AULON400

Architectural Metalwork in Advance Steel: Hands-on Lab for Beginners

Jonathan Hand
Excitech Ltd.

Learning Objectives

- Learn how to use Advance Steel for Architectural Metalwork
- Explore all the tools for adding a balcony & glazed railing and create fabrication drawings
- Create your own custom user section
- Get best practice tips & tricks for architectural metalwork detailing

Description

Get familiar and upskilled with architectural metalwork detailing using Advance Steel. In this hands-on lab you will learn how to detail a balcony unit complete with custom user sections and glazed panels. I will show all the tools in Advance Steel Revit that can be utilized for architectural metalwork detailing. As part of the lab, we will create all the required fabrication drawings and bill of materials. I will also share my tips & tricks about architectural detailing to help you produce your fabrication details.

Speaker(s)

Jonathan Hand (@handjonathan) is a consultant with Excitech Ltd in the UK. With over 15 years of experience, Jonathan has a unique blend of commercial, digital, and construction expertise. Jonathan's expertise lies with structural and off-site manufacture-related disciplines. In 2016 he was awarded Autodesk Expert Elite status.

Contents

Hands on Lab Overview

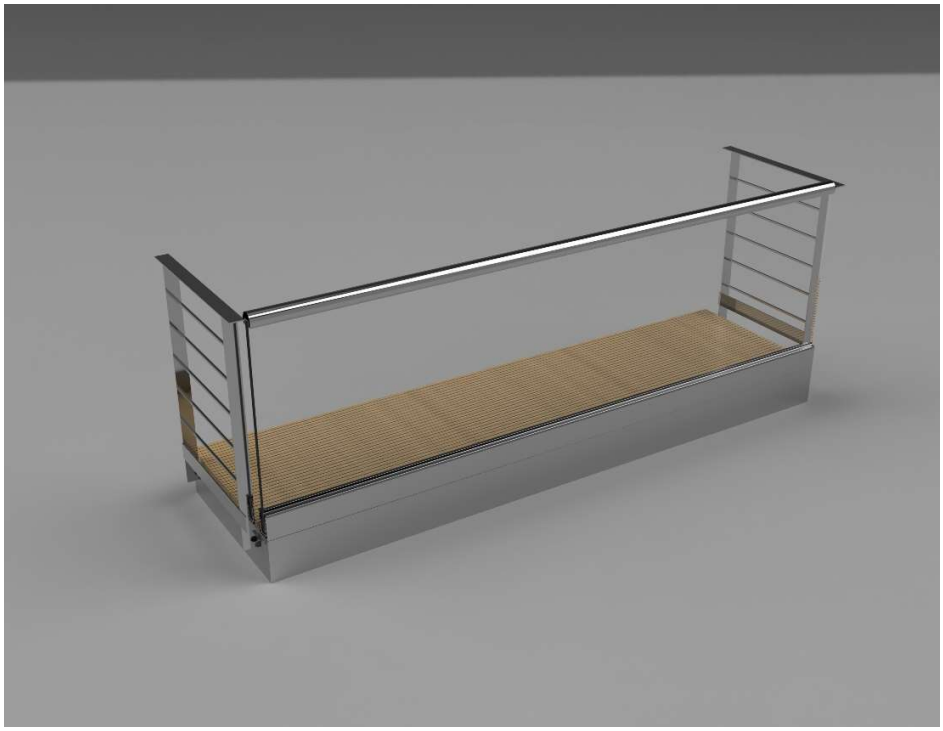
Icon Conventions

Recommended workflow or important points

Extra tips to enable the best from the system

User Exercise

New feature in Advance Steel 2020

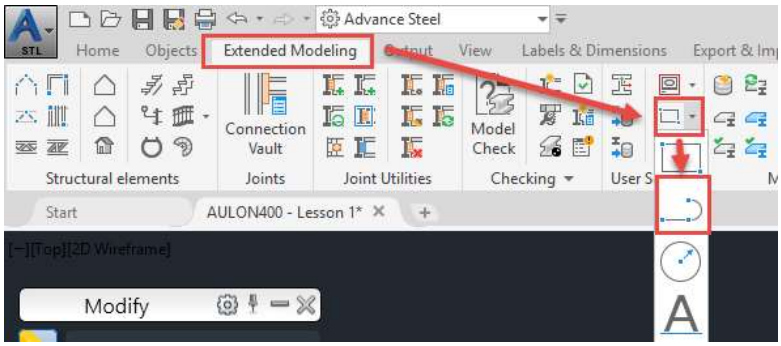


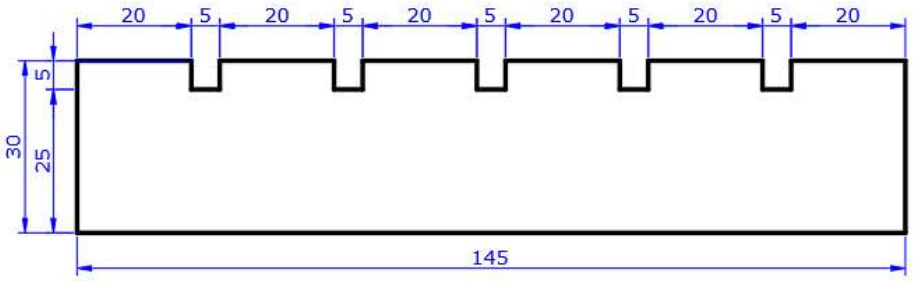
Lesson 1 – Glass Balustrade Kit

Create the decking profile

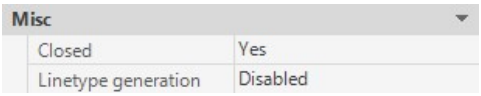
In this lesson, we will create the baluster and decking user profiles.

1. Open **AULON400 - Lesson 1.dwg** from your dataset folder
2. From the **Extended Modelling > User Section ribbon**, select the **polyline** command and create the shape as below for the decking profile

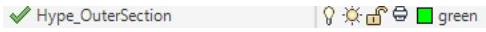




Ensure the polyline properties are set to closed

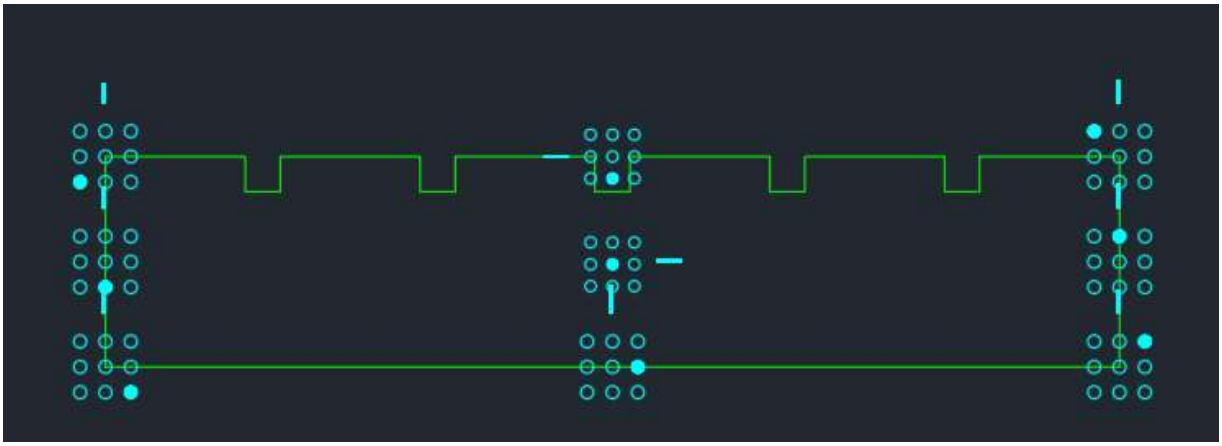


3. Set the layer of the polyline to **Hype_OuterSection**



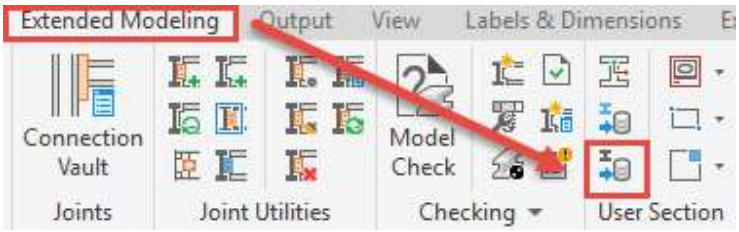
4. From the **Extended Modelling > User Section ribbon**, select the **reference axis** dropdown command and assign the reference axis to the 9 required points on the polyline shape.

Use linework where needed to define the (top middle) and (center, center) of the polyline

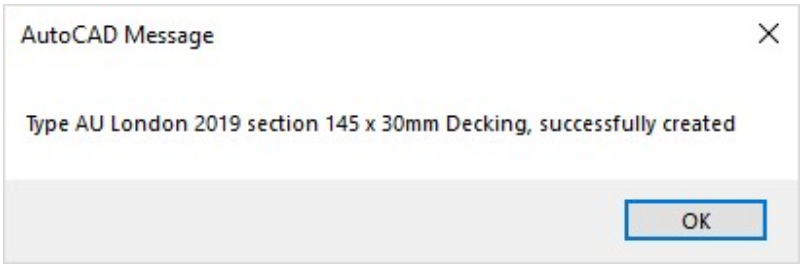


Generate the user section into the database

5. From the **Extended Modelling > User Section ribbon**, select **Generate All Sections**



6. Confirm creation of each user section



These user sections are written into the Advance Steel database and will now be available to use.

7. Close and save **AULON400 - Lesson 1.dwg**

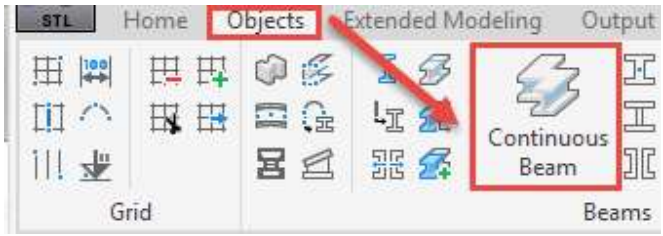
Lesson 2 – Main balcony beam and connections

Add balcony beams

In this lesson, we will create main support beams for the balcony and create connection between all members.

