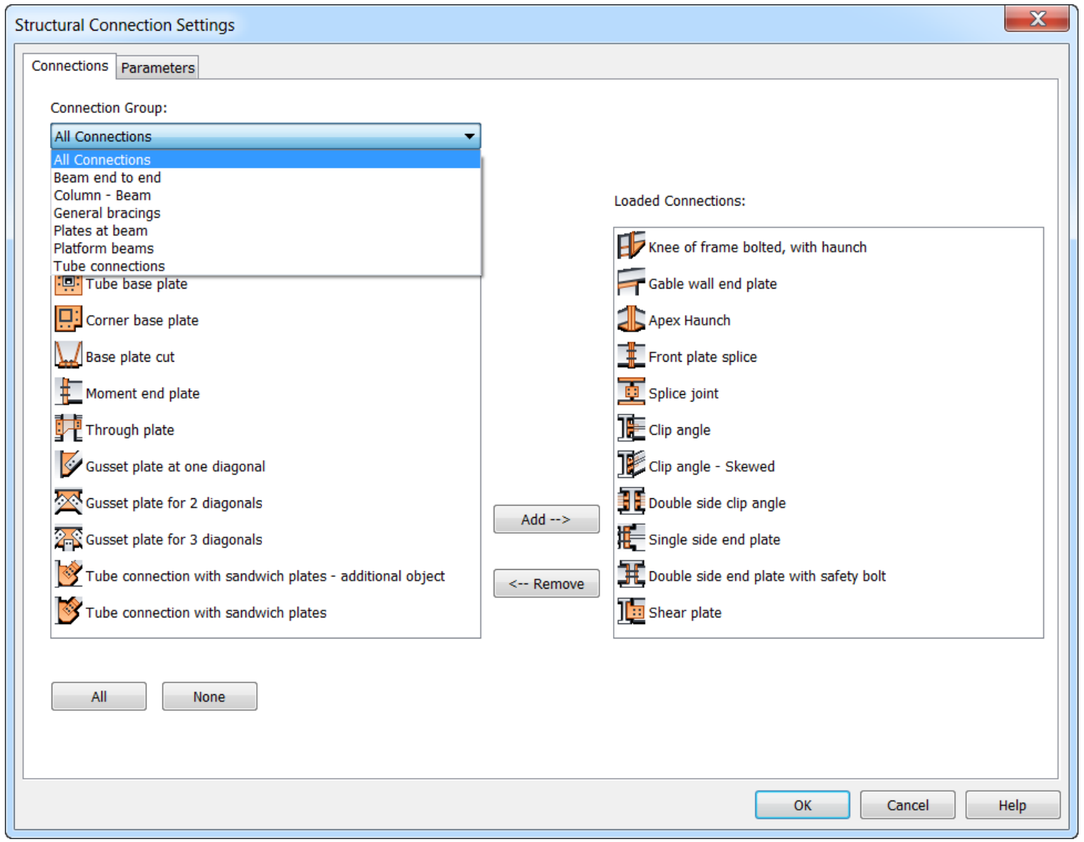
- Can be specified for each connection
- Customizable in “Structural Connection Settings”:
  - Add/delete buttons
  - E.g.
    - Approved
    - Rejected
    - Revised
- Transferred to Autodesk Advance Steel ®
  - with the SMLX file format

You can create a schedule of steel connections.



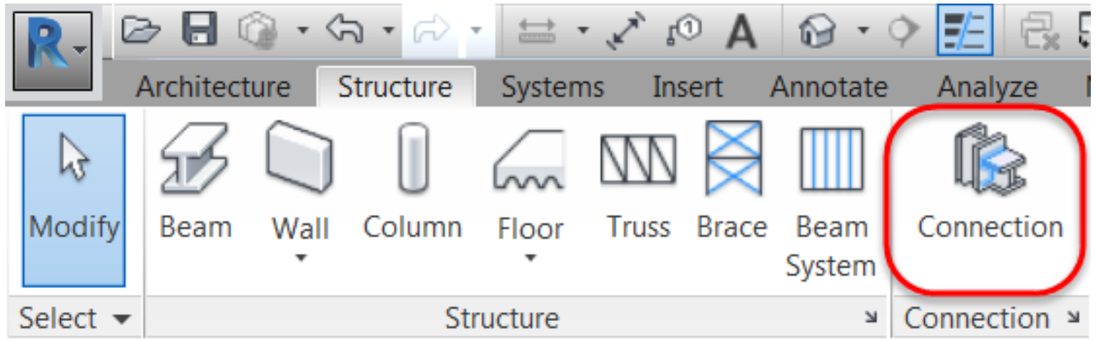
Steel connections – Different types

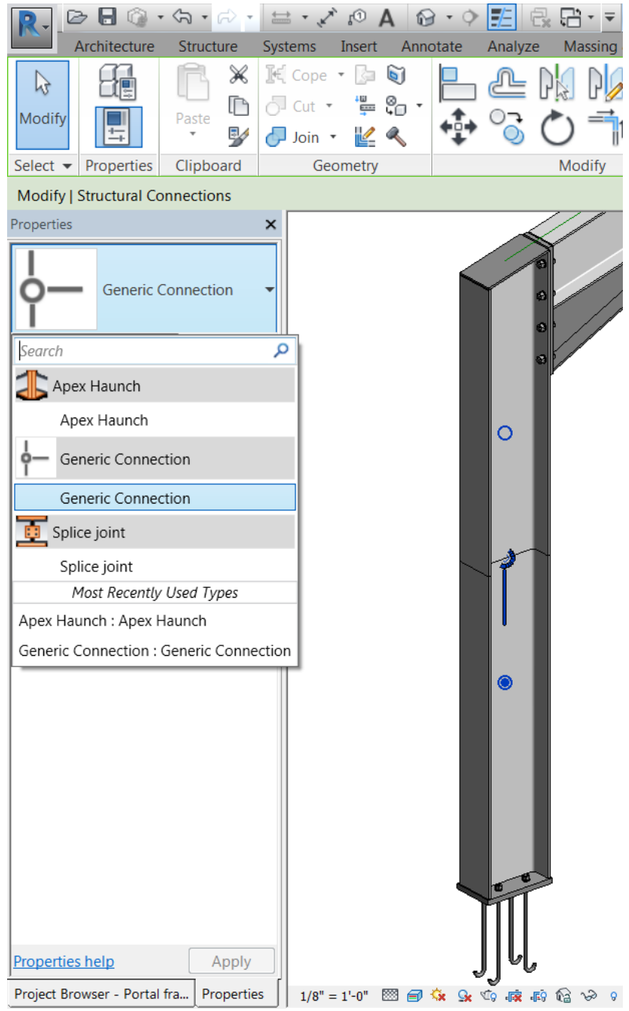
- The Autodesk ® Steel Connections for Revit ® offers 22 parametric steel connections available in 6 groups:
  - Base plate connections
  - Column – beam
  - Beam – beam
  - Platform beams
  - General bracings
  - Tube connections



Steel connections – How to insert

- Insert a steel connection:
  - Select members to be connected
  - Go to Structure tab, Connection button
  - Select one of the steel connections

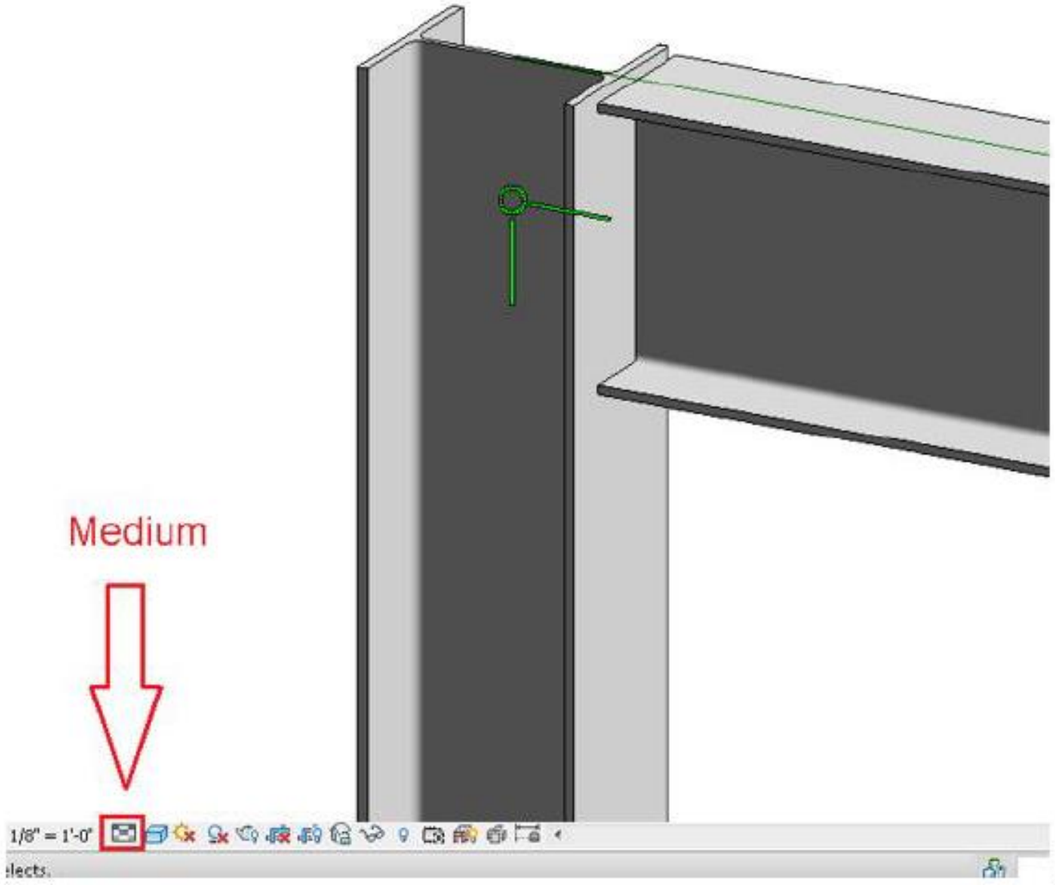


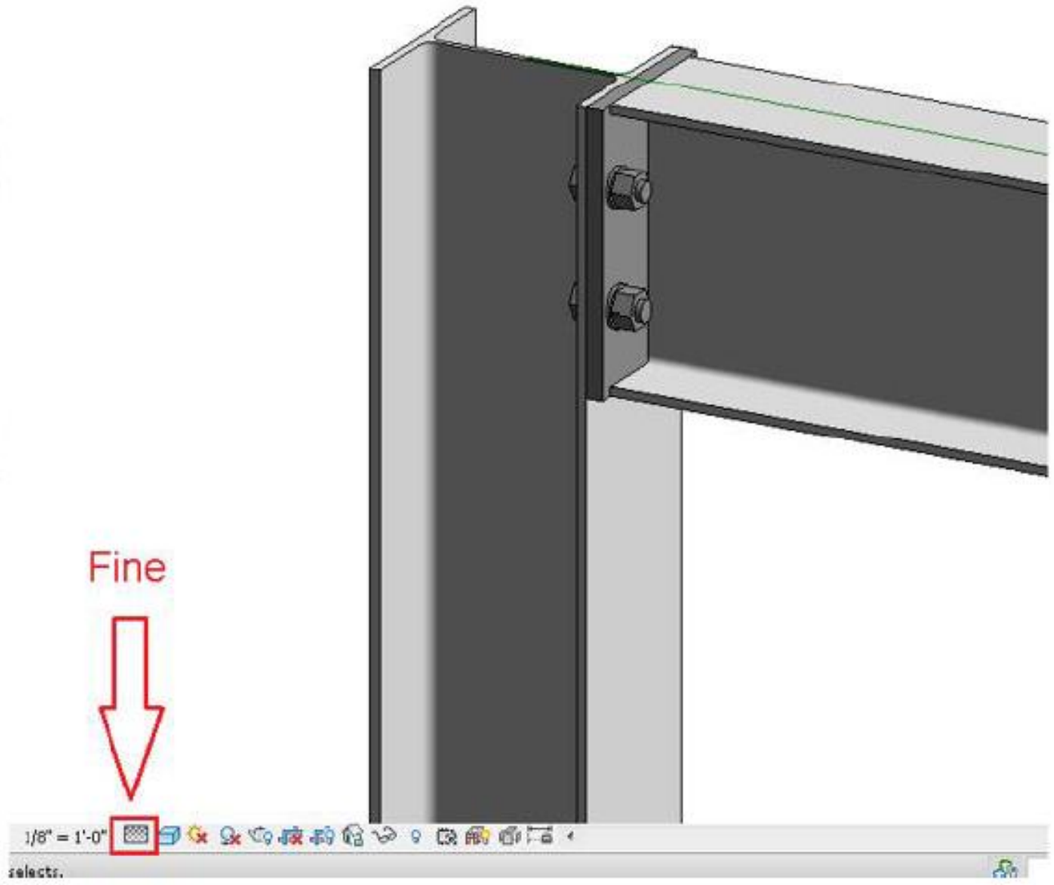


Important: steel connections can only be inserted on new structural framing families

Steel connections – Detail levels

Different display at Medium vs Fine detail levels:

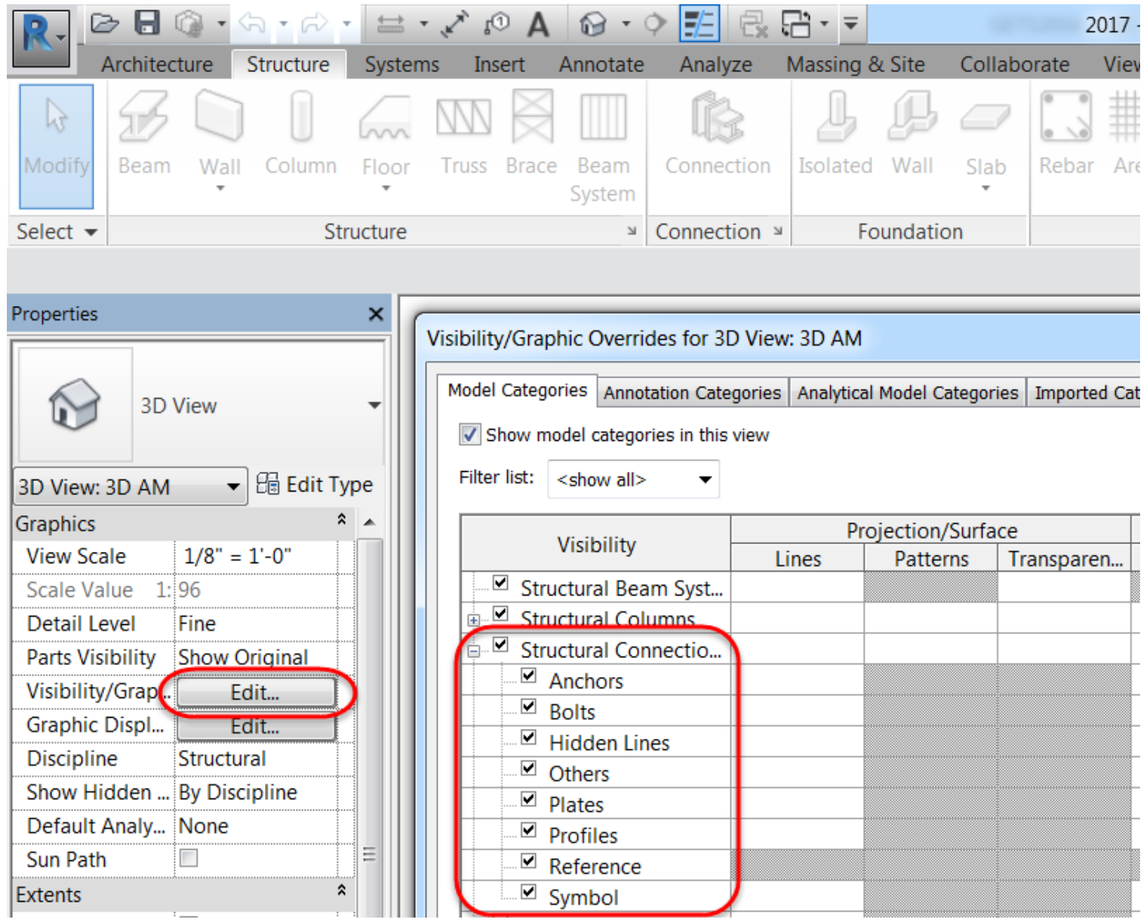




Steel connections – Visibility & Display

Control the visibility and graphic of steel connections model objects

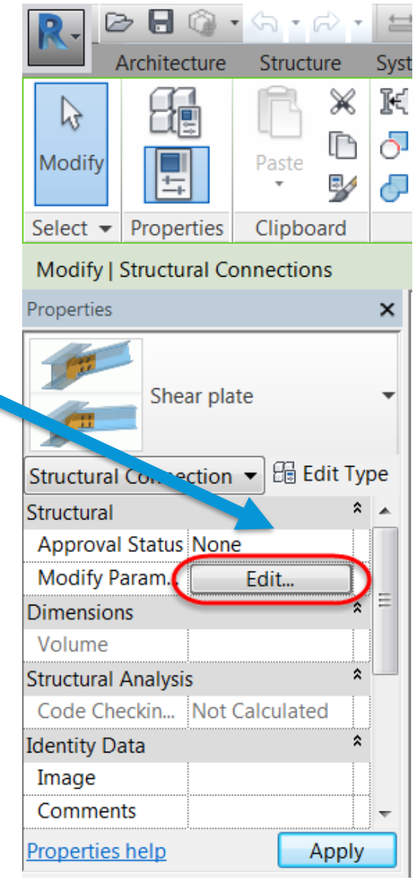
- Visibility/Graphics Overrides dialog
- Structural Connection category
- Specific sub-categories:
  - Anchors
  - Bolts
  - Hidden lines
  - Others
  - Plates
  - Profiles
  - Reference
  - Symbol



Steel connections – Modification

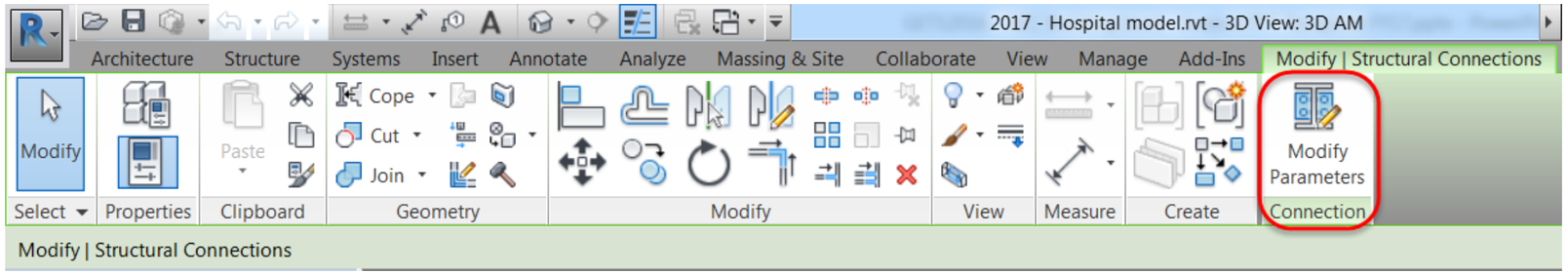
In the Properties panel:

- Modify parameters > Edit button



In the Ribbon:

