

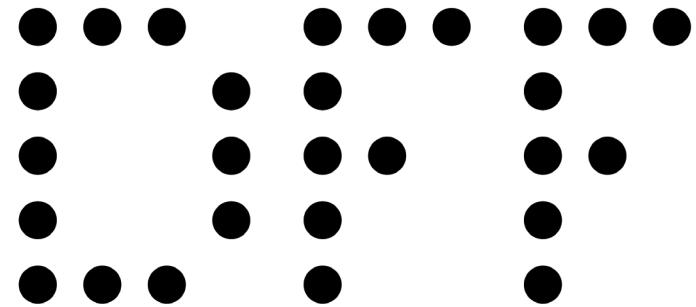
3.3

Sample:

detail

model

A sample study for physical modelling



Digital Fabrication Facilities
for Architecture



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Intro

make 2D details

design 3D model

Make physical model

Q: How to make a detail model?

A:

A detail model can help you understand construction detail design of your model. It is a section model that looks into the construction of the design. In order to make a detail model, you will need to first create 2D details of the section. Then you can create 3D model from the 2D details.

This guide will utilise the laser-cut to create main structural pieces of the detail model. Then we can make the rest of the parts by hand with materials such as corrugated cardboard, balsa wood and foam.

We use the same model from the other tutorials and in order to make it work, we need to do some preparation to convert some parts.

Please note the document shows you the principle and in practice details may vary.

Q: What to prepare?

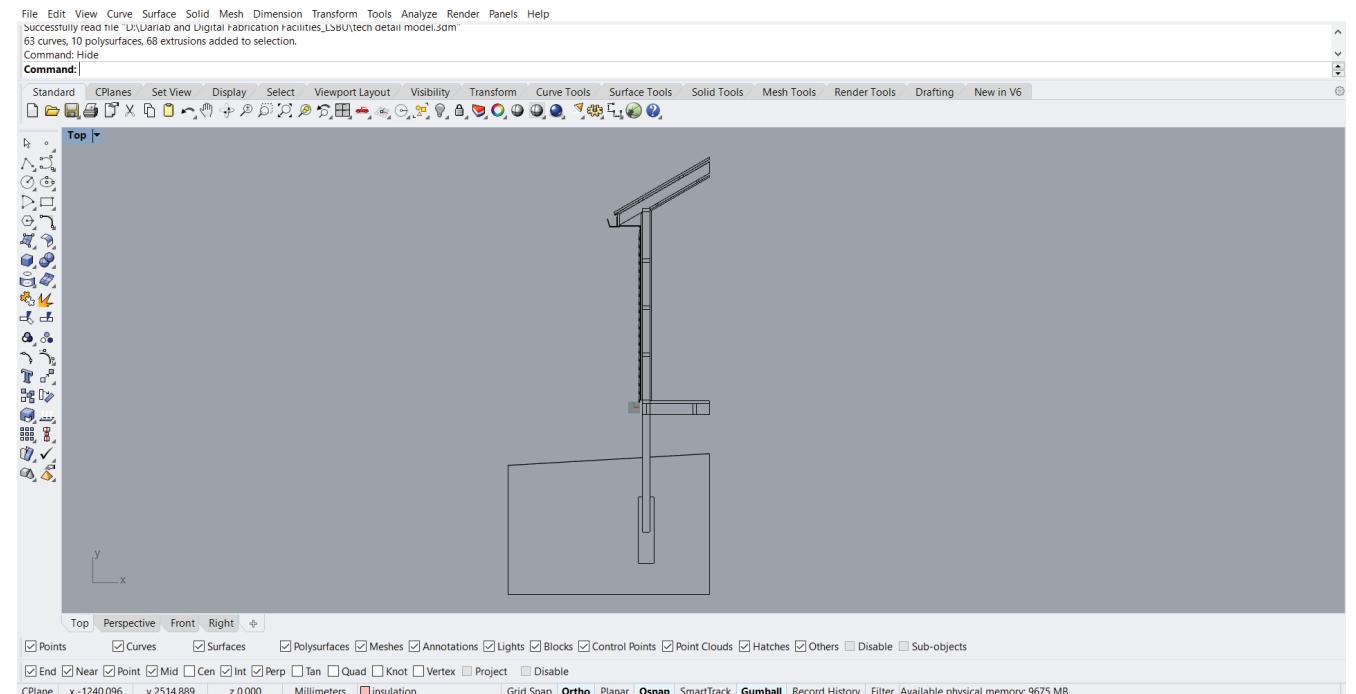
A:

This guide will show you how to turn your 2D details into a 3D for physical modeling.

You will need to first produce a section with construction detail in a CAD format.