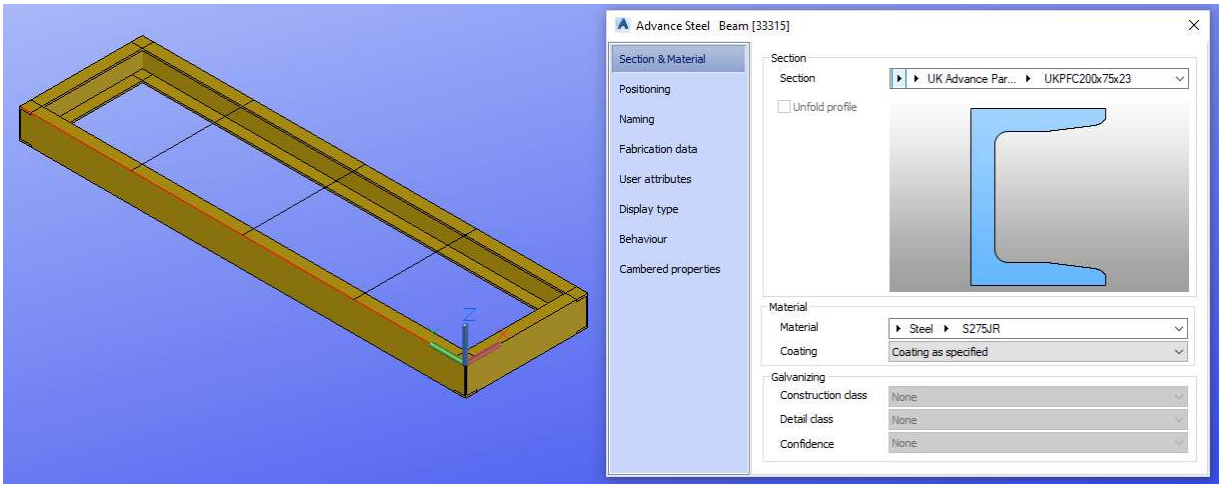
1. Open **AULON400 - Lesson 2.dwg** from your dataset folder

2. From the **Objects > Beams ribbon**, select the **Continuous Beam** command and create the outer beams

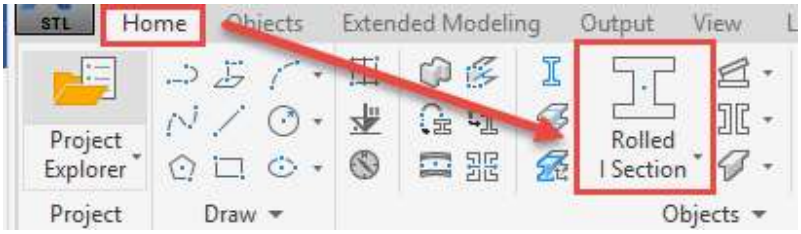


3. Set the beam section to **Channels > Parallel Flange Channels > PFC200x75x23**

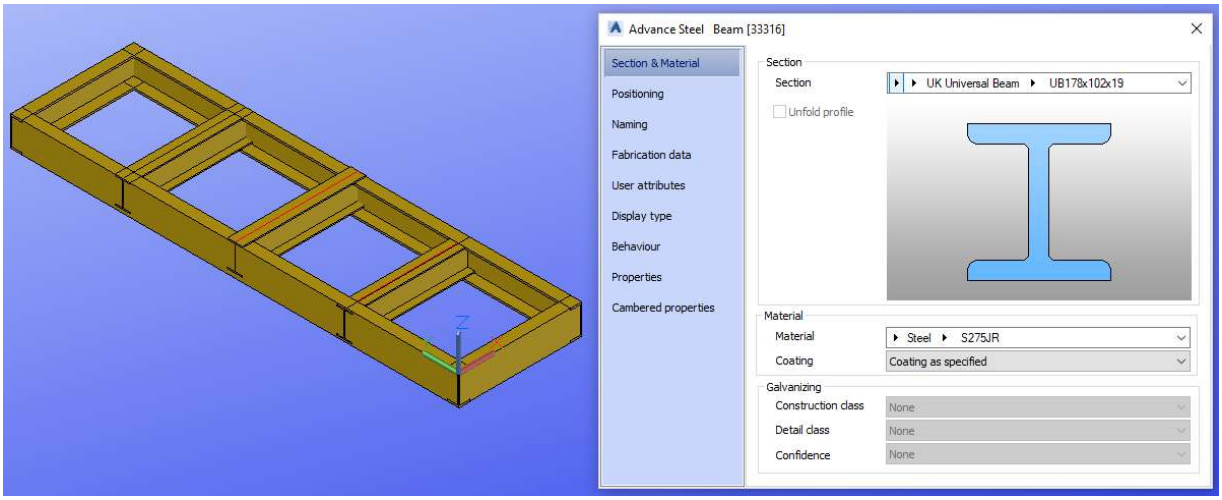
Ensure the channel is positioned **toes in** and the **model role** is set to **Beam**



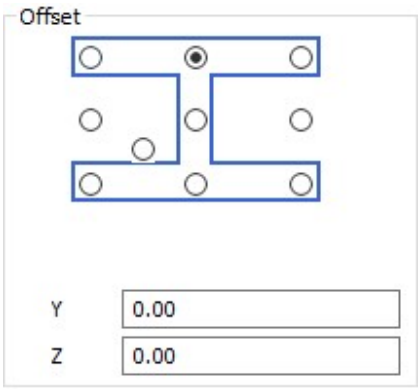
4. From the **Home > Objects ribbon**, select the **Rolled I Section** command and create the intermediate beams



5. Set the beam section to I Sections > UK Universal Beam > UB178x102x19



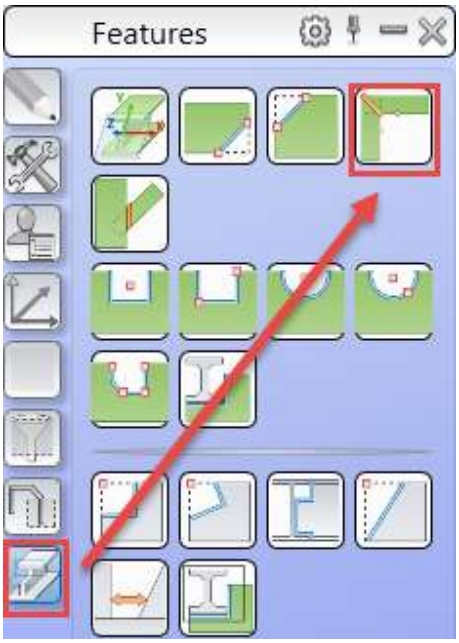
Ensure the I Beams are is positioned **top centre** and the **model role** is set to **Beam**



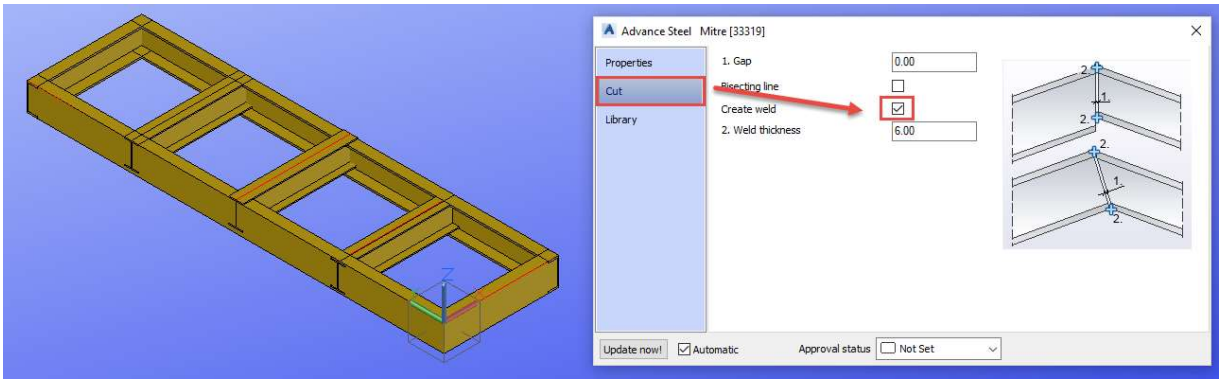
Add mitre connections

1. Open **Advance Steel Tool Palette** if not already open from the **Home > Extended Modelling ribbon**

2. Select the **Features Palette** and select the **Mitre** tool

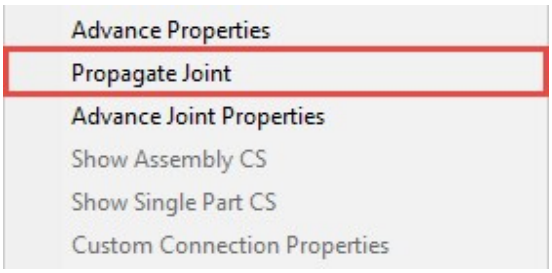


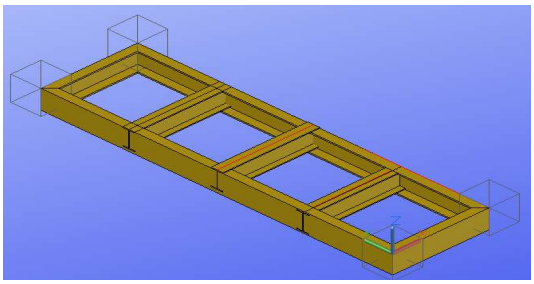
3. Create a **mitre** between 2 of the channel sections that form a corner
4. Select the **Section to cut against** > Channel Section 1
5. Select the **Section to cut** > Channel Section 2
6. Set the **Create Weld** option in the **Cut Tab**



7. Select the **grey joint box** that controls the mitre connection

8. Right Click and select **Propagate Joint**



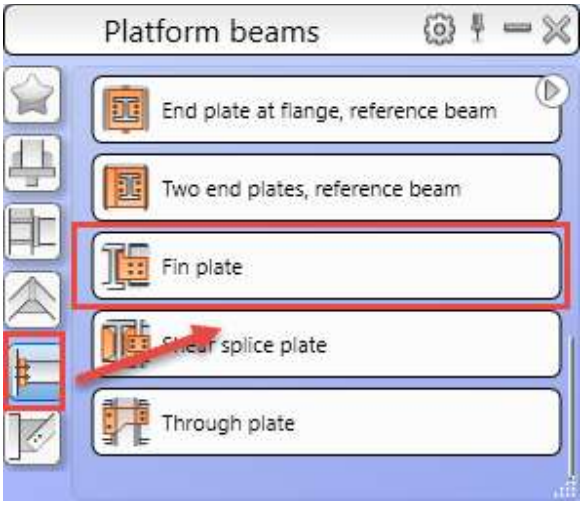


The mitre connection will now be automatically positioned at each corner of the balcony frame.