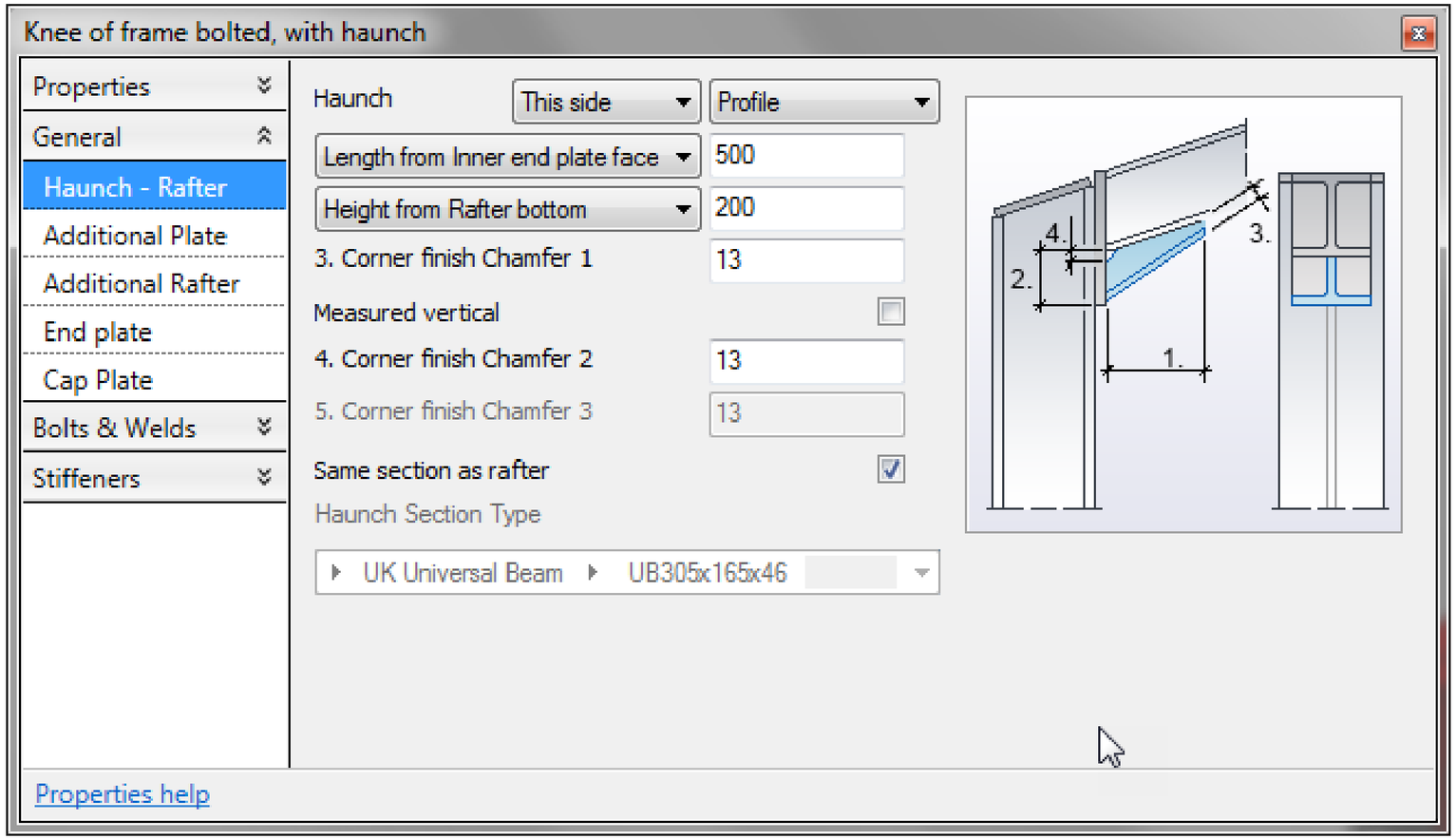
- Modify | Structural Connections > Modify parameters button



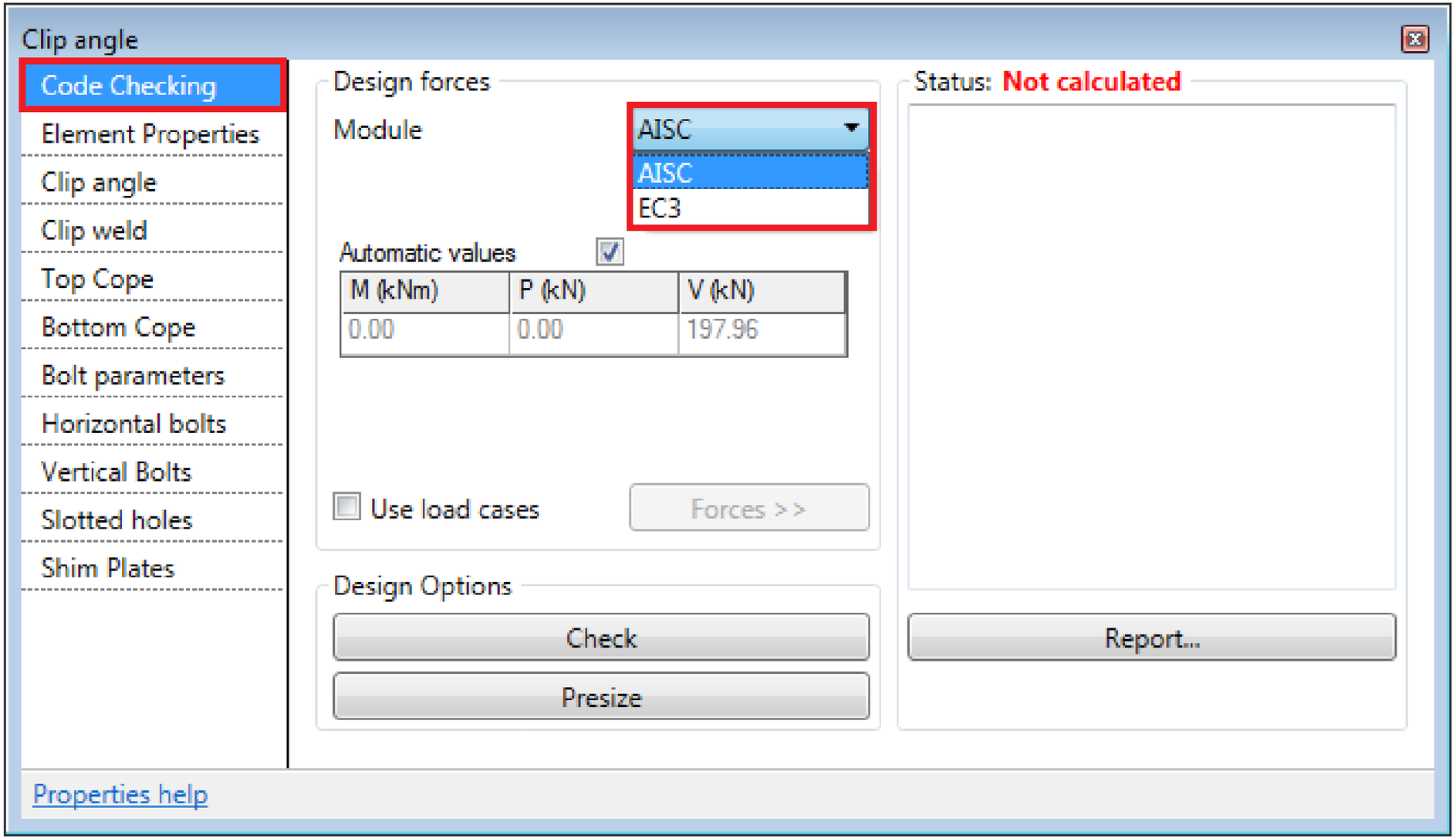
<u>Important</u>: multi-edit is not available with steel connections

Steel connections – Modification

Modify parameters adjacent to Advance Steel dialogues

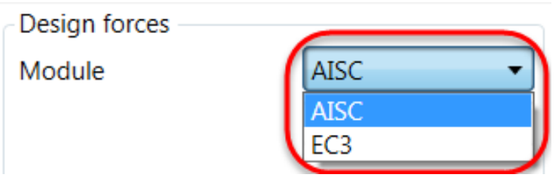


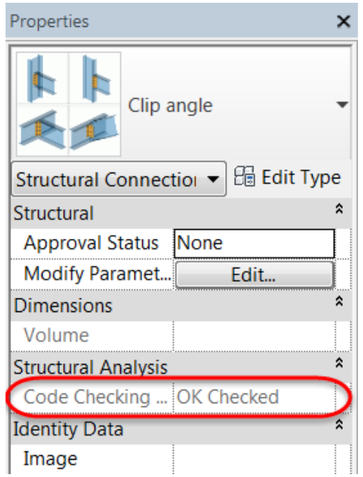
Autodesk® Steel connections – Code checking

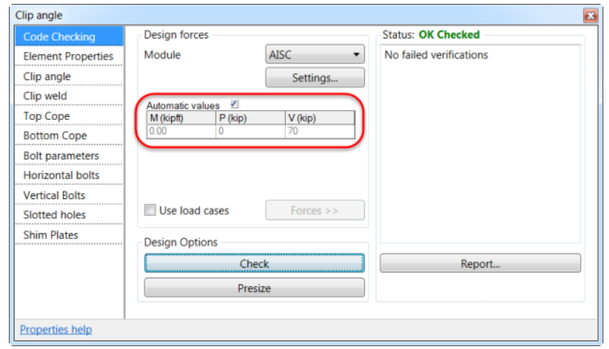


Autodesk® Steel connections – Code checking

- AISC/EC3:
  - Check steel connections according to these standards
- Settings menu:
  - Options that control the report content
- Forces and moment used
  - Automatic values or Use load cases or Values entered manually
- Check or presize:
  - Choose if you want to verify or run an iterative process
- Code checking status:
  - Not calculated, Checking failed, OK Checked
- Generating a report:
  - Creates a document displaying all the verifications done



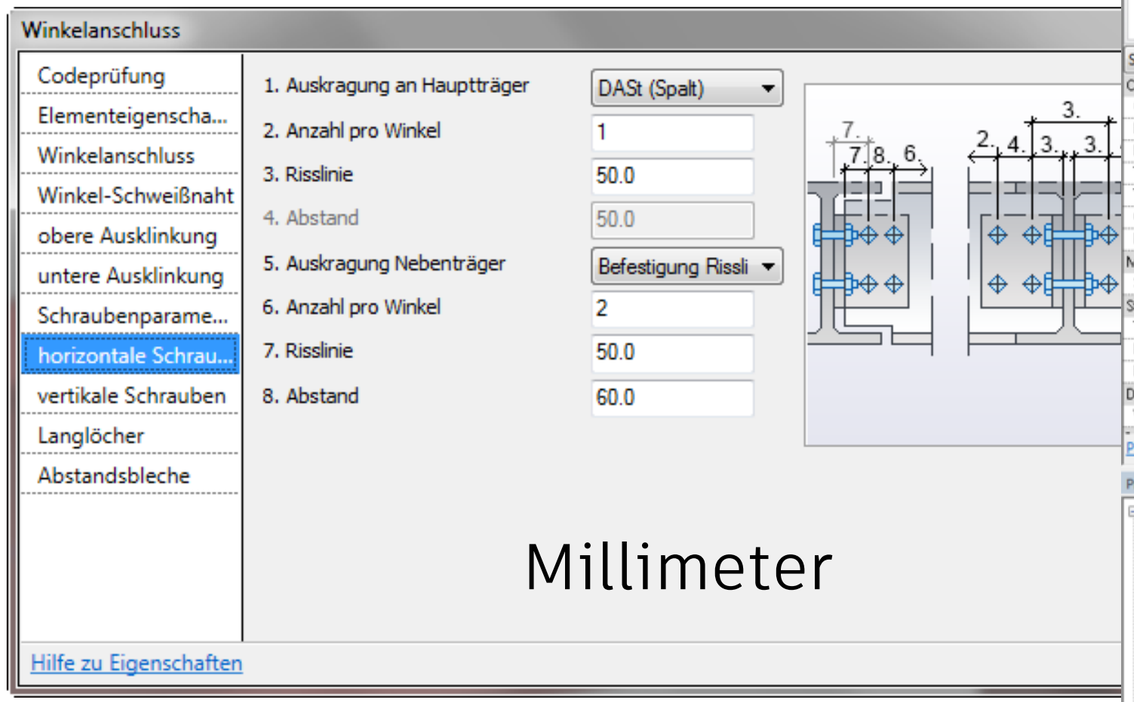




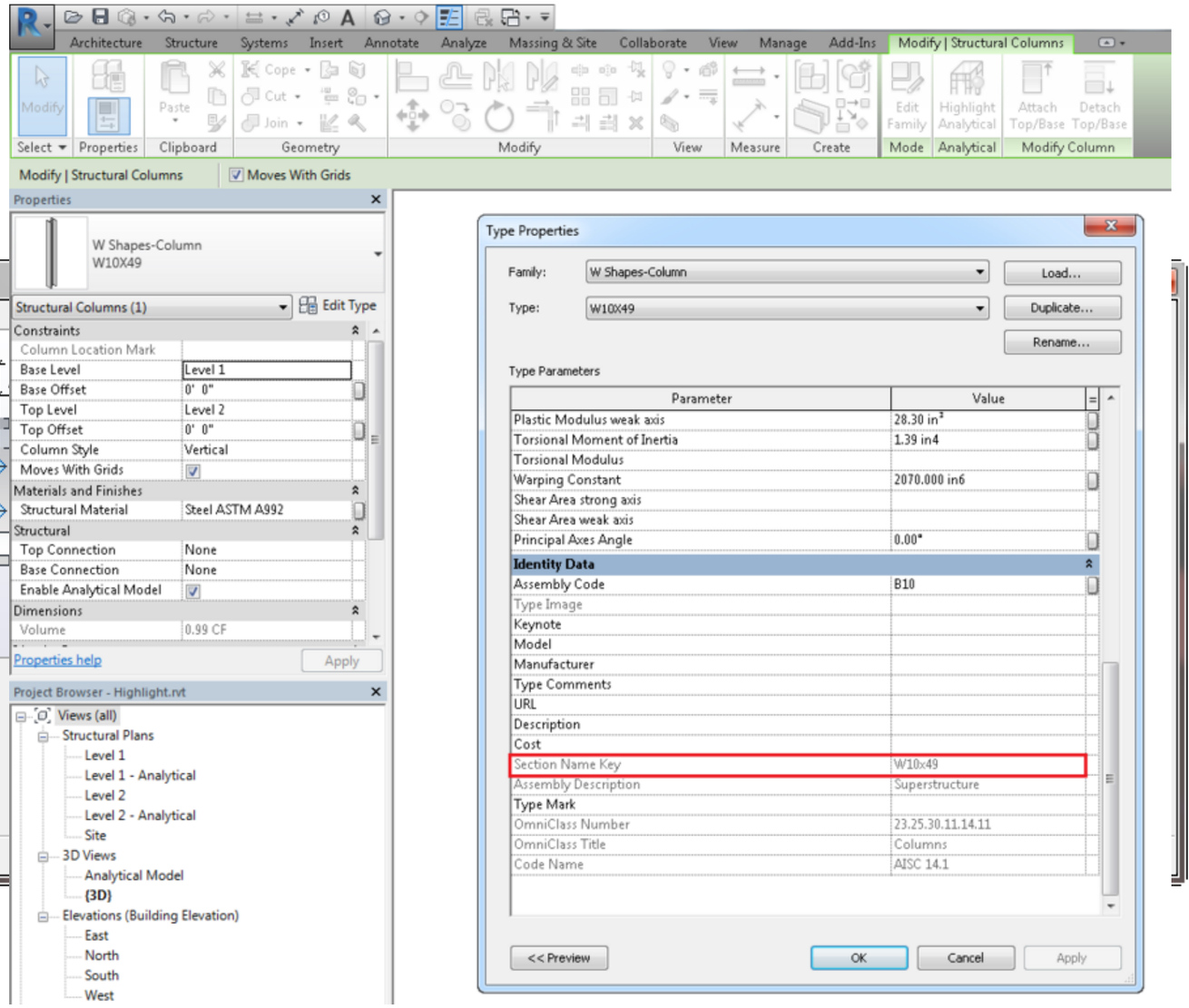
Best practices for steel connections and the extension

Revit 2017 – Best practices

- Use „correct“ template
- UI-language of Revit

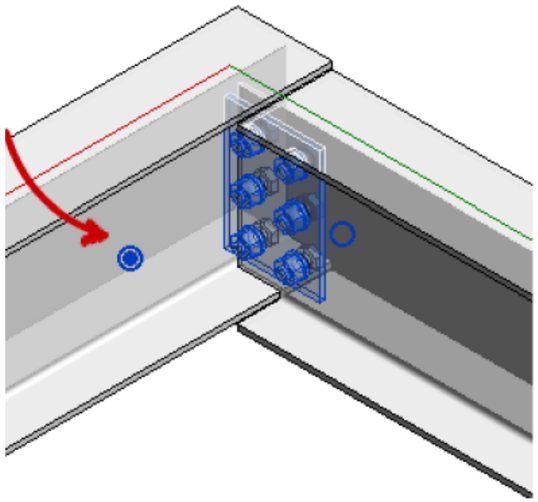


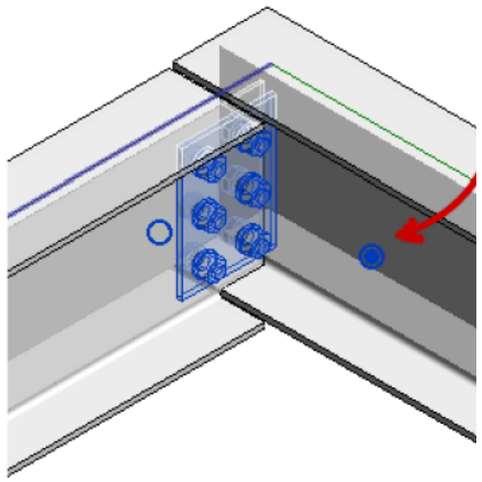
Millimeter

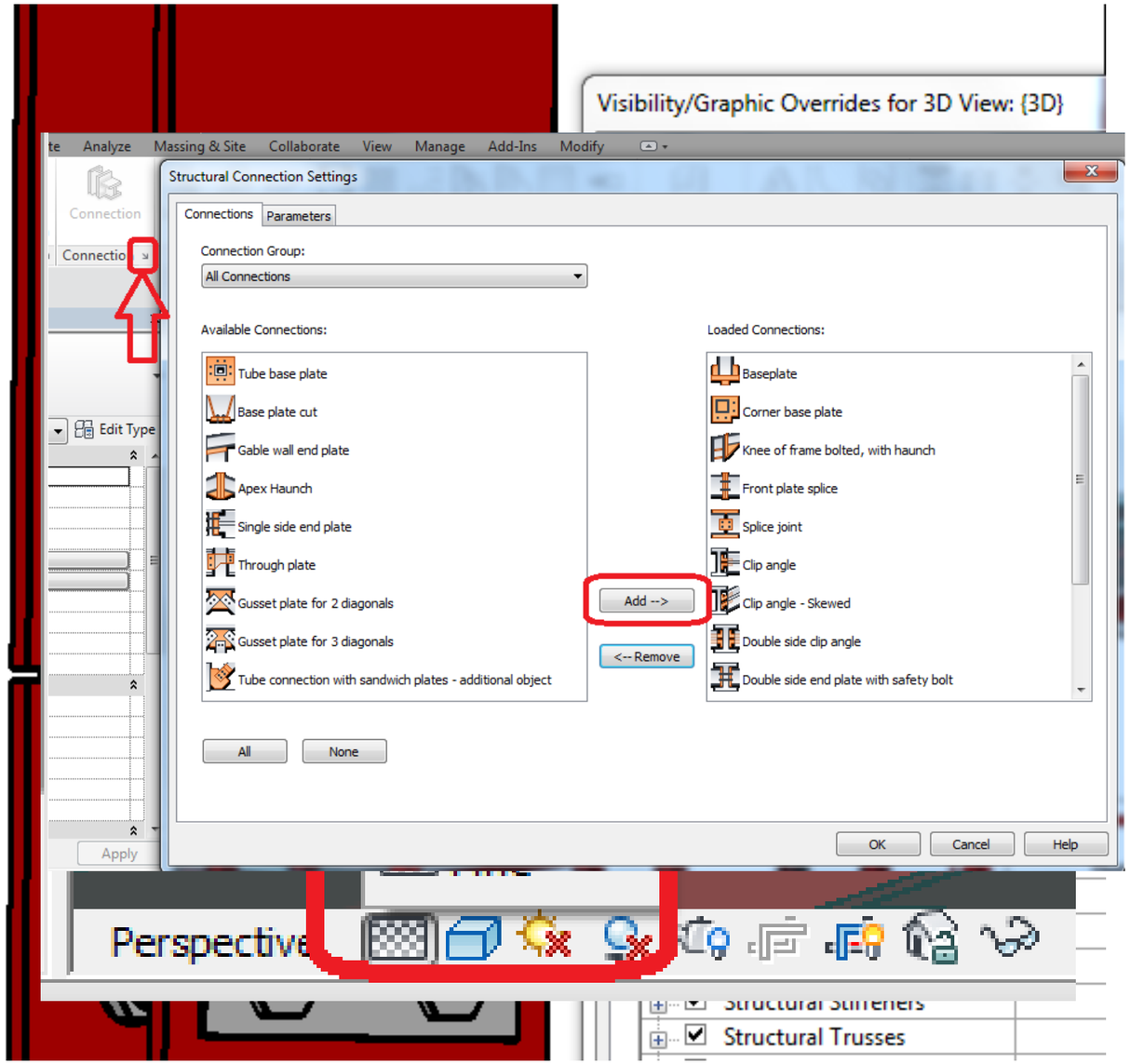


Revit 2017 – Best practices

- Correct view settings?
- Fine view?
- Connections added?
- Main framing element

