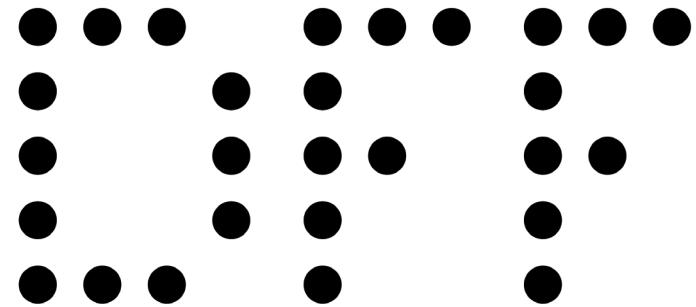


1.1

Model making methodology

Methods on making physical models



Digital Fabrication Facilities
for Architecture



Contents

Intro

Labelling

Connection joints

Workshop skills

Q: What skills and tricks are useful?

A:

There are many techniques and tricks you should apply to ensure good result, which can be summarised as the following:

- Labelling and planning during design stage.
- Connection joints for assembly.
- Manual skills from workshop.

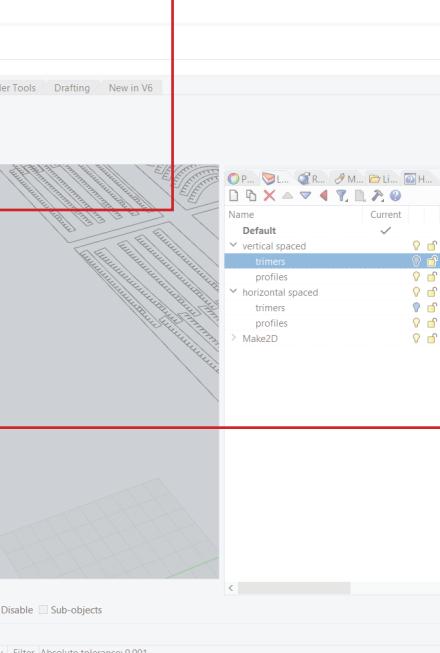
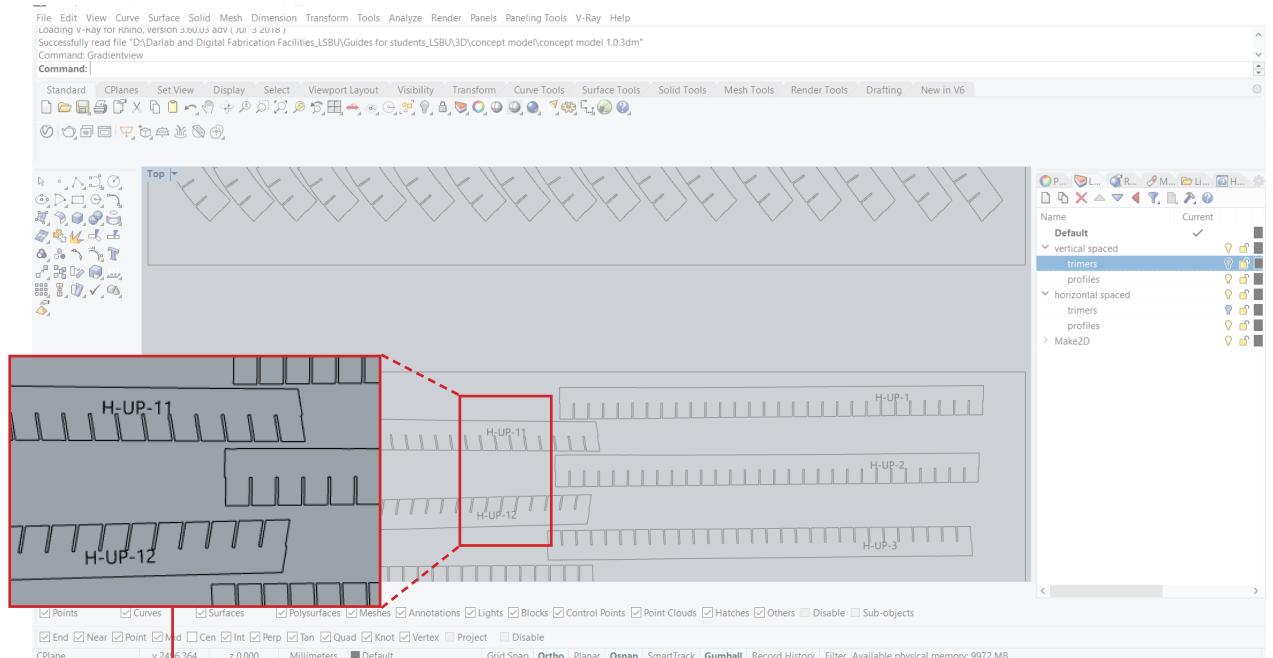
It is important to think about how things can be produced and assembled and the afro-mentioned steps are crucial. Even if you 3D print everything, you will still need to consider some sort of assembly mechanism. During the design stage you should make your model have been labelled and in the same time you need to retain the 3D model with the correct labelling which will serve as an instruction manual. It is like a set of Lego you need pieces as well as the instruction manual. Fortunately, it is unlikely that your model will be as complex as a Leo set and nevertheless, you need to have some sort of guidance for assembling your model. For assembling your model you should use both glue and joints for best results. And last, you need to keep in mind that things do go wrong and you need a safety net. And that is why you need some workshop skills to be able to fix things up.

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

Labelling your model pieces can help you assemble the model quickly. In some cases, you won't be able to assemble the model without proper labelling and instruction. This guide will include two labelling methods:

- Sequencing
- Matching

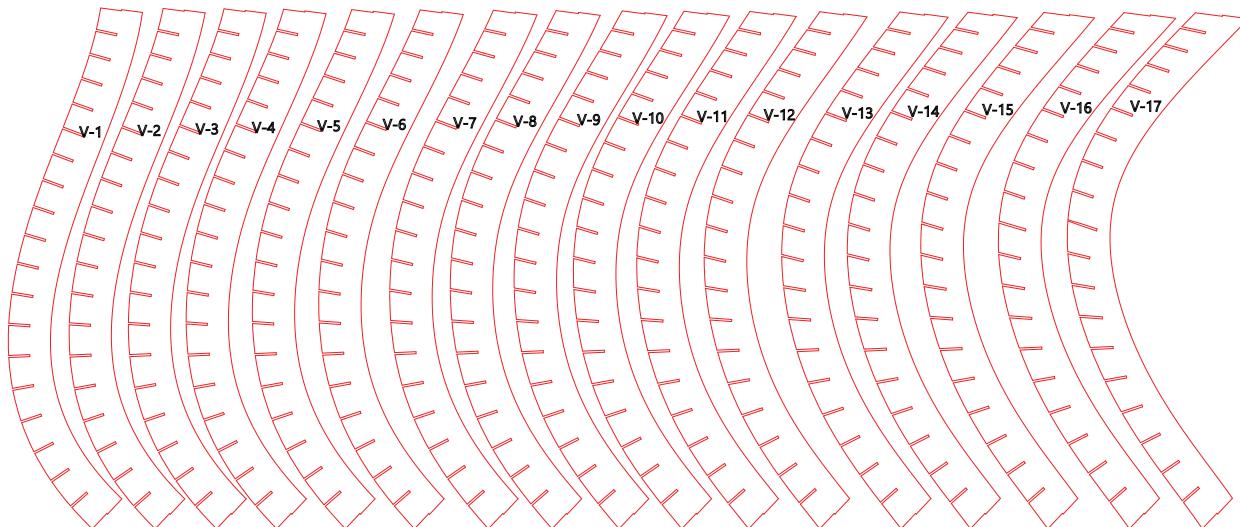
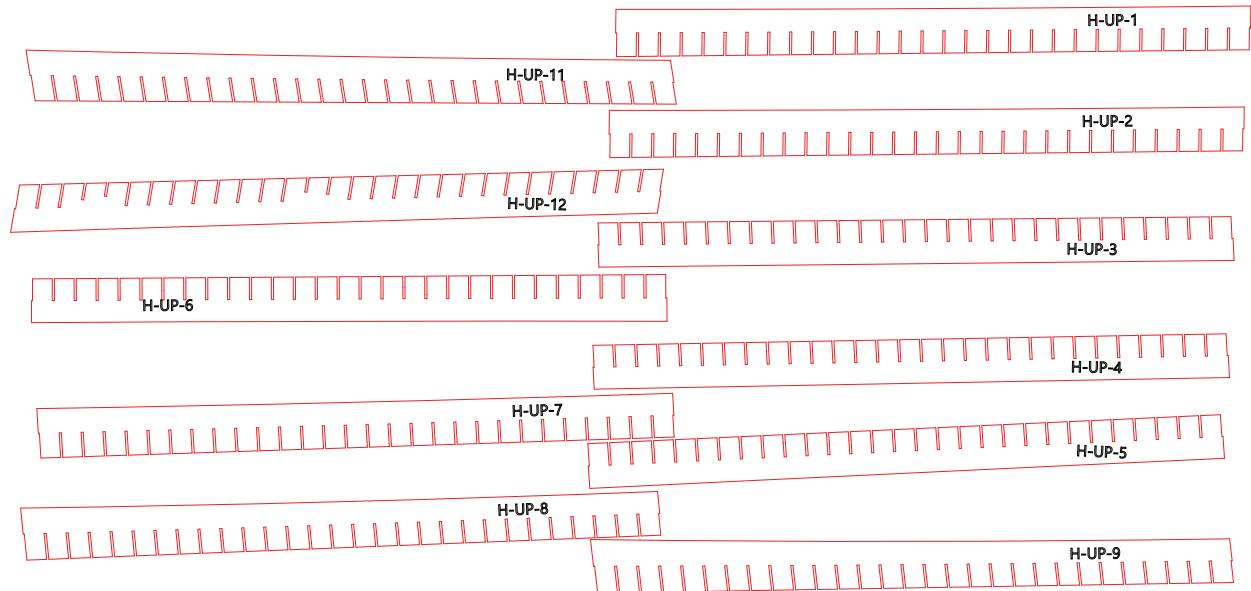
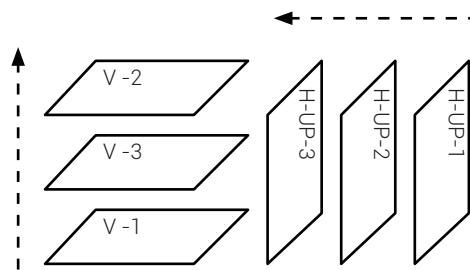
Here is an example of sequencing labels. The pieces are labelled with a number sequence with annotation showing the direction and type. This is suitable for making a complex model.



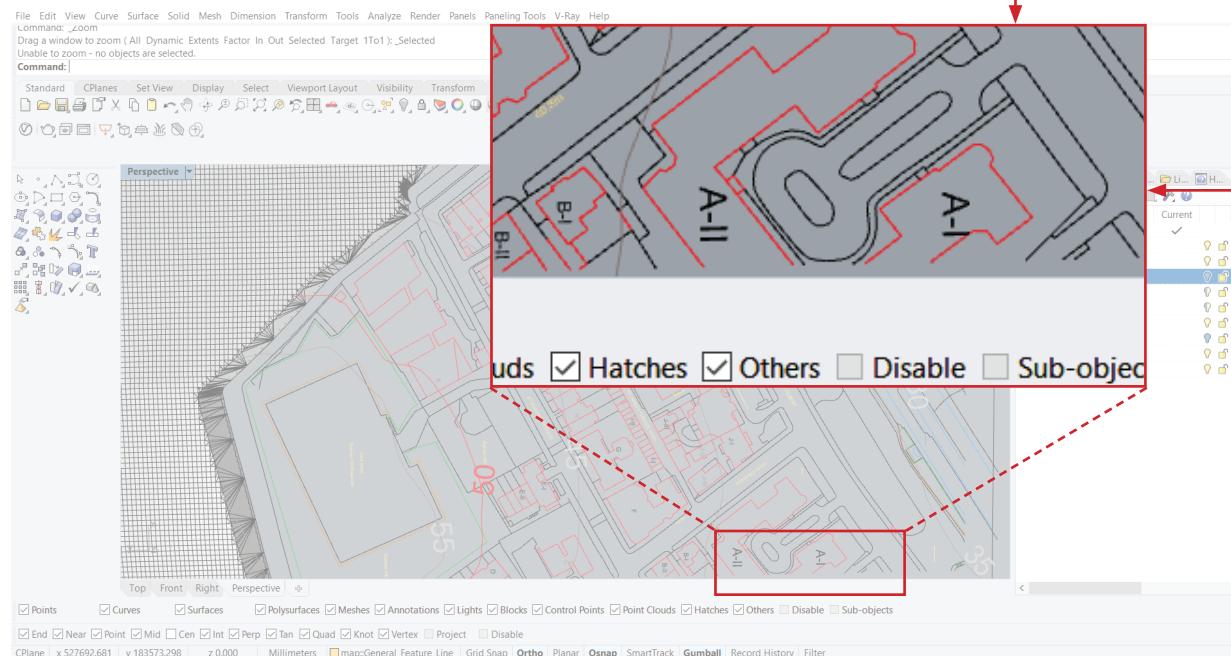
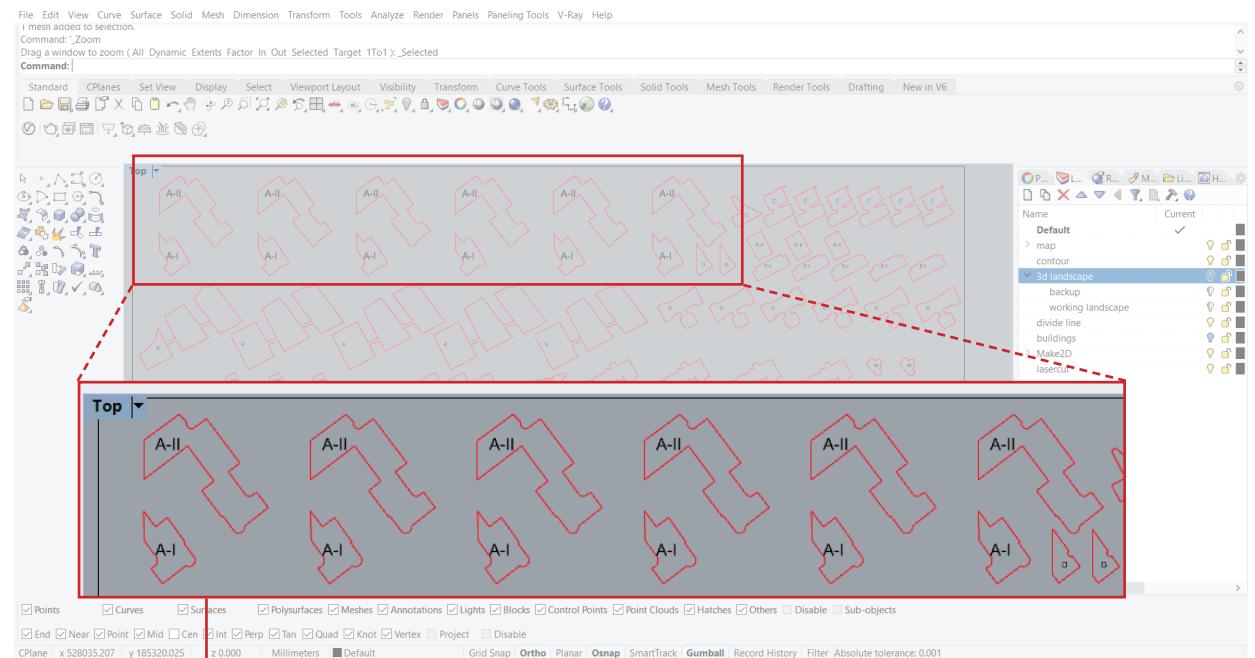
1. In the box highlighted above, the label "H-UP-11" can be seen on a piece. "H" indicates it is horizontally spaced and the 11 shows it is the 11th piece. "UP" indicate the side with the label should be pointing upwards. When you put the labels, be sure to put annotation on the 3D model to indicate the assembling sequence. In the screens-hot, the arrow shows the order to place the pieces from lowest to highest digits.