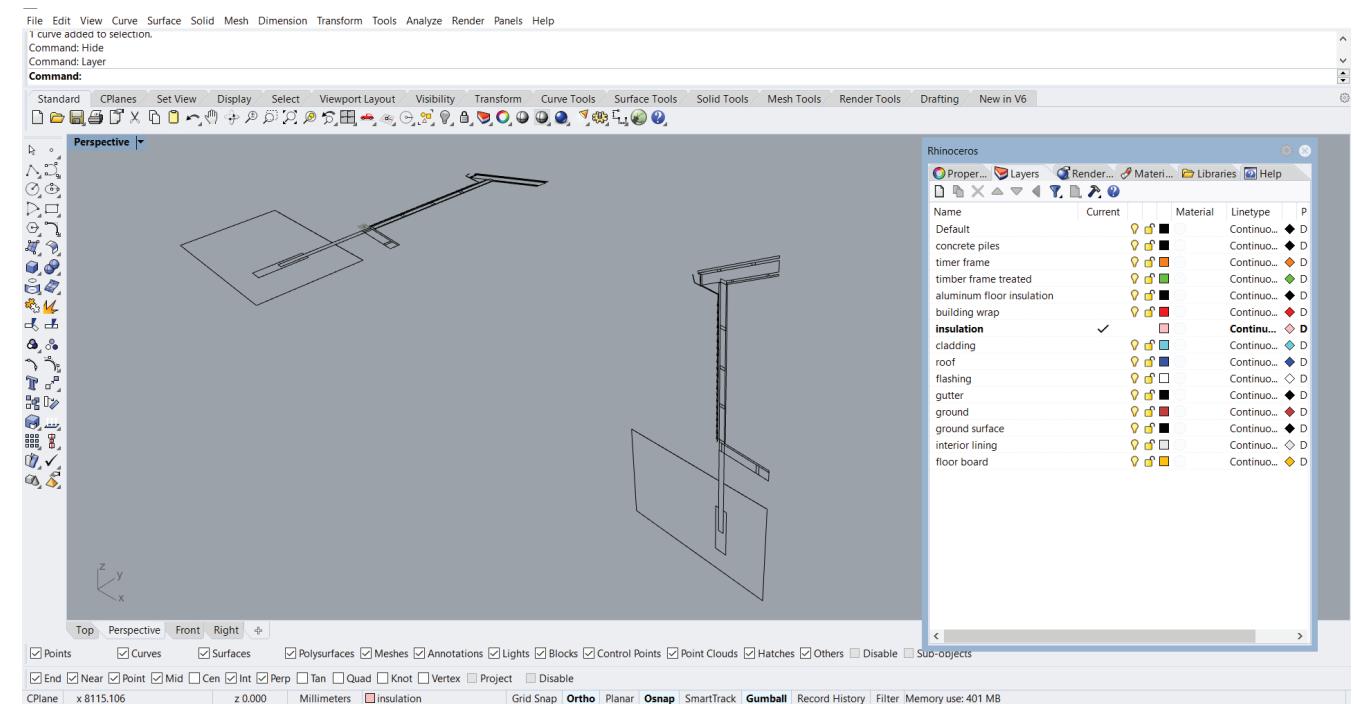
Please refer to specification of the building materials of your choose for your project.

Then, You will turn it into a 3D model in Rhino. So first, open the CAD model in Rhino on a plan top 2D view.

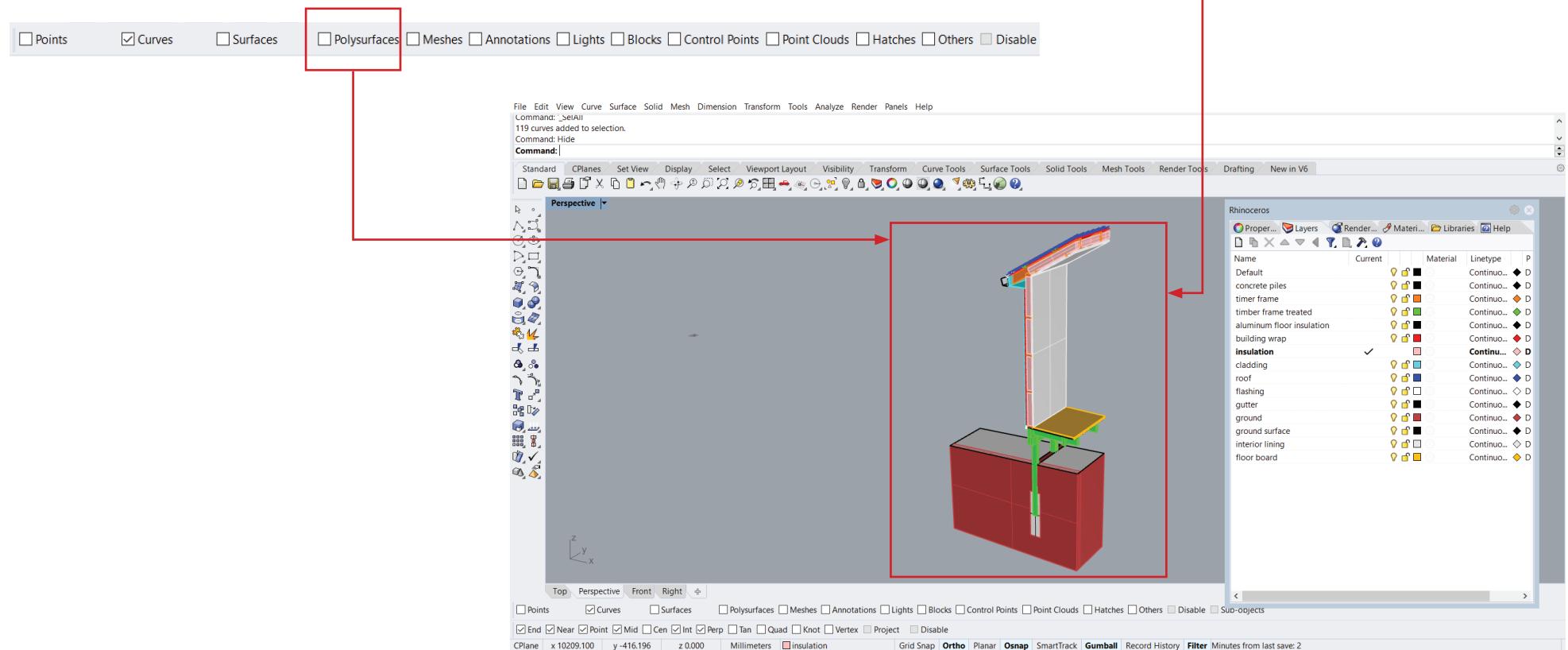
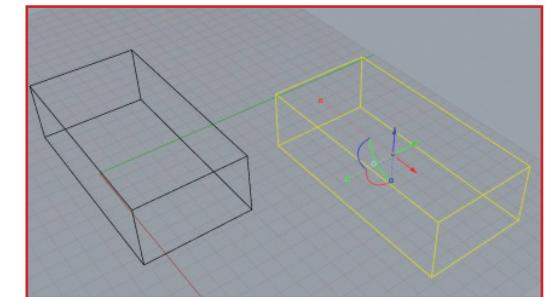


Design 3D model / Orientation

Prepare your CAD section for 3D modeling. Rotate the drawing to vertical position and prepare the layers. It is imperative to prepare an extensive layer which will store different model part. It is advised to arrange the model part with the same materials into the same layer. This will make later stage much easier.



Make the 2D drawing into 3D model. The primary command to use is "extrudeCrv" and "move". Utilise gumball function to move the object. You can click on the arrow on the gumball to type in the distance you want to move. After this, your model is almost ready for Keyshot. It is recommended to export only without 2D section drawings. Use "selectionFilter" and right click the polysurface box. Then select all, this will automatically ignores all the 2D lines. Then, type in "export selected" option to export the model to make a clean file to prepare for making it physically. Then scale down the model to your choose, for example 1:10.