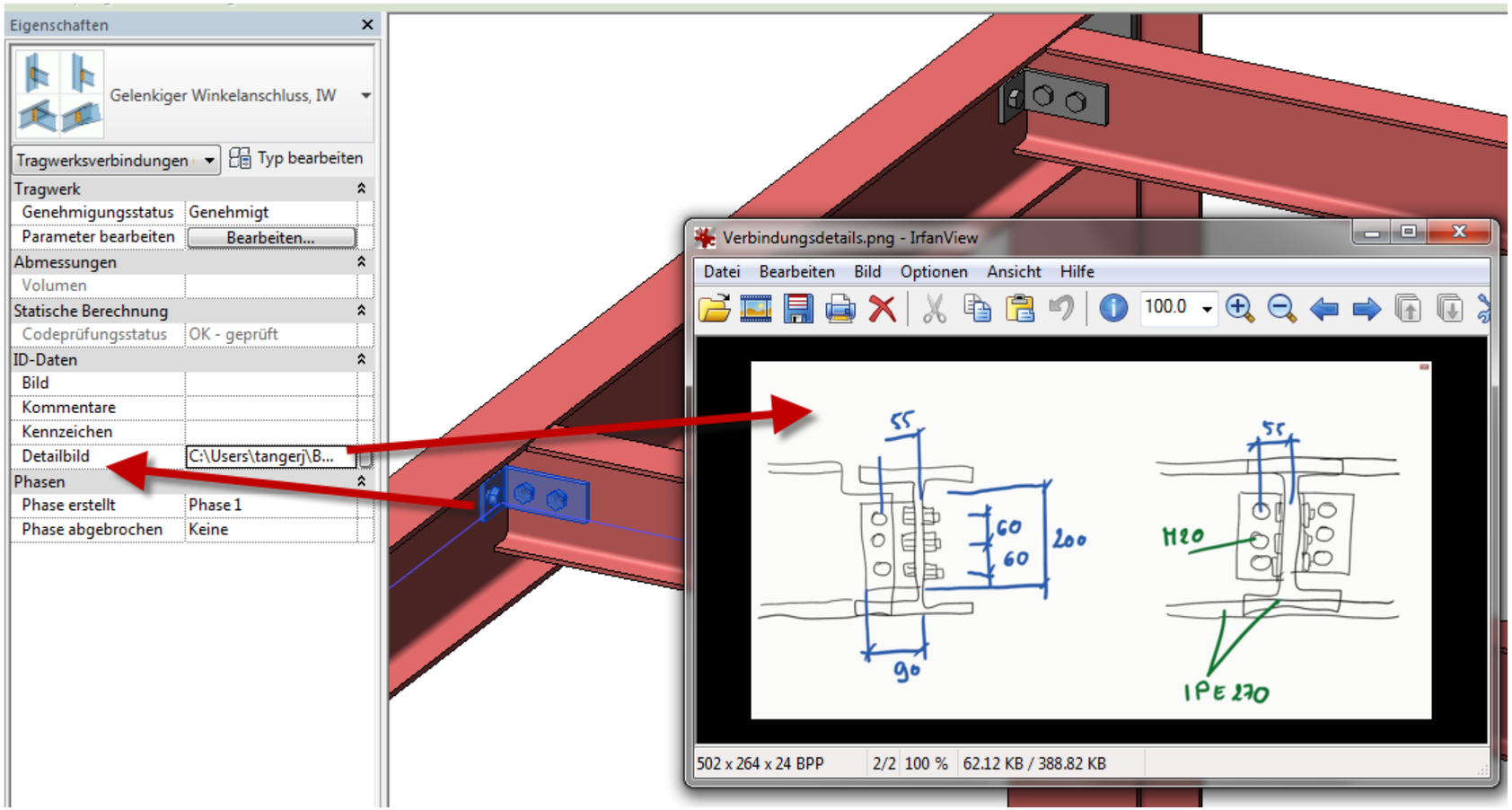






Revit 2017 – Best practices

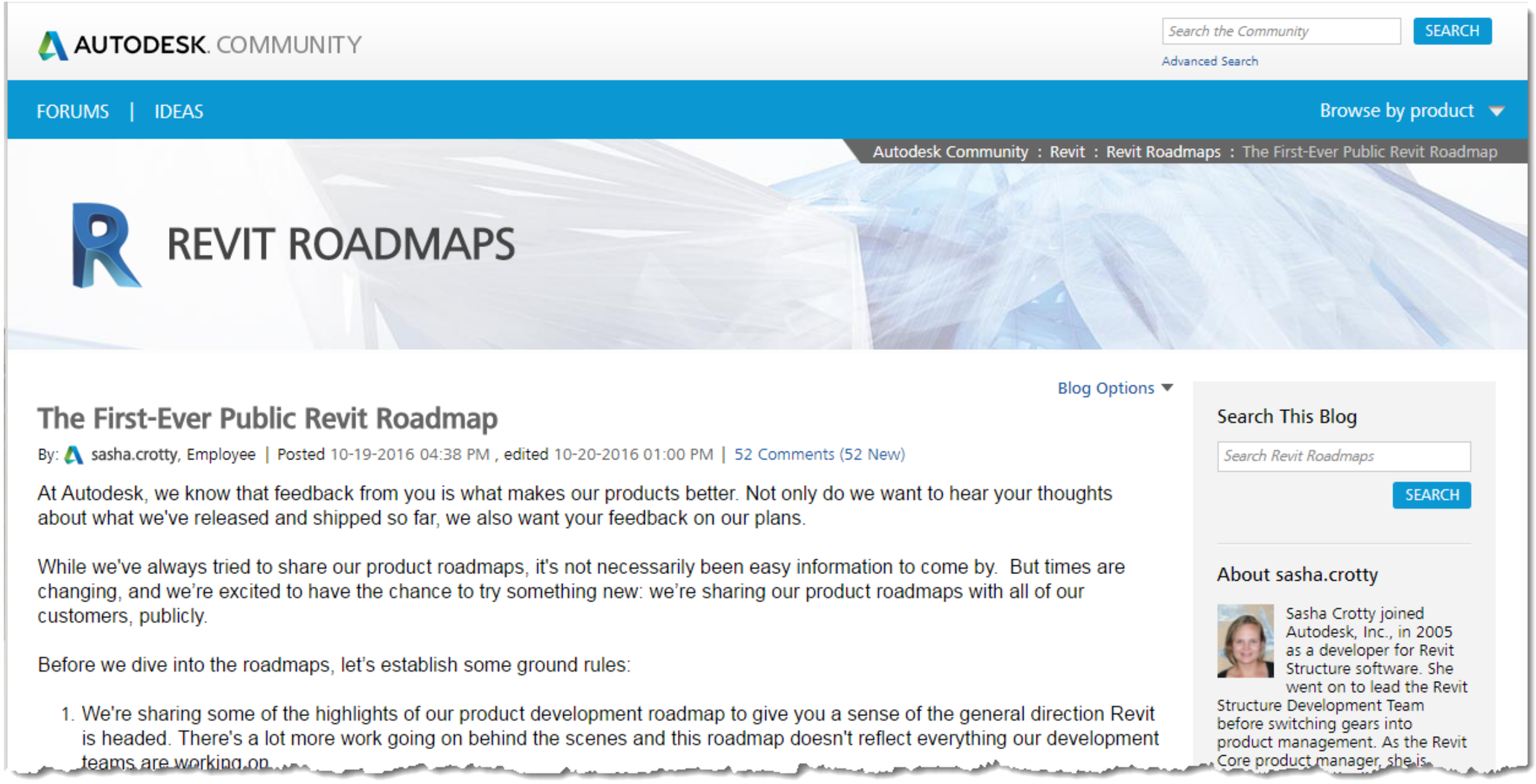
- Detail pictures inserted with URL parameter?



Steel connections outlook

Revit Roadmaps

http://forums.autodesk.com/t5/revit-roadmaps/the-first-ever-public-revit-roadmap/ba-p/6633199



Revit Roadmaps

http://forums.autodesk.com/t5/revit-roadmaps/the-first-ever-public-revit-roadmap/ba-p/6633199

STRUCTURE

This part of the roadmap is focused on structural workflows from Design to Fabrication, supporting the key construction methods for Steel, Reinforced Concrete, and Precast Concrete.

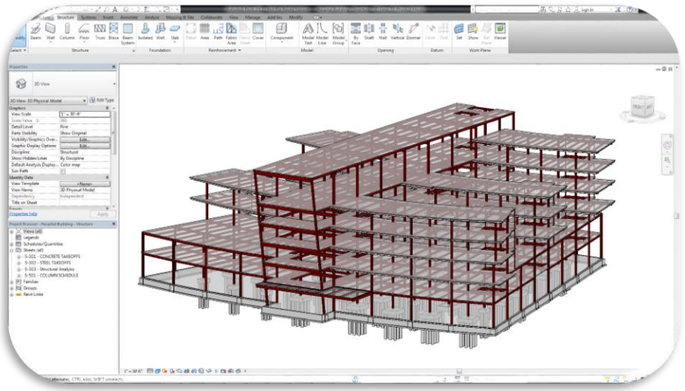
In this space, Revit is considered as a multi-material modeling and documentation authoring environment to capture both Design-intent and Fabrication execution as appropriate.

Create	Extend	Optimize
More Steel Connections	IFC Export for Detailed Steel Models	Steel Connections Automation

Connection exchange with Advance Steel

Workflow

AUTODESK® REVIT®



- Design your structure
- Use parametric components and families
- Create steel connections
- Advance Steel Plug-in for Revit

Advance Steel 2017 Extension ★★★★★ (2)

OS: Win64

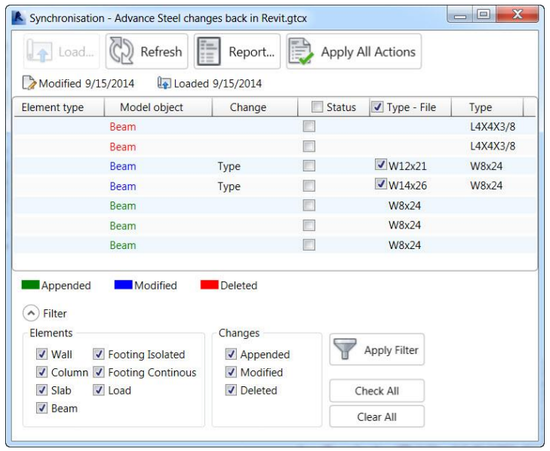
Advance Steel 2017 Extension enables BIM data exchange between Autodesk® Revit® 2017 and Advance Steel 2017, through a complete set of functionalities like import, export or synchronize.

Free

Export / Import

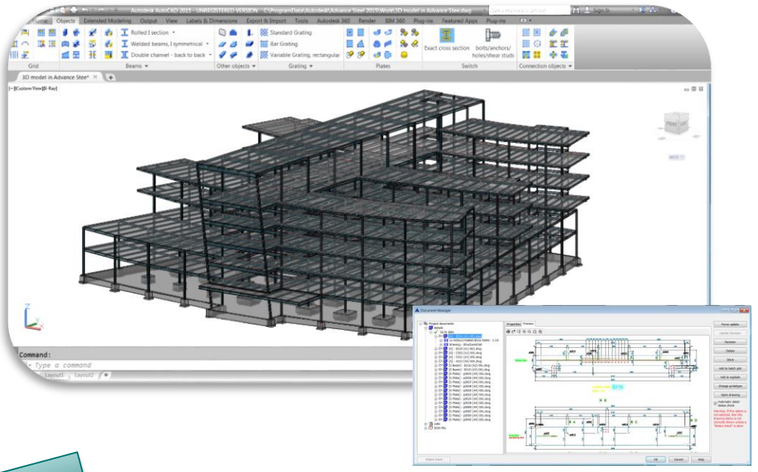
SMLX

Synchronization



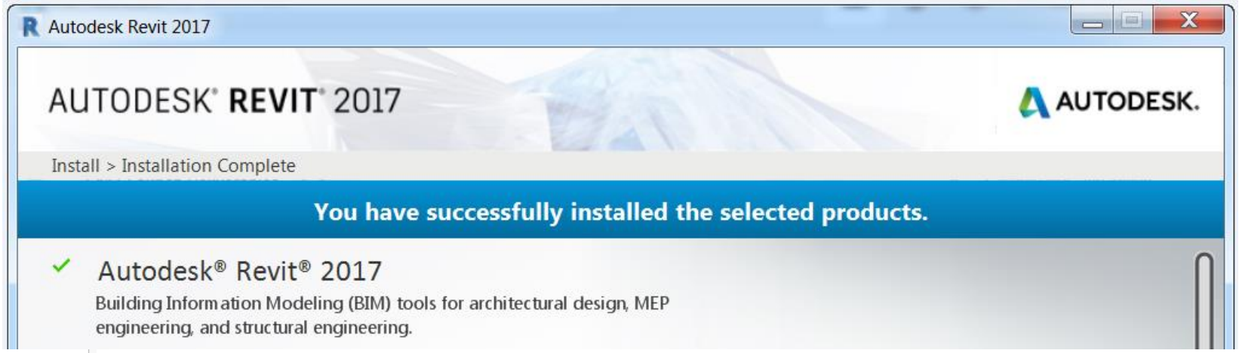
- Full control on changes
- Option to select which elements to export/import
- Automatic section & material mapping
- Detailed summary report

ADVANCE STEEL

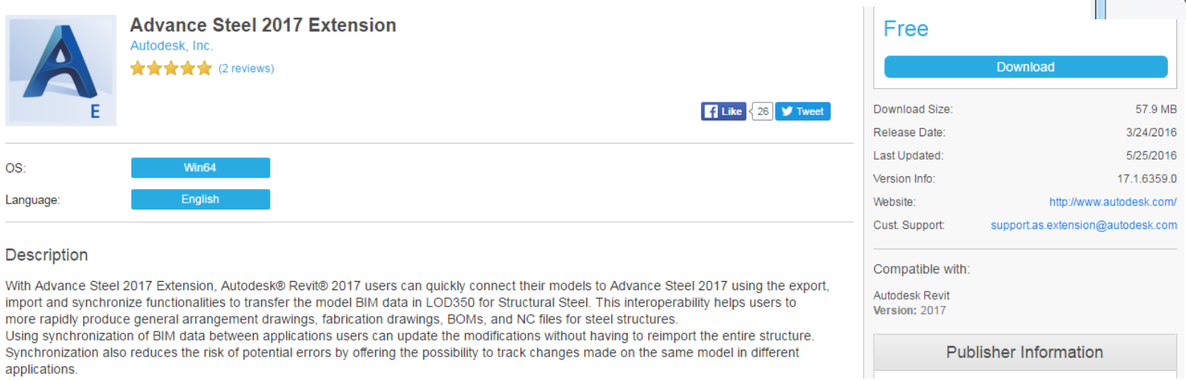


- Access to a comprehensive library of steel connections
- Get shop drawings, BOMs and CNC
- Integrated revision control

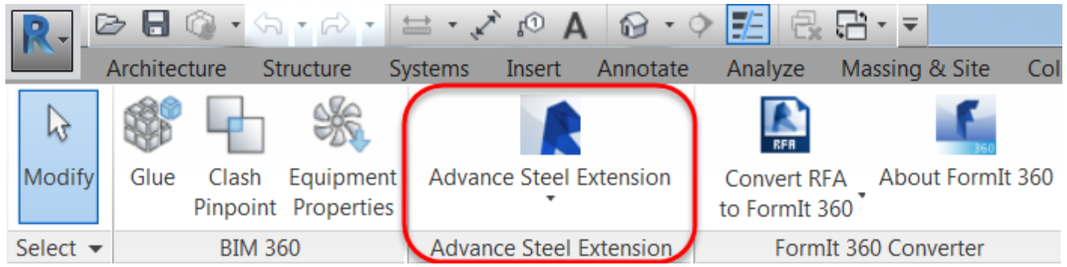
Advance Steel® Extension – How to get it



1 - Install Autodesk Revit ® 2017



2 – Download Autodesk Advance Steel ® 2017 Extension from Autodesk ® Apps Store & install it



3 – Find “Advance Steel Extension” in “Add-Ins” tab

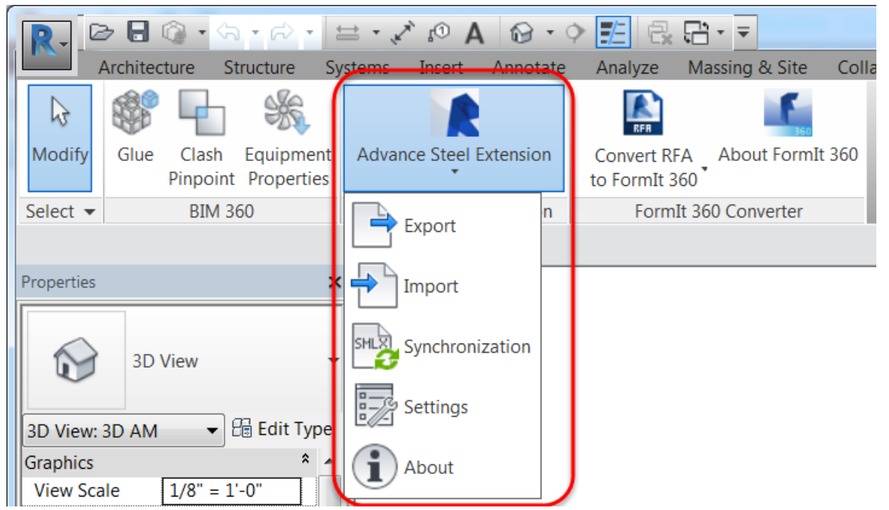
Autodesk Advance Steel® Extension 2017

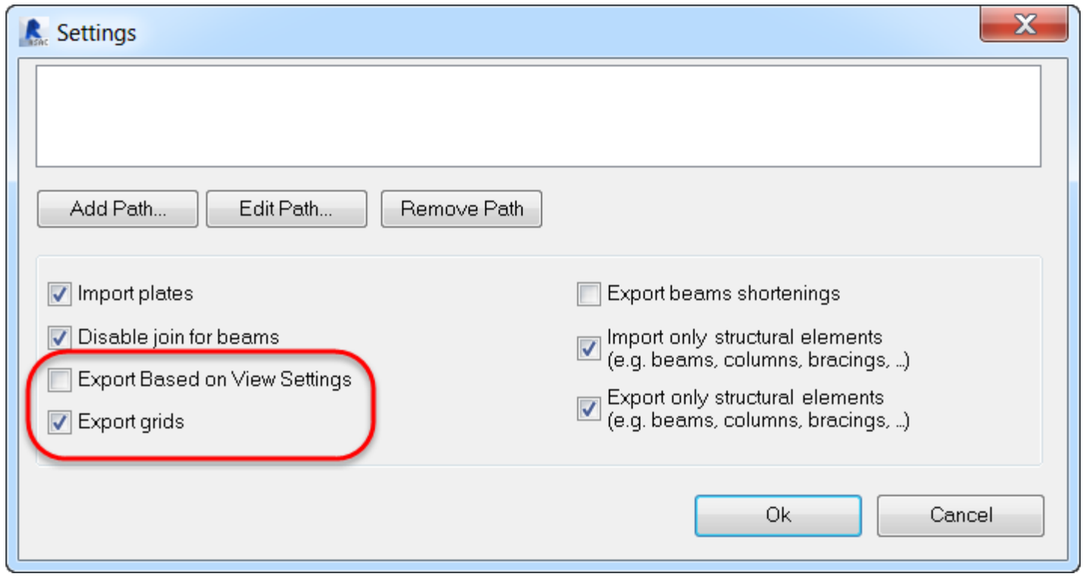
- Sections automatically mapped between Autodesk Revit® and Autodesk Advance Steel® :
  - *US Imperial*
  - *US Metric*
  - *Canada*
  - *UK*
  - *Australia*
  - Germany
  - France
  - Poland
  - India