Labelling / Sequencing methods

Assemble the model by following the number sequence. Letter abbreviation is used to help better organise pieces.

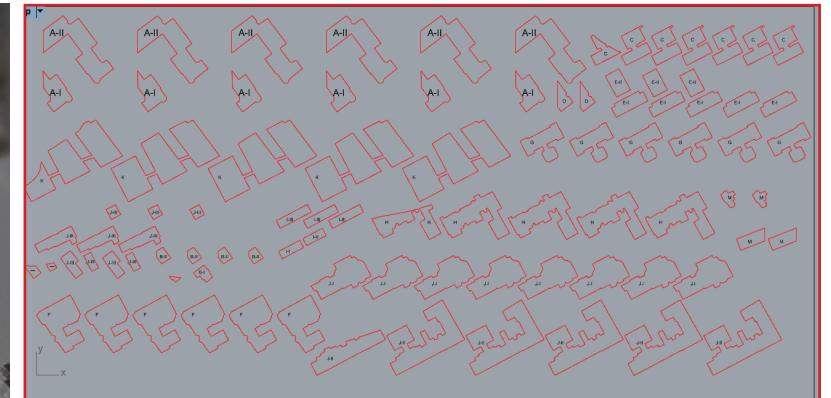


Matching methods means that the pieces with the same label will be glued/assembled together. This is more straightforward and is suitable for cutting a number of simplistic models at the same time, such as buildings on a site model.



2. Be sure to place labels on the master plan to help you identify pieces. To avoid confusion, Arabic numerals should be avoided. Instead use the Alphabet to label different pieces. If you are worried that alphabet is not enough, use affix as an addition like the one shown in the screenshots.

Group together pieces with the same labels on them. It is beneficial to use sort the pieces against a contrasting back ground for example use a cardboard box to hold them. This will significantly speed up the assembly process and prevent mistakes.