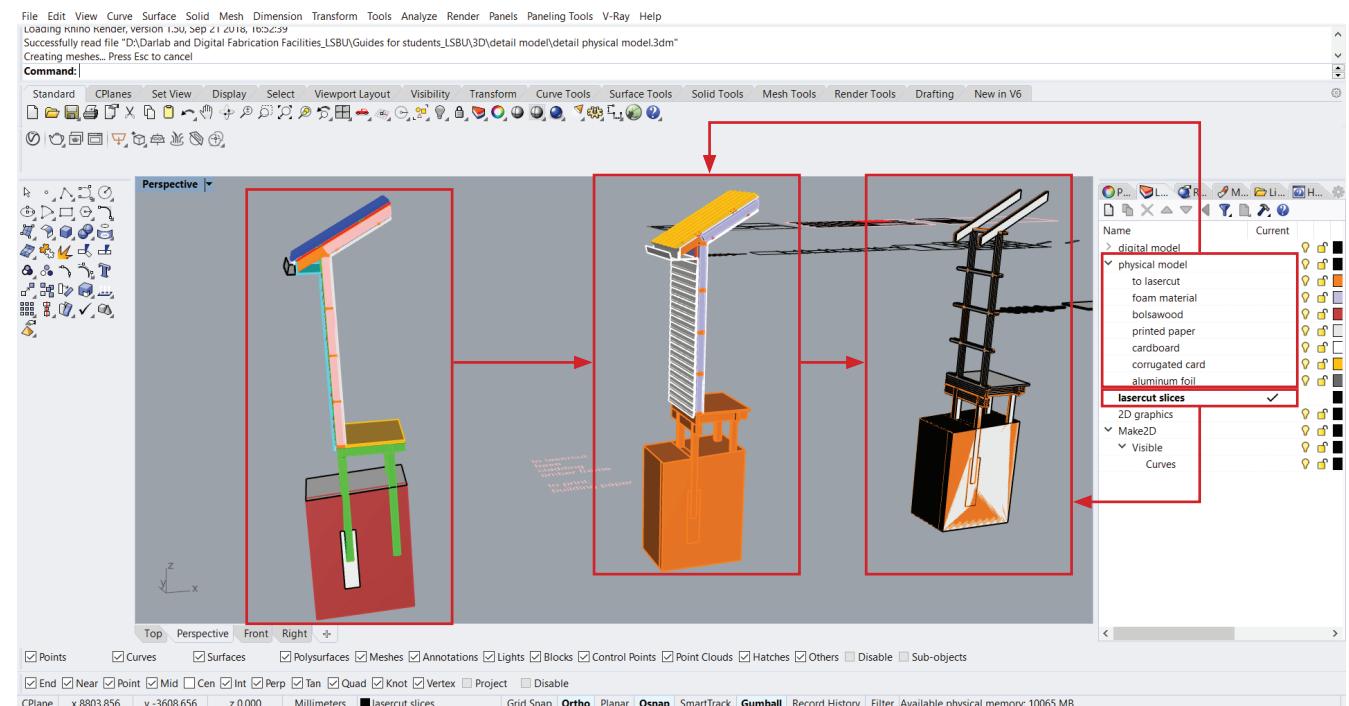


Make physical model / Digital prep

Now we need to some preparation to convert the pieces in a orderly and organised fashion.
So first, create layers in response to the type of the materials you want to use.
Here are the list of layers of the sample model:

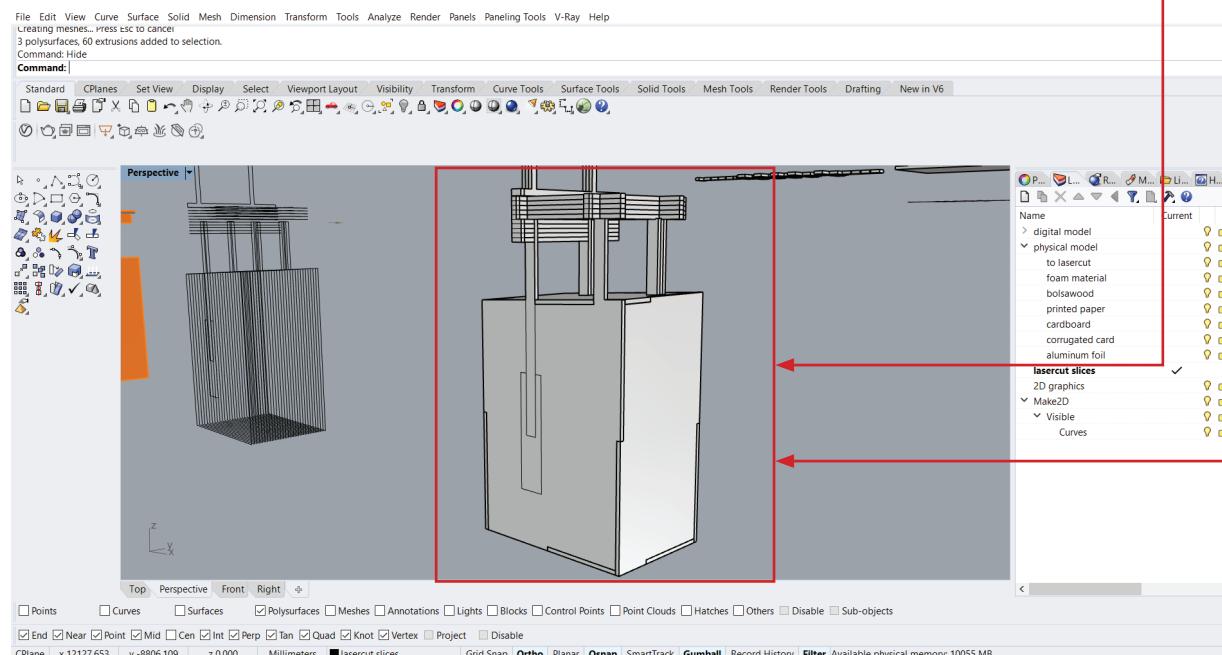
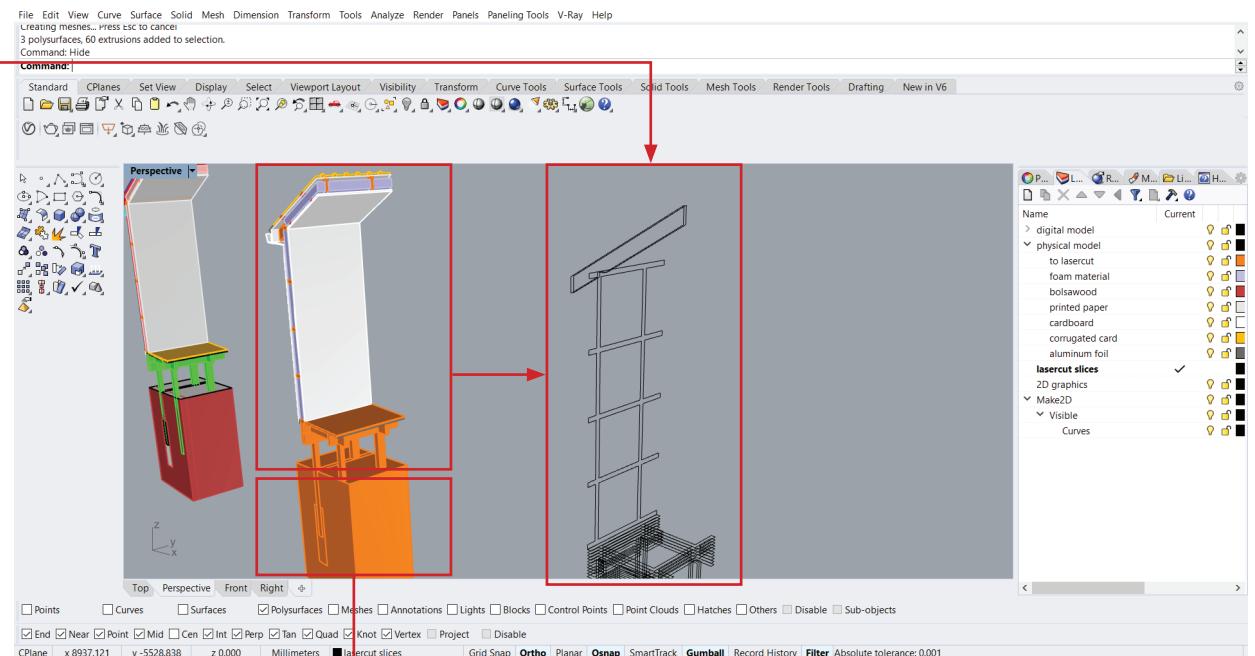
- Cloth material
- Bolsawood
- Printed tracing paper
- Cardboard
- Plywood
- Aluminum foil

Also create a layer specifically to contain the parts that requires laser-cut.



Make physical model / Digital prep

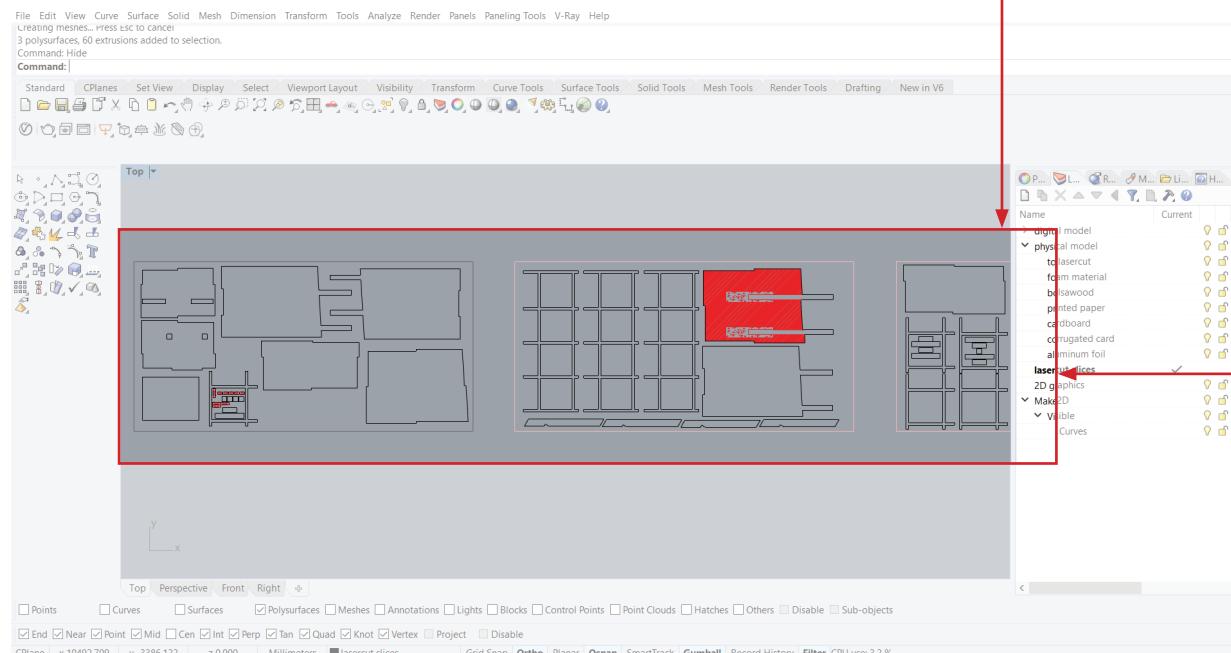
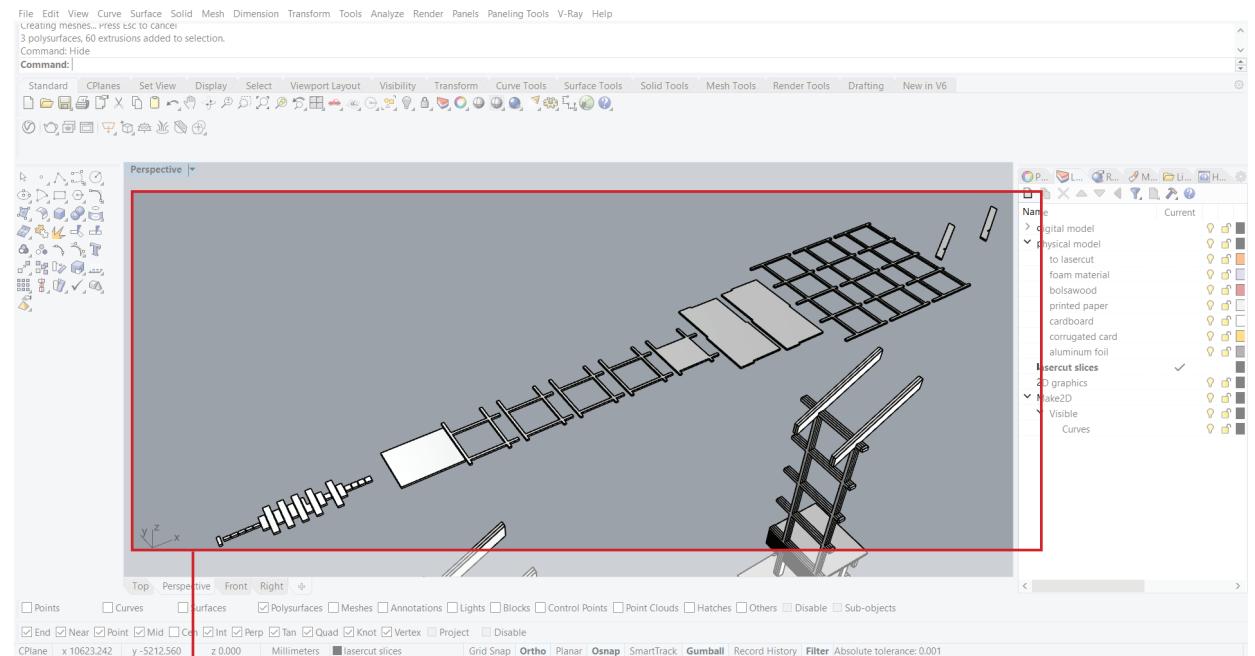
- Once you have isolated the parts for lasercut, use "Contouring" command to generate profiles for stacking model. Create contouring in both vertical and horizontal direction as you sees fit.