Country	Category	Revit - family	Advance Steel - AstorProfiles table
Europe & Germany	Structural Framing	HE-A	EXT_HEA_DIN18800-1
	Structural Framing	HE-AA	EXT_HEAA_DIN18800-1
	Structural Framing	HE-B	EXT_HEB_DIN18800-1
	Structural Framing	HE-C	EXT_HEM_DIN18800-1
	Structural Framing	HE-M	EXT_HEM_DIN18800-1
	Structural Framing	Bisected HE-A	EXT_HEA_half_DIN18800-1
	Structural Framing	Bisected HE-B	EXT_HEB_half_DIN18800-1
	Structural Framing	Bisected HE-M	EXT_HEM_half_DIN18800-1
	Structural Framing	IPE	EXT_IPE_DIN18800-1
	Structural Framing	IPE750	EXT_IPEovsa_DIN18800-1
	Structural Framing	IPEa	EXT_IPEovsa_DIN18800-1
	Structural Framing	IPEo	EXT_IPEovsa_DIN18800-1
	Structural Framing	IPEv	EXT_IPEovsa_DIN18800-1
	Structural Framing	Bisected IPE	EXT_IPE_half_DIN18800-1
	Structural Framing	Bisected IPEa	EXT_IPEovsa_half_DIN18800-1
	Structural Framing	Bisected IPEo	EXT_IPEovsa_half_DIN18800-1
	Structural Framing	Bisected IPEv	EXT_IPEovsa_half_DIN18800-1
	Structural Framing	I	EXT_I_DIN18800-1
	Structural Framing	IPN	EXT_IPN
	Structural Framing	HD	EXT_HD_DIN18800-1
	Structural Framing	Equal L	EXT_Angle_eq_DIN18800-1
	Structural Framing	Unequal L	EXT_Angle_uneq_DIN18800-1
	Structural Framing	U	EXT_Channels_DIN18800-1
	Structural Framing	UAP	EXT_UAP_Section
	Structural Framing	UPE	EXT_UPE_Section
	Structural Framing	UPN	EXT_UPN
	Structural Framing	T	EXT_T_DIN18800-1

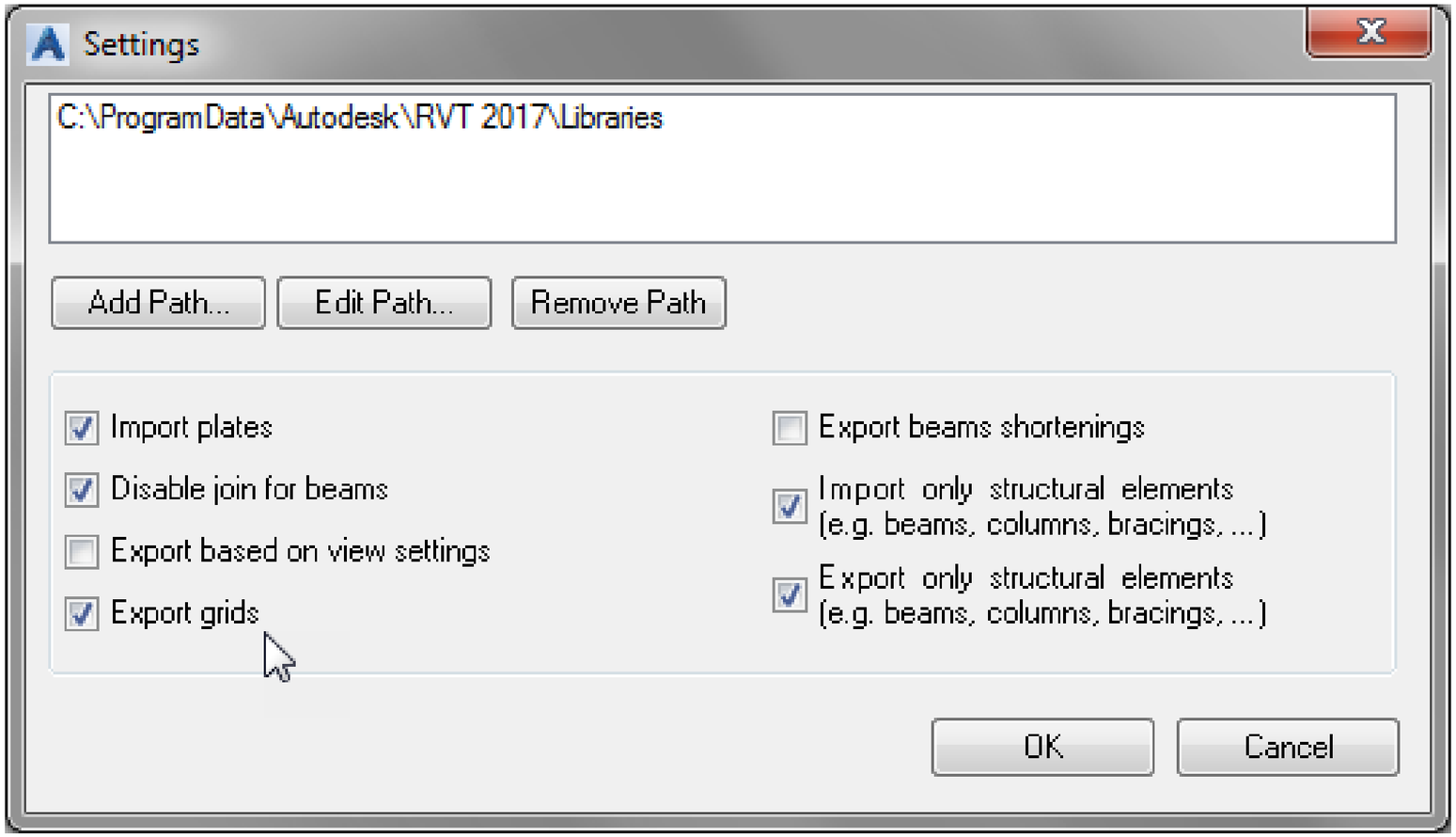
Autodesk Advance Steel® Extension 2017

- Grid exported with the “Export grids” option
- More flexibility to export what you want with the “Export based on view settings” option
- Synchronization dialog uses the project units and tolerances set in Revit
- Synchronization dialog in Revit highlights the selected objects
- Steel connections can be exported/imported/synchronized

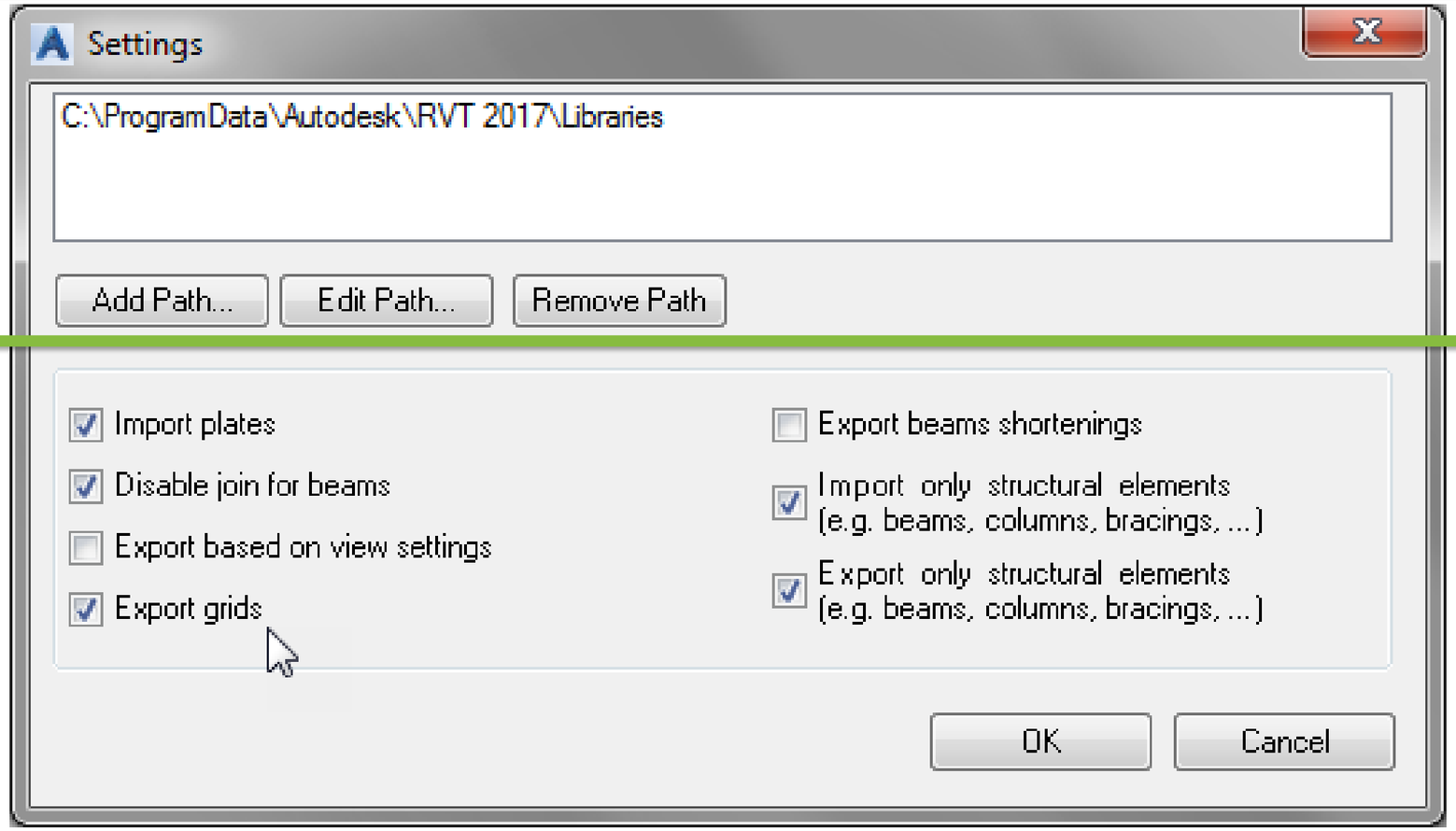




Extension - Settings



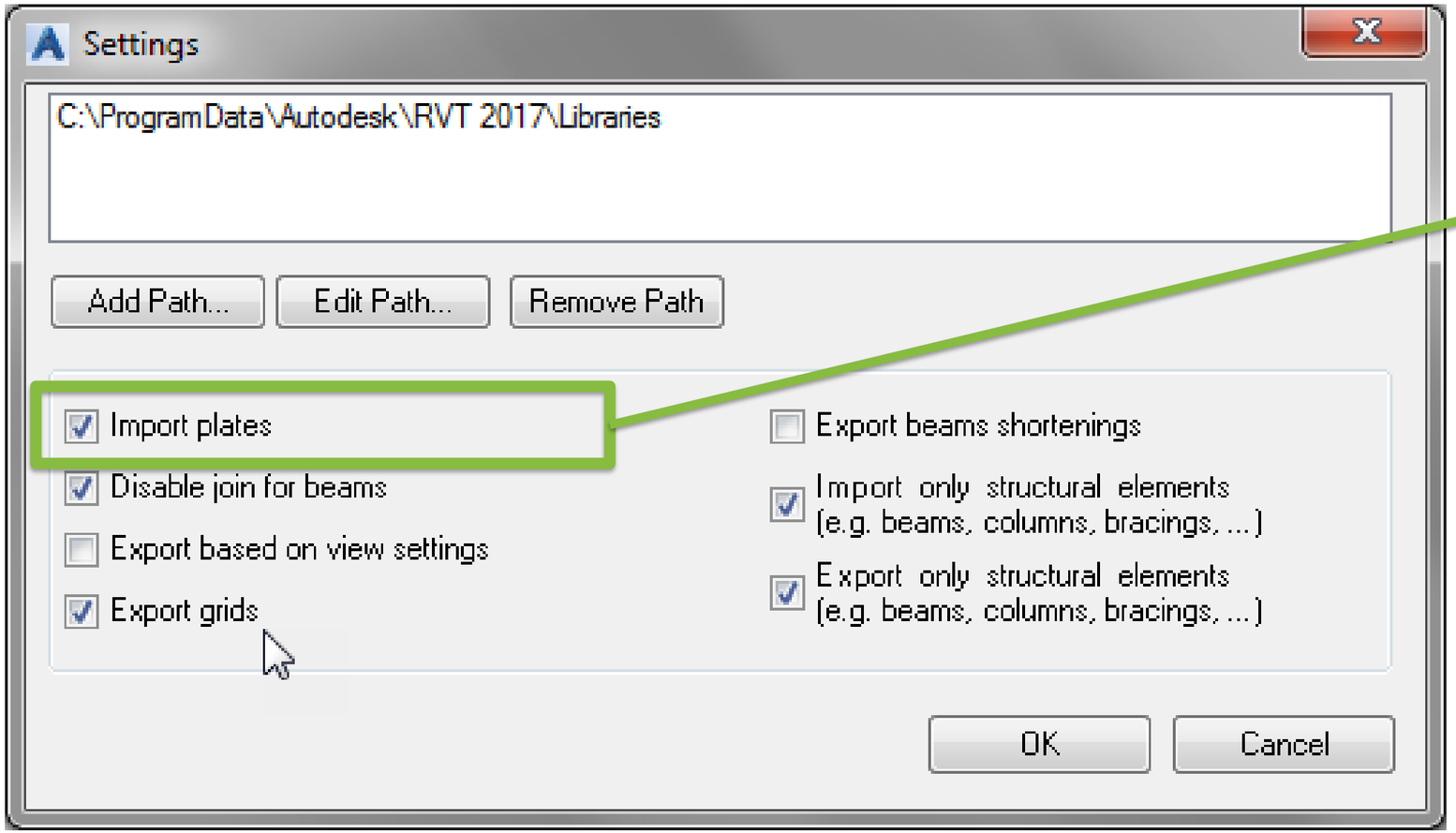
Extension - Settings



Path configuration for Revit library

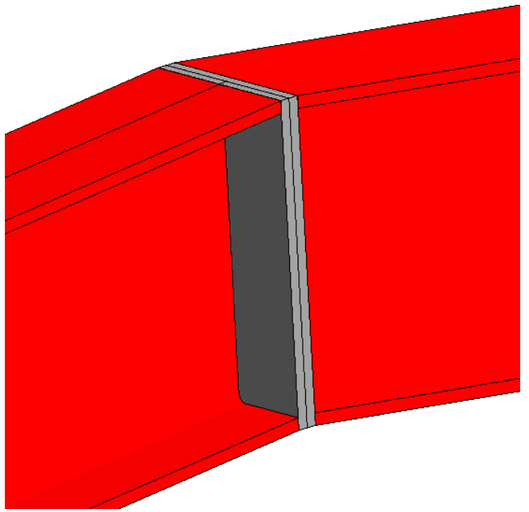
Steel section definitions

Extension - Settings

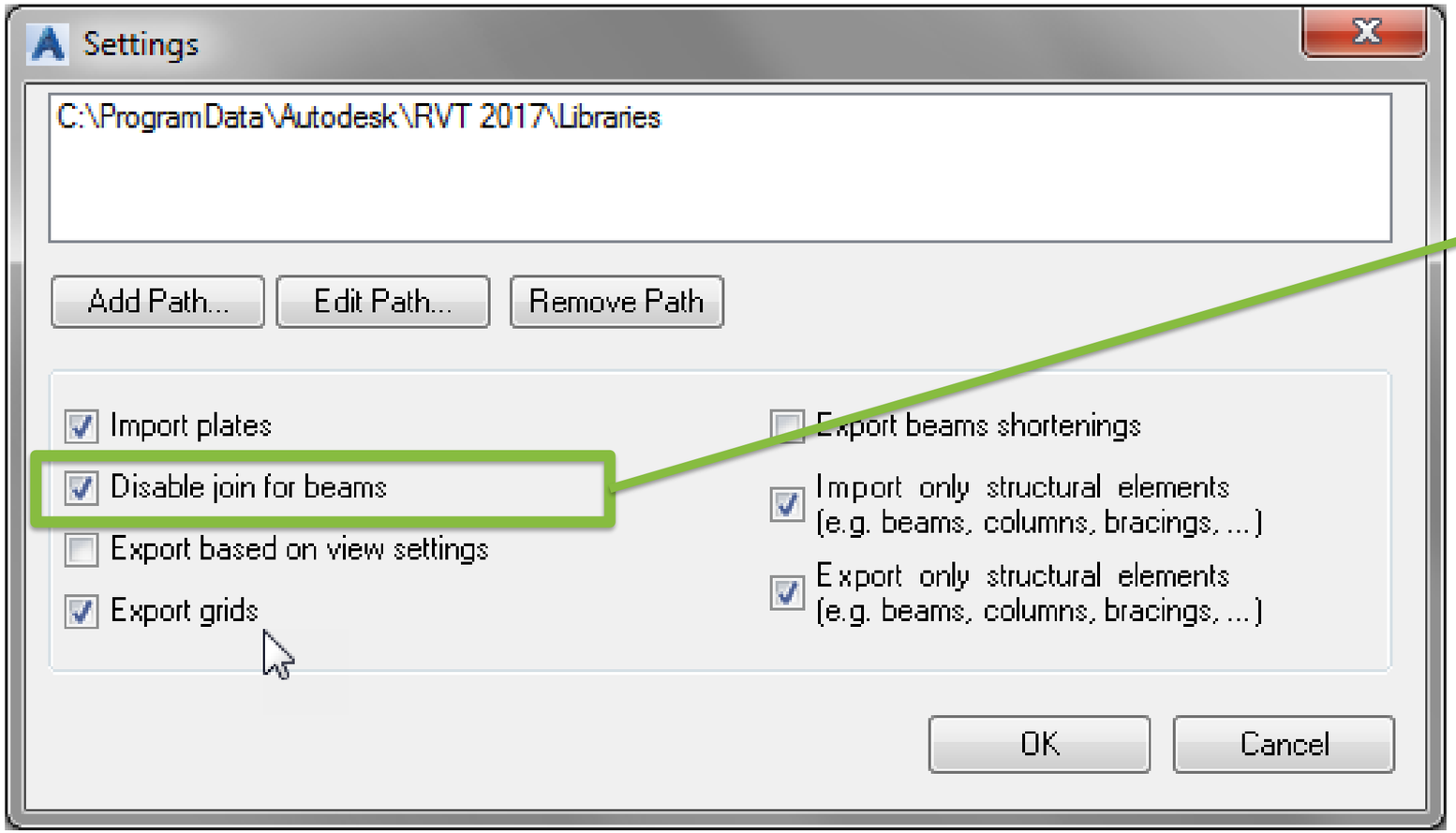


Import plates

Allows the import of Plate objects in Revit.

