

Creating Your Own Intelligent Custom Steel Connections in Advance Steel

Document Overview:

This technical workflow course addresses the modeling requirements for special connections, that can't be achieved with existing connection macros in Advance Steel.

Audiences are Advance steel users and technical.

This course will contain 1 Lesson in the following format;

The total time of the course will be 90 minutes of show and redo.

Course Title: Creating Your Own Intelligent Custom Steel Connections in Advance Steel

Course Description

This course covers Advance Steel's comprehensive solution for creating intelligent custom steel connections to give structural engineers more flexibility in the modeling process.

Course Objectives

- Demonstrate the key workflow for intelligent custom connections on different examples to let users understand, what is the best way to go in different model situations

Requirements

- Attendees are familiar with
 - o Advance steel modeling functionalities like shortenings, miter, cope
 - o Advance Steel connections

Basics

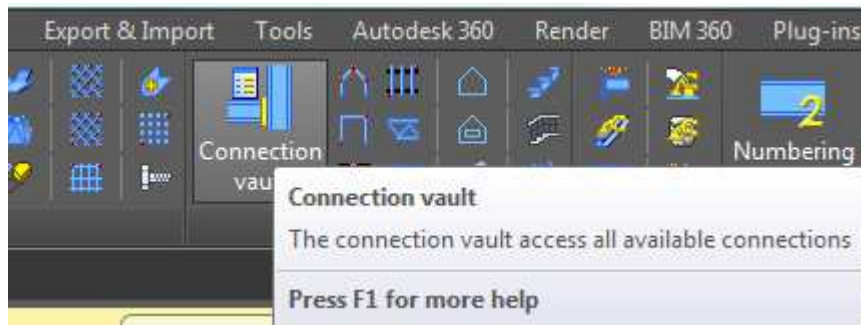
- What can be a part of a user connection
 - o All kind of Advance Steel objects like beams, plates, gratings, bolts, welds,...
 - o All kind of features from "Feature" tool palette
 - o Many connections from "Connection vault"
 - o "Bricks" from the "Custom connection" tool palette

Preparation:

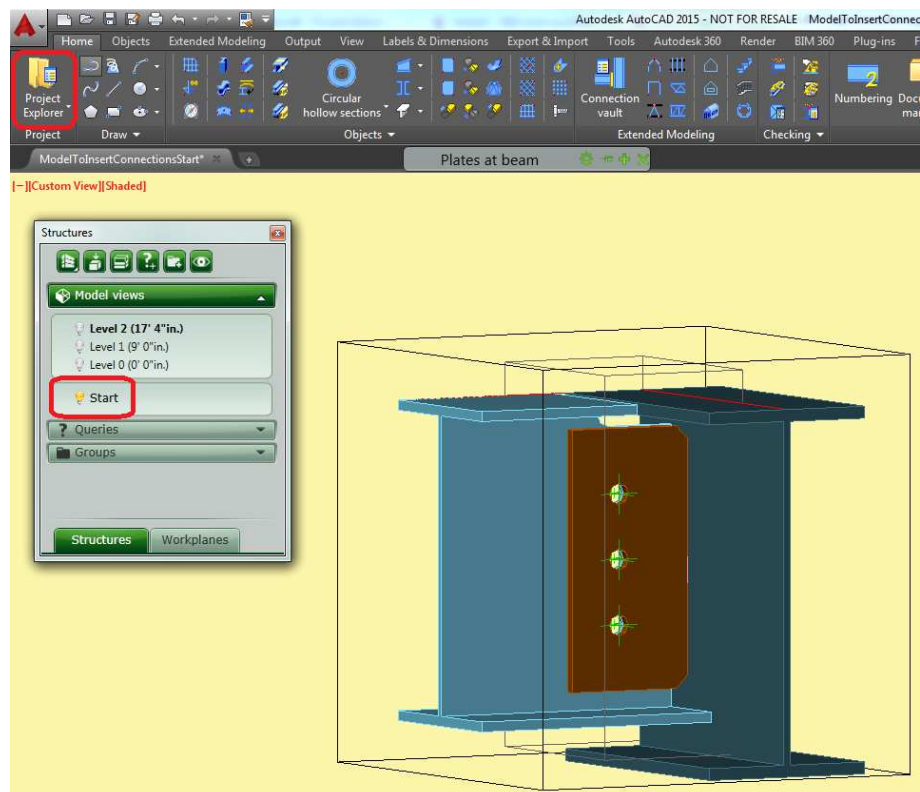
- Start Advance Steel
- Open the file “ModelToInsertConnectionsStart” and save it with a new name
- Open the Advance Steel tool palette (Home / Settings)



- Open the connection vault (Home / Extended Modeling)

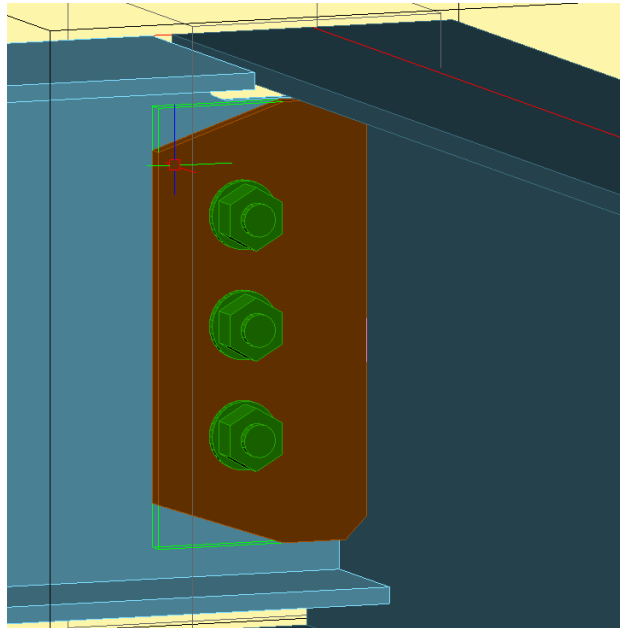


- Open the project explorer and use the model view “Start”