- For the base, it is not economical to make it entirely out of contouring methods. Instead, create a box with teeth edges to ensure its integrity.

Make physical model / Digital prep

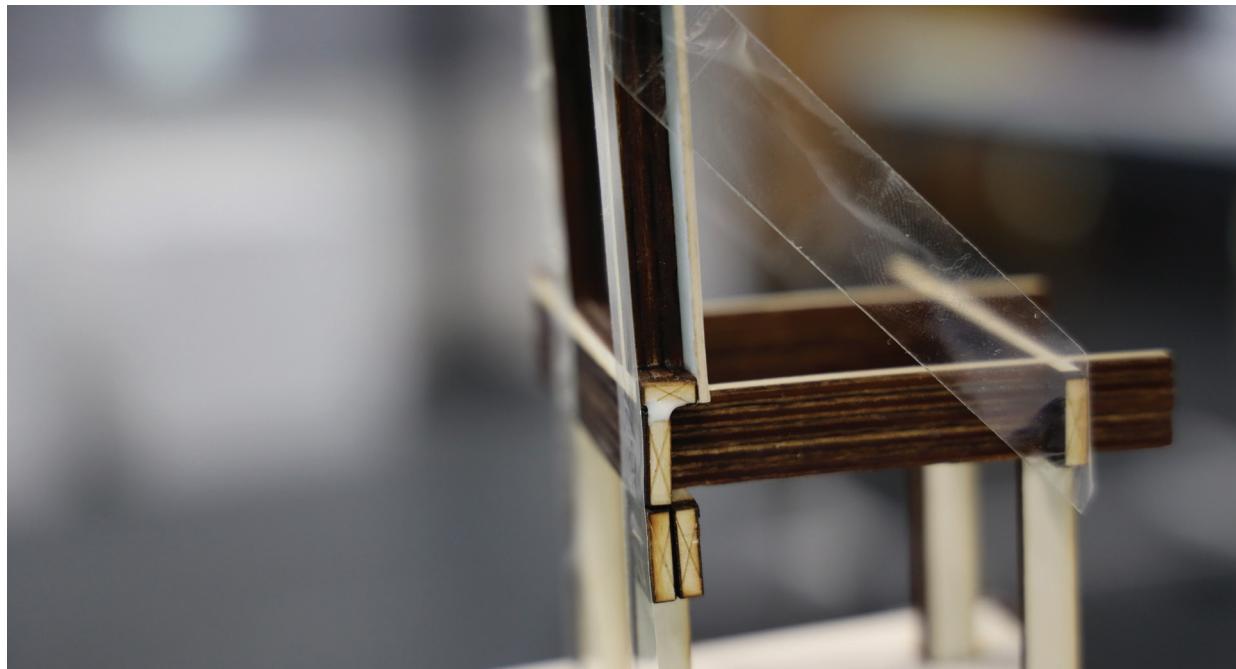
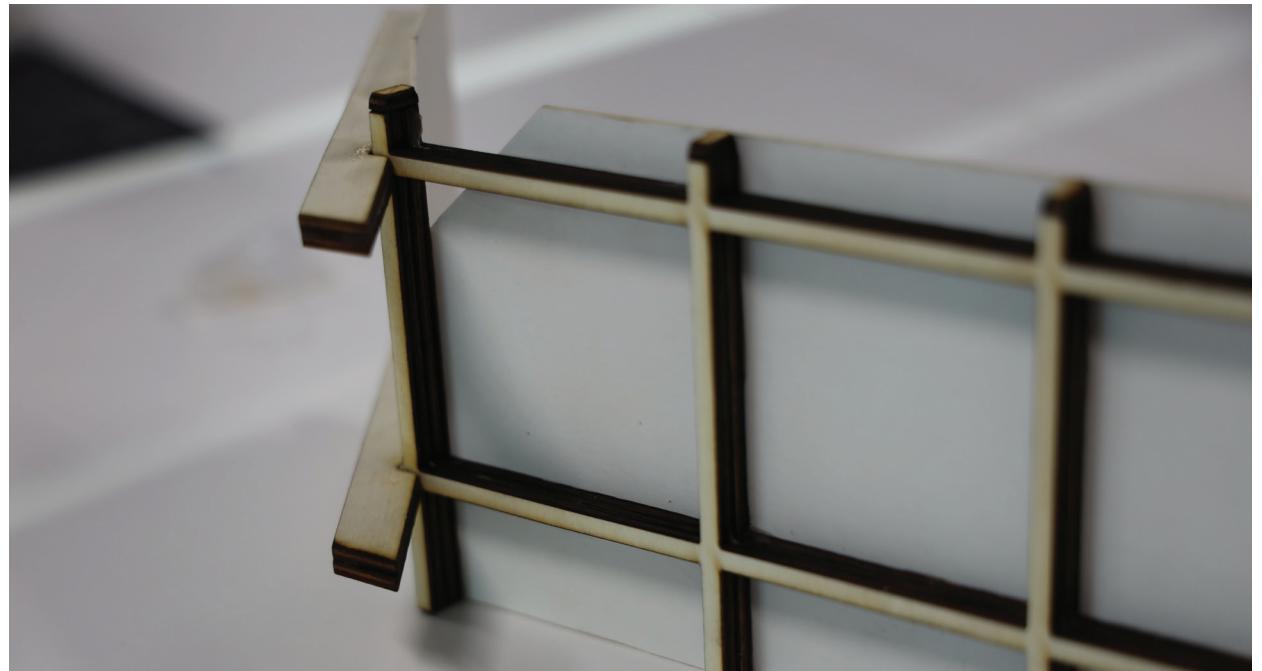
Once you have finished the model pieces, arrange the pieces into flat packaged. You can also create 2D graphics for the sectional face of the model for engraving.