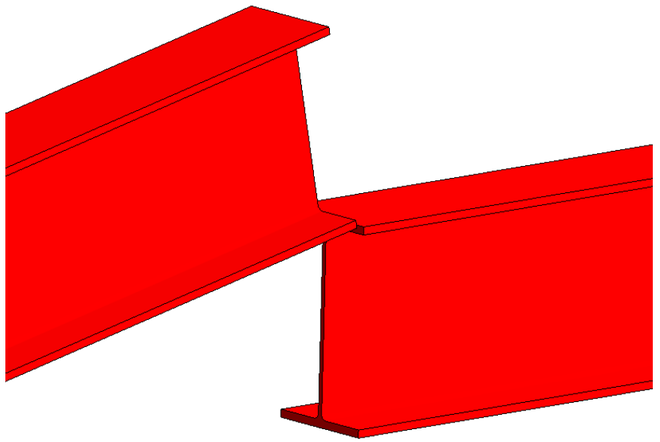


Extension - Settings

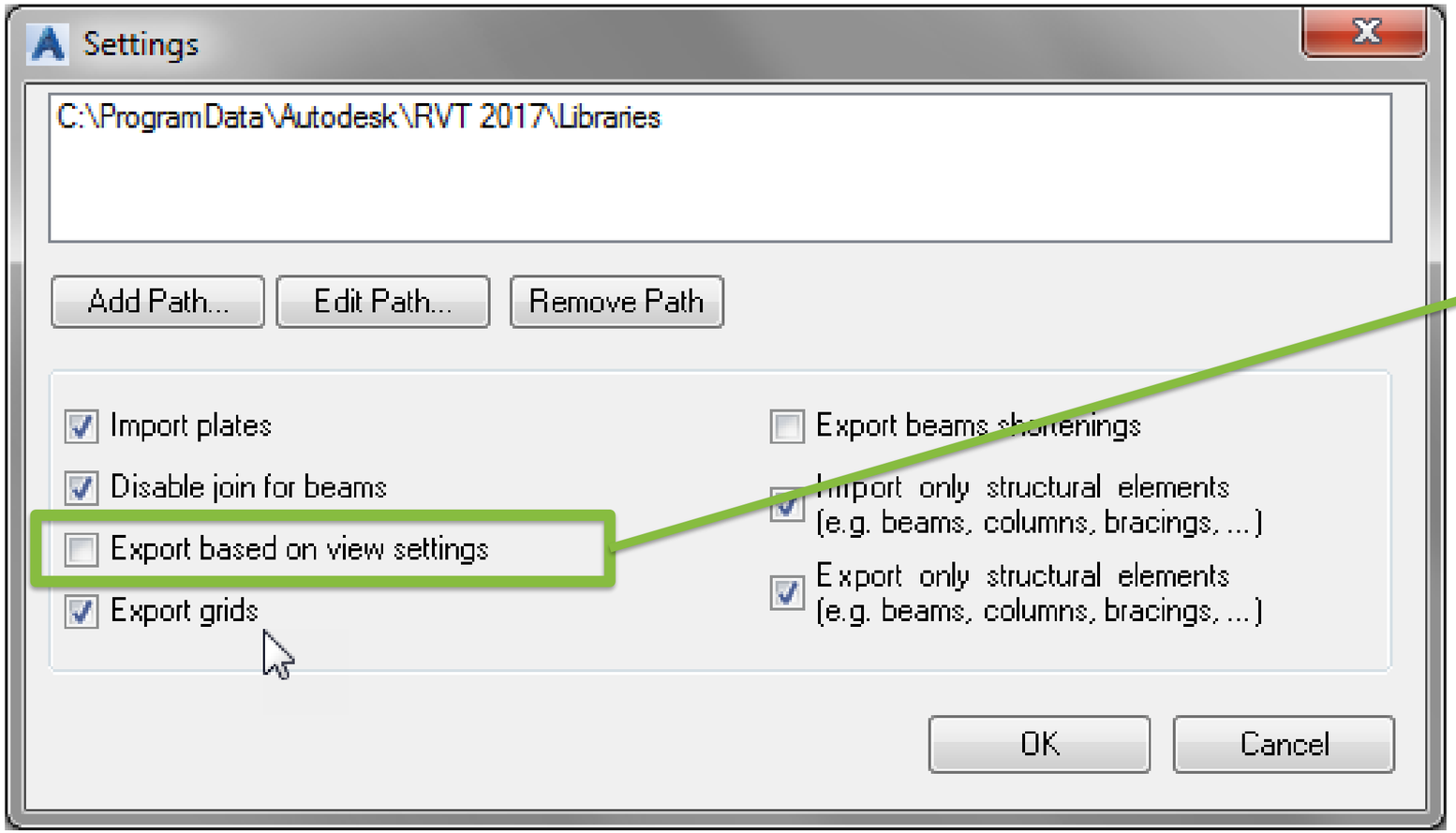


Disable join for beams

Disables the automatic Revit joint for steel beams during import



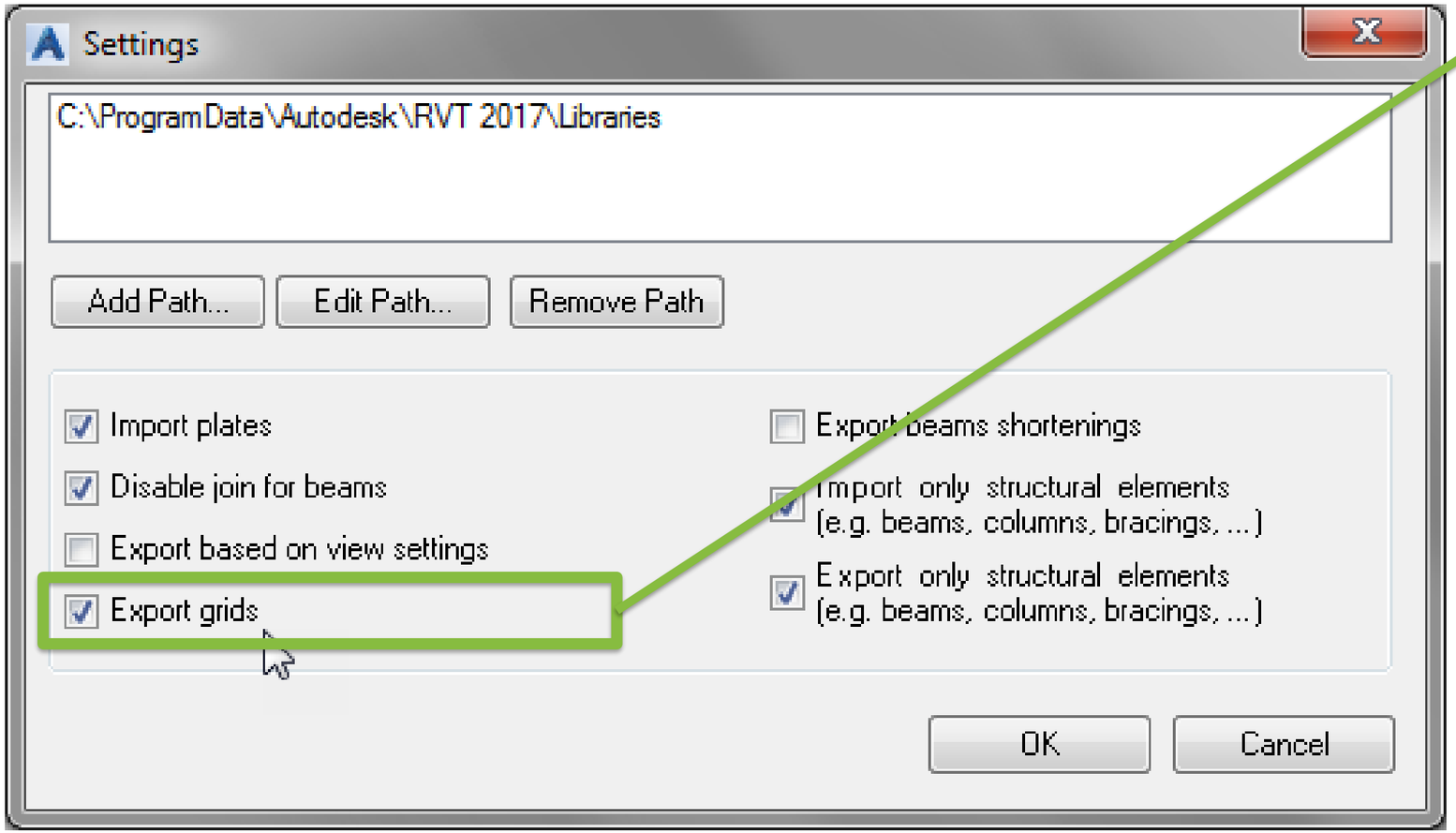
Extension - Settings



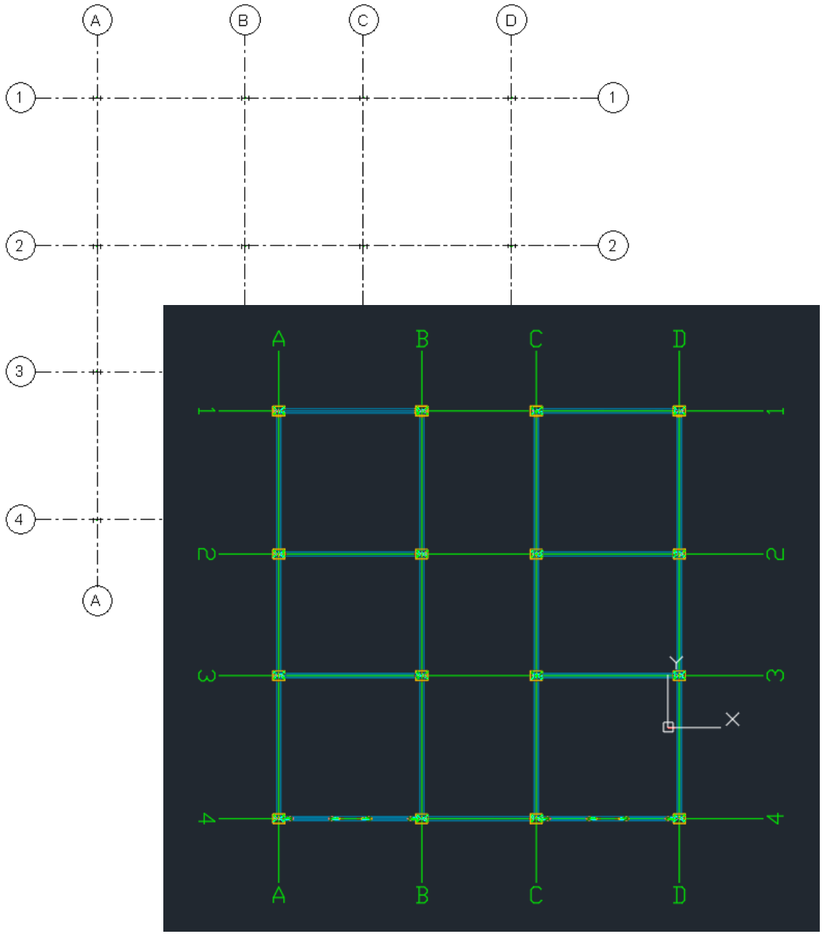
Export based on view settings

Only visible objects in view will be exported. No need to preselect objects or delete them in Advance Steel afterwards

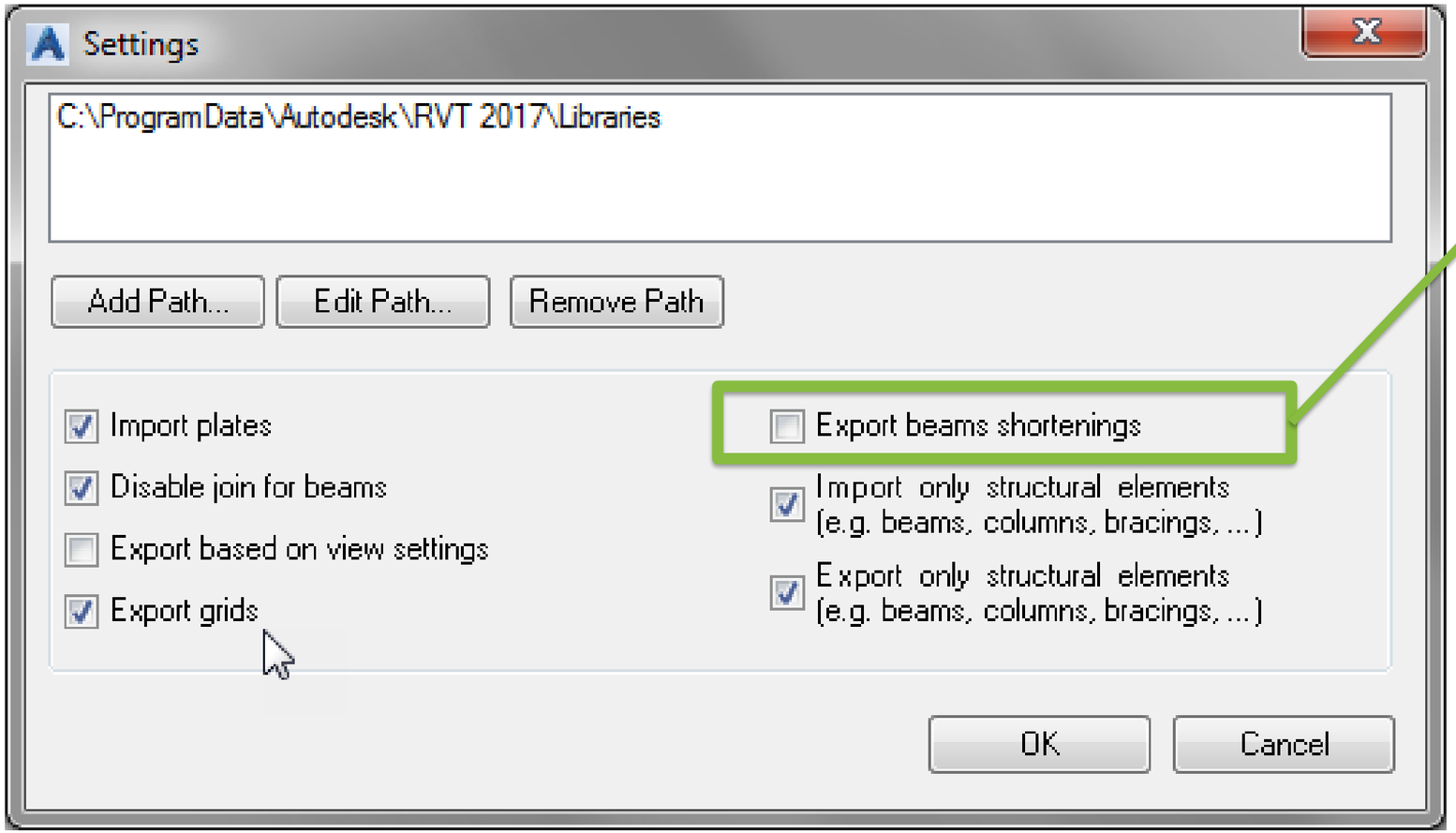
Extension - Settings



Export grids

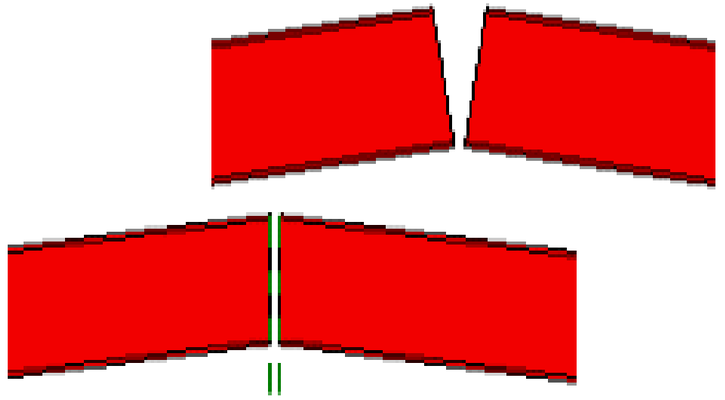


Extension - Settings

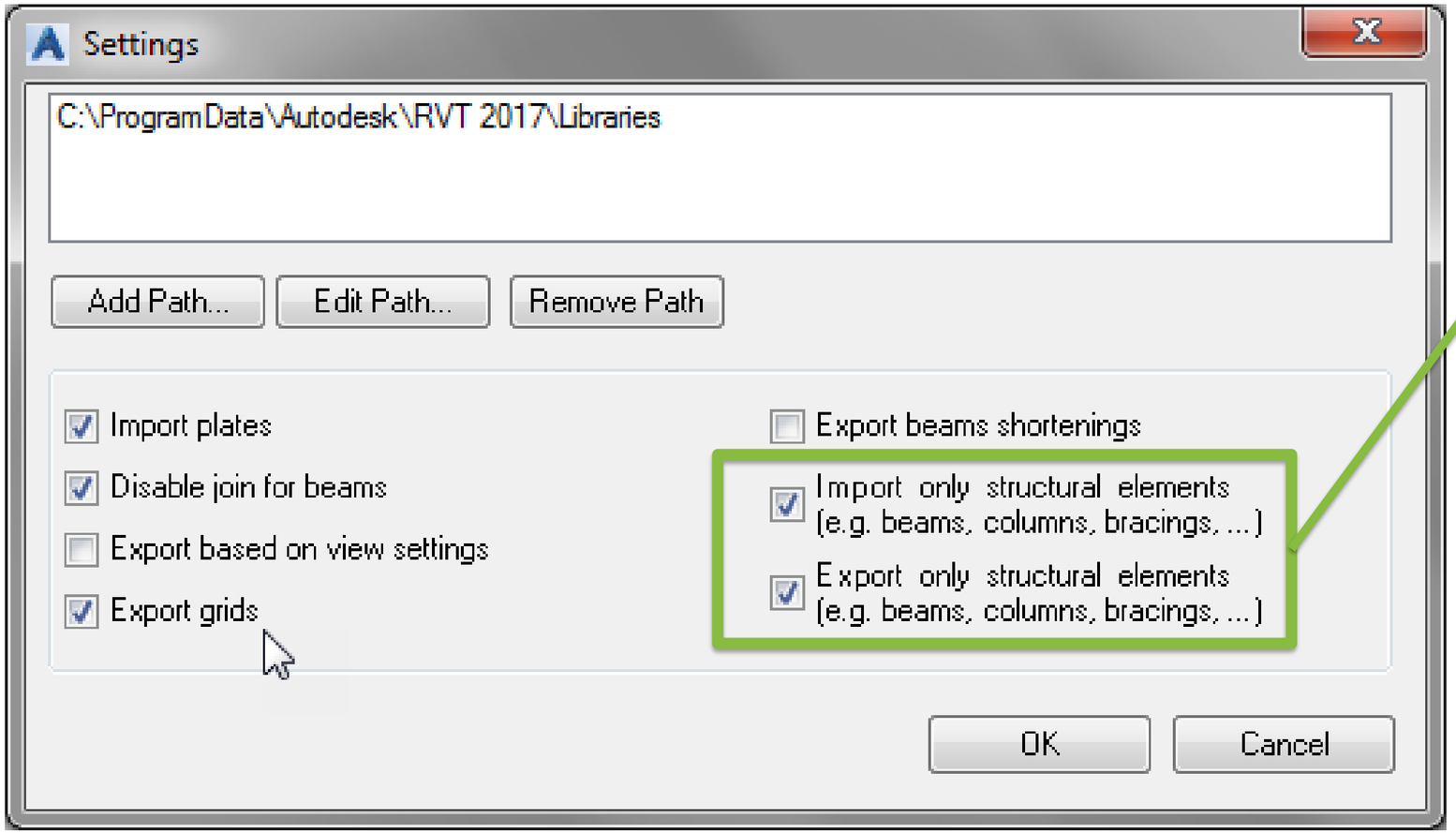


Export beam shortenings

Exports shortenings to Advance Steel for beams joined automatically by Revit.