Add fin plate connections

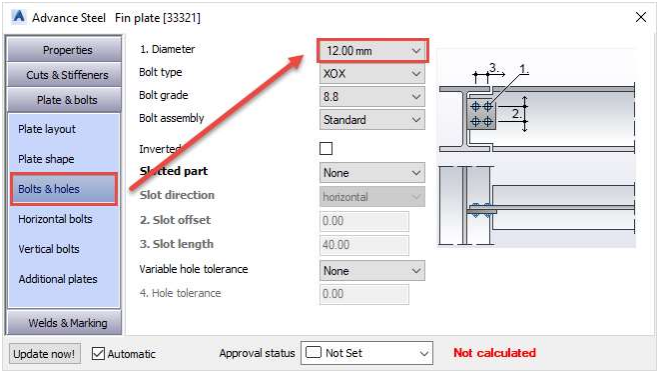
1. Open **Connection Vault** if not already open from the **Home > Objects ribbon**

2. Select the **Platform Beam** tab and select the **Fin Plate** connection tool



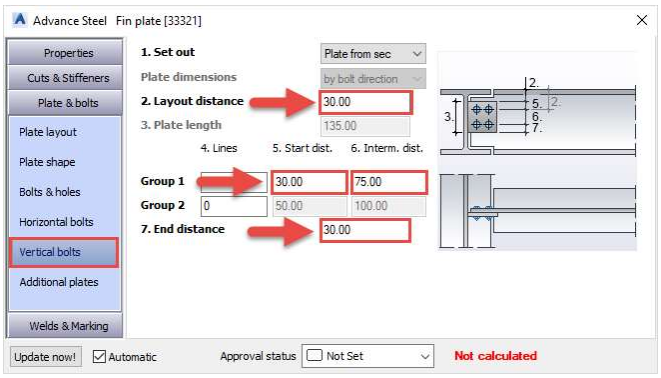
3. Select the **main beam** > Channel Section
4. Select the **secondary beam** > I Section

5. Right Click to confirm selection
6. Set the **Bolt Diameter** to **12mm**



7. Set the **Vertical bolts** as per the below

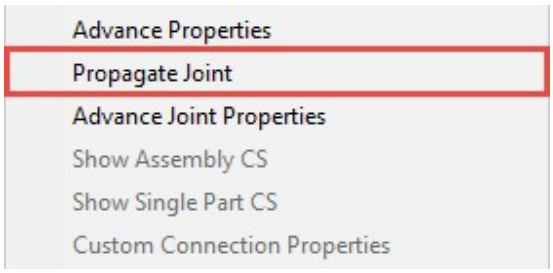
   a. Layout Distance – **30mm**
   b. Group 1 Start Distance – **30mm**
   c. Group 1 Intermediate Distance – **75mm**
   d. End Distance – **30mm**

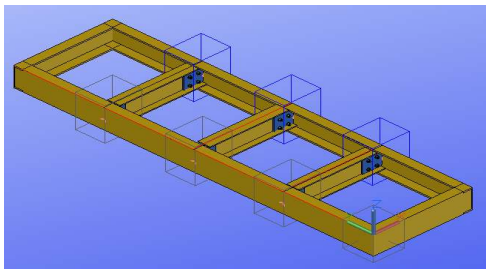


8. Close the dialog box
9. Select the **grey joint box** that controls the fin plate connection

NEW

10. Right Click and select **Propagate Joint**





The fin plate connection will now to automatically positioned at channel and I section intersections.

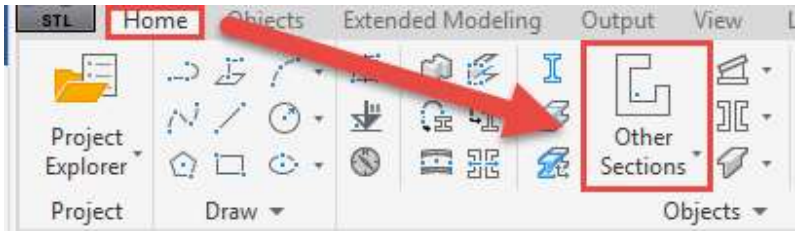
Lesson 3 – Glazing

In this lesson, we will add the glazing baluster support and glazed panel

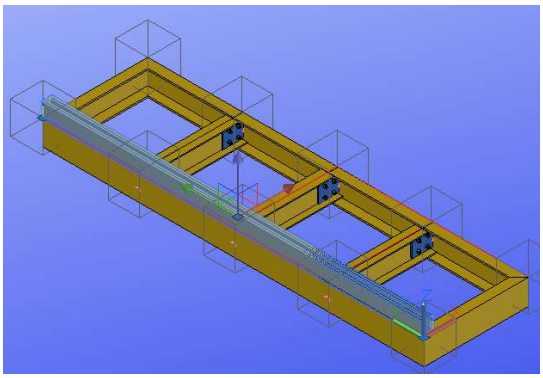
Add Balustrade Section

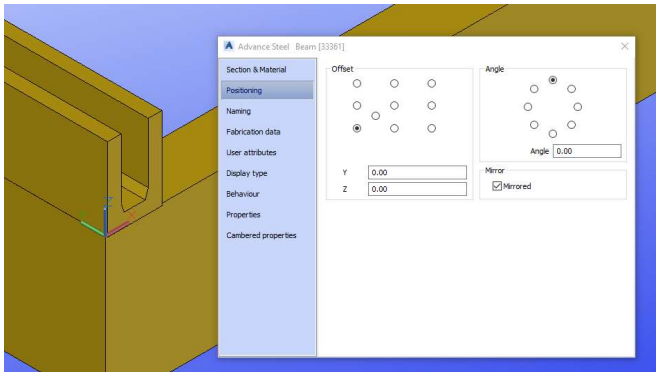
1. Open **AULON400 - Lesson 3.dwg** from your dataset folder or continue from **AULON400 – Lesson 2.dwg**

2. From the **Home > Objects ribbon**, select the **Other Sections** command.



3. Add a beam so that its sits on top of the channel section as shown below





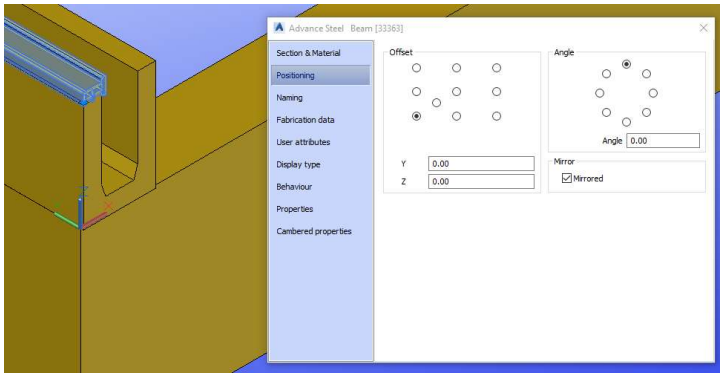
4. Set the user section as **Other Profiles > All > AU London 2019 > Bottom Rail**
5. Set the position of the beam so that it is flush with the channel section

Ensure the **model role** is set to **Beam**

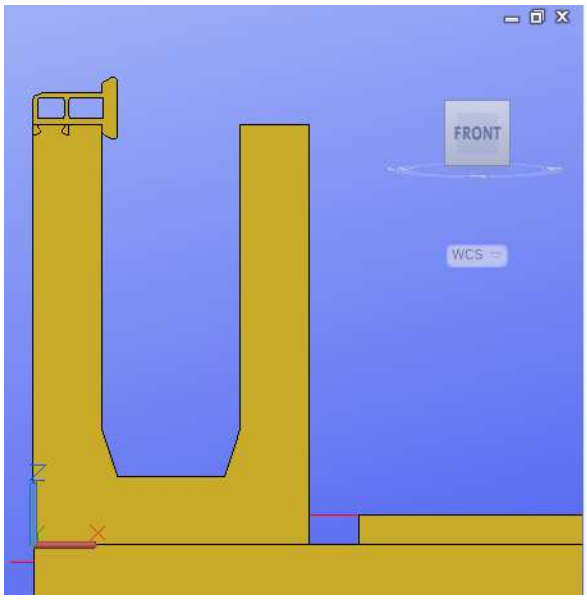
Add Balustrade Packer

1. From the **Home > Objects ribbon**, select the **Other Sections** command
2. Add a beam so that its sits on top of the previously placed beam
3. Set the user section as **Other Profiles > All > AU London 2019 > Bottom Packer**

Ensure the **model role** is set to **Beam**

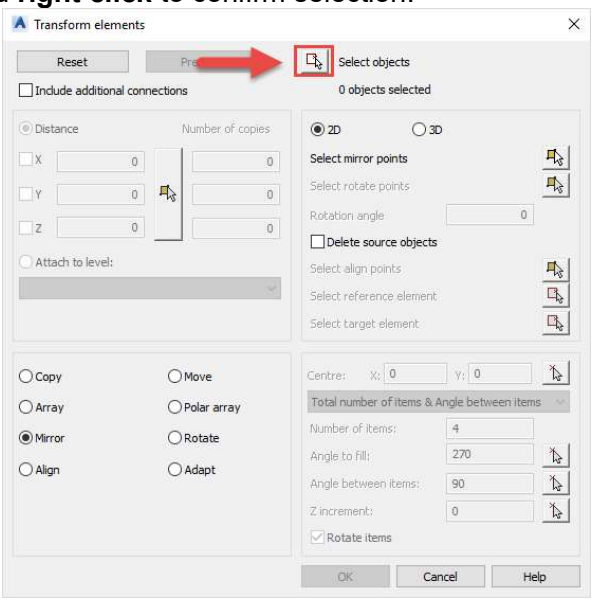


4. Change the view using the view cube to **Front** and zoom in on the baluster sections as below

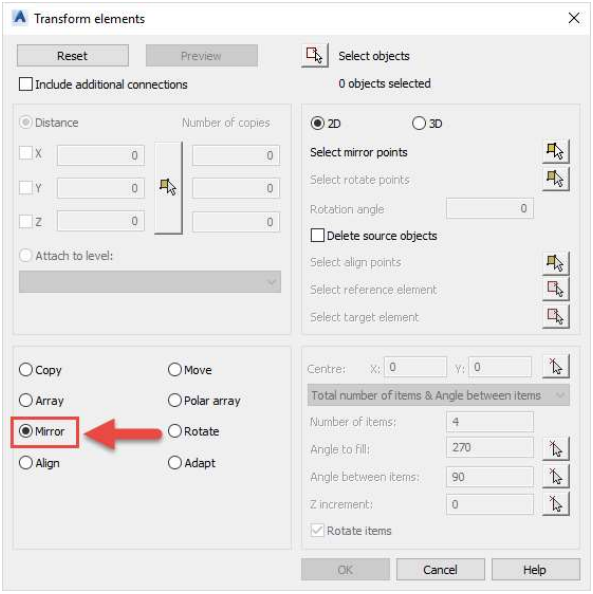


5. Select **Transform Elements** from the **Tools** Tool Palette

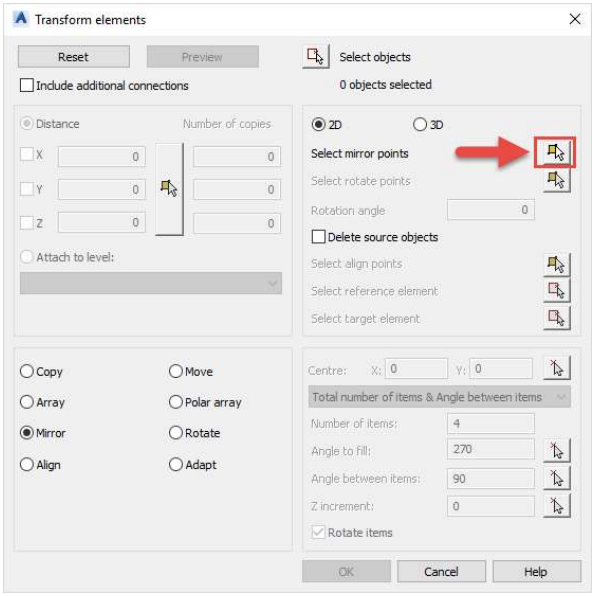
6. Using the select objects button, select the **Bottom Packer** you have just placed in the model and **right click** to confirm selection.