3. Once you have all the model pieces ready, arrange them into the spaces of 600x300mm(dimension for university department's laser cutter)spaces for laser cut. And don't forget to use " make 2D command to turn all models into flat 2D CAD profiles.

4.

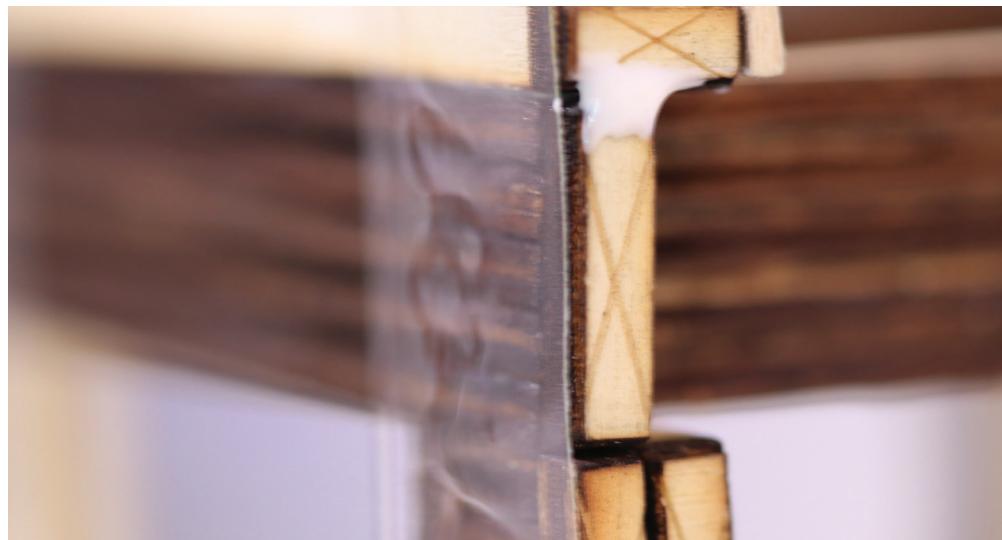
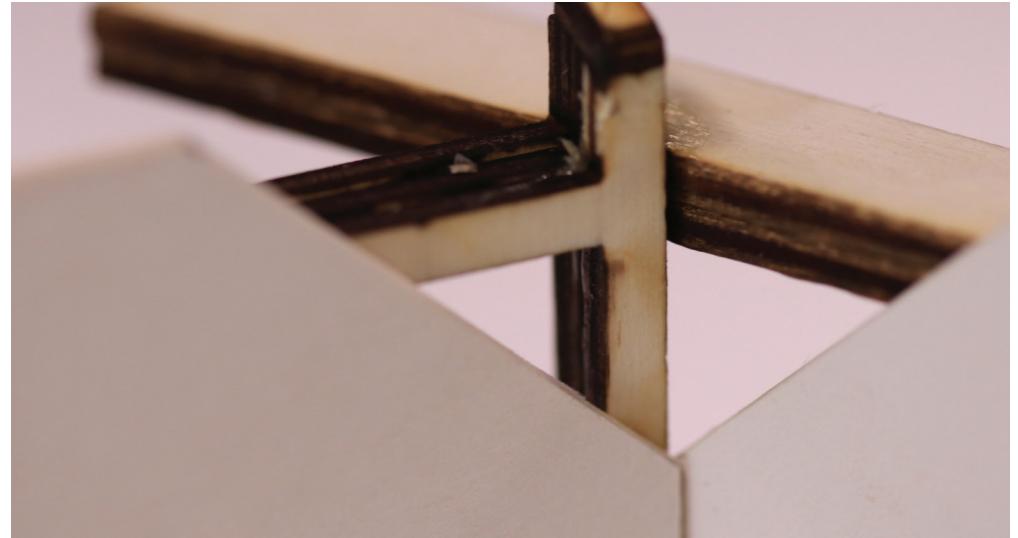
Once you have all the pieces made physically either by Lasercut or by hand, It is time for assembly. Use appropriate glue for the job. Be sure to lay down the model in desired orientation on a flat surface for the glues to dry properly.



5. Use tapes to reinforce the pieces while the glue is drying. This is especially important for PVA glue as it usually take around 30 minutes for the bond to form. However, it might take up to a day for the glue to dry completely.