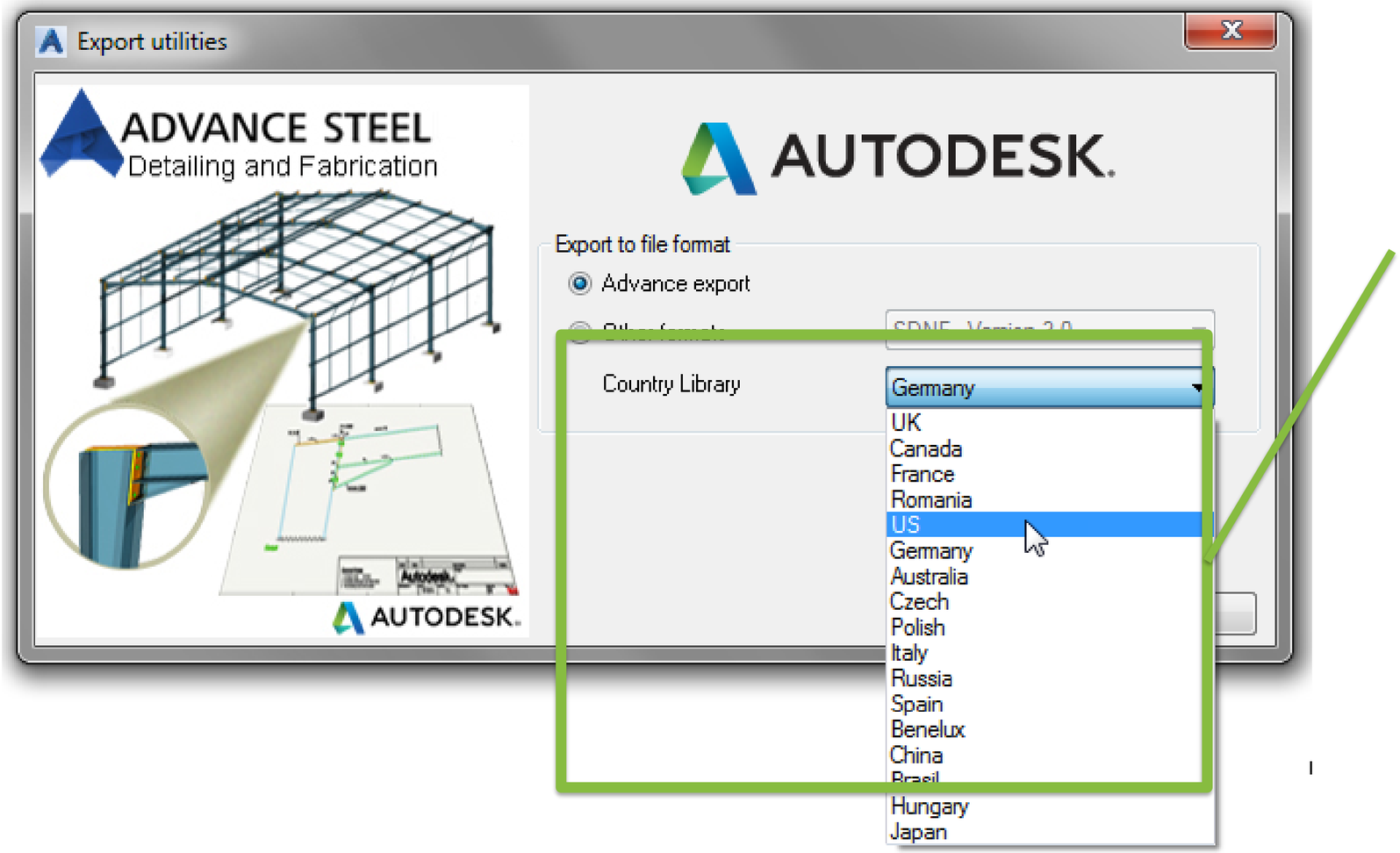
Extension - Settings



Import only structural elements and **Export only structural elements**

Turns the *import/export of only structural elements* (beams, columns etc.) on or off.

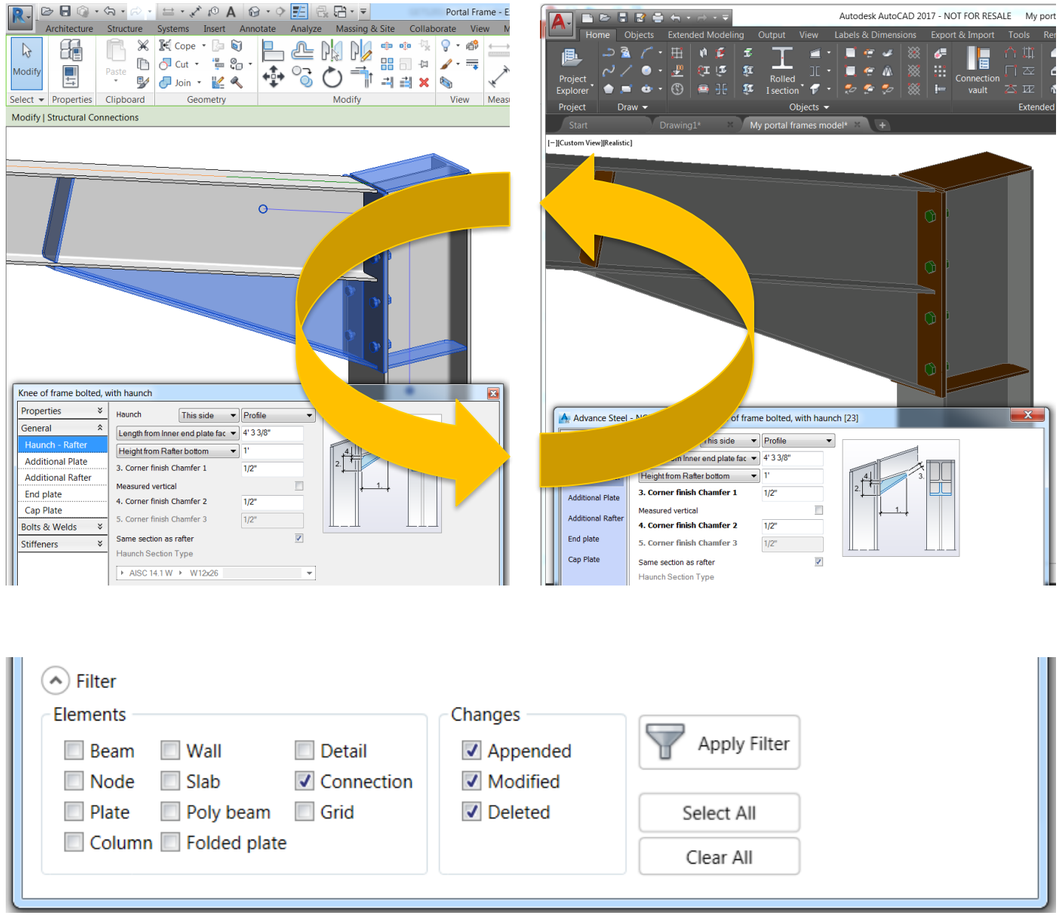
Extension - Settings



The *Country Library* option has no influence in the export file any longer as the mapping is being done automatically with the existing presettings and databases.

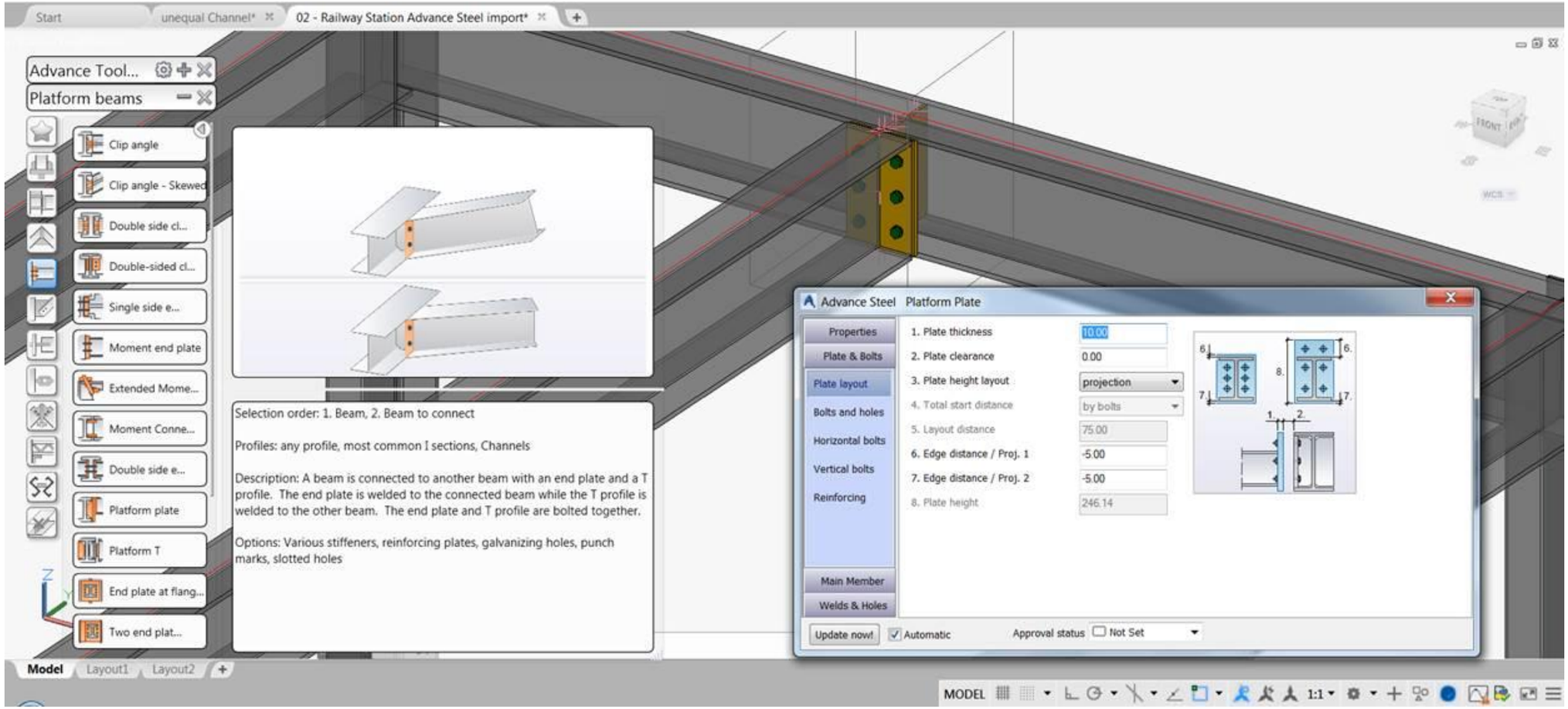
Steel connections synchronization

- Steel connections can be exported/ imported or even synchronized:
  - In Autodesk Revit ®
  - In Autodesk Advance Steel ®
- Steel connections remain intelligent parametric connections
- New filter options in the Synchro dialog
- Approval status taken in consideration



Steel connections synchronization

What happens to connections that are not available in Revit yet?



Steel connections synchronization

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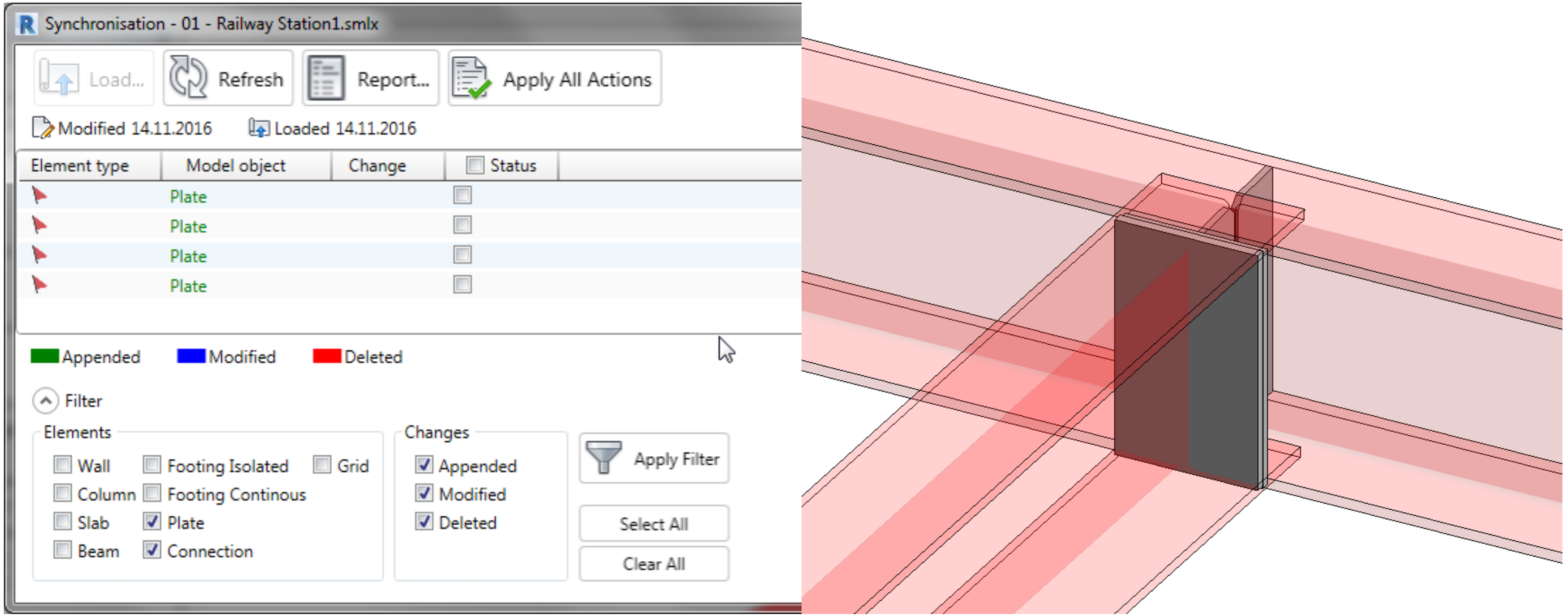
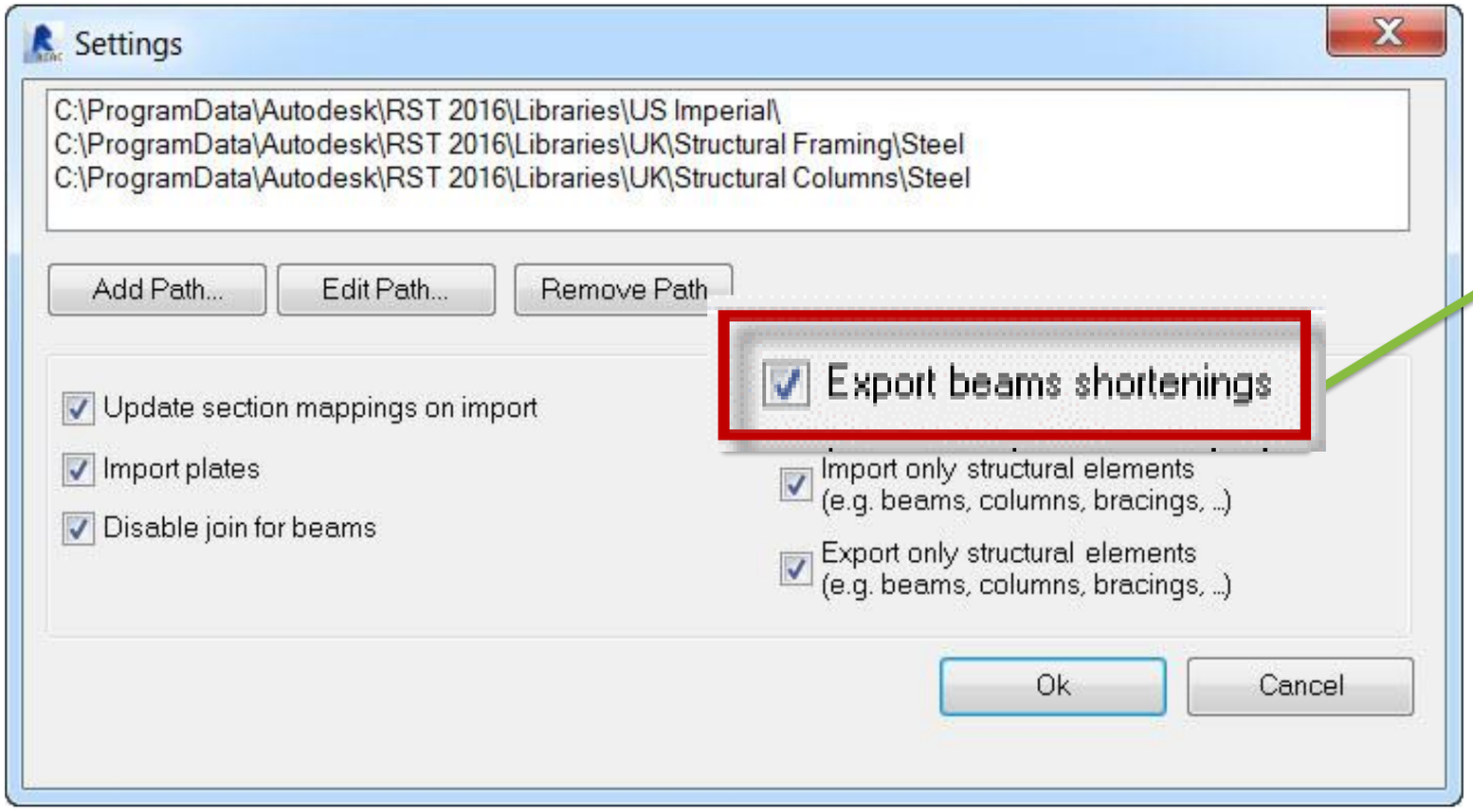


Best practices for Advance Steel extension

Best practice | Revit Model - Shortenings

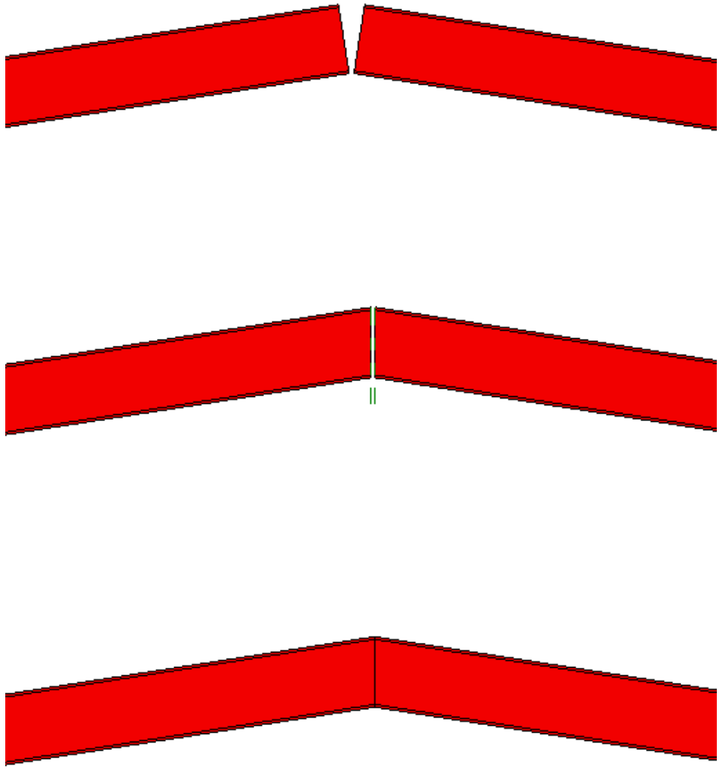


Export beam shortenings

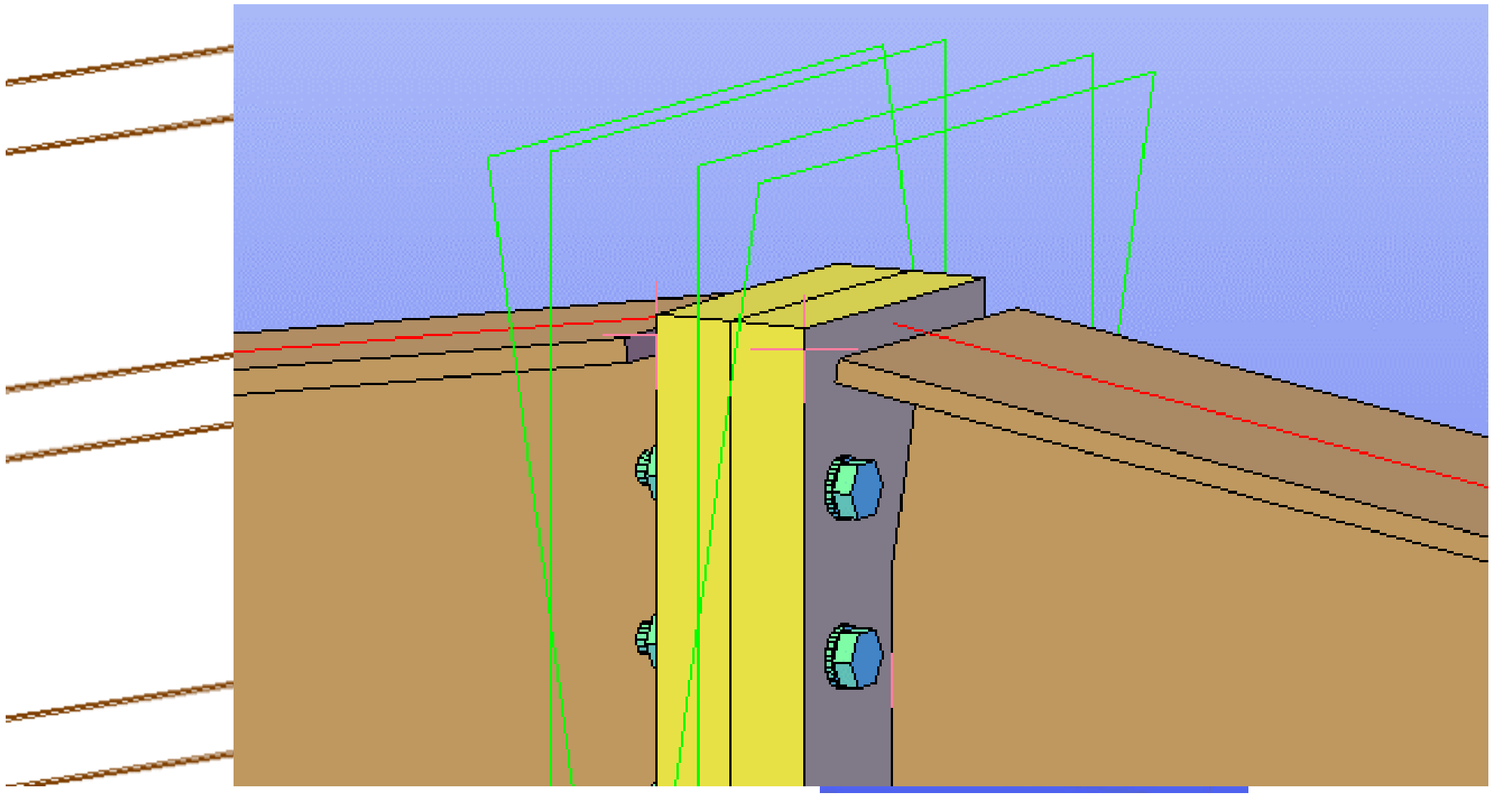
Exports shortenings to Advance Steel for beams joined automatically by Revit.