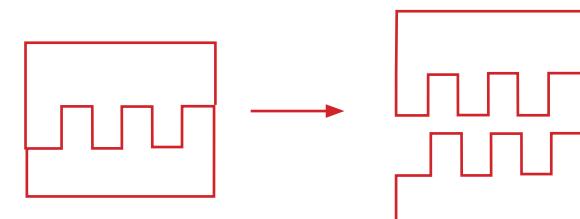
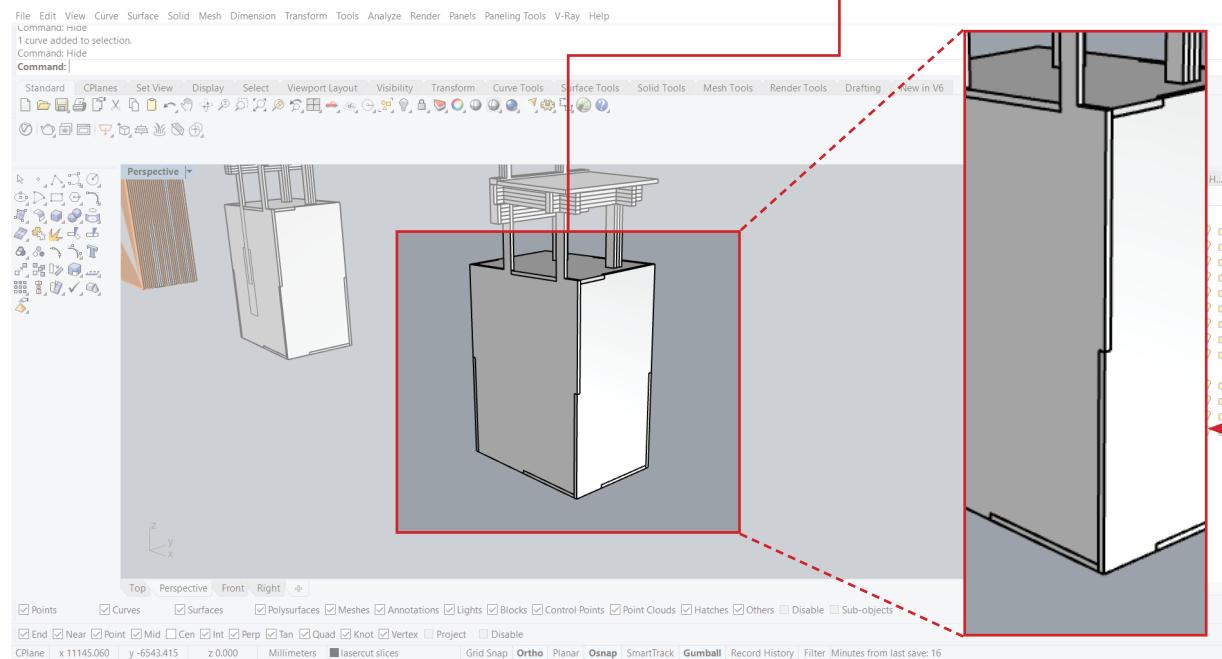
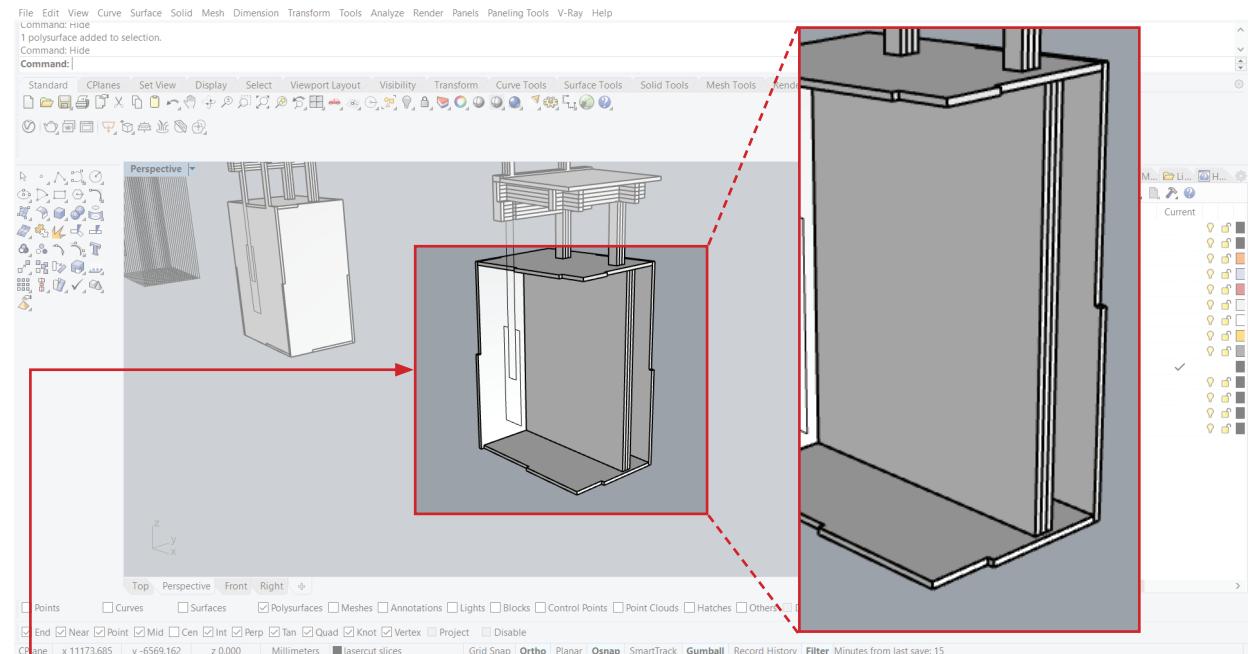
Labelling / Matching methods

Print a screenshot of the model with guide numbers on it to help you place the pieces in the designated place.



Connection joints / Boxing

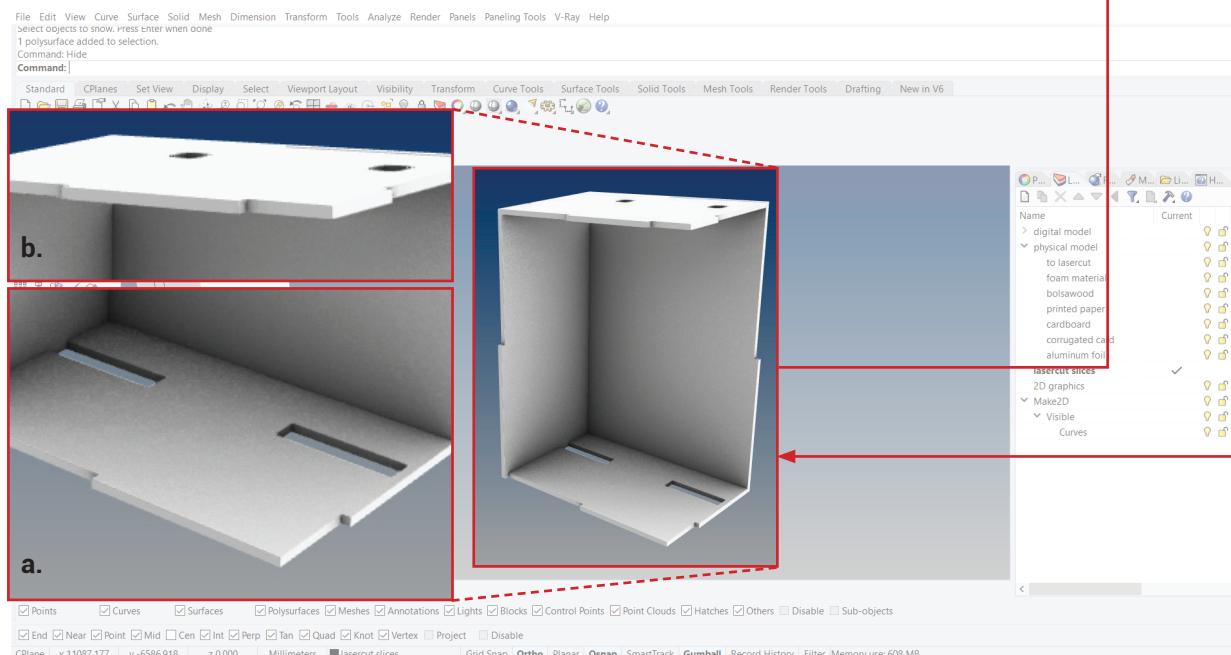
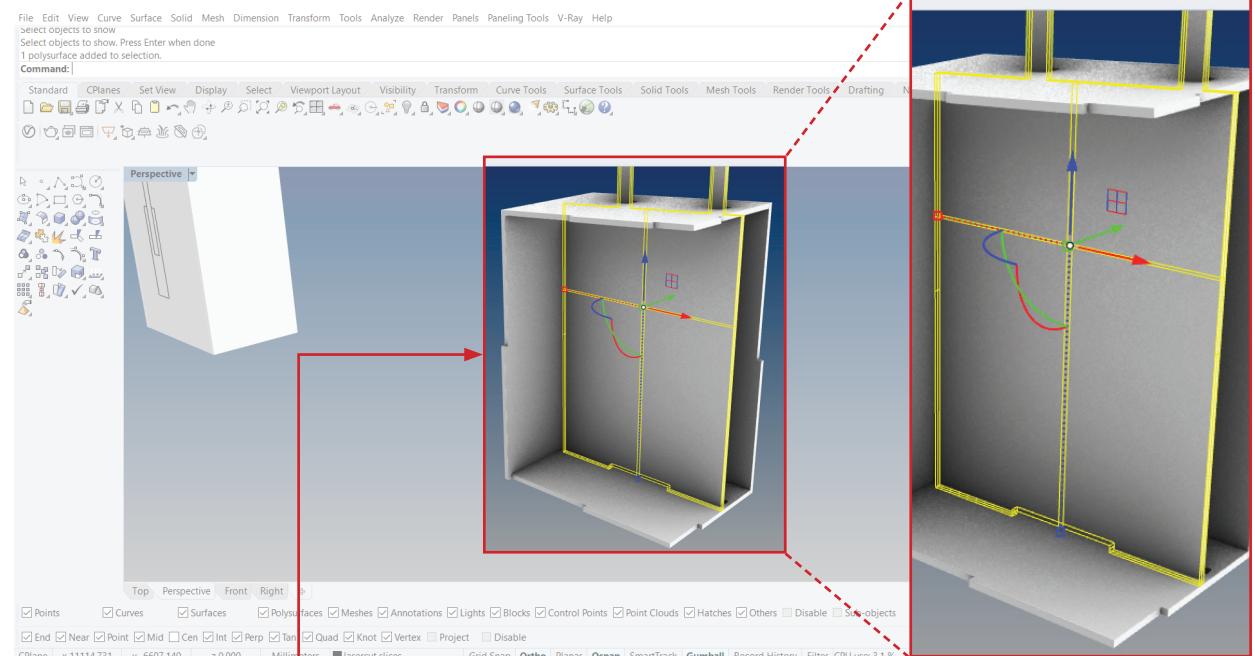
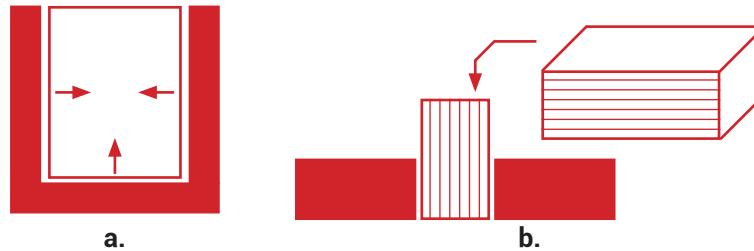
While designing a model, it is highly recommended to include joints to help you assemble the model. This is usually required when you are not making your model as a stack. Here we are showing you a basic way to make box edge joints.