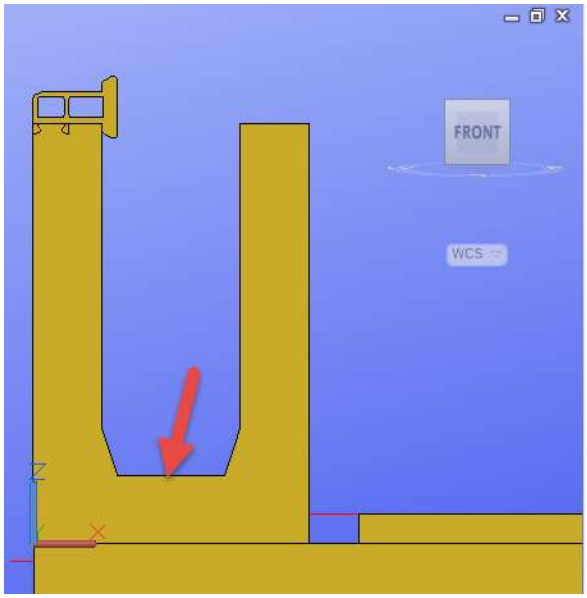


7. Set the **mirror** option as below

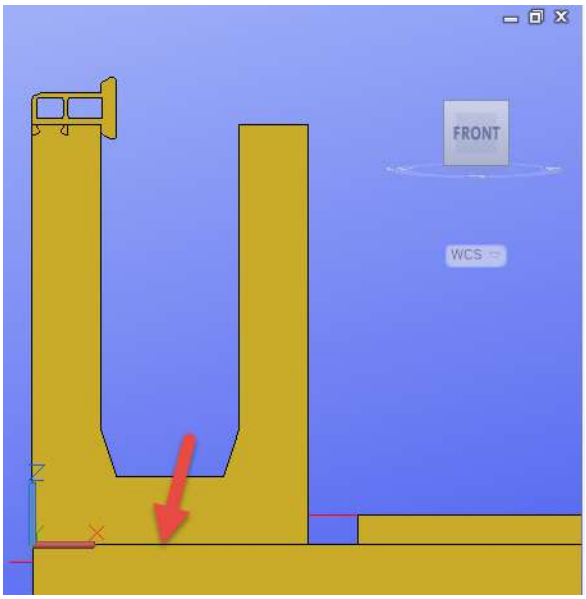


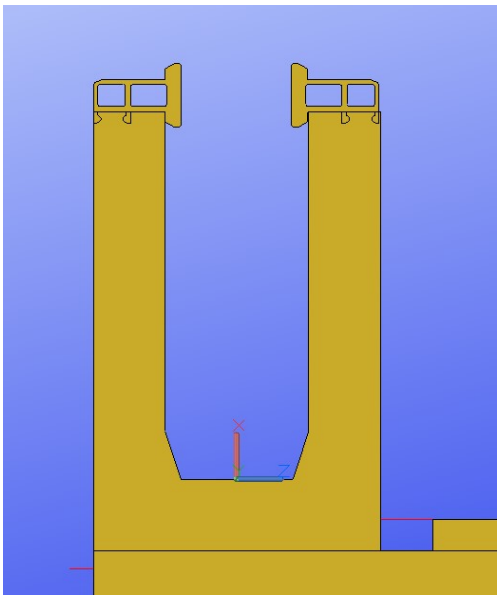
8. **Select mirror points** button and select the first midpoint as shown





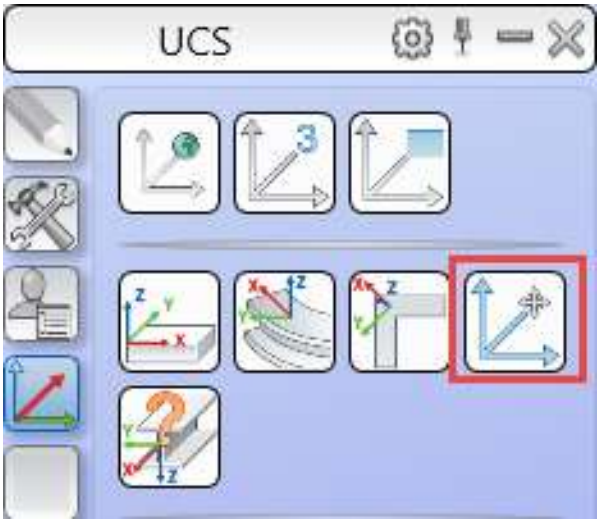
9. Select the **second mirror point** as shown and select OK when the transform elements dialog shows.

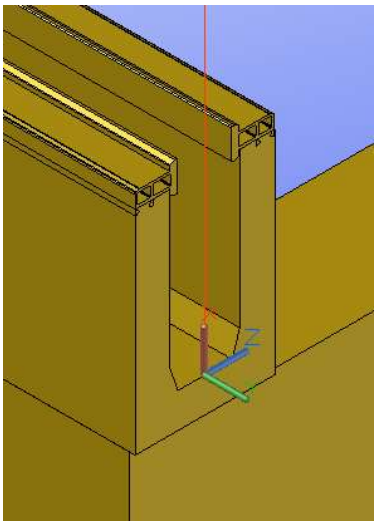




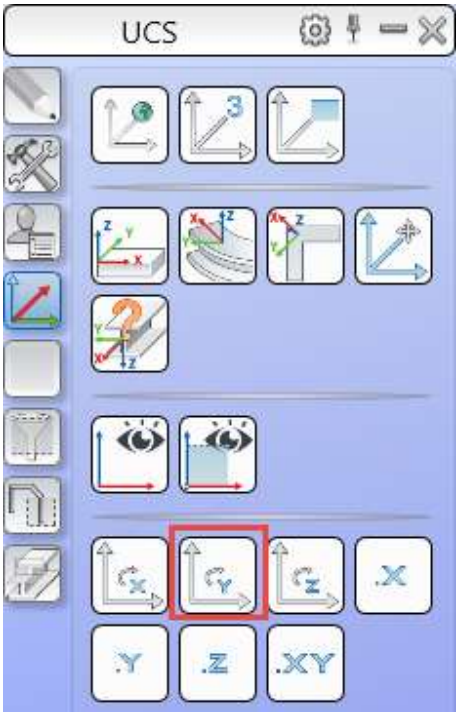
Add Glazing to Balustrade

1. From the **UCS Palettes,** select **Move UCS**. Position the **UCS** on middle of the inner edge of the baluster beam as shown below.

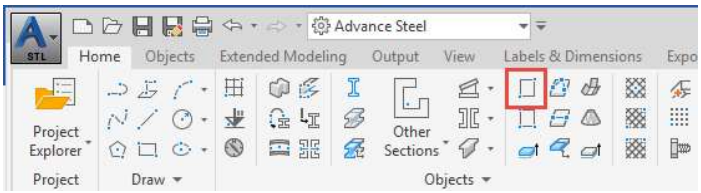




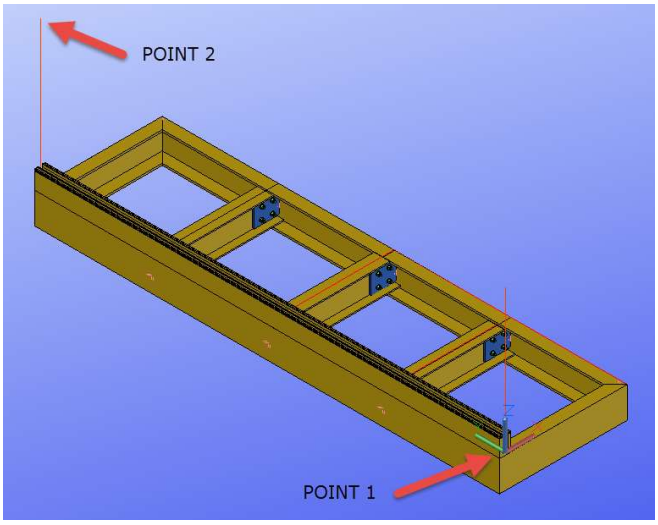
2. Rotate the UCS about **Y** once using the **Rotate UCS About Y** command



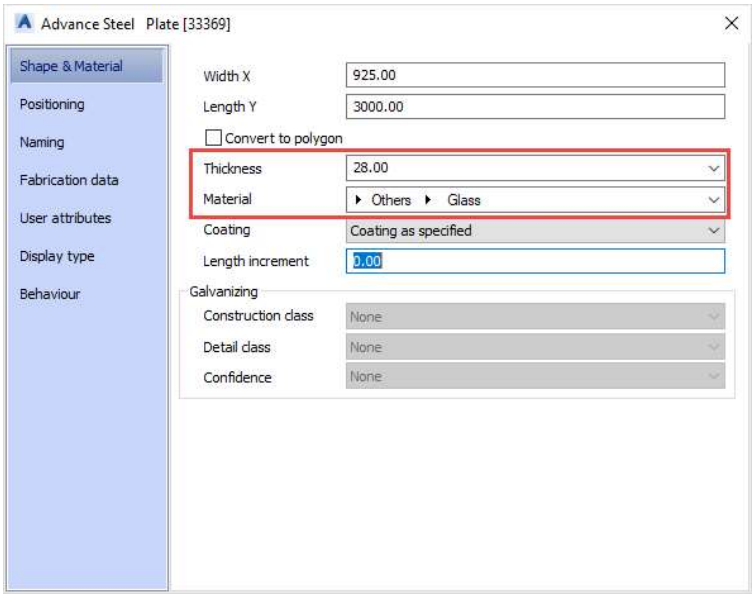
3. From the **Home > Objects ribbon**, select the **Rectangular Plate, 2 points** command and create the glazing plate



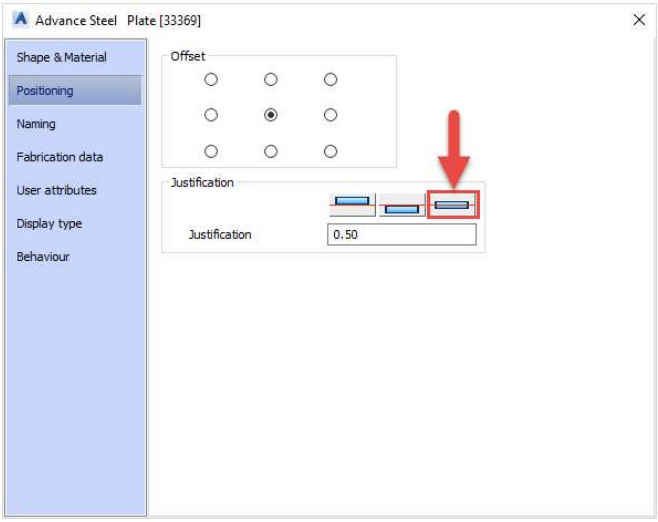
Use the red construction line as the 2 rectangular points