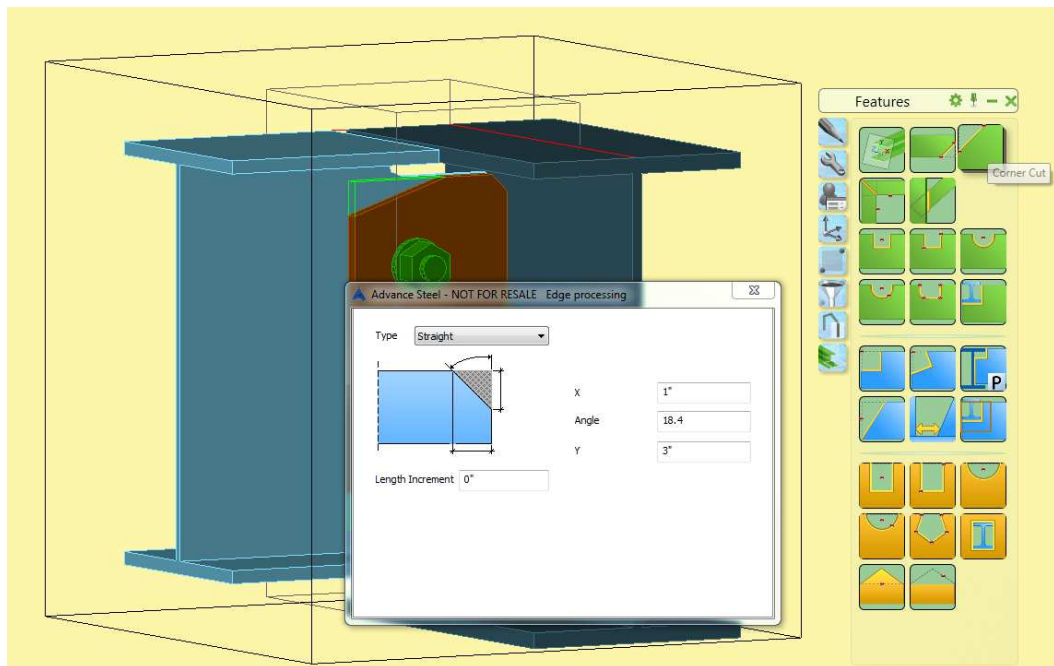


1st example:

- Standard shear plate connection, but with coped plate edges required



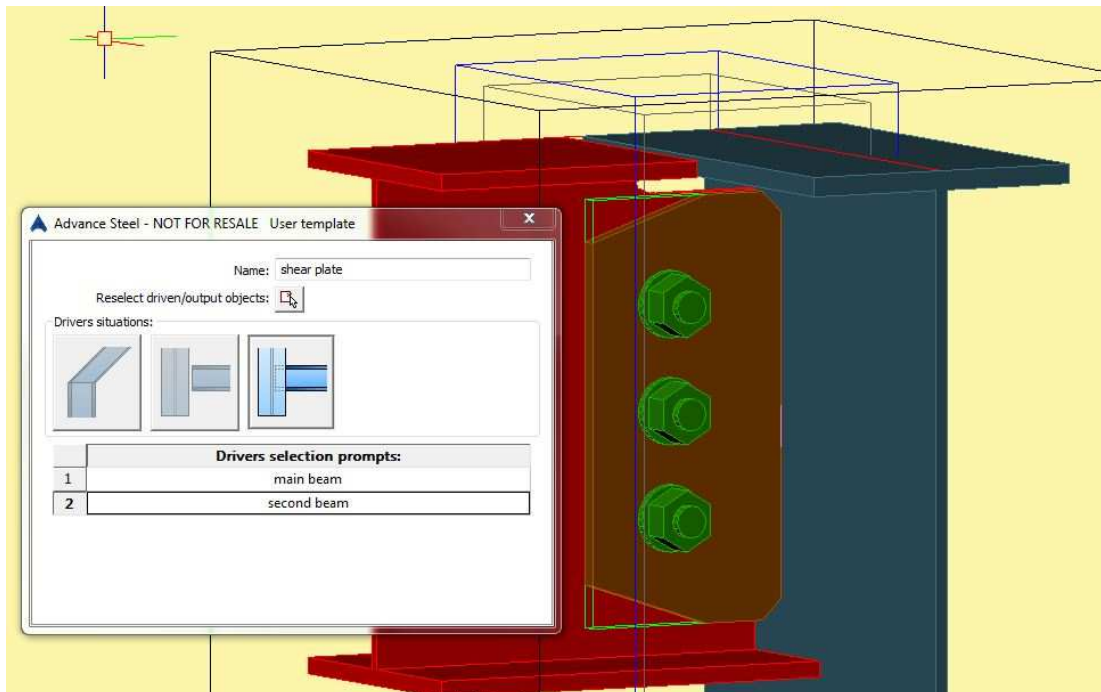
- Go to tool palette “Features” and start command “Corner cut”



- Select upper plate edge and set X = 1" and Y = 3"
- Repeat the command for lower plate edge and set X = 3" and Y = 1"

Note: The commands “Create by template”, “Create by template, multiple”, “Create joint in a joint group” and “Create joint in a joint group, multiple” will transfer only the connection without the plate corner cuts. To copy also the corner cuts it’s required to create a custom connection.

- Go to tool palette “Custom connections” and run the “Create connection template” command
- Choose definition method “2 beams”
- Select the dark blue beam as 1st input beam, confirm with right mouse button (RMB)
- Select the light blue beam as 2nd input beam, confirm
- In the dialog make the following settings
- When selecting the driven/output objects make sure, you select the grey shear plate connection box and the two corner cuts, confirm with RMB
- When finished, close the command with “x” on top right



- The blue box shows that you have successfully created your 1st custom connection.
- Click to the lamp in front of the “Start” model view in project explorer

Use “Insert connection template” command to create the connection at another right beam end in the model.

- In the “Connection template explorer” select your model file and the “shear plate” connection, click “OK”
- Select the dark blue beam on grid “C” as main beam and the light blue beam between grid “4” and “5”
- The connection is created

Transfer this connection to the other beam crossings at grid “C” and “7” using the “Create joint in a joint group multiple” command from “Tools” tool palette.

- Start the command
- Select the blue box around the inserted connection, confirm with RMB
- Select the dark blue beams at grid “C” and “7”, confirm with RMB
- Select the corresponding light blue beams, confirm with RMB

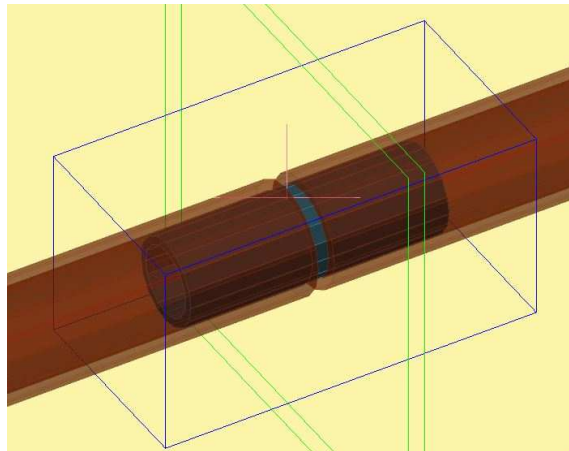
Use this connection also for the other beam side, but with inserted bolts.