Make physical model / Lasercut materials

6. Pay attention to the engraved lines on lasercut pieces. Make sure the model is assembled in the correct order.

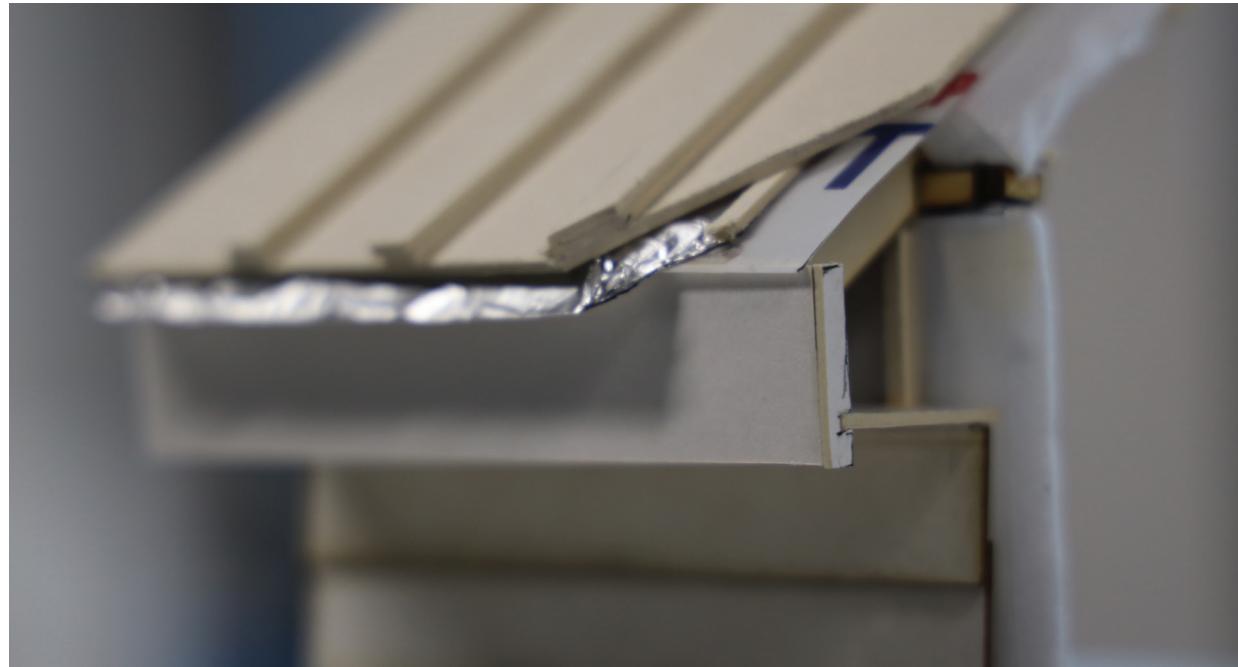


7. Other house hold items such as aluminum foil are great for mimicking metals. Make sure you have a sharp knife, a ruler and a cutting mat as foils can be tricky to work with.



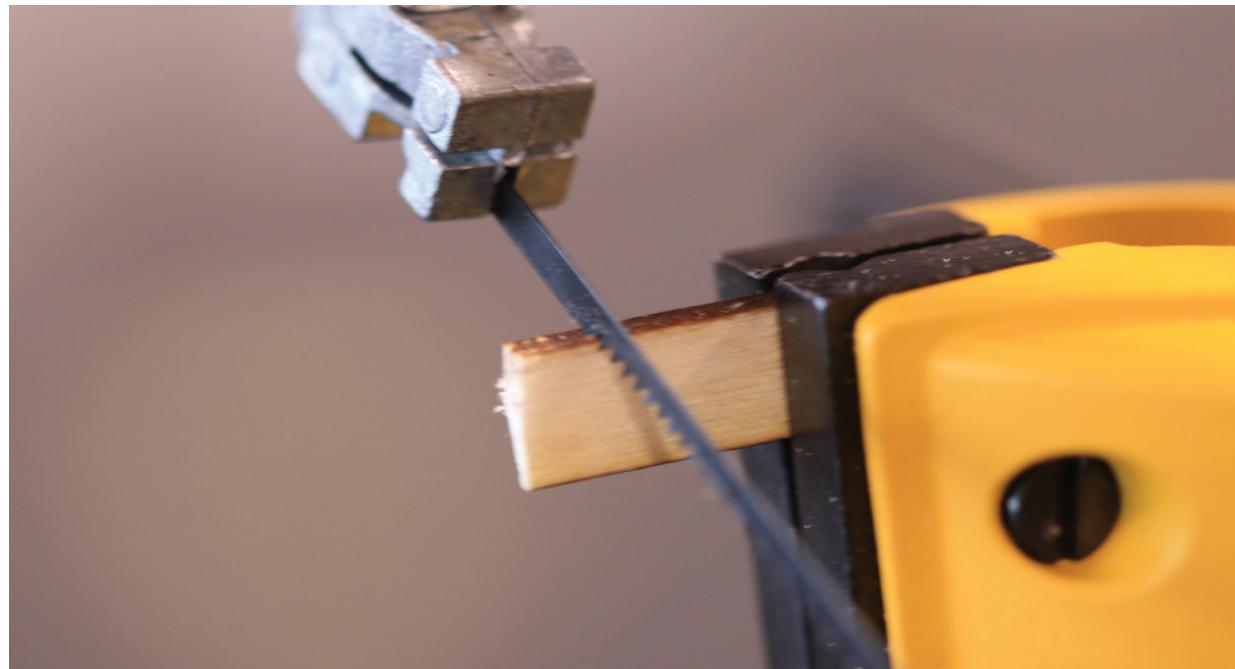
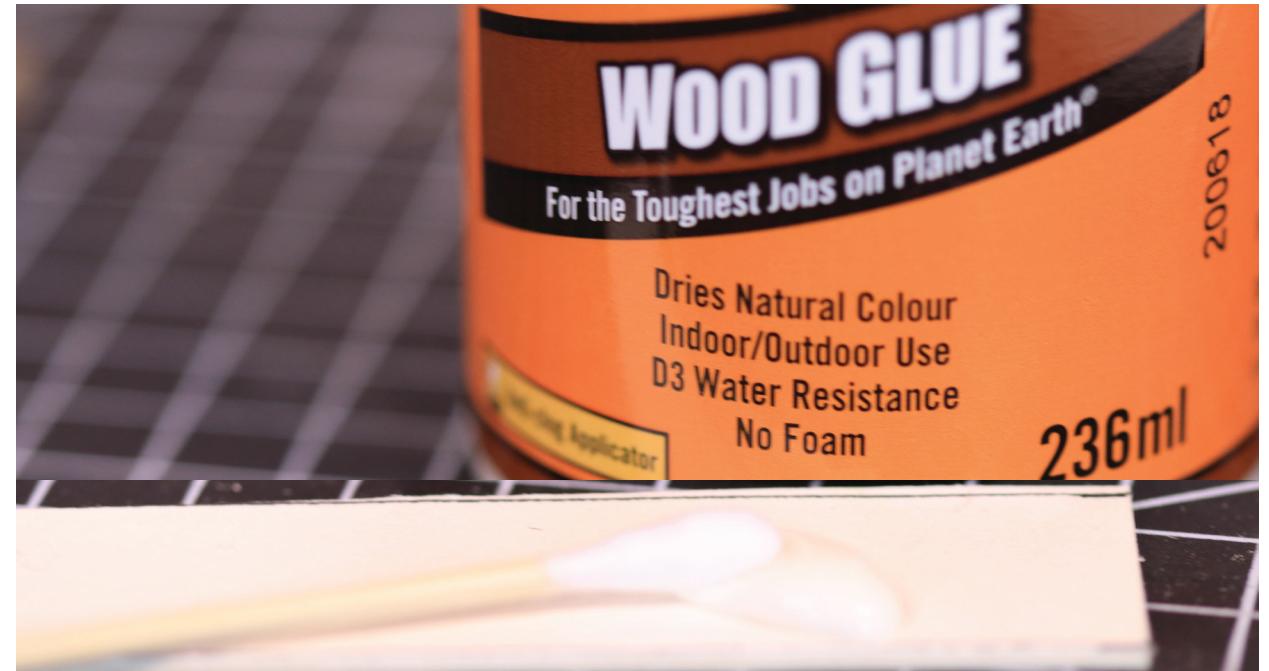
8. You can request patterns to be printed on special paper to mimic special features such as the building wrap shown here. We have special papers left over from other project left in stock but it is recommended to source your own.