3. The box has edges that will fit together Like teeth as shown below. In this example, you can see that there is no need to make that many teeth. One one set will be enough.

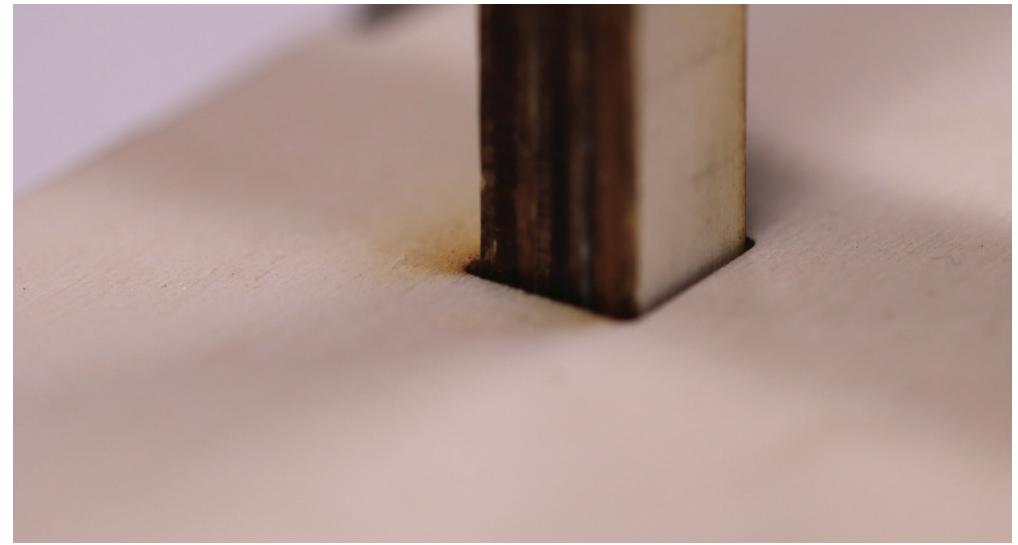
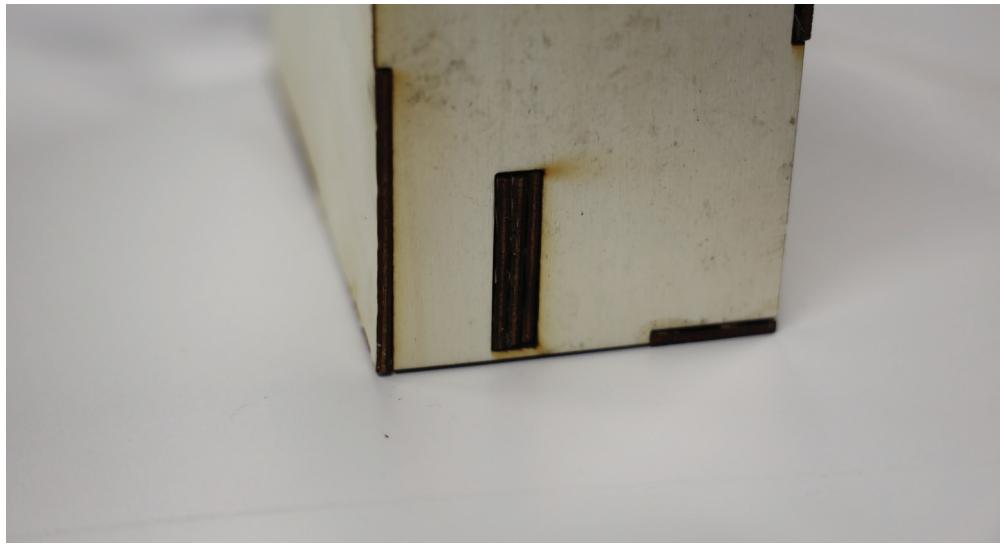
Connection joints / Boxing

In some cases, slots should be introduced to incorporate extra support. In this example, the support block is added to the inside of the box to support the extra weight of the models above. Our materials except cardboards are 3mm thick.