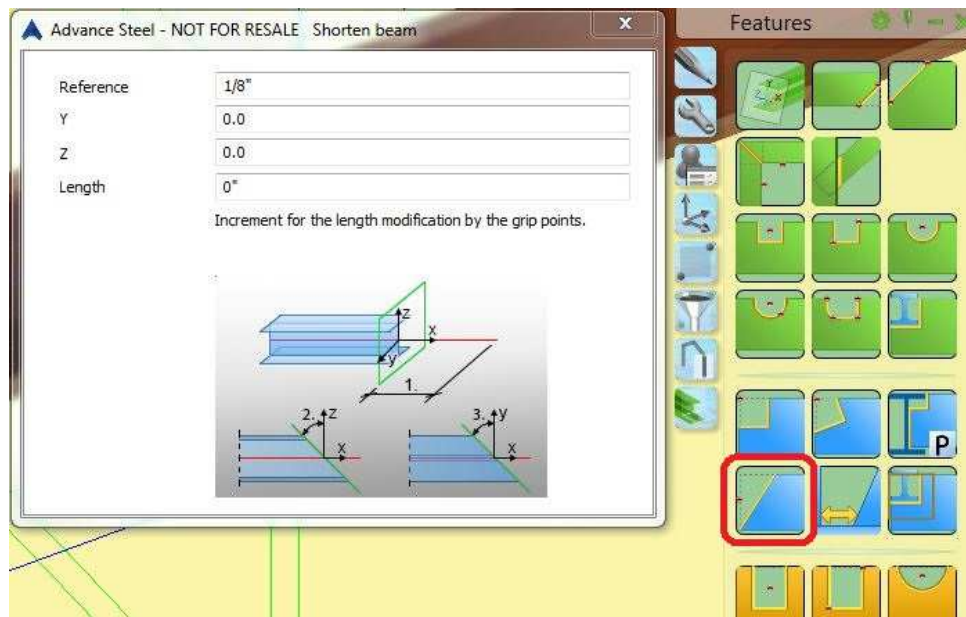
- Run the “Insert connection template” command, select the connection and create it at the dark blue beam on grid “B” as main beam and the light blue beam between grid “3” and “3”
- In the dialog check the box for “Allow object modification” then close the box
- Double click on the grey connection box, go to tab “Plate & bolts” / “Bolts and holes”
- Set the check box for “Inverted” (sometimes the change is made after 2nd tick)

Transfer this connection to the rest of the light blue beams.

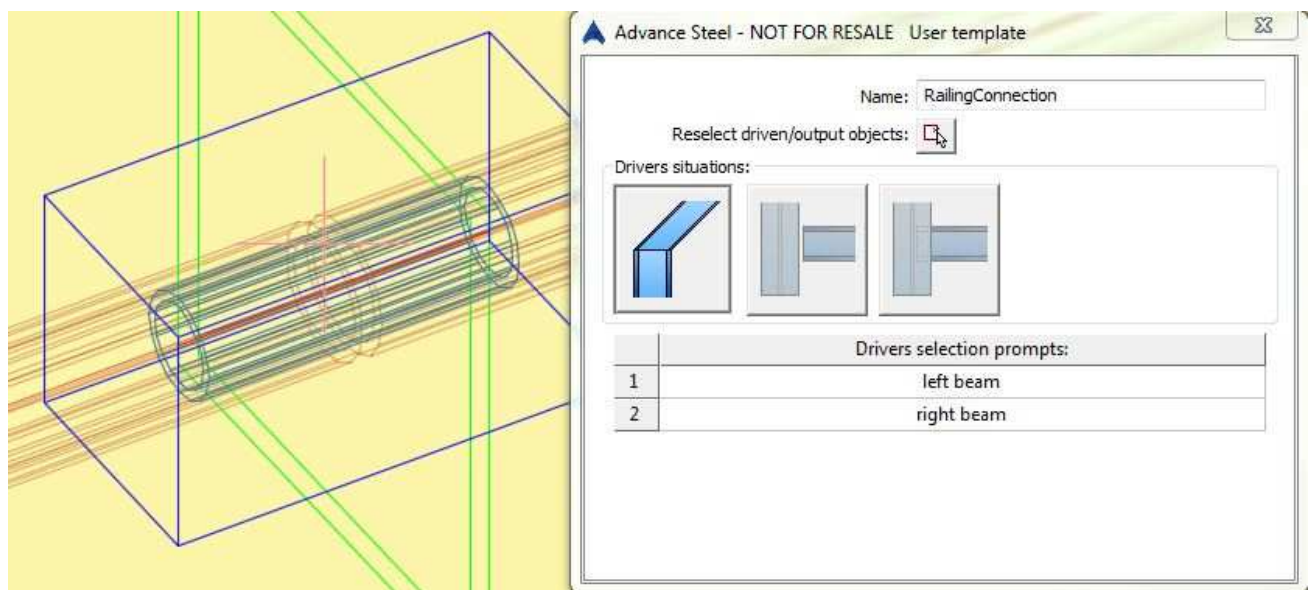
2nd example:

- Grab rail connection
- This connection is one, that we may use later also in a different model.
- Take one handrail from grid 7, that will be connected with CTRL + C into the clipboard
- Open a new drawing
- Paste the object with CTRL + V into this empty model
- Save the file as “railing connections.dwg” under C:\ProgramData\Autodesk\Advance Steel 2015.1\Shared\ConnectionTemplates
- Zoom to the object and split the beam with “split beams” command from “Objects” ribbon / “Beams” tab
- Use the shorten command from “Features” tool palette for both beam ends at contact point





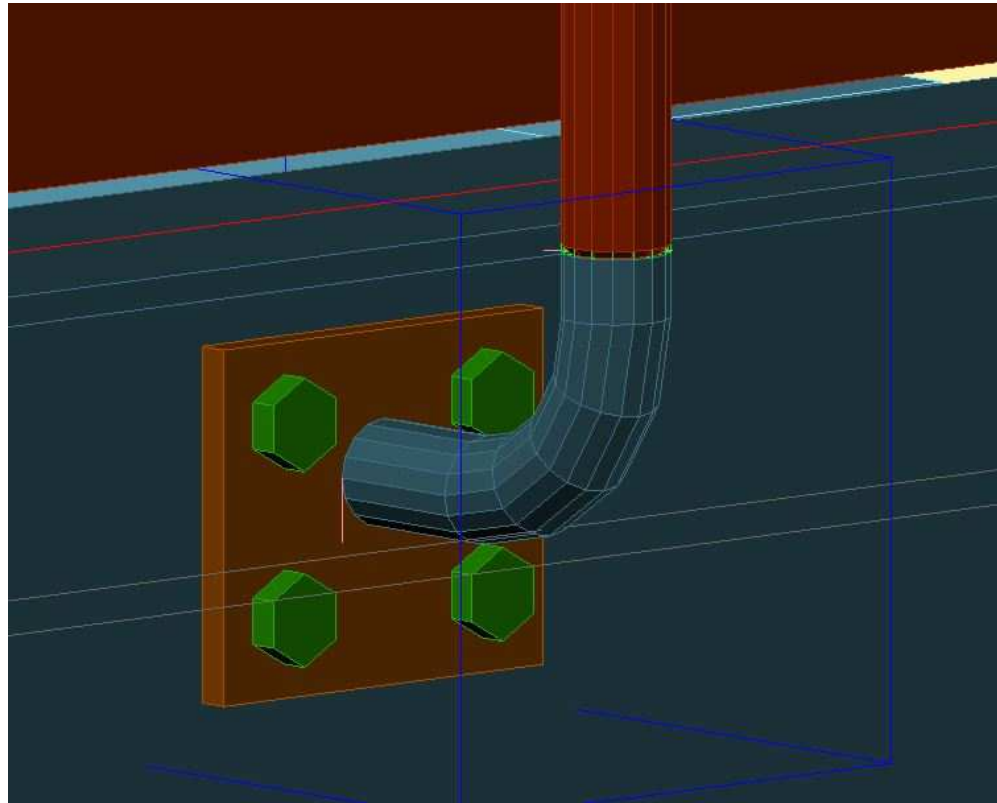
- In wireframe mode create a tube *AISC HSS Pipe Std\Pipe 1 Std* inside the tubes starting from system line end point in one orthogonal direction with length = 4" / size =
- Move the inner tube 2" in direction, so that it is placed centered between the 2 outer tubes
- Run a clash check
- Weld the inner tube and left outer tube
- Change the presentation type of the outer beams to "Features"
- Create the custom connection using the features, the inner tube and the weld as "driven/output objects"