4. Set the thickness to **28mm** and the material to **Glass**

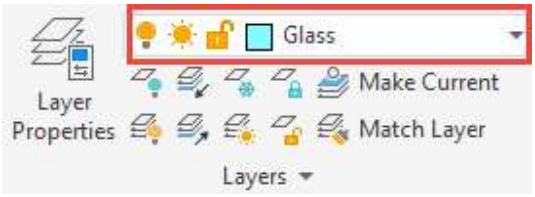


5. On the positioning tab, set the plate justification to center

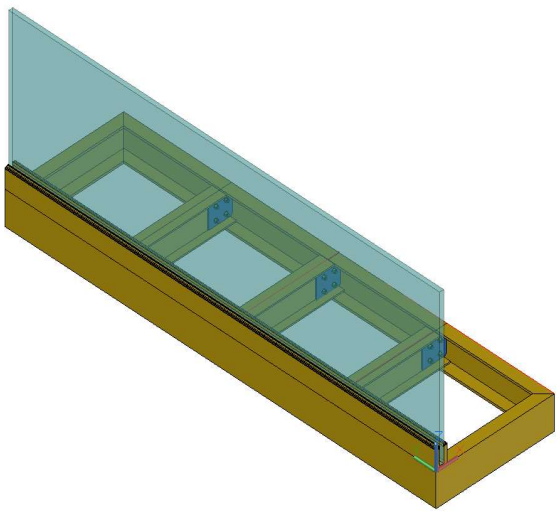


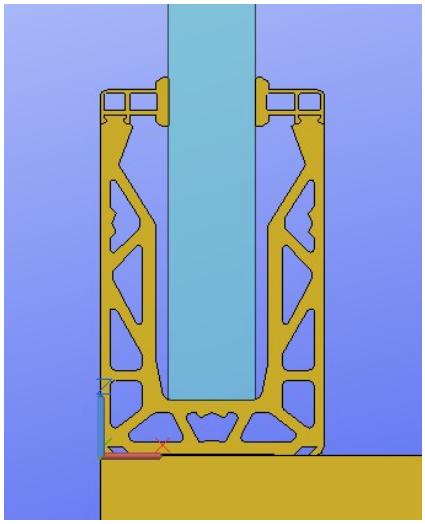
Set the **model role** to **plate**

6. Select the plate and change the layer to Glass



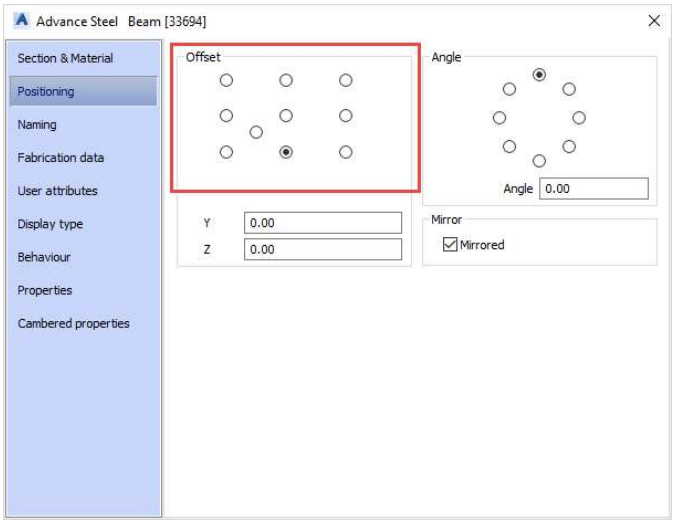
7. Select the Balustrade Support and right click to select **Advance Properties**, change the Display to **Exact**

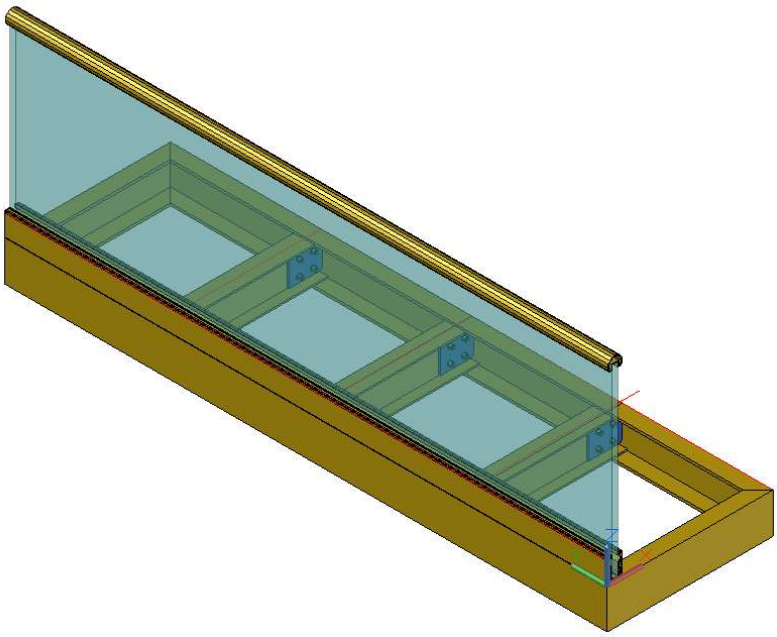




8. From the **Home > Objects ribbon**, select the **Other Sections** command
9. Add a beam so that its sits on top of the glazed panel, Picking the midpoints at the top of the glazing
10. Set the user section as **Other Profiles > All > AU London 2019 > Top Rail**
11. Set the position to be **Bottom Centre**

Set the **model role** to **plate**



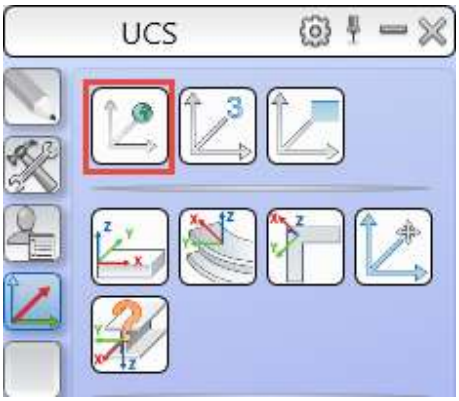


Lesson 4 – Railing & Decking

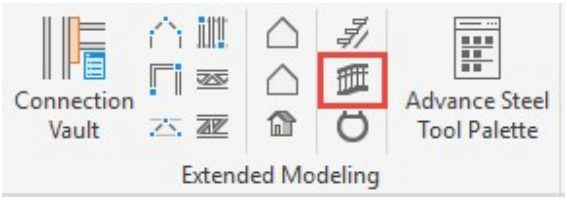
In this lesson, we will add the railing sections and the timber decking to the balcony.

Add Railing sections

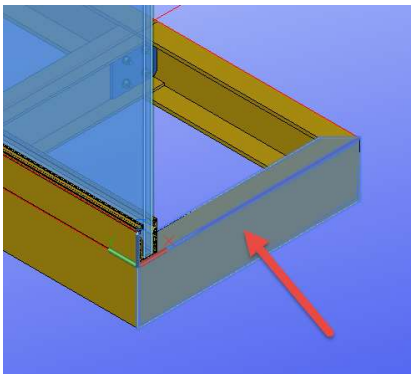
1. Open **AULON400 - Lesson 4.dwg** from your dataset folder or continue from **AULON400 – Lesson 3.dwg**
2. Reset the **UCS** back to **World** using the UCS Palette



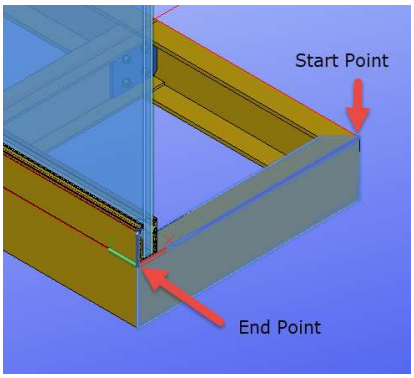
3. From the **Home > Extended Modeling ribbon**, select the **Hand Railing** command



4. Select the **side channel section**, right click to confirm selection

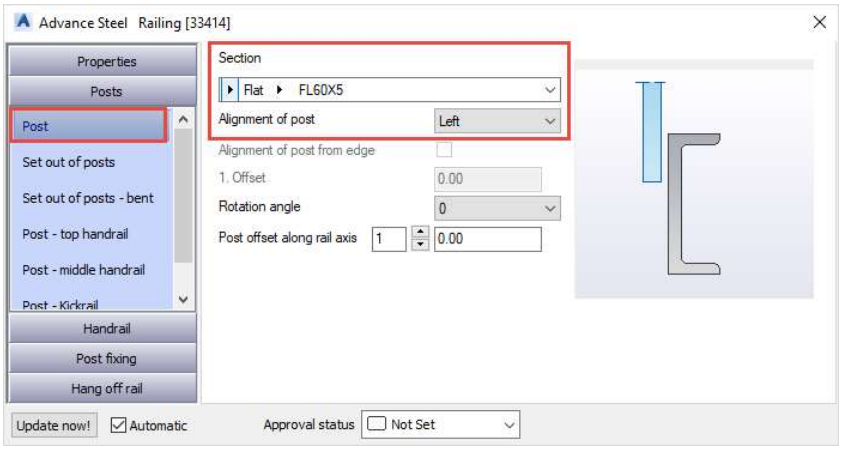


5. Select the **start** and **end** points as shown



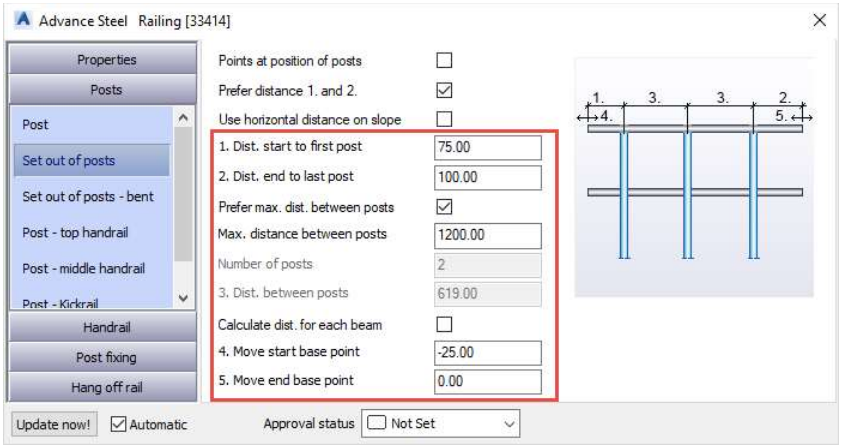
6. Select **No**, when prompted **"Do you want to select a nosing point relative to the start point?"**
7. On the **Posts > Posts** tab, set the following

   a. Section: **Flat > FL60x5**
   b. Alignment of Post: **Left**



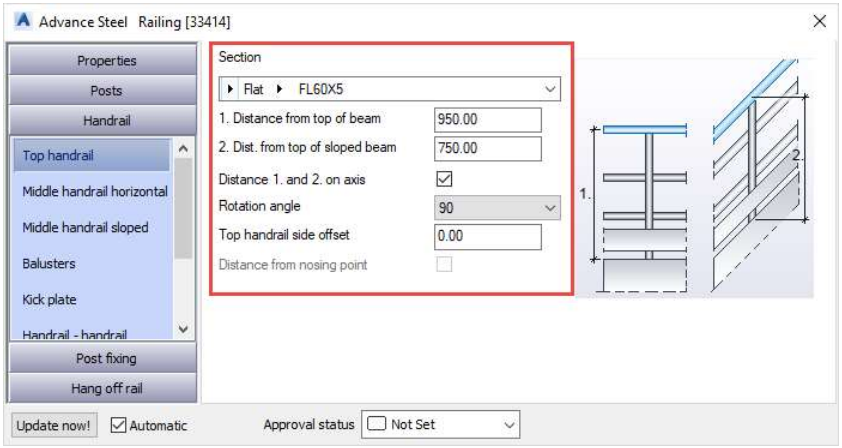
8. On the **Posts > Set out of posts tab**, set the following

    a. Dist. Start to first post: **75mm**
    b. Dist. End of last post: **100mm**
    c. Max. distance between post: 1200mm
    d. Move start base point: **-25mm**
    e. Move end base point: **0mm**