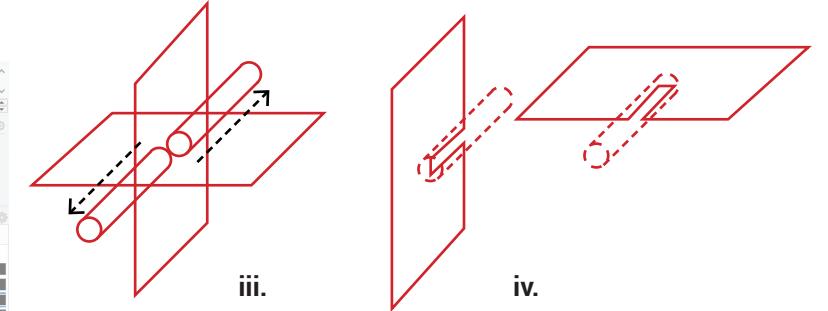
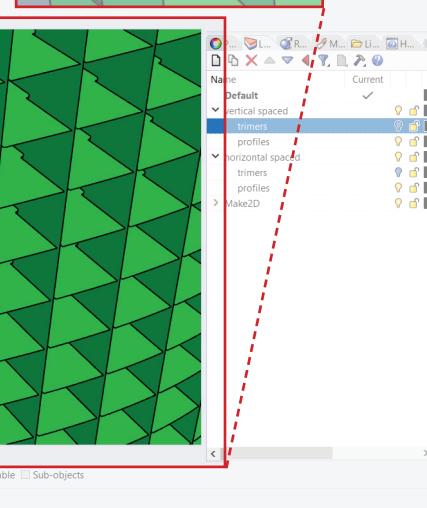
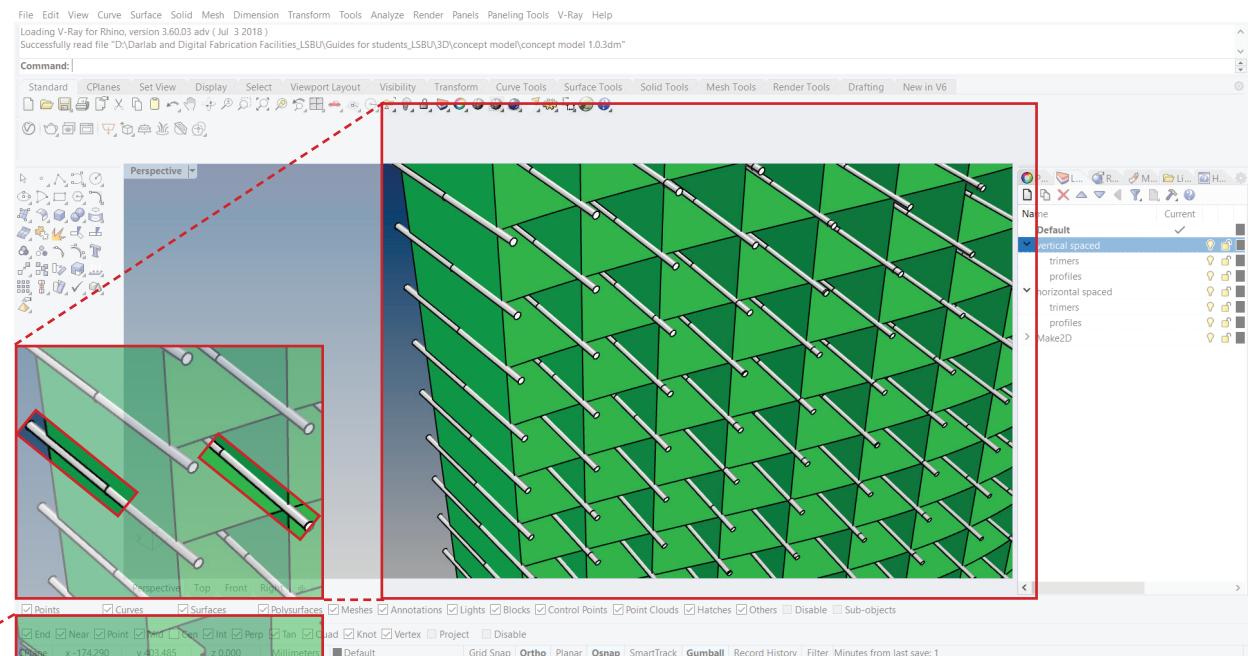
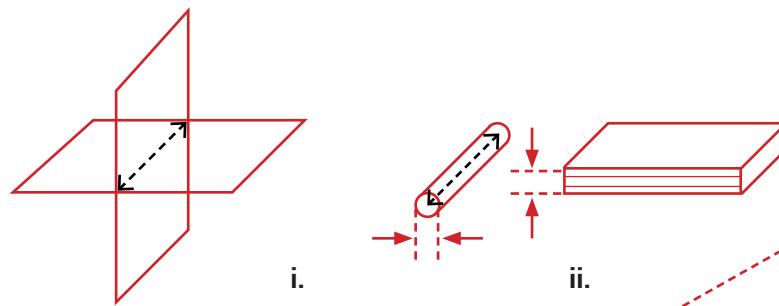
- a. In addition, keep in mind that the support block needs to have a smaller size to be fitted in side the box.
- b. When making the slots, take the thickness of the material consideration.