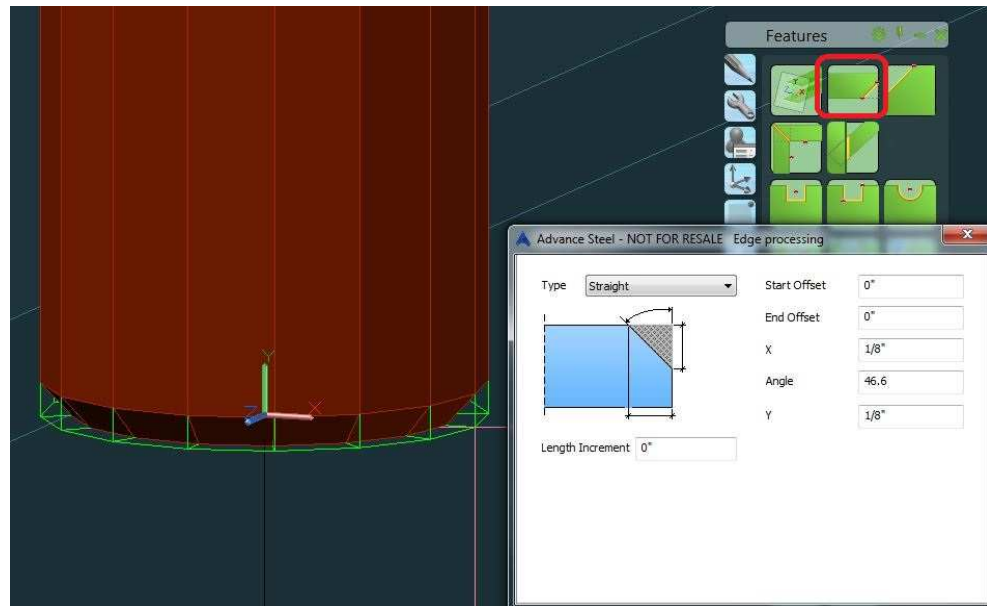
- Save & close the file and insert the connection into the model.

3rd example:

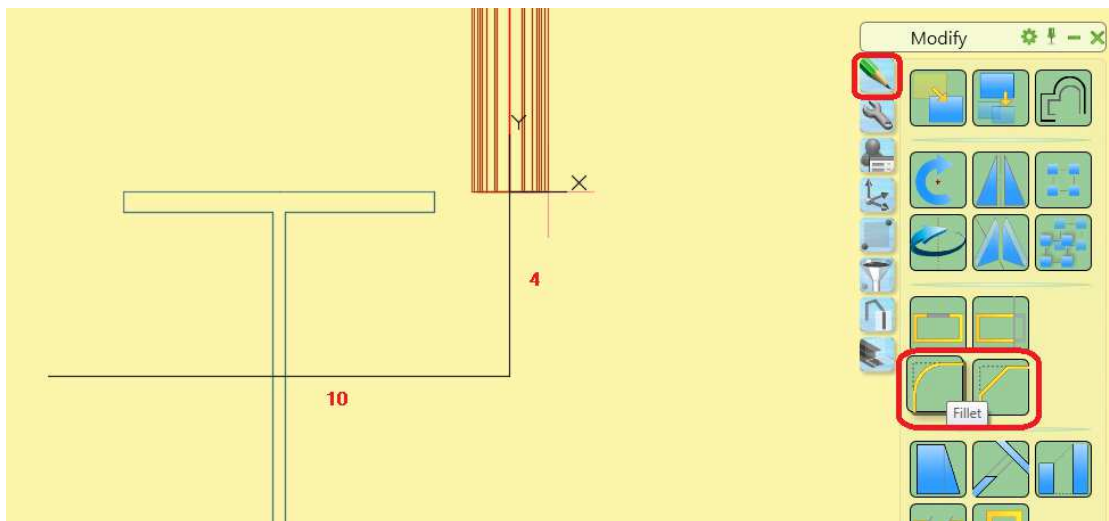
- Curved post connection



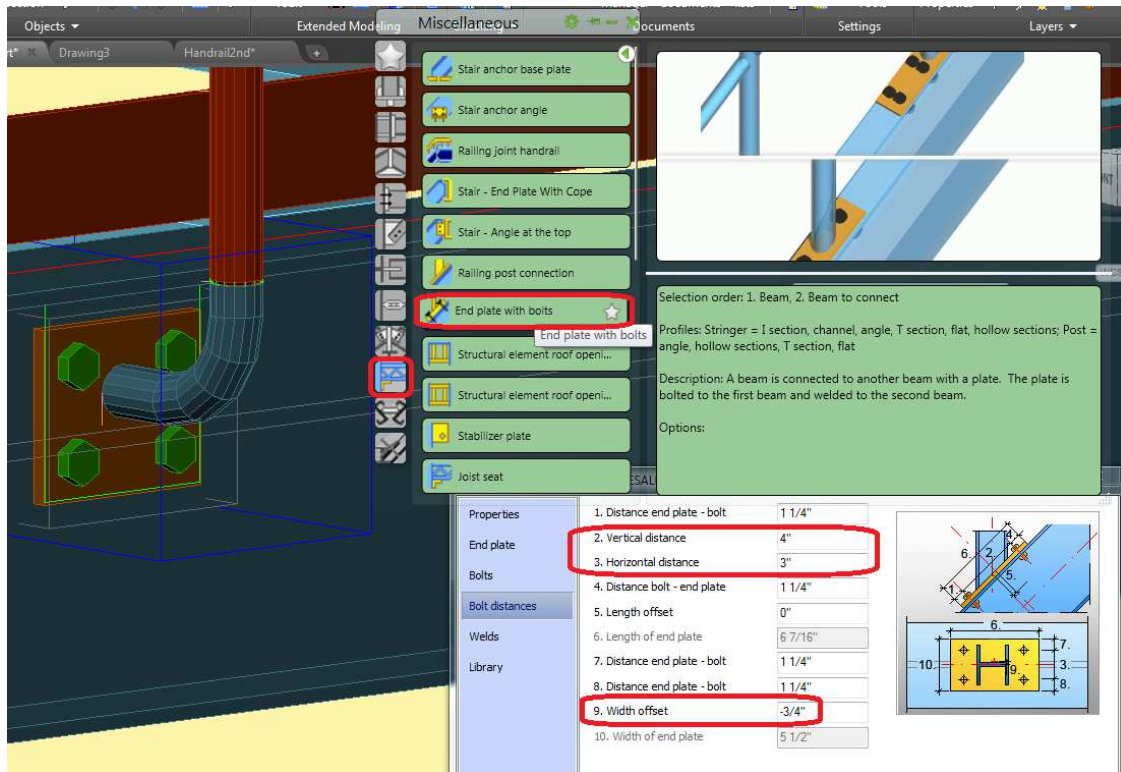
- Copy two objects, that will be connected with CTRL + C into the clipboard
- Open the file "railing connections.dwg" under C:\ProgramData\Autodesk\Advance Steel 2015.1\Shared\ConnectionTemplates and insert the 2 objects
- Zoom with double click on center mouse wheel to the objects
- Place the UCS per drag & drop to the post system line
- Create a weld preparation on the lower post end with the command "bevel cut" from "Features" tool palette