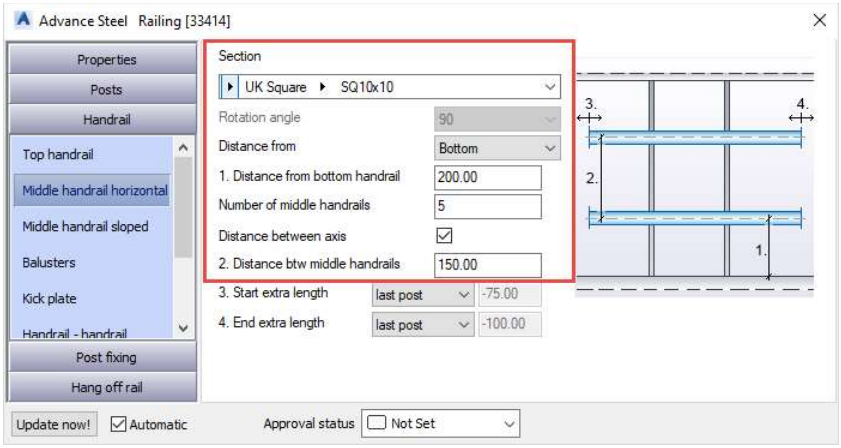
9. On the **Handrail > Top Handrail**, set the following

    a. Section: **Flat > FL60x5**
    b. Distance from top of beam: **950mm**
    c. Rotation Angle: **90**



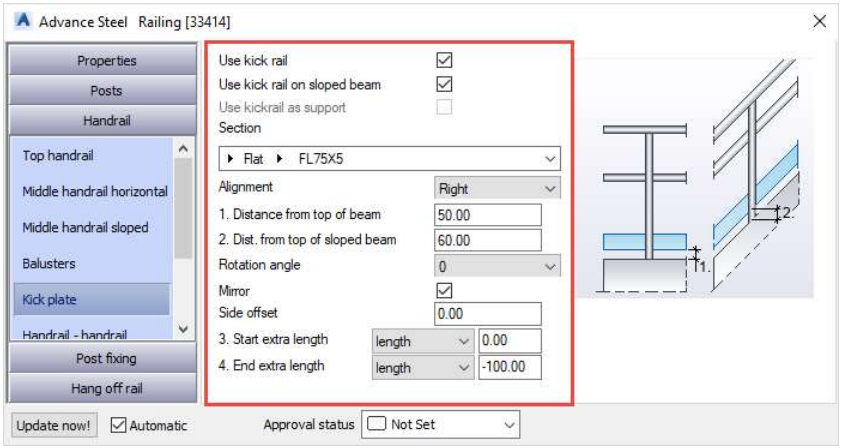
10. On the **Handrail > Middle handrail horizontal**, set the following

    a. Section: **UK Square > Sq10x10**
    b. Distance From: **Bottom**
    c. Distance from bottom handrail: **200mm**
    d. Number of middle handrails: **5**
    e. Distance btw middle handrails: **150mm**



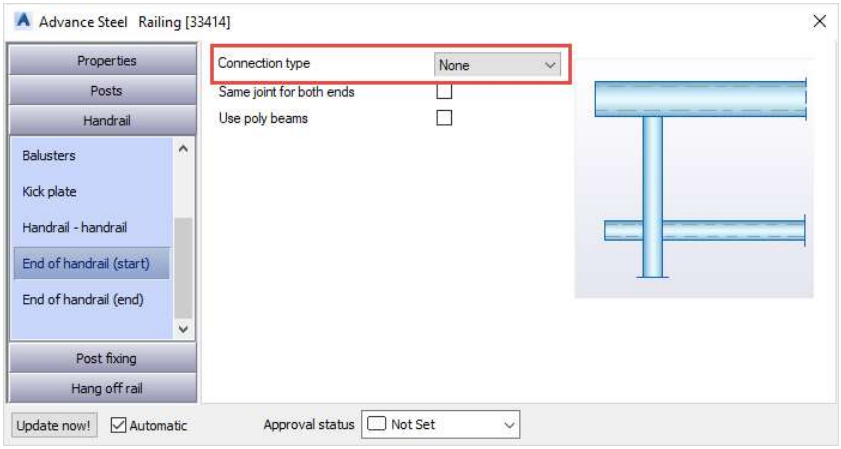
11. On the **Handrail > Kickplate**, set the following

    a. Use Kick Rail: **Tick On**
    b. Section: **Flat > FL75x5**
    c. Alignment: **Right**
    d. Distance from top of beam: **50mm**
    e. Rotation Angle: **0**
    f. Side Offset: **0**
    g. Start extra length: **0mm**
    h. End extra length: **-100mm**



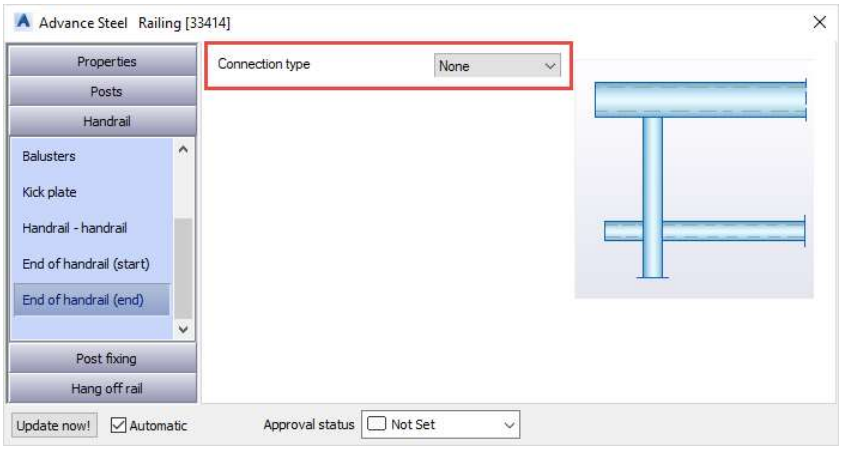
12. On the **Handrail > End of handrail (start)**, set the following

    a. Connection type: **None**



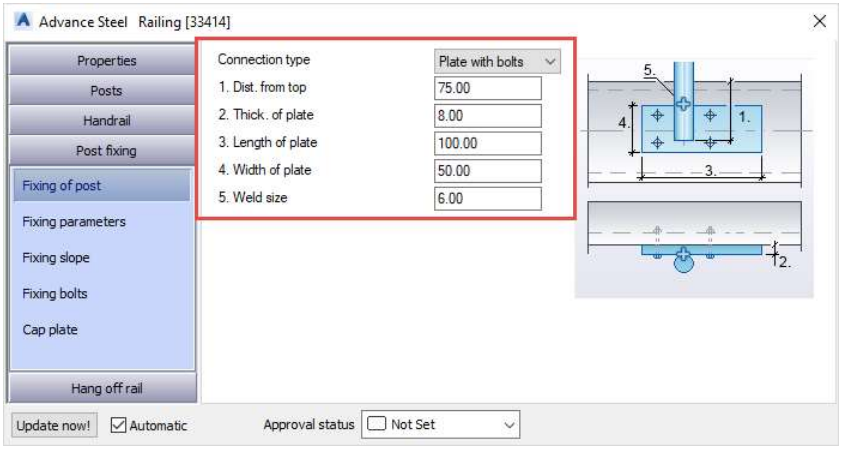
13. On the **Handrail > End of handrail (end)**, set the following

    a. Connection type: **None**



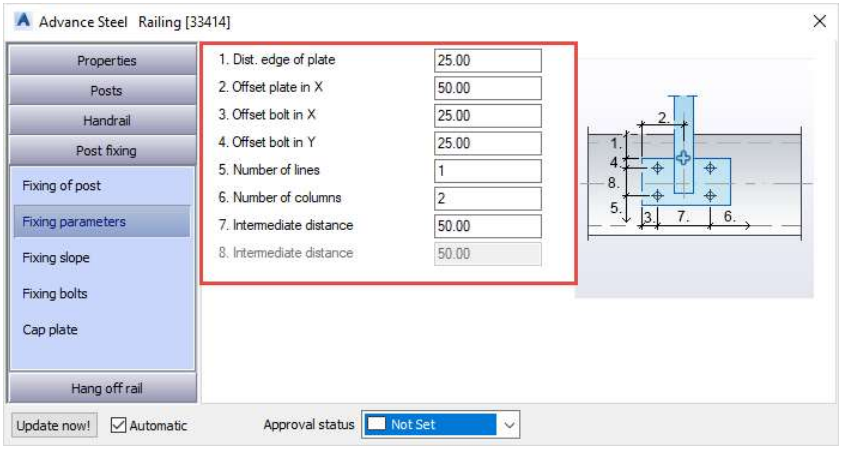
14. On the **Post Fixing > Fixing of Post** set the following

    a. Connection type: **Plate with bolts**
    b. Dist. from top: **75mm**
    c. Thick. Of plate: **8mm**
    d. Length of plate: **100mm**
    e. Width of plate: **50mm**
    f. Weld size: **6mm**



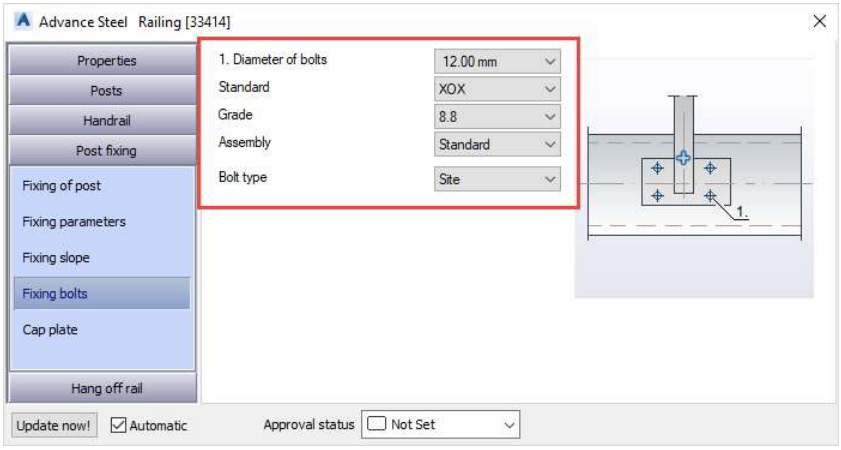
15. On the **Post Fixing > Fixing Parameters** set the following

    a. Dist. edge of plate: 25mm
    b. Offset plate in X: **50mm**
    c. Offset bolt in X: **25mm**
    d. Offset bolt in Y: **25mm**
    e. Number of lines: **1**
    f. Number of columns: **2**
    g. Intermediate distance: **50mm**