Connection joints / Boxing



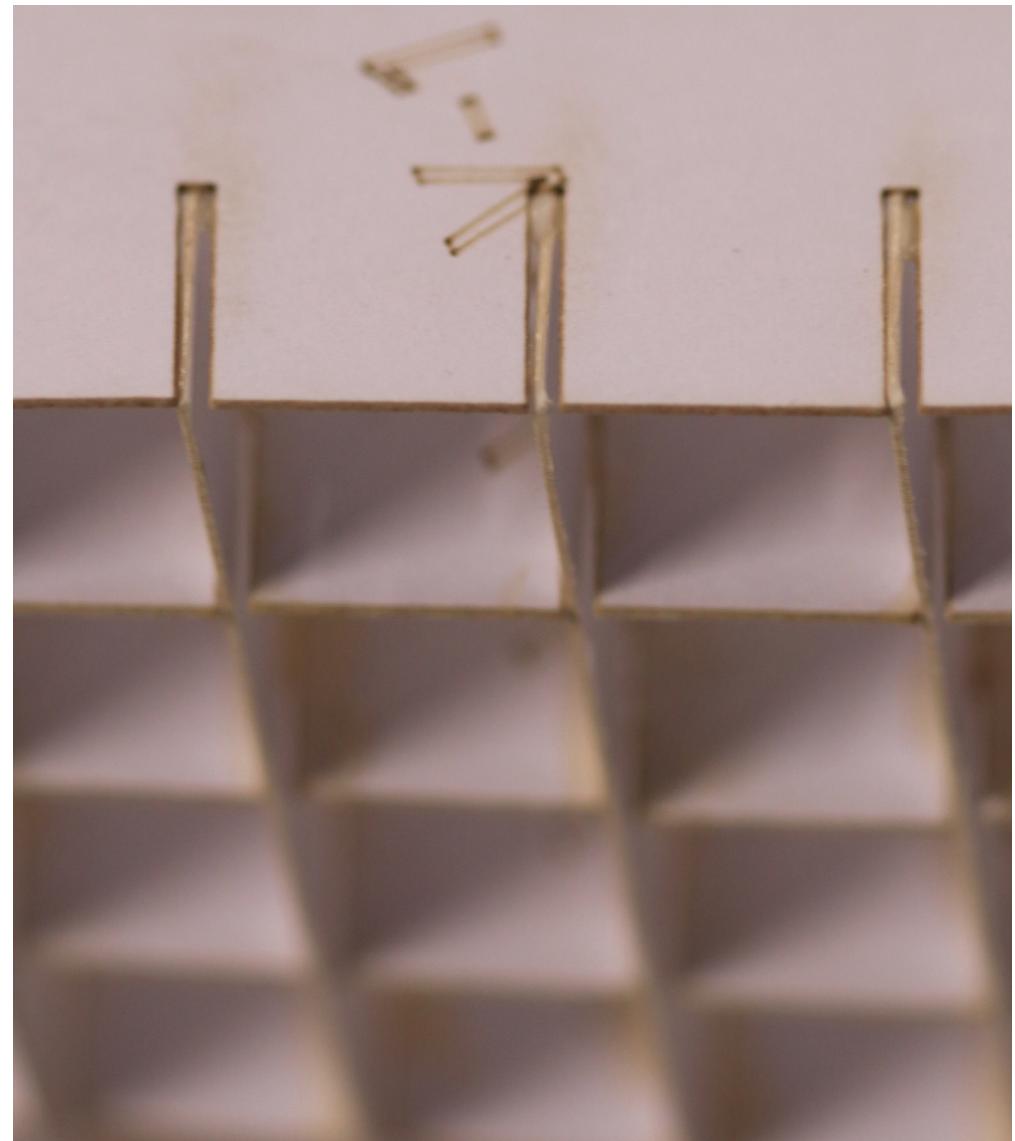
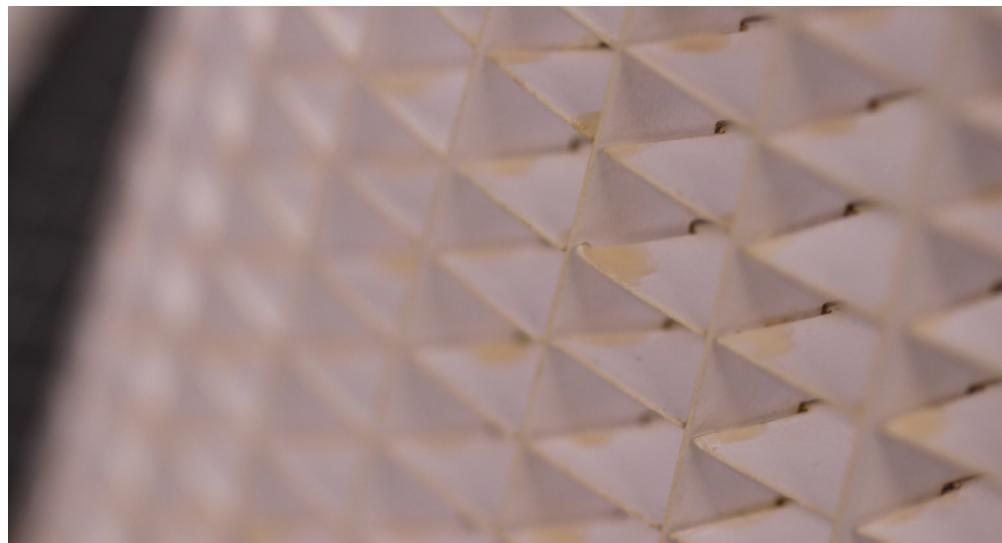
Connection joints / Slots

To assemble complex pieces, the model needs to be assembled with slots To make these slots use objects to trim the model.



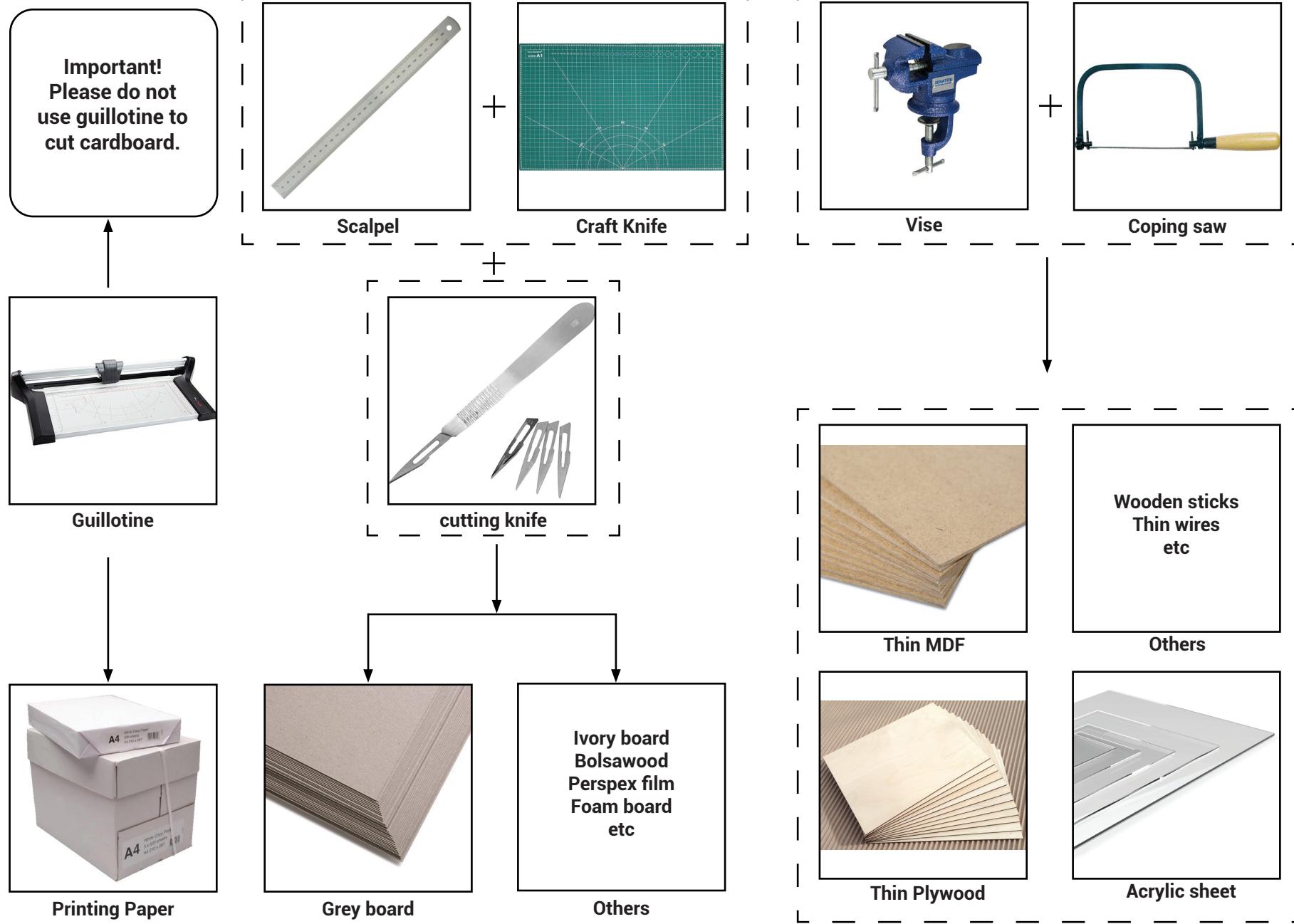
- i. Get intersection line.
- ii. Make a pipe to trim, use same diameter as the material thickness used.
- iii. Copy the pipes and move along the axis.
- iv. Trim the two parts accordingly.