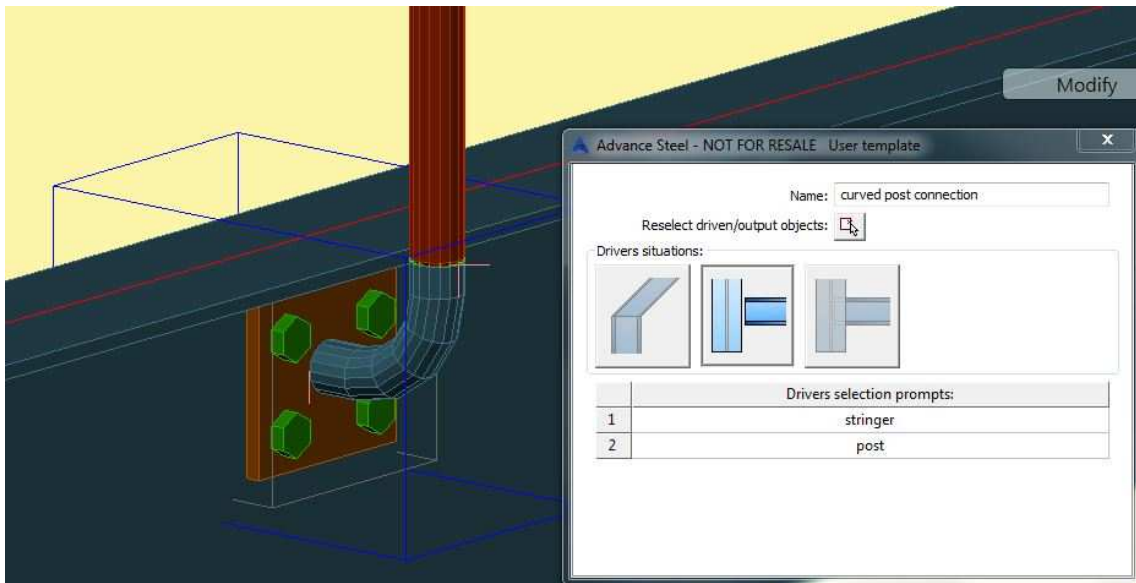
- Rotate to front view using the view cube
- Use the “UCS view” command from UCS tool palette
- Create a polyline starting from system line end point (or 0,0,0) going 4” down and 10” left



- Use the “Fillet” command from Modify tool palette to create a fillet with radius = 3”
- Create a polygonal beam on that polyline with section size AISC HSS Pipe Std\Pipe 1 1/4 Std
- Create a shop weld between the two sections – Weld type Flare V – thickness 1/4 - Continuous
- Create an endplate connection between stringer and polygonal beam using the “end plate with bolts” connection from “Miscellaneous” tab of connection vault



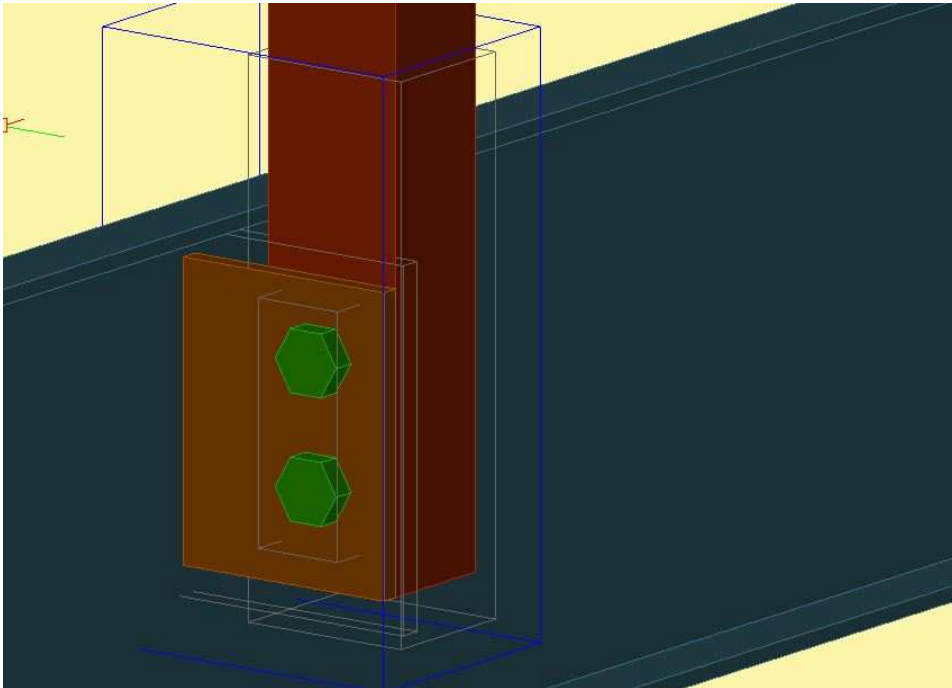
- Close the connection dialog when all settings are done
- Make sure, that the weld preparation and the connection box are visible
- Run a clash check
- Create the custom connection with the known command and the following settings
- Make sure, that you select the weld symbol & preparation, the polygonal beam and the connection box as driven/output objects