Best practice | Revit Model – Shortenings

Export beam shortenings checked

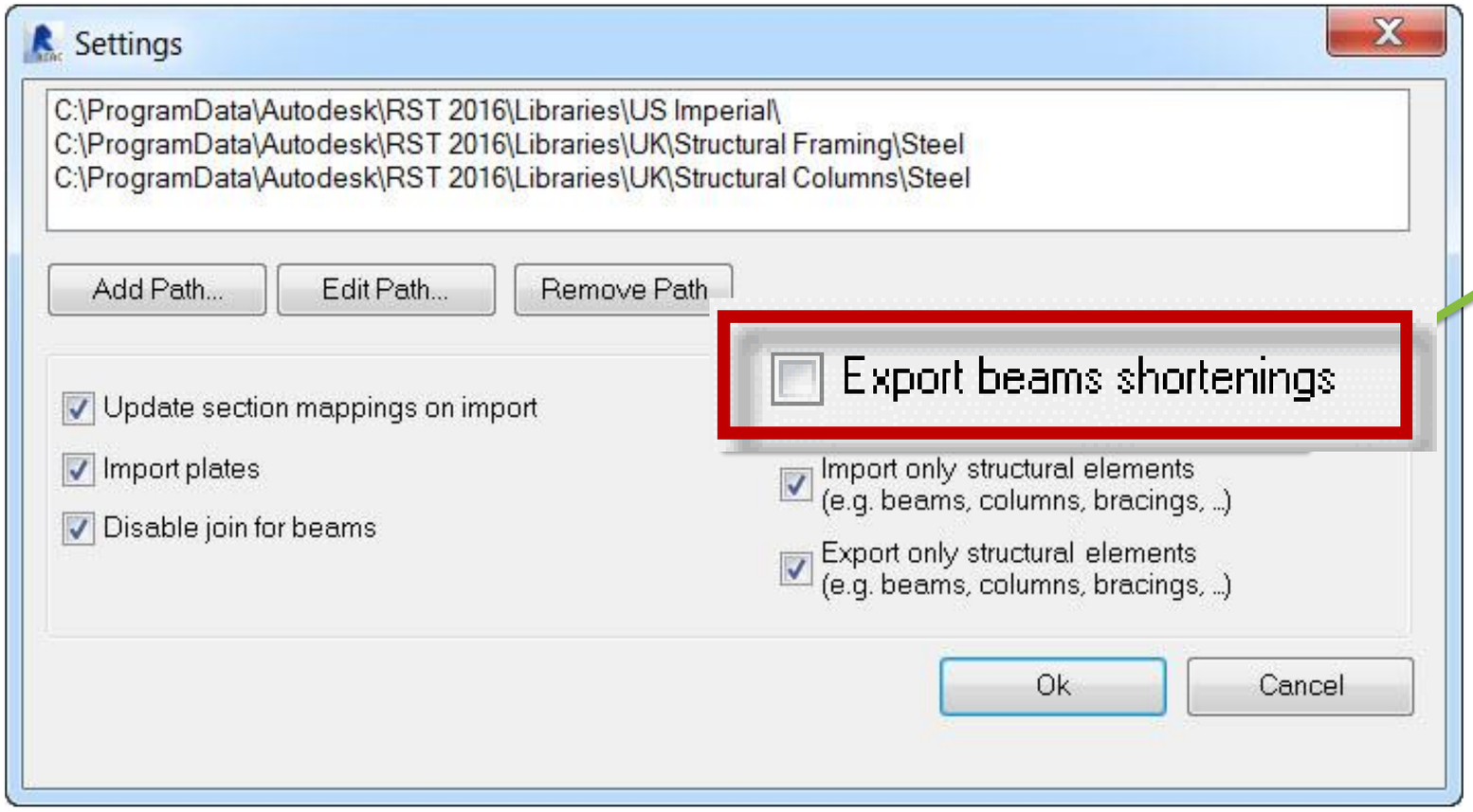


Revit



Advance Steel

Best practice | Revit Model - Shortenings

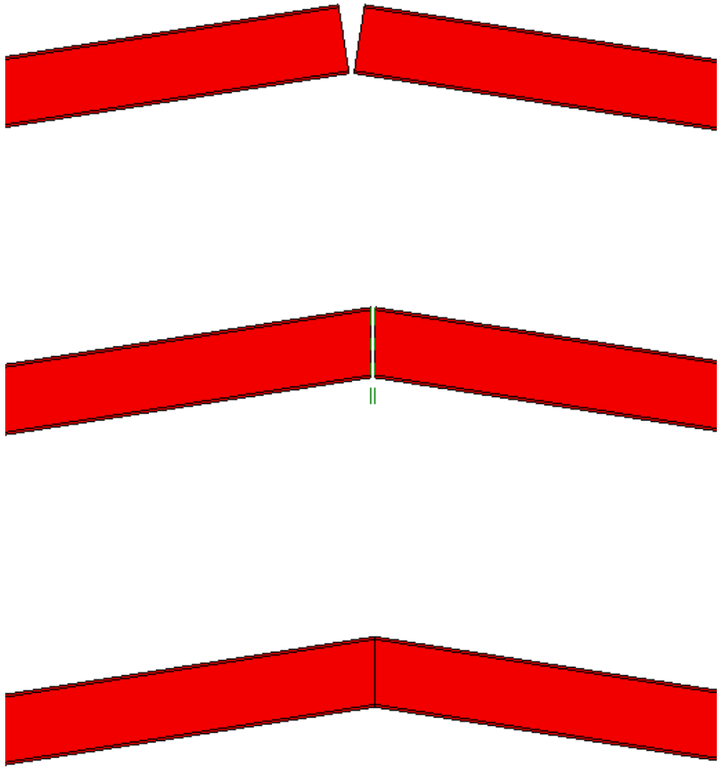


Export beam shortenings

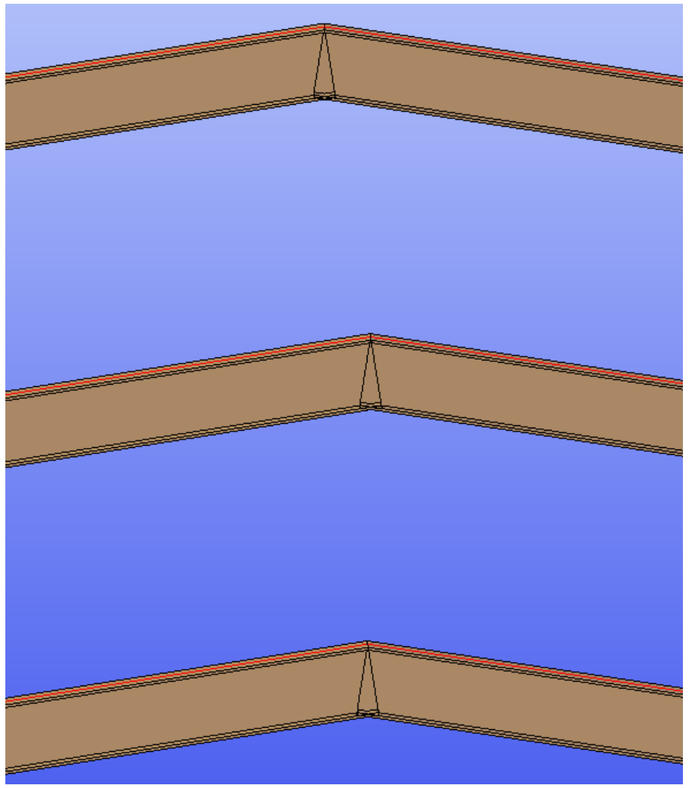
Exports shortenings to Advance Steel for beams joined automatically by Revit.

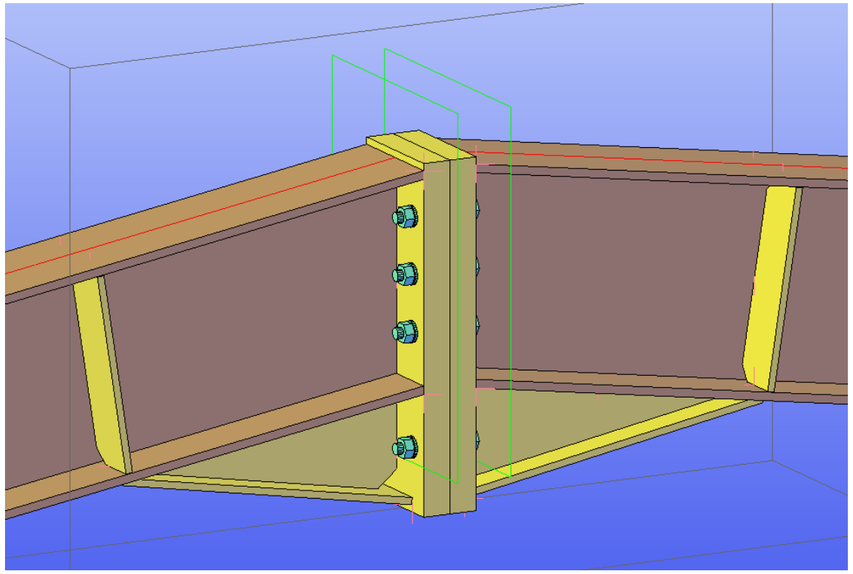
Best practice | Revit Model – Shortenings