Connection joints / Slots



Workshop skills /

Cutting

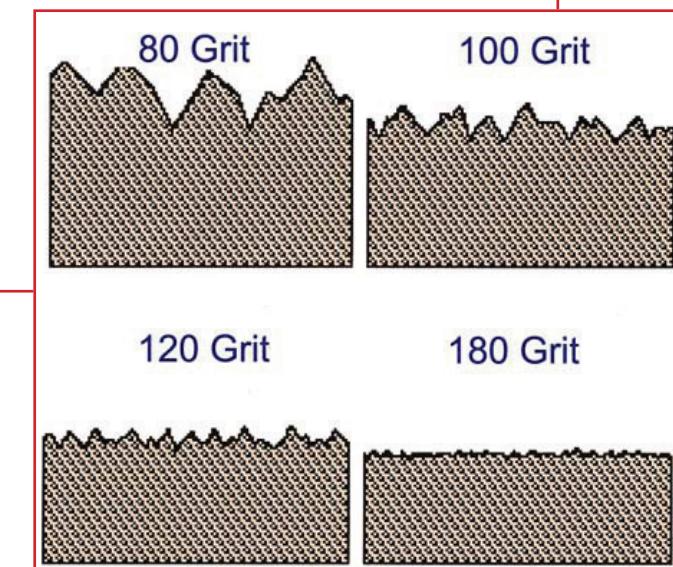


Learn to use the right type of glue and temporary holding techniques to help you assemble the model. Here are the main types of glue and its main usage:

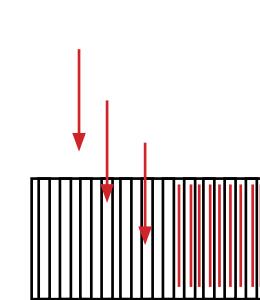
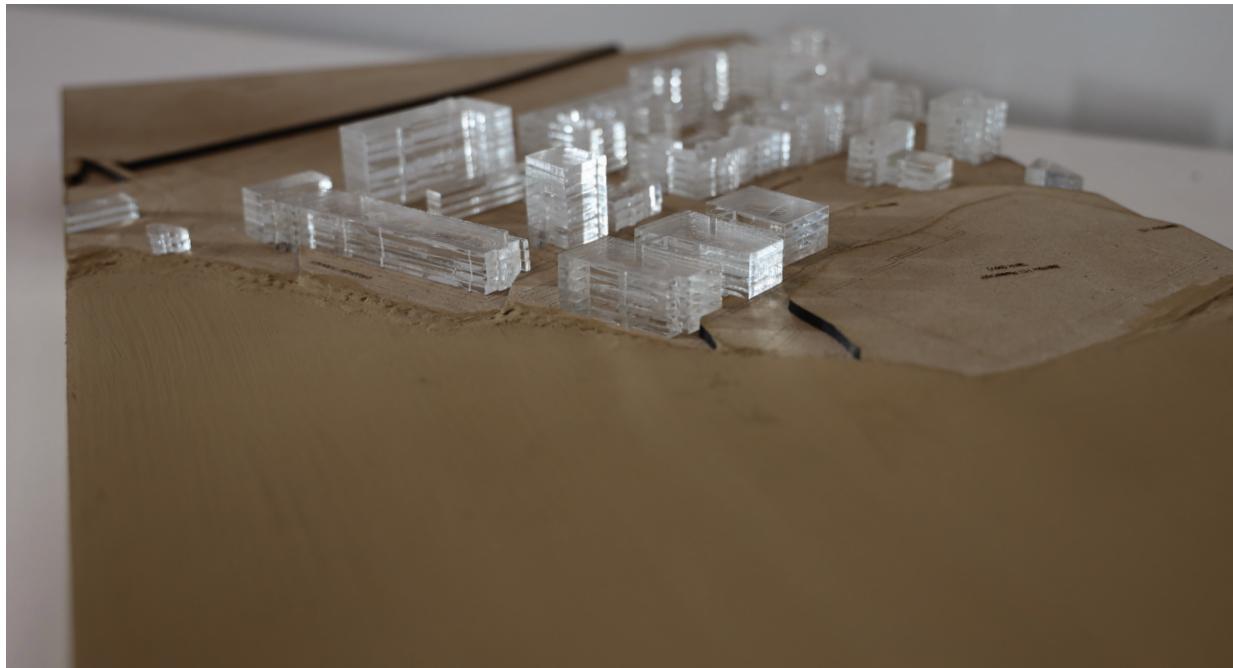
Glue type	Main use	Advantage	Disadvantage
Super glue	Everything	Fast, simple application,	Not as strong for large objects
PVA	Wood, paper	Water soluble, clean	Slow drying time
Acrylic glue	Acrylic sheets	Good for acrylic, clean	For acrylic only
Apoxy	Everything	Quick, strong	Messy
Hot glue	Everything	Quick, strong	Require hot glue gun, messy

For best application, make use of clamps and tapes to help you fix your pieces properly. In addition, use combination of glues to get the best result.

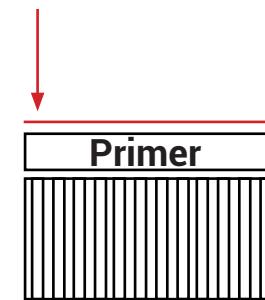
Use sandpapers to sand the models to desire optimal results. You should start with a lower grade sand paper which is more coarse that can remove more material faster and then drop down to a finer grade (higher number). Use wood filler to fix mistakes and sand it again.



It is advised to prime a surface before painting, especially for MDF. Because the material to paint on could absorb a lot of paint and a primer will be able to seal off the surfaces making it better for paint applications. You can get MDF primer from a store or you can also try make your own by watering down PVA glue.



Paint absorbed
by MDF



Paint stays on
primed surface