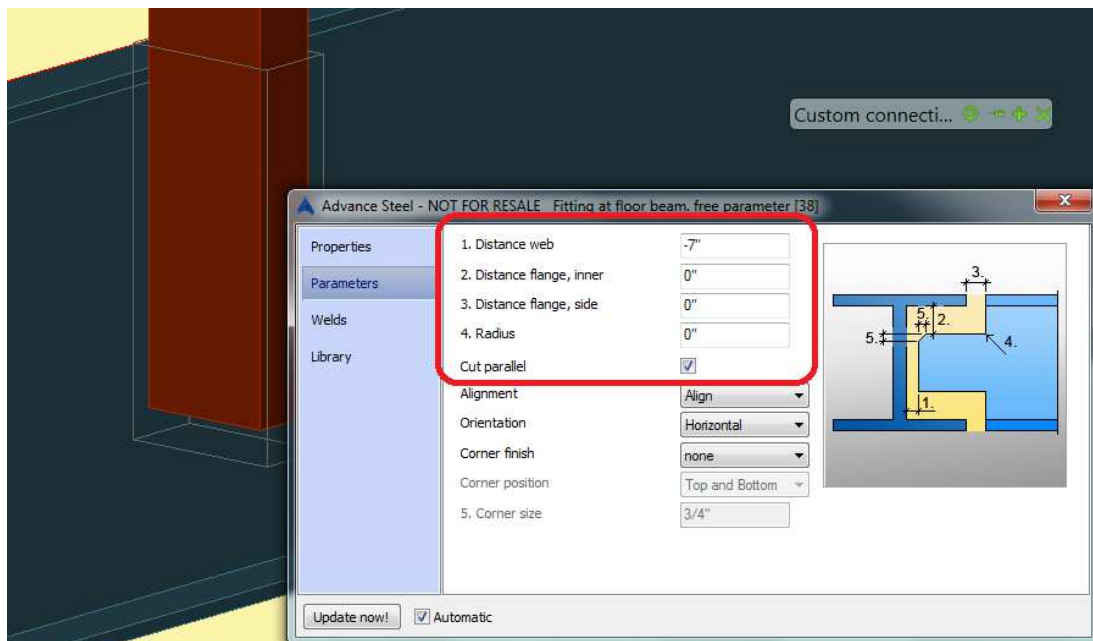
- Save & close the file, insert the custom connection to one post in the model.
- Transfer the connection in the model to the other tube posts

4th example:

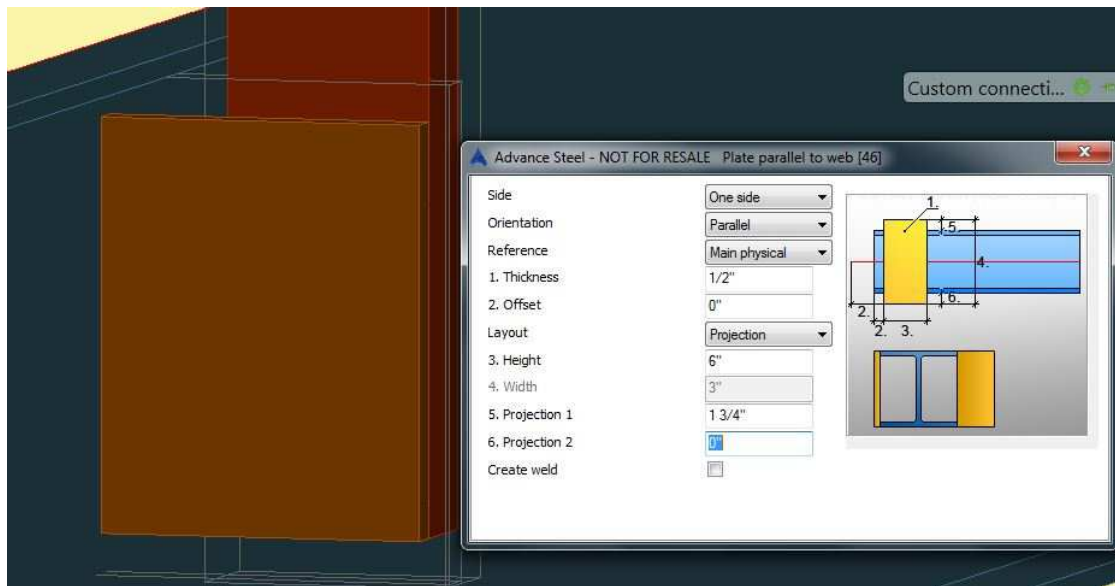
- Post connection with plate



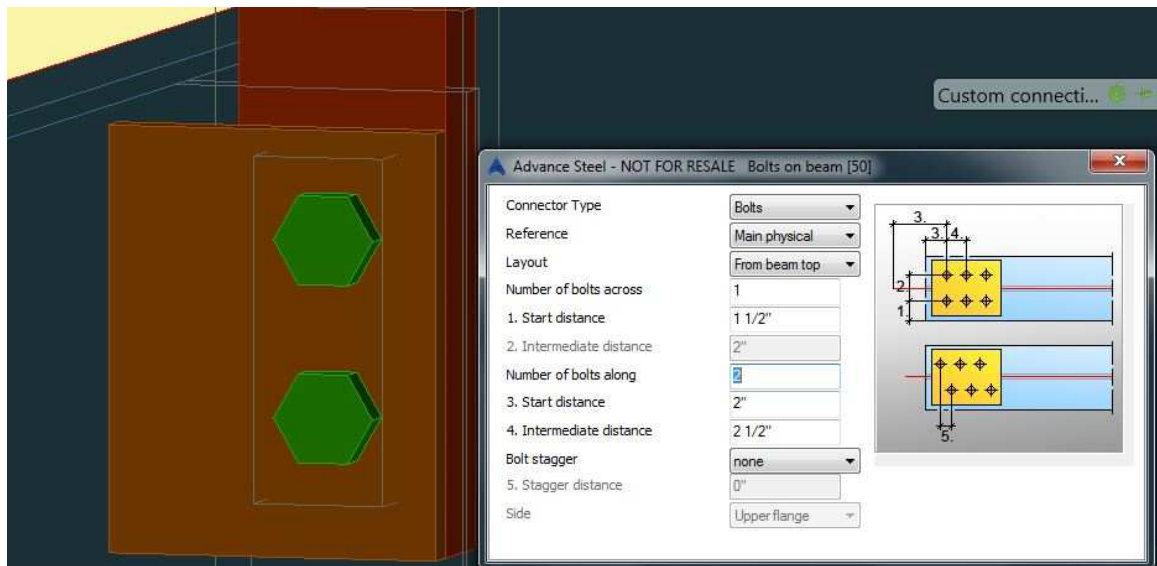
- As you are now familiar with the basic procedure to create a custom connection, the following steps are not explained as detailed anymore like the previous.
- We will now implement some bricks into the connection.
- Copy the objects to the file “railing connections.dwg”.
- Use the “cope, parametric” from Features palette for the post end



- Add the brick “plate parallel to web” from the “custom connections palette” to the post end.



