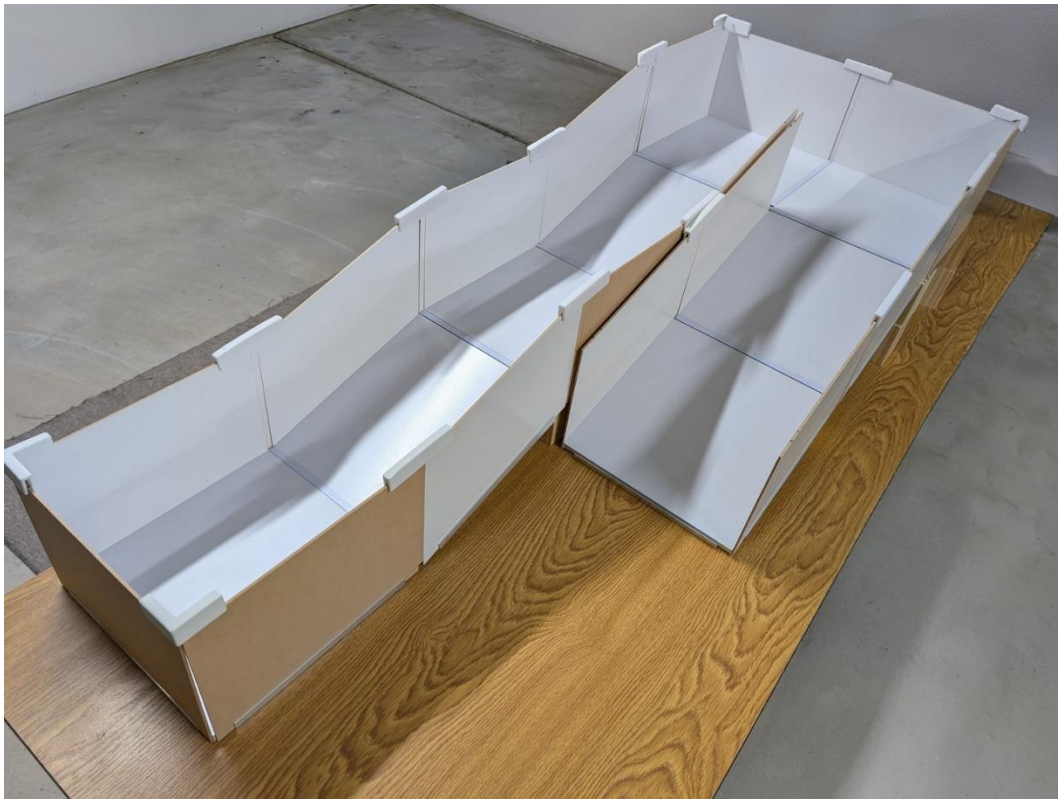
Robocup Junior Rescue Maze

Flat Pack Course Ramp Design

This is an expansion set to the Flat Pack Course Design to add ramps to Robocup Junior Australia Open Maze courses. It uses tiles with aluminium channels on their edges, allowing for walls to be slotted into place as needed. The channels formed where two tiles meet are covered over with a tile joiner. The walls are held in place with 3D printed joiners.

Here is an example course showing the ramp pieces in use. One side rises two levels in one go and the other side has a platform between the two ramp sections.



Instructions

The instructions below are for an expansion set of 4 flat pack ramp pieces with 8 ramp wall pieces and 4 flat pack base pieces with 14 standard wall pieces. Also included at 16 riser blocks, 8 ramp blocks and 2 ramp supports. The parts have been chosen to make them easy to transport by not being too large.

Tools List

- Table Saw and Mitre Saw (with wooden blade and multi-purpose blade for aluminium)
- Craft knife
- Hole Punch and hammer or auto hole punch (recommended)
- Small Phillips screwdriver (or drill with screwdriver mode and P1 Phillips bit)
- Ruler
- Rubber Roller (Croc Grip Application Roller from Bunnings is perfect)
- Drill 3mm drill bit and counter sinking bit (or 6mm drill bit).
- Metal file

Parts List

The parts list below from Bunnings makes the expansion set with 4 ramp tiles and 4 base tiles:

- 1 x MDF Standard Panel Board 1200 x 600mm x 12mm $23.50
- 2 x Melamine MDF White Board 1200mm x 600mm x 3mm $26.60
- 2 x Square General Purpose Pine 70 x 70mm x 1.2m $58.60
- 8 x Aluminium Angle 20 x 12 x 1.4mm x 1m (L shape profile) $42.80
- 4 x Aluminium Channel 10 x 10 x 1.5mm x 1m (U shape profile) $27.32
- 1 x Pack Timber Screws Hinge-Long Threads 4G x 12mm Qty: 100 $4.95
- 2 x Pack White Gloss Vinyl Adhesive Wrap Film 1.5m x 45cm $11.14
- **Total:** **$194.91**