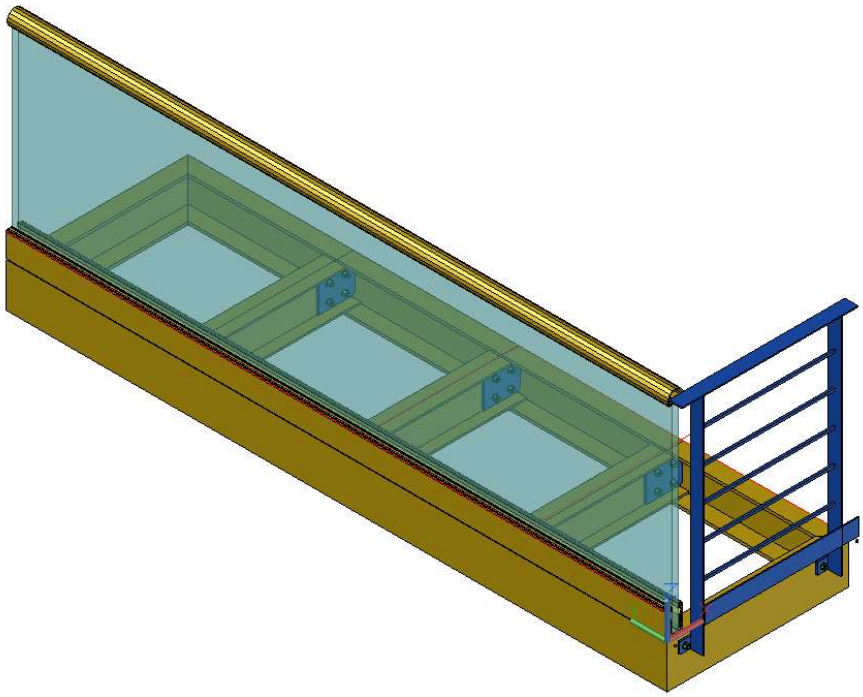


16. On the **Post Fixing > Fixing Bolts** set the following

    a. Dist. edge of plate: 25mm
    b. Offset plate in X: **50mm**
    c. Offset bolt in X: **25mm**
    d. Offset bolt in Y: **25mm**
    e. Number of lines: **1**
    f. Number of columns: **2**
    g. Intermediate distance: **50mm**



17. Close Dialog box



Copy Railing

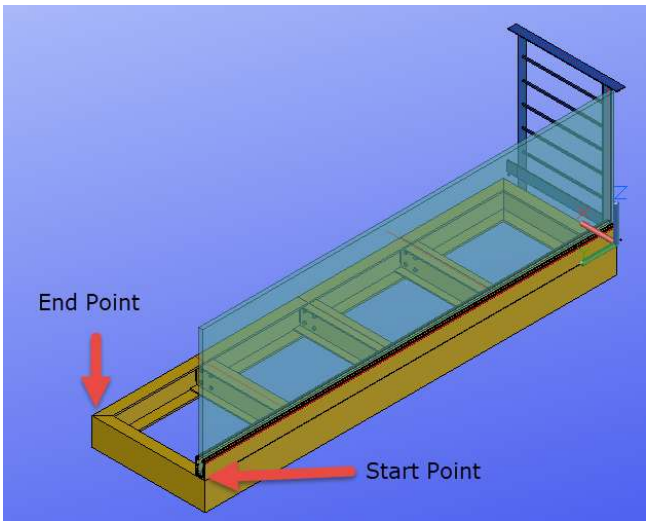
1. From the **Tools Palette,** select **Joint Copy** to copy the railing to the other side of the balcony.

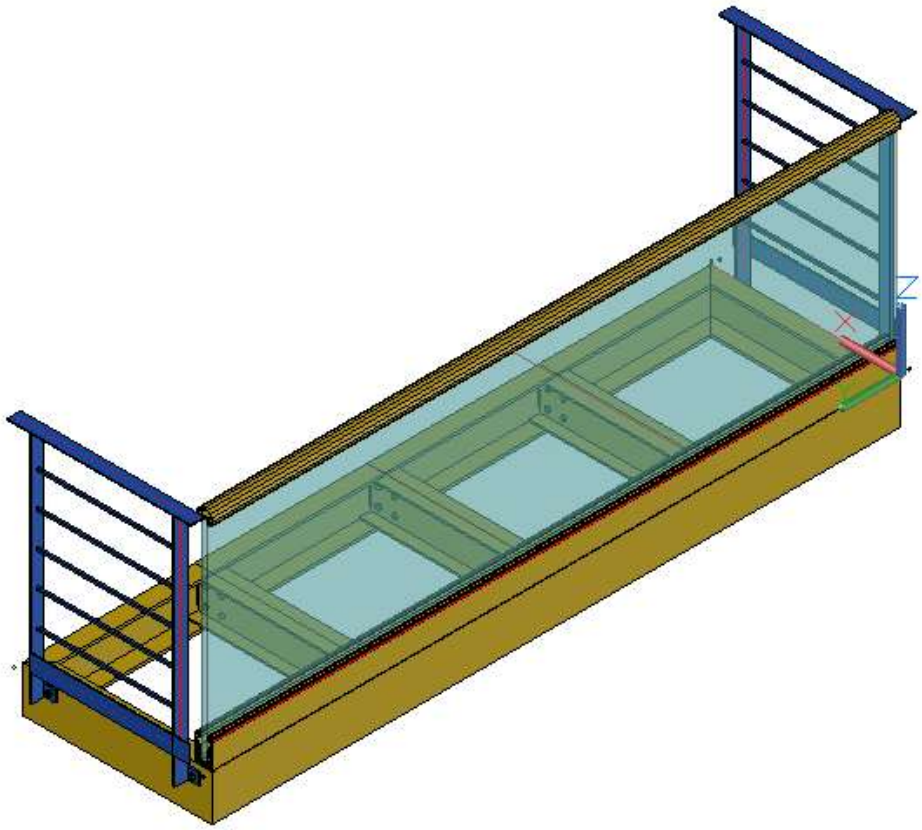
2. Select **Connection Part**

This can be any part of the railing, including the grey joint box

3. Select **Base beam for railing**, this will be the other side channel section

It will be easier to select the base beam if the model is orbited as its trickier to select through the glass panel.

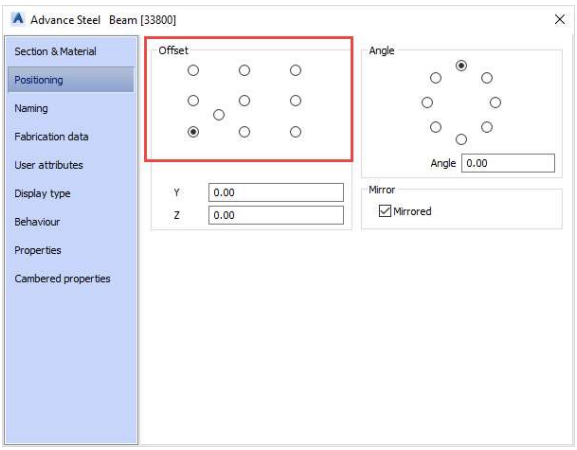


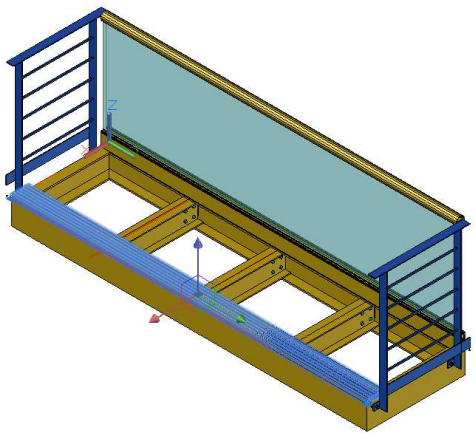


Add Decking

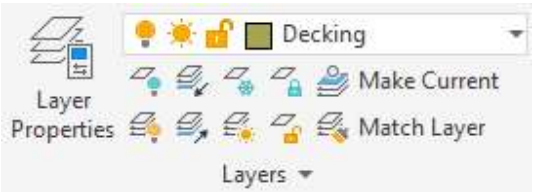
1. From the **Home > Objects ribbon**, select the **Other Sections** command
2. Add a beam so that its sits on top of the balcony frame, Picking the corner endpoints
3. Set the user section as **Other Profiles > All > AU London 2019 > 140 x 30mm Decking**
4. Set the position to be **Left Bottom**

Set the **model role** to **beam**



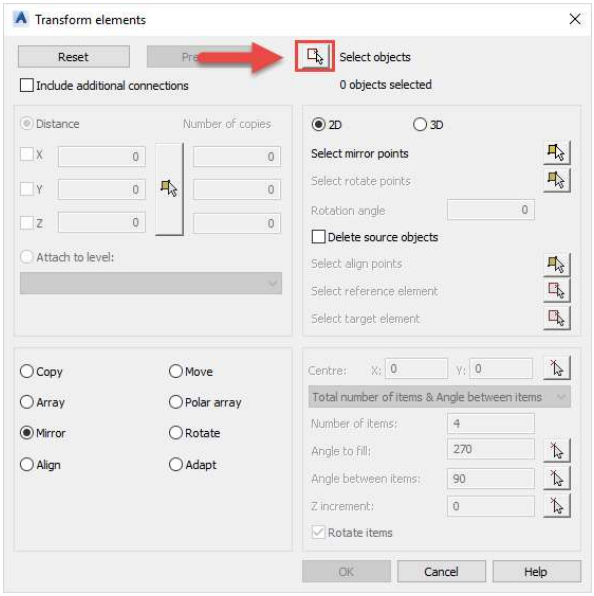


5. Set the layer of the decking beam to **Decking**

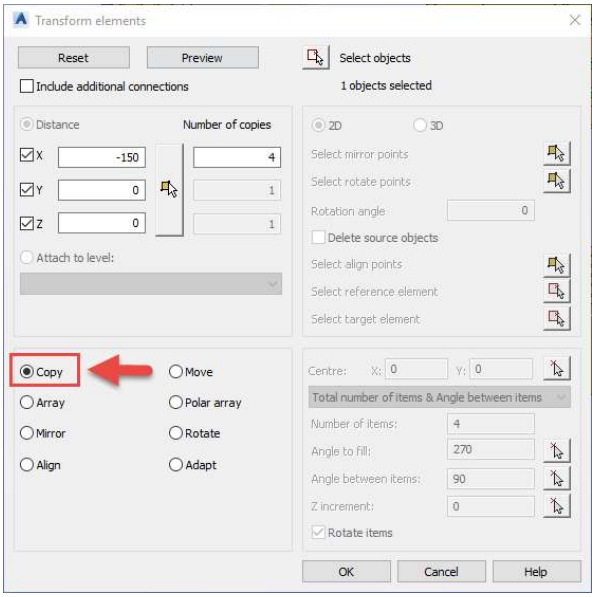


6. Select **Transform Elements** from the Tools Tool Palette

7. Using the select objects button, select the **Decking** you have just placed in the model and **right click** to confirm selection.