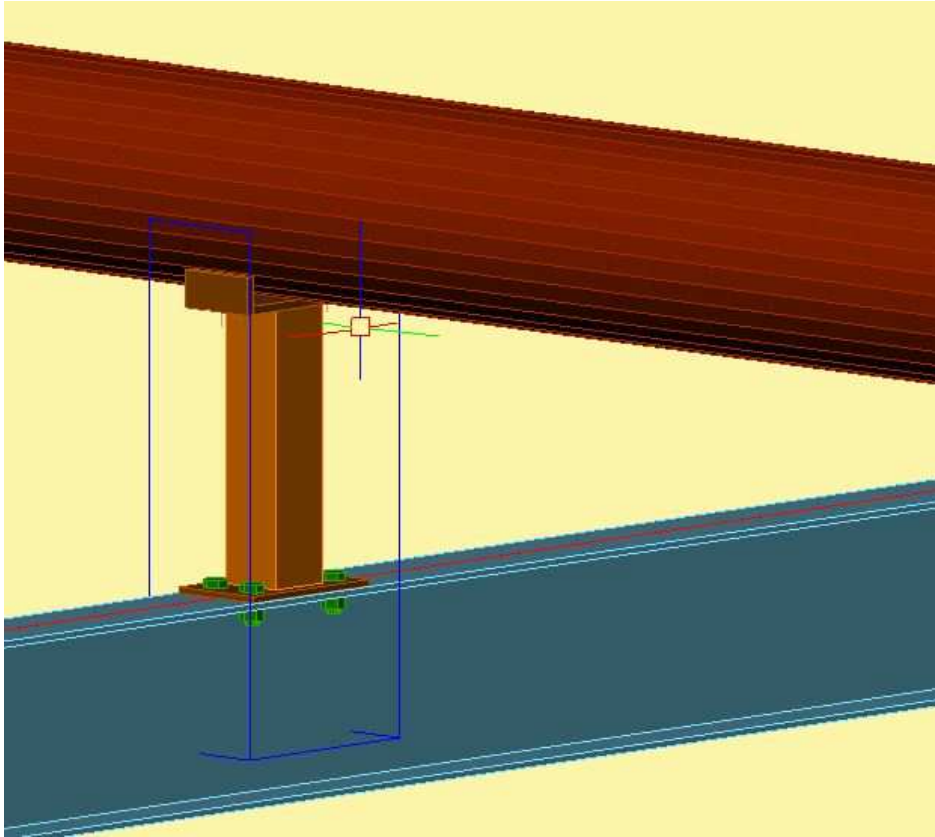
- Use the brick “bolts on beam” to create the bolts between plate & post.



- Weld the plate to stringers web.
- Run a clash check.
- Create the custom connection and save the file.
- Insert the connection to the posts in the model. Try also the posts on sloped stringers. Move the stringers inside railing macro.

5th example:

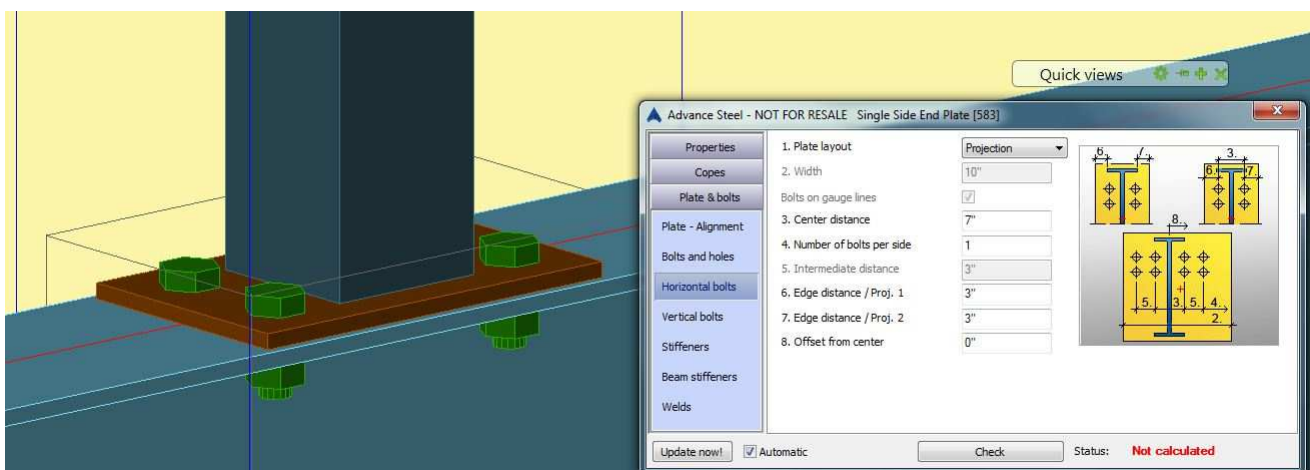
Pipe support (to be used for different distances between pipe and beam)

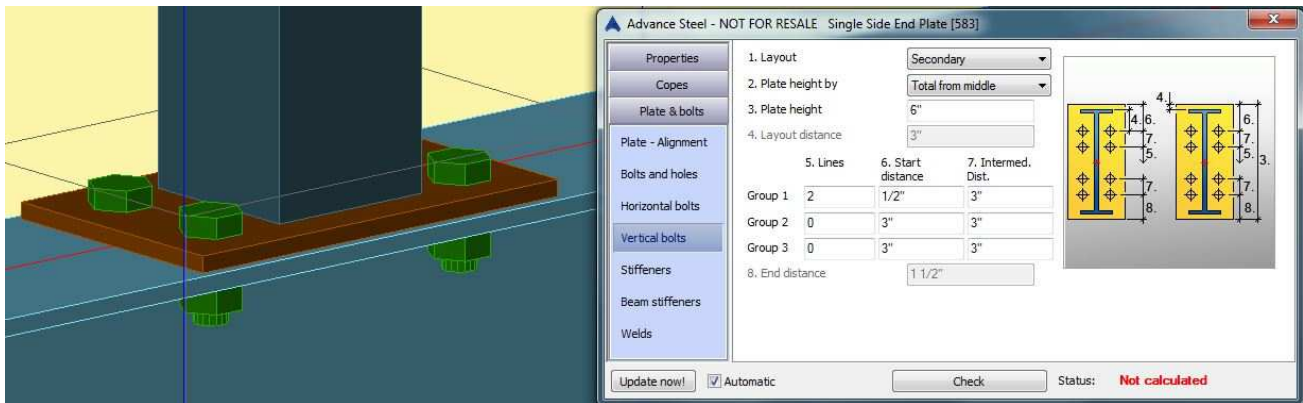


- Use the command “All visible” from “Quick views” palette in our model.
- Copy a pipe and one light blue beam under a pipe to a new drawing and save it in the custom connections folder
- Create a square rectangular beam AISC HSS square\HSS 4X4X3/8 from center of the light blue beam to top with a length of 2”

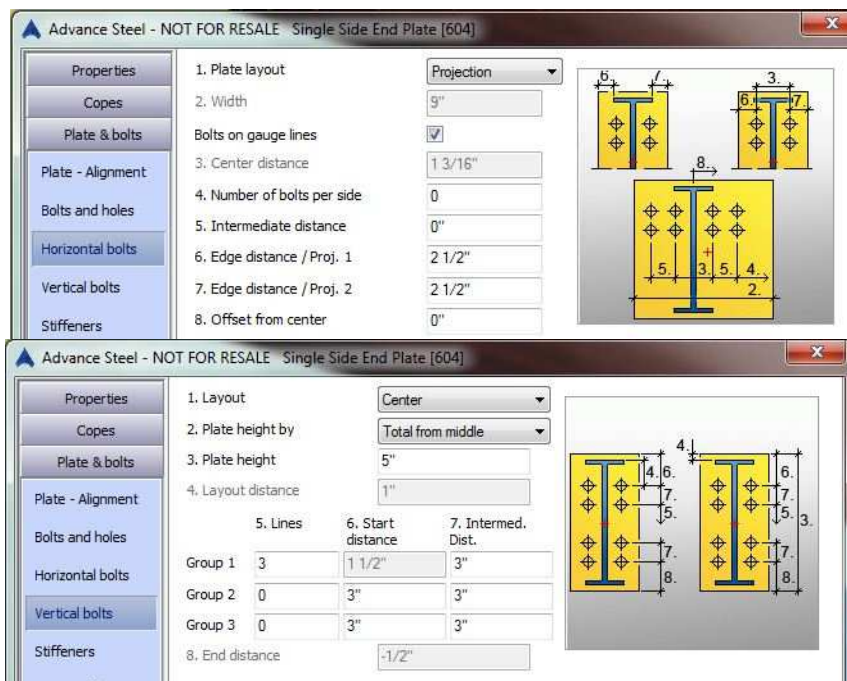
Note: To allow this connection to be used at different distances between beam and pipe it is key, to have the supporting section shorter than the distance.