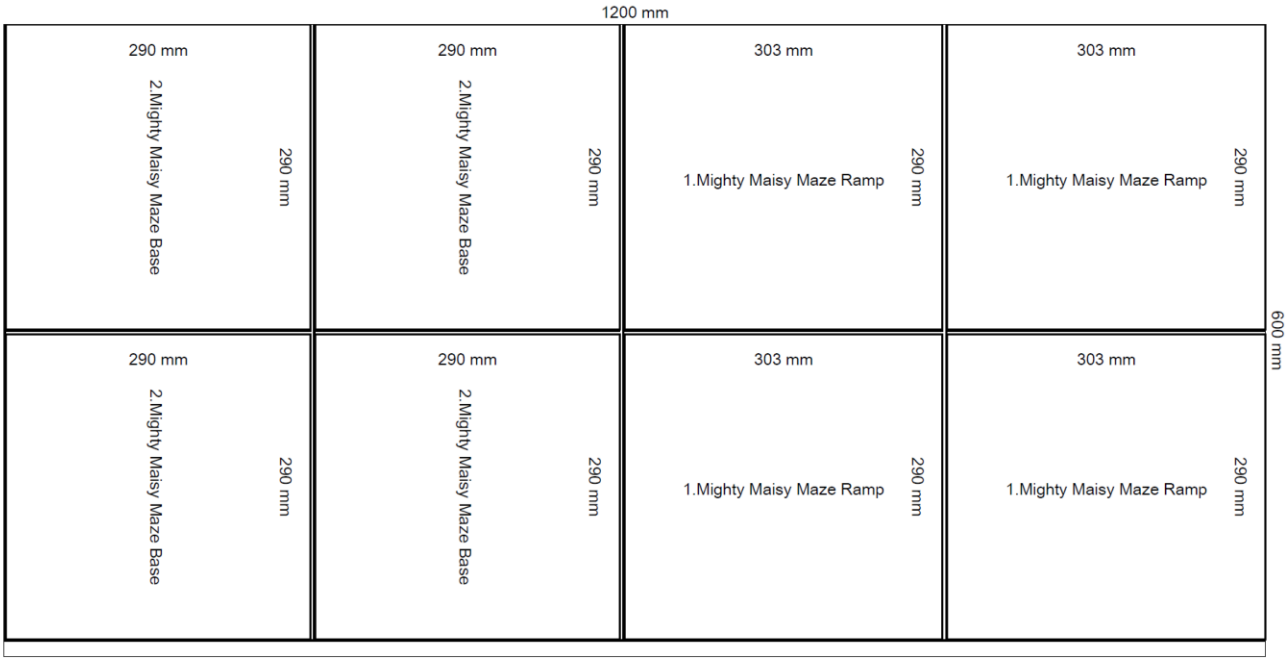
Add an optional storage container:

- 1 x Plastic Storage Container Ezy Storage 52L Solutions $19.96

The pricing and links from Bunnings (as at February 2026), not including any trade discounts.

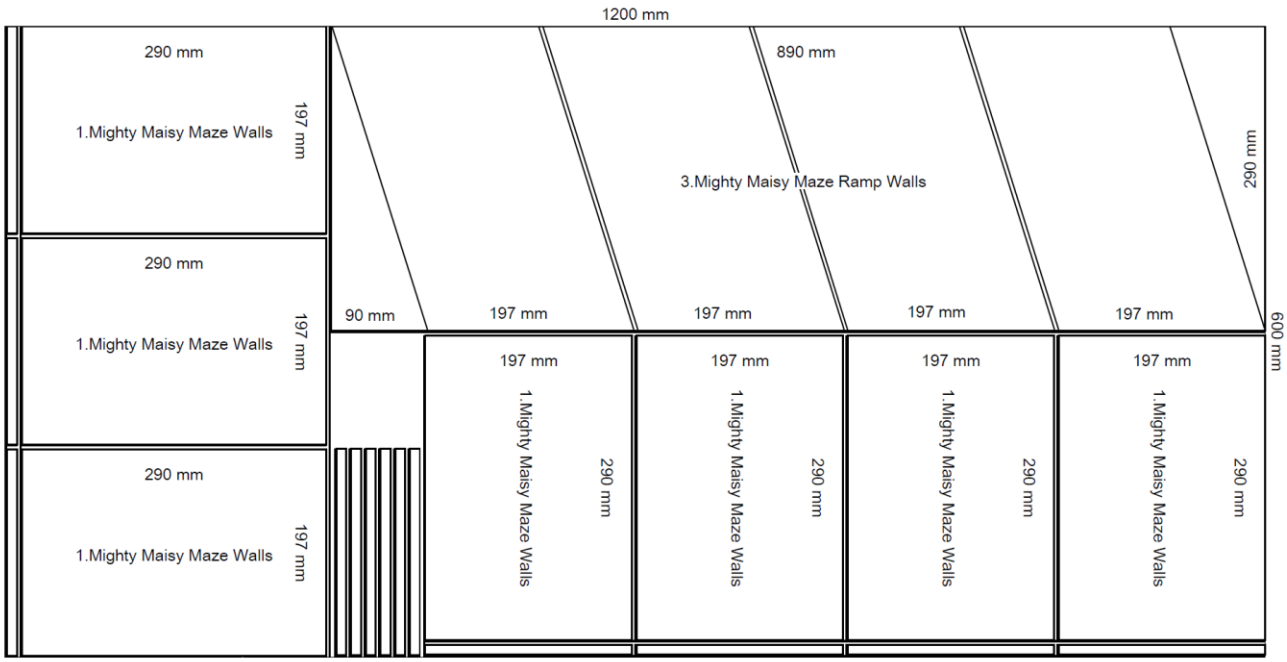
Cutting Base, Walls and Aluminium

1. Cut the 12mm thick MDF board into 4 rectangles of 303mm x 290mm and 4 squares of 290mm x 290mm. Cutting sheet below, assuming a 4mm saw kerf:



2. Cut each 3mm thick MDF boards into 1 rectangle 890mm x 197-200mm, 7 rectangles 290mm x 197-200mm and 13 rectangles 10mm x 197-200mm. Then cut the large rectangle into 4 parallelograms 197-200mm wide using 90mm offset to set the angle. Cut one set of parallelograms white side up and one set white side down to get mirrored pairs. Additional 10mm x 197-200mm strips can be cut from the triangles left over from the parallelograms. Cutting sheet below, assuming a 4mm saw kerf.

   NOTE: If saw kerf is less than 4mm, increase height towards 200mm. For example: a 3mm saw kerf will allow the height to be 198mm.