Export beam shortenings un-checked



Revit

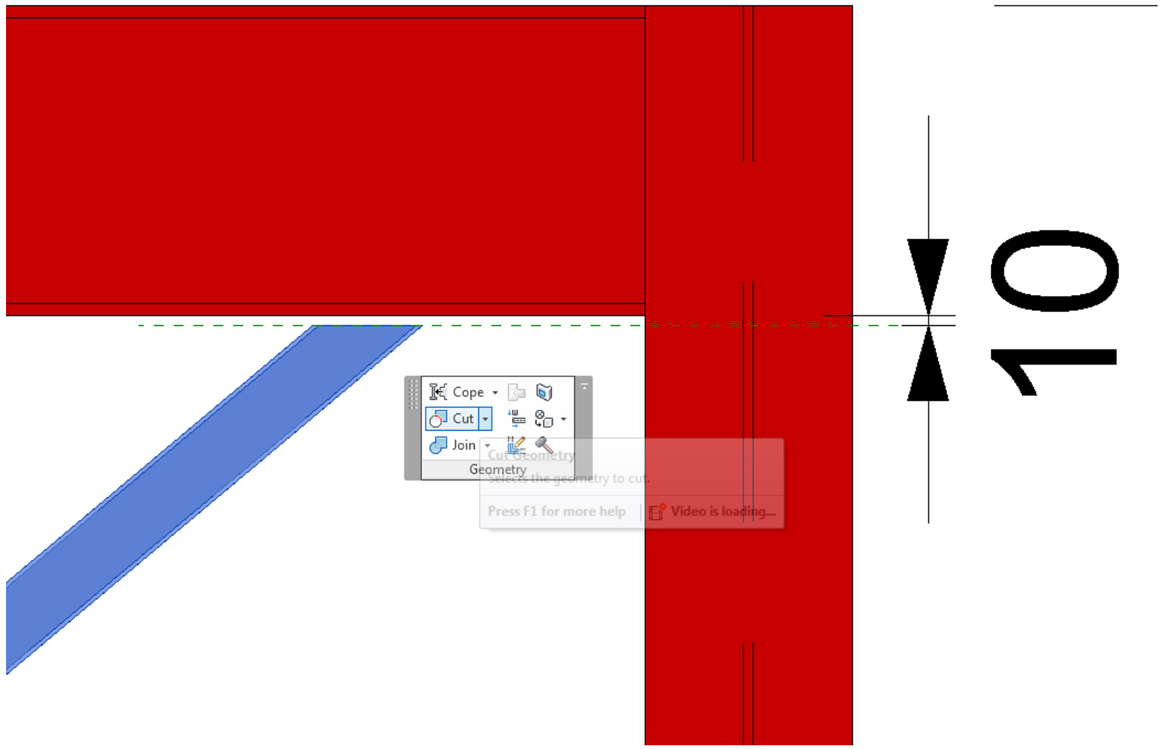




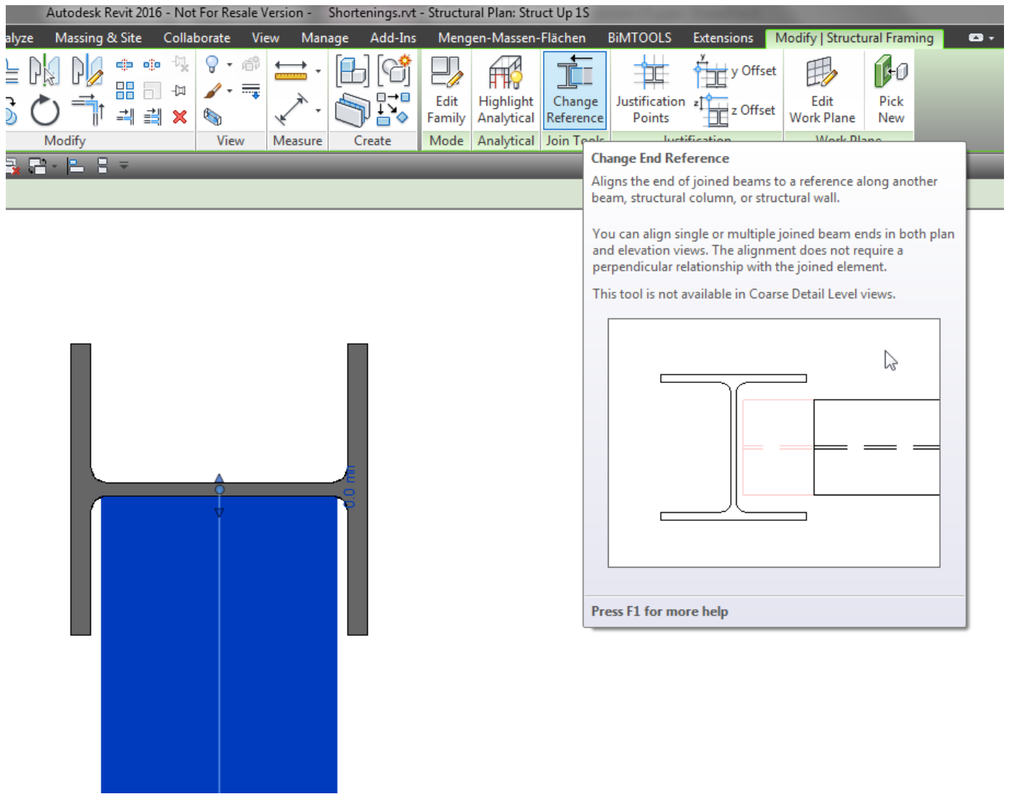
Advance Steel

Best practice | Revit Model – Shortenings

Export beam shortenings – „special“ shortenings – Revit



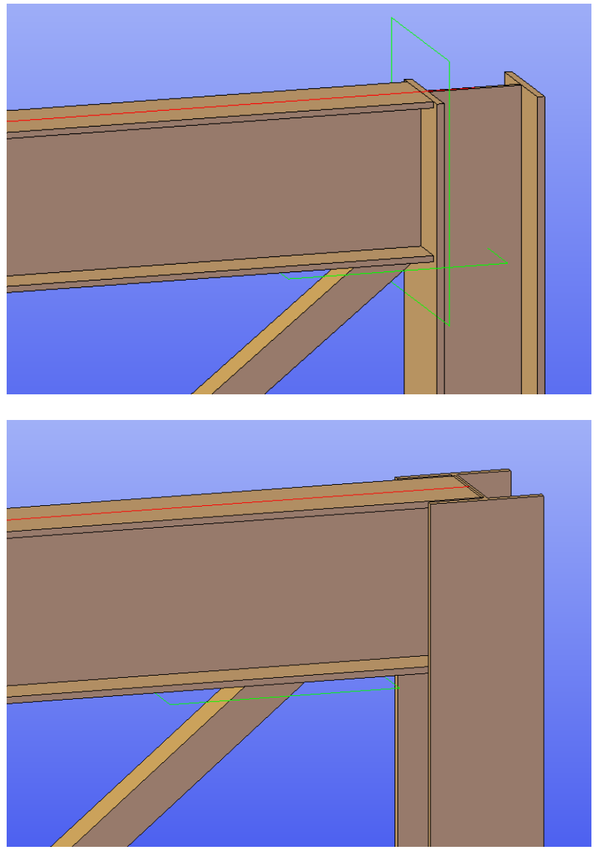
Cut with plane



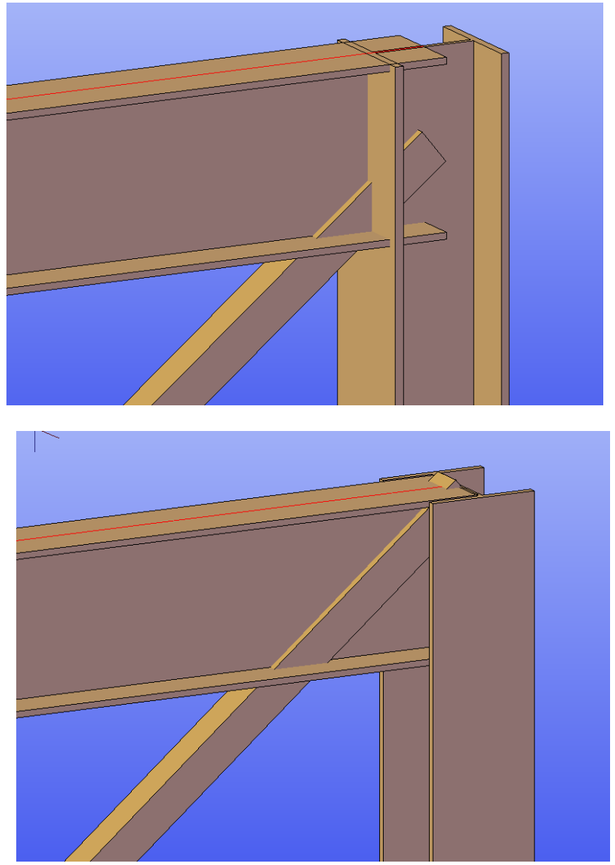
Change End Reference

Best practice | Revit Model – Shortenings

Export beam shortenings – „special“ shortenings – Advance Steel



With shortenings export

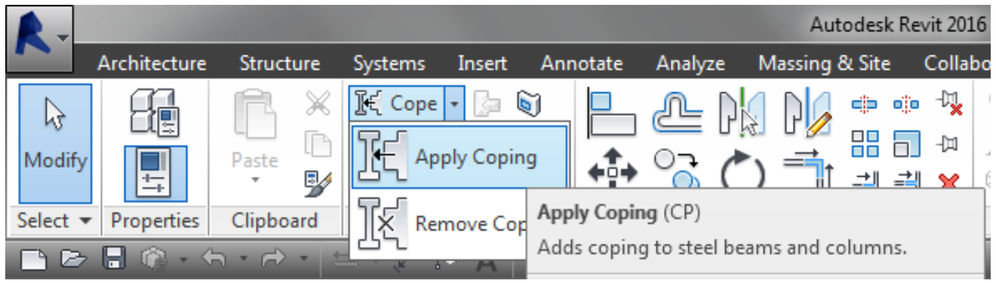


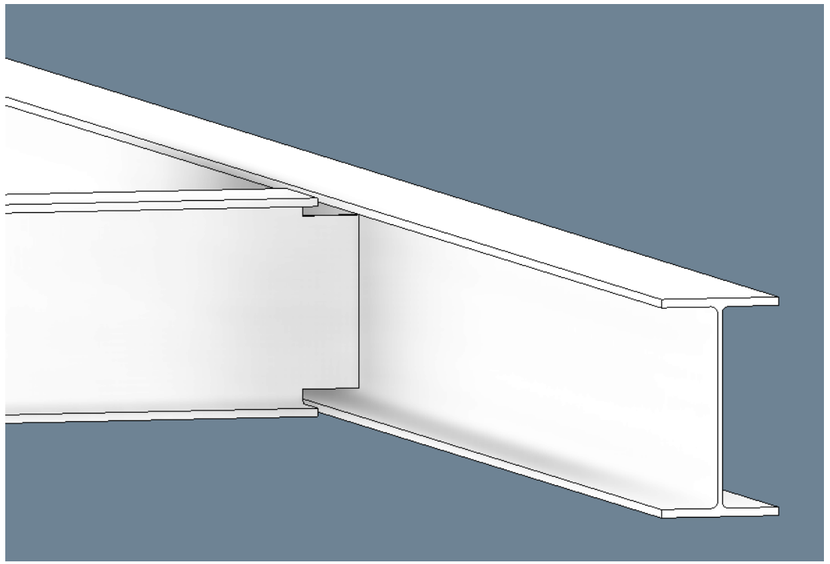
Without shortenings export

Best practice | Revit Model – Shortenings

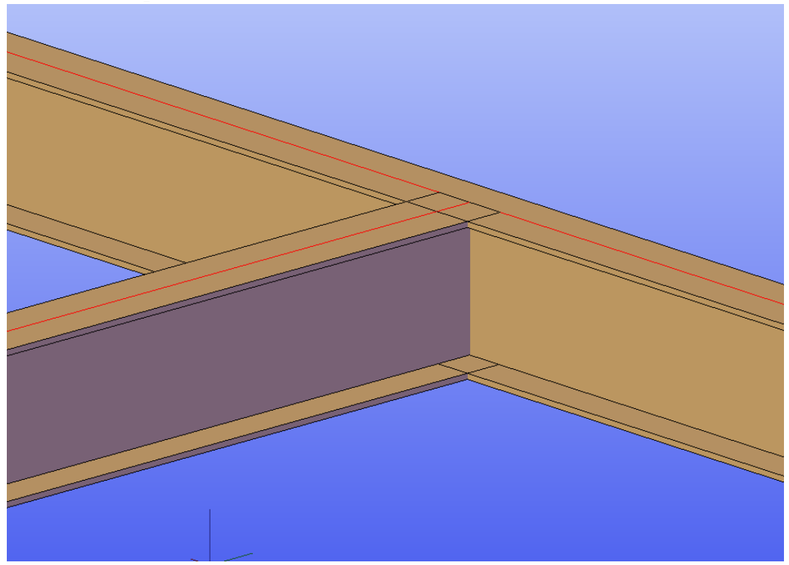
Export beam shortenings – „special“ shortenings

Revit coping





No shortening with either option in AS



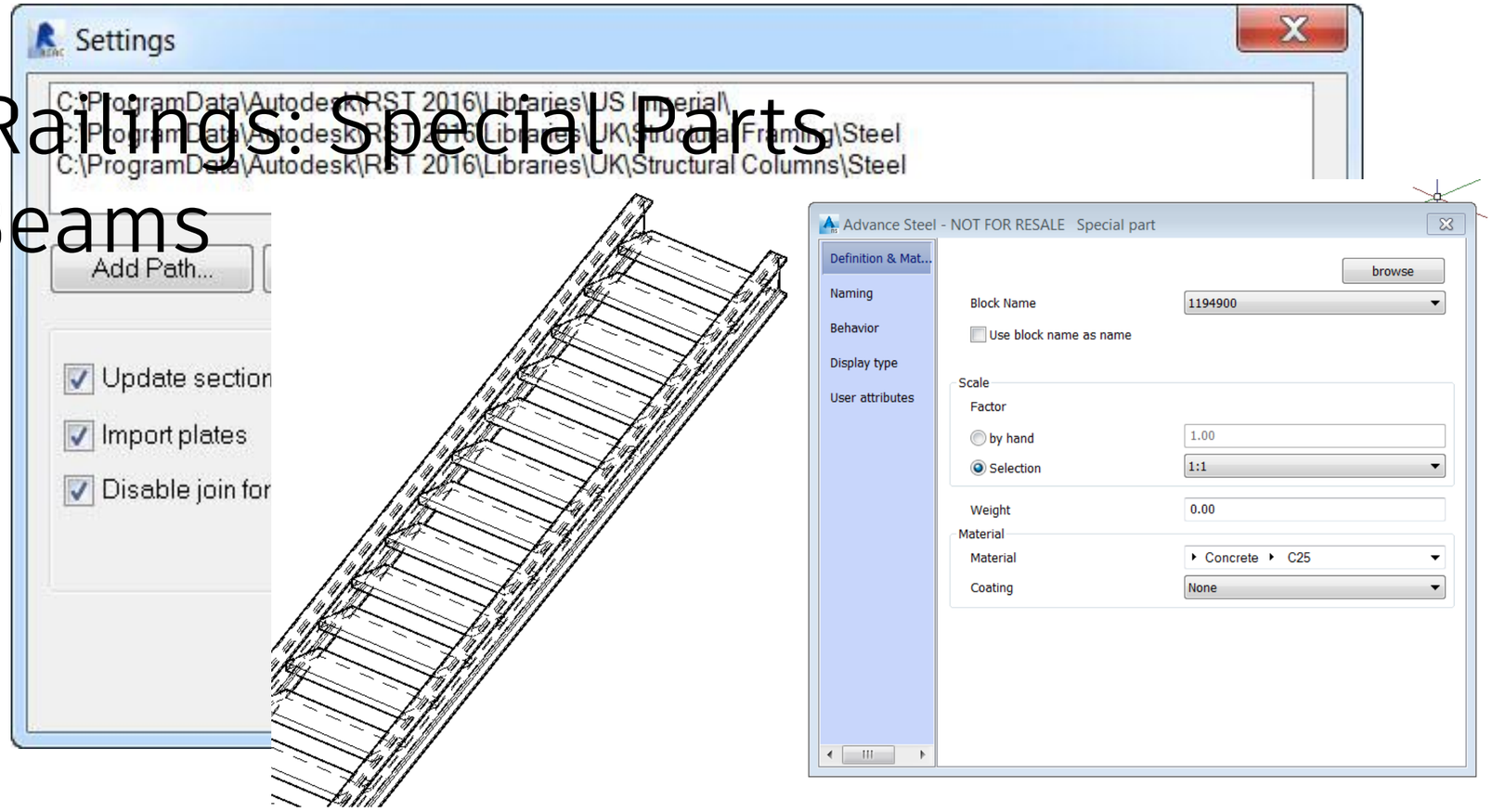
Best Practice | Plates

- Revit Plate Families = Advance Steel Plate Objects
- Plates ≠ Plates within Joints
- Holes ≠ Holes created by Bolts

- Modifications can be synchronized:
  - Position
  - Shape
  - Thickness
  - Material

Best Practice | Structural Elements

- Settings: Export only Structural Elements
- Stairs, Railings: Special Parts
- Truss: Beams



Scope of model elements transferred

Here is a matrix showing which type of elements can be transferred between Revit and Advance Steel, and vice-versa:

CLASS	OBJECT TYPE	REVIT TO ADVANCE STEEL	ADVANCE STEEL TO REVIT
General	Level	✓	✓
	Grid	✓	✓
Steel Beams	Beam	✓	✓
	Column	✓	✓
	Compound beam	**X**	✓
	Welded beam	**X**	✓
	Tapered beam	**N/A**	✓
	Curved beam	✓	✓
	Poly beam	**N/A**	✓
	Folded beam	**N/A**	**X**
	Aluminum beam	**X**	✓
Plates	Rectangular plate	✓ **(AS-Revit-AS)**	✓
	Polygonal plate	✓ **(AS-Revit-AS)**	✓
	Circular plate	✓ **(AS-Revit-AS)**	✓
	Folded plate	**N/A**	✓
	Twisted folded plate	**N/A**	✓
	Conical folded plate	**N/A**	✓

CLASS	OBJECT TYPE	REVIT TO ADVANCE STEEL	ADVANCE STEEL TO REVIT
Wood	Timber beam	✓	✓
Concrete elements	Wall	✓	✓
	Polygonal wall	✓	✓
	Slab	✓	✓
	Polygonal Slab	✓	✓
	Concrete beam	✓	✓
	Concrete curved beam	✓	✓
	Concrete column	✓	✓
	Isolated footing	✓	✓
	Continuous footing	✓	✓
Grating	Standard grating	**N/A**	✓
	Bar grating	**N/A**	✓
	Variable grating, rectangular	**N/A**	✓
	Variable grating, polygonal	**N/A**	✓

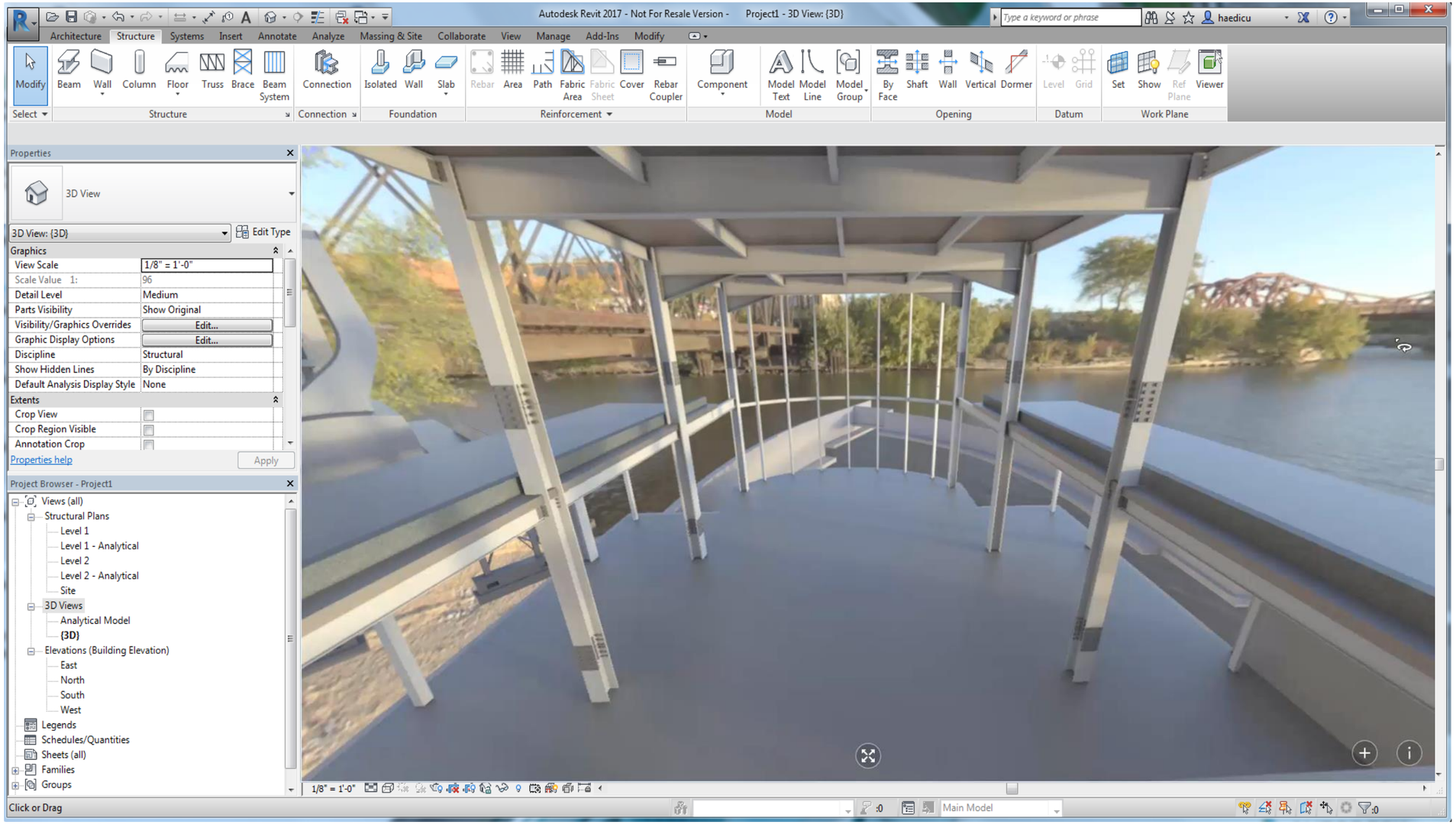
Scope of model elements transferred

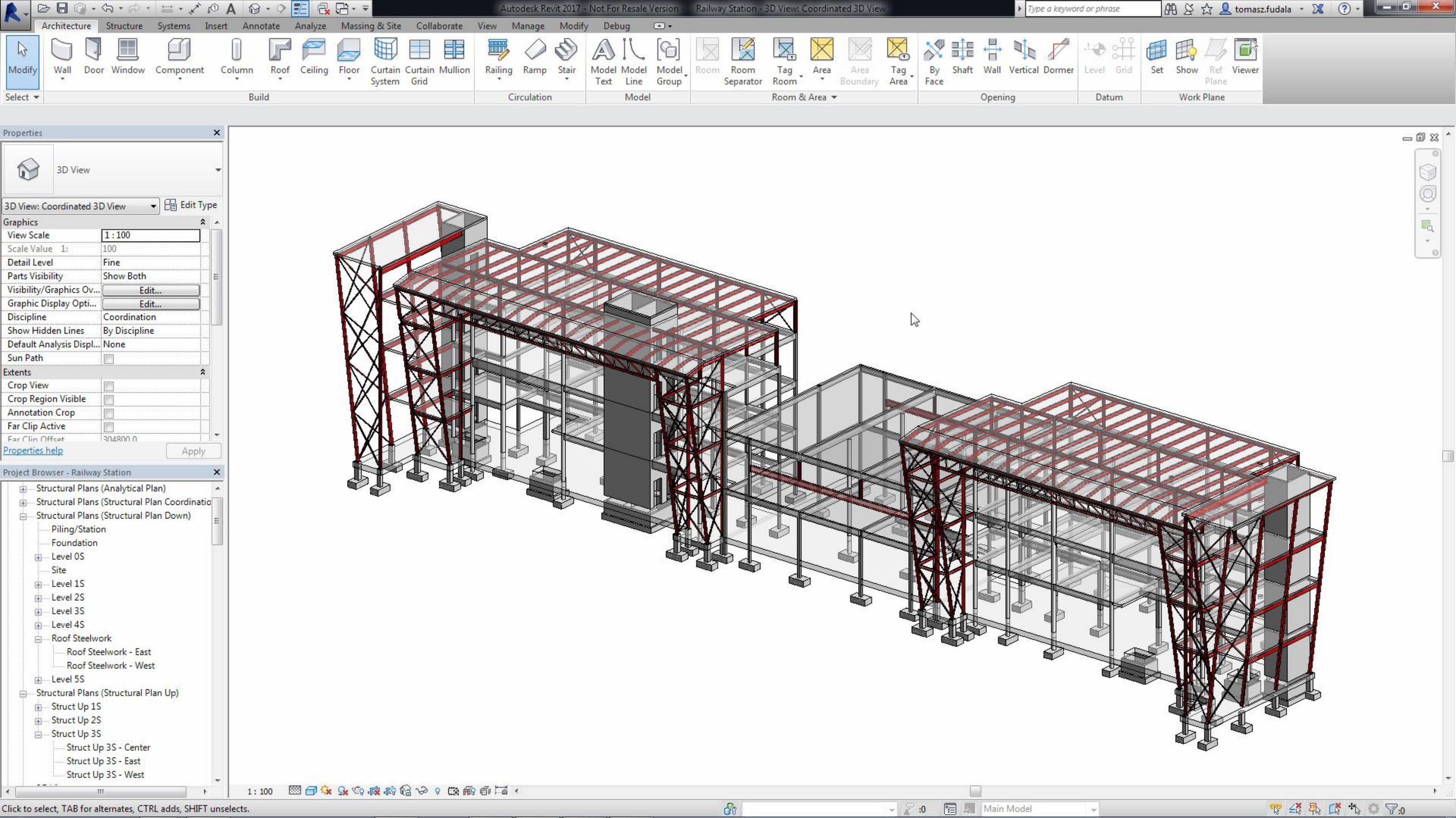
Any other objects that are not beams, concrete beams, slabs, columns and walls are exported from Revit and imported as special parts in Advance Steel (e.g. concrete stairs; sloped slabs).

The 2016 release currently does not transfer bolts, anchor bolts, special parts and welds from Advance Steel to Revit.

CLASS	OBJECT TYPE	REVIT TO ADVANCE STEEL	ADVANCE STEEL TO REVIT
Beam features	Shorten	✓	**X**
	Contour	✓	**X**
	Cope	**N/A**	**X**
	Weld preparation	**N/A**	**X**
	Corner cut	**N/A**	**X**
	Cope (from Revit)	✓ **(only shorten)**	**N/A**
Plate features	Shorten	**N/A**	✓
	Contour	**N/A**	✓ **(only polygonal)**
	Weld preparation	**N/A**	**X**
	Corner cut	**N/A**	✓
Structural analysis results	Torsor (N,V,M)	✓	**X**

Connected Insight: Design to Detailing




Autodesk Revit 2017 - Not For Resale Version - Railway Station - 3D View: Coordinated 3D View
Type a keyword or phrase
tomasz.fudala
Architecture Structure Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Modify Debug
Modify Wall Door Window Component Column Roof Ceiling Floor Curtain System Curtain Grid Mullion Railing Ramp Stair Model Text Model Line Model Group Room Room Separator Tag Room Area Area Boundary Tag Area By Face Shaft Wall Vertical Dormer Level Grid Set Show Ref Plane Viewer
Select Build Circulation Model Room & Area Opening Datum Work Plane
Properties
3D View
3D View: Coordinated 3D View
Edit Type
Graphics
View Scale 1 : 100
Scale Value 1: 100
Detail Level Fine
Parts Visibility Show Both
Visibility/Graphics Ov... Edit...
Graphic Display Opti... Edit...
Discipline Coordination
Show Hidden Lines By Discipline
Default Analysis Displ... None
Sun Path
Extents
Crop View
Crop Region Visible
Annotation Crop
Far Clip Active
Far Clip Offset 304800.0
Properties help
Apply
Project Browser - Railway Station
Structural Plans (Analytical Plan)
Structural Plans (Structural Plan Coordinatio
Structural Plans (Structural Plan Down)
Piling/Station
Foundation
Level 0S
Site
Level 1S
Level 2S
Level 3S
Level 4S
Roof Steelwork
Roof Steelwork - East
Roof Steelwork - West
Level 5S
Structural Plans (Structural Plan Up)
Struct Up 1S
Struct Up 2S
Struct Up 3S
Struct Up 3S - Center
Struct Up 3S - East
Struct Up 3S - West
1 : 100
Click to select, TAB for alternates, CTRL adds, SHIFT unselects.
Main Model