- Connect the beam and the rectangular section with single side end plate connection from connection vault

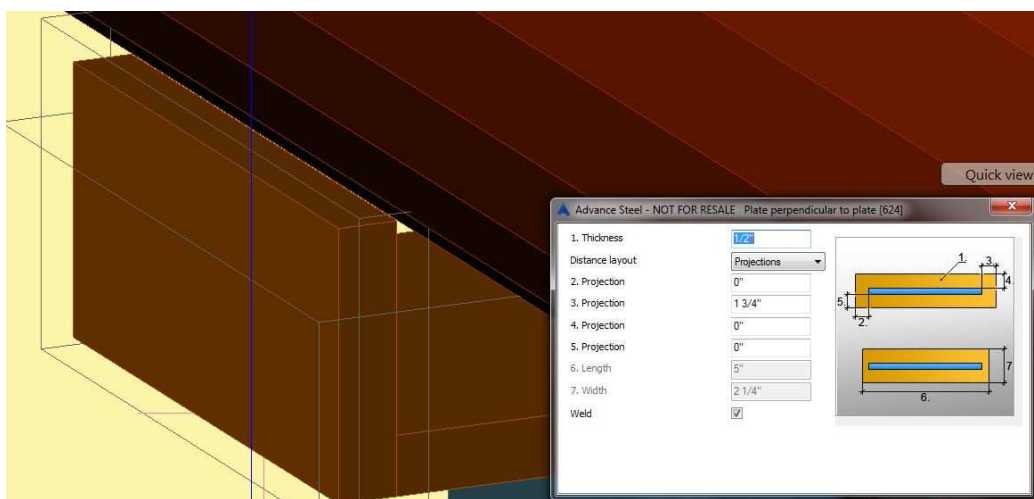




- If you like, you can add some stiffeners to the light blue beam using the stiffener connection from connection vault.
- Use also the single side end plate for the supporting plate under pipe



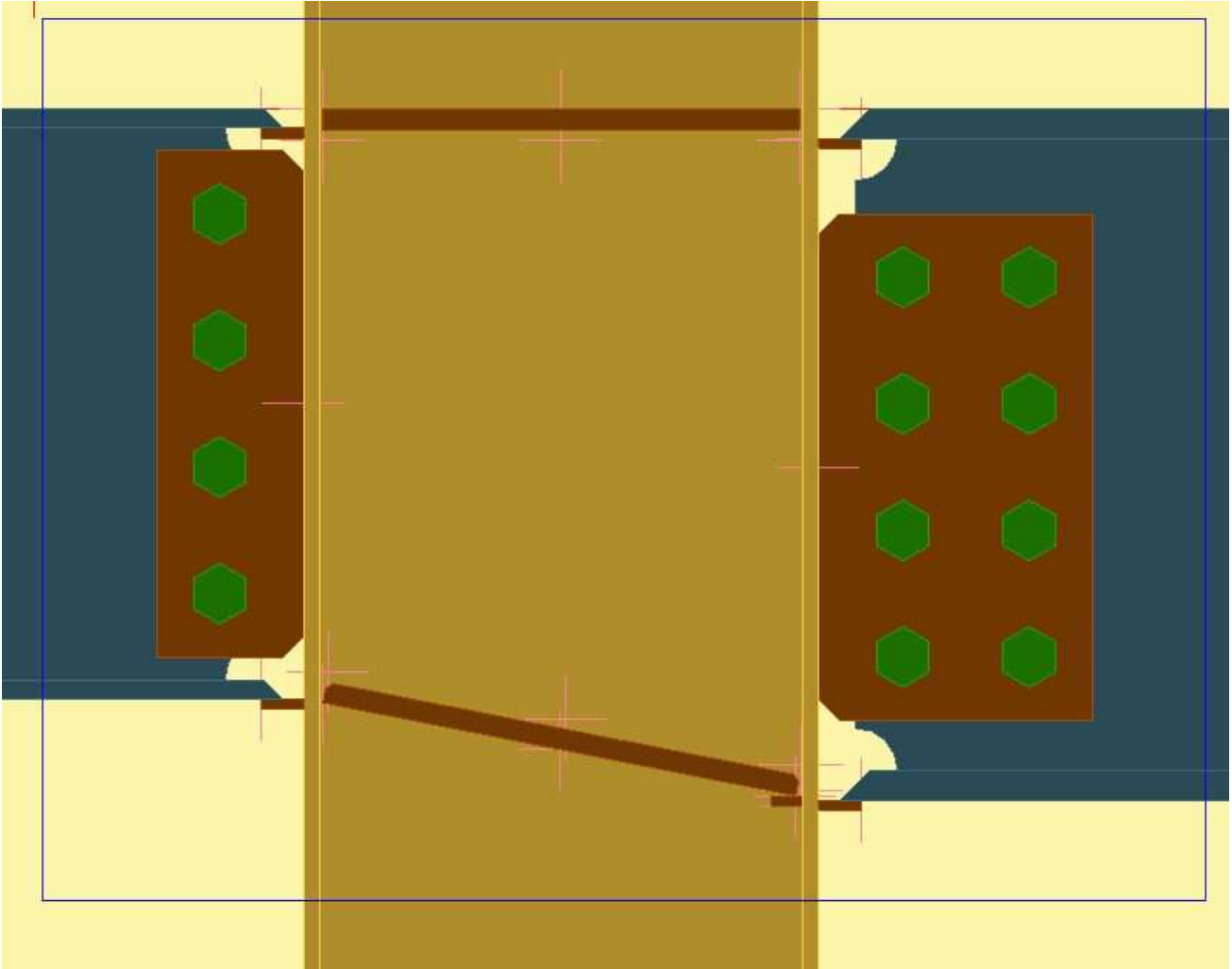
- Use brick "plate perpendicular to plate" to the plate edge.



- Copy this as a slave connection to the other side of the plate.
- Create the custom connection and insert it in the model to different situations.

6th example:

Try to use the things you know already and have learned in the last minutes to create the connection as shown below. Don't hesitate to ask, if you feel uncertain about the procedure at one point.



- Use the shear plate connection and moment connection from Connection vault
- Use the column stiffener brick from custom connection tab