9. You should consider cutting away certain materials to reveal the composition of your model as a detail model is supposed to help people understand how building components come together.



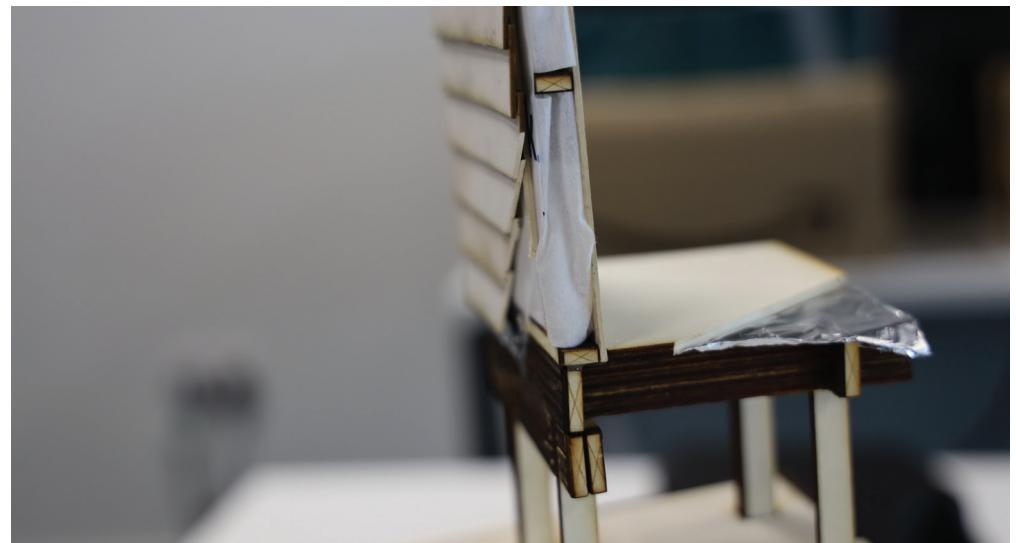
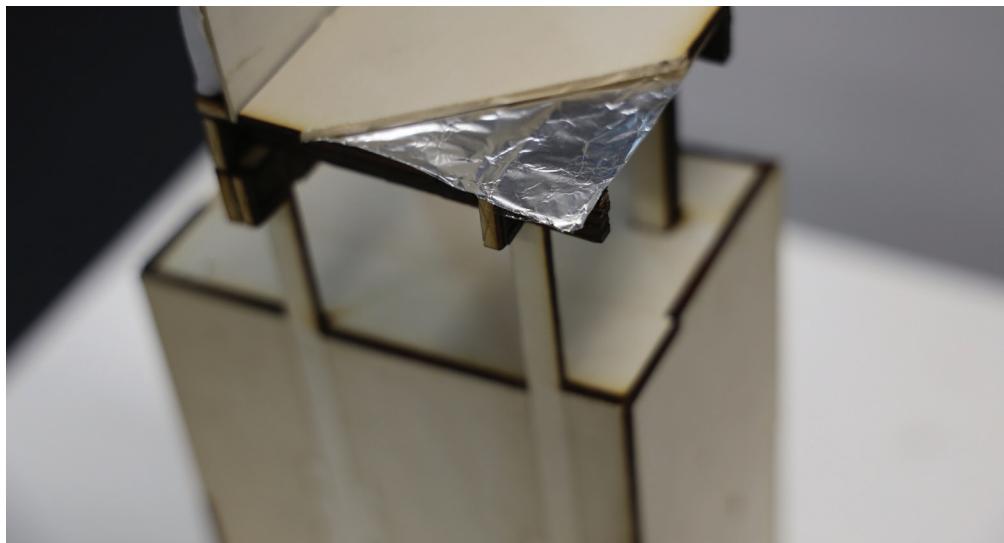
10. Pay attention to these 3D elements as it will help you understand and visualise construction details.

- 11.** To apply the PVA glue properly, you should consider pouring an adequate amount out of the bottle and use Q-tips to apply them to the model. This only applies to PVA as it has a long drying time.



- 12.** If you realise an adjustment is needed for hard materials such as MDF and plywood. Consider using a vise and a coping saw.

Make physical model / Modelling



Make physical model / Modelling