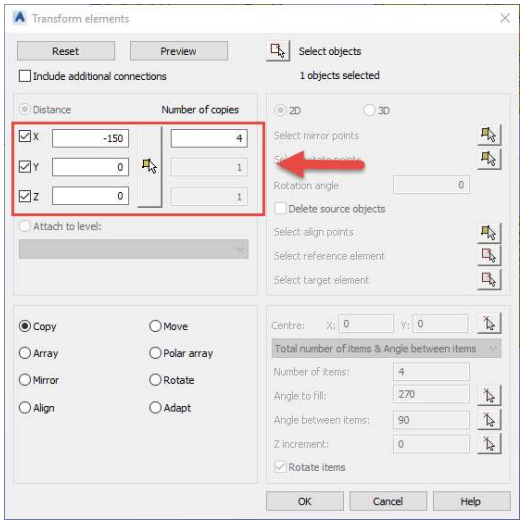


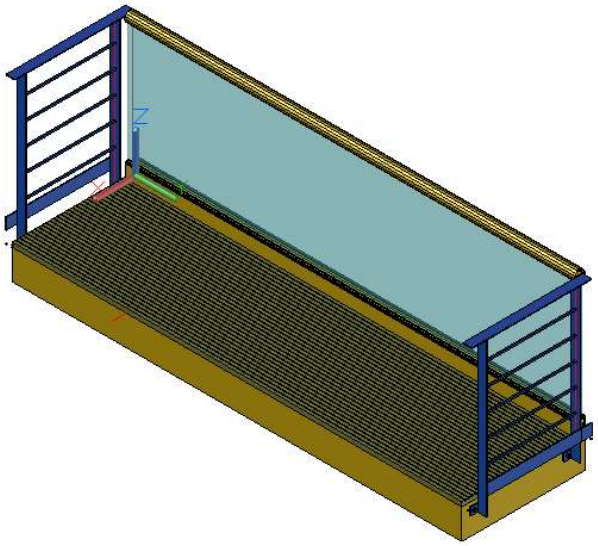
8. Select the **copy** option



9. Set the copy options as below and select **OK**

   a. X Distance: **-150mm**
   b. Y Distance: **0mm**
   c. Z Distance: **0mm**
   d. Number of copies: **4**





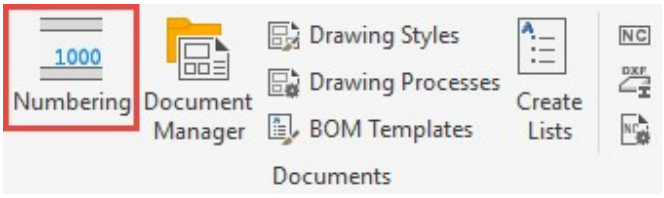
10. Select **OK**

Lesson 5 – Prepare model for fabrication

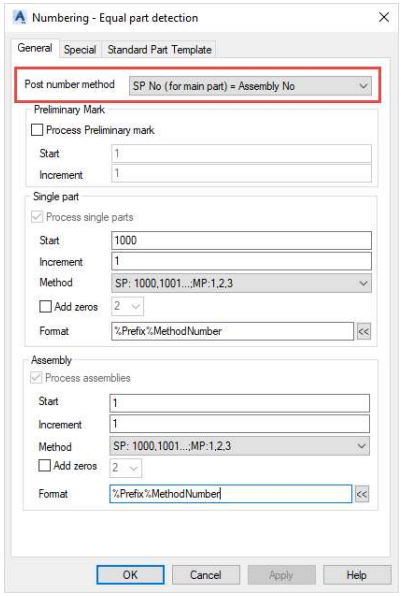
In this lesson, we will add numbering to all the single and assembly parts.

Numbering

1. From the **Home > Documents ribbon**, select the **Numbering** command



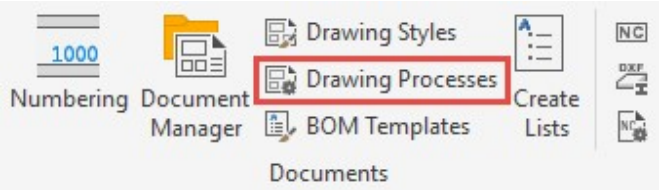
2. Set the **Post Number Method** to **SP No. (for main part) = Assembly No** and select **OK**



Lesson 6 – Fabrication documentation

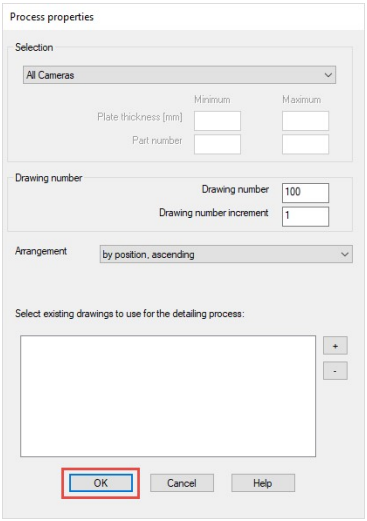
General Arrangement Drawings

1. From the **Home > Documents** ribbon, select **Drawing Processes**



2. Select the **Cameras tab** and select **Cameras – All – A1**

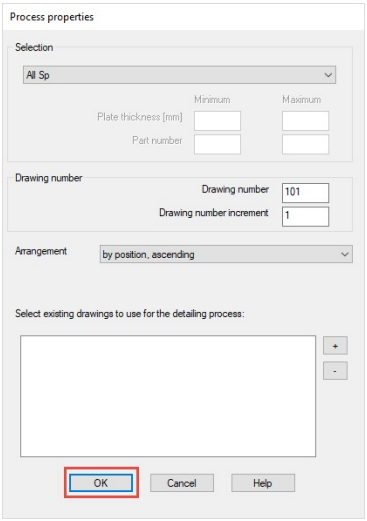
3. Select **OK**



Part Drawings

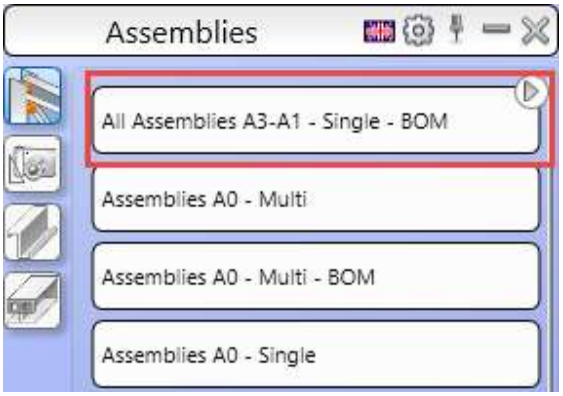
1. Select the **Parts** tab and select **All Parts A4-A1 – Single - BOM**

2. Select **OK**

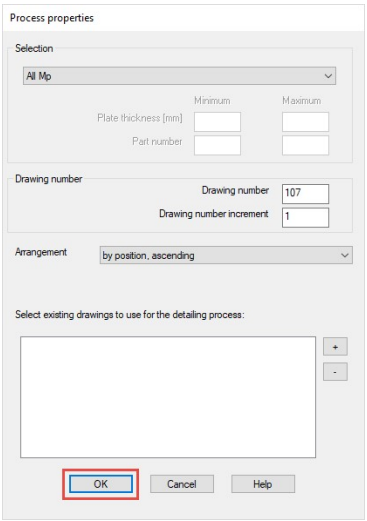


Assembly Drawings

1. Select the **Assemblies** tab and select **All Assemblies A3-A1 – Single - BOM**

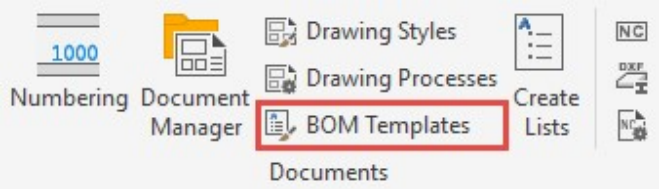


2. Select **OK**

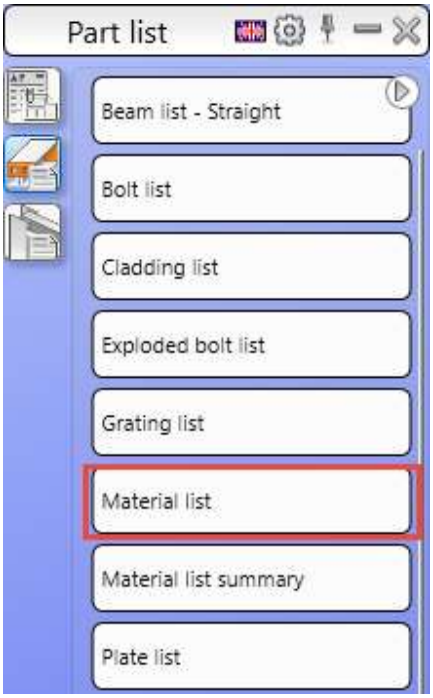


Bill of Materials

1. From the **Home > Documents** ribbon, select **Drawing Processes**



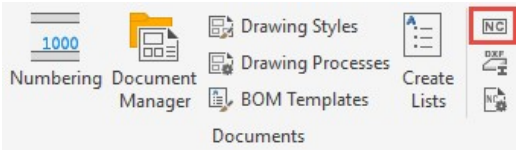
2. Select the **Parts List** tab and select **Material List**



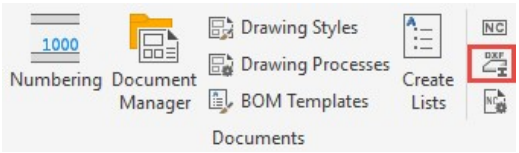
3. Close Material List

DXF & NC Files

1. From the **Home > Documents** ribbon, select **NC**

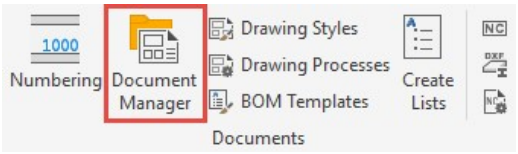


2. From the **Home > Documents ribbon**, select **DXF**

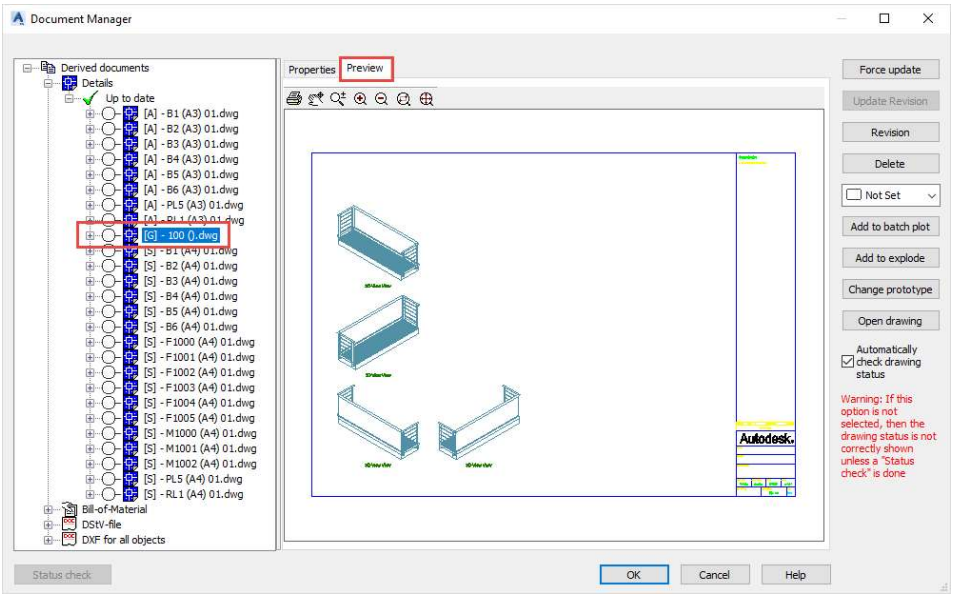


Review Documents

1. From the **Home > Documents ribbon**, select **Document Manager**



2. Expand **Derived Drawings > Details > Up to Date** and select a document to review



Select the **Preview Tab** to show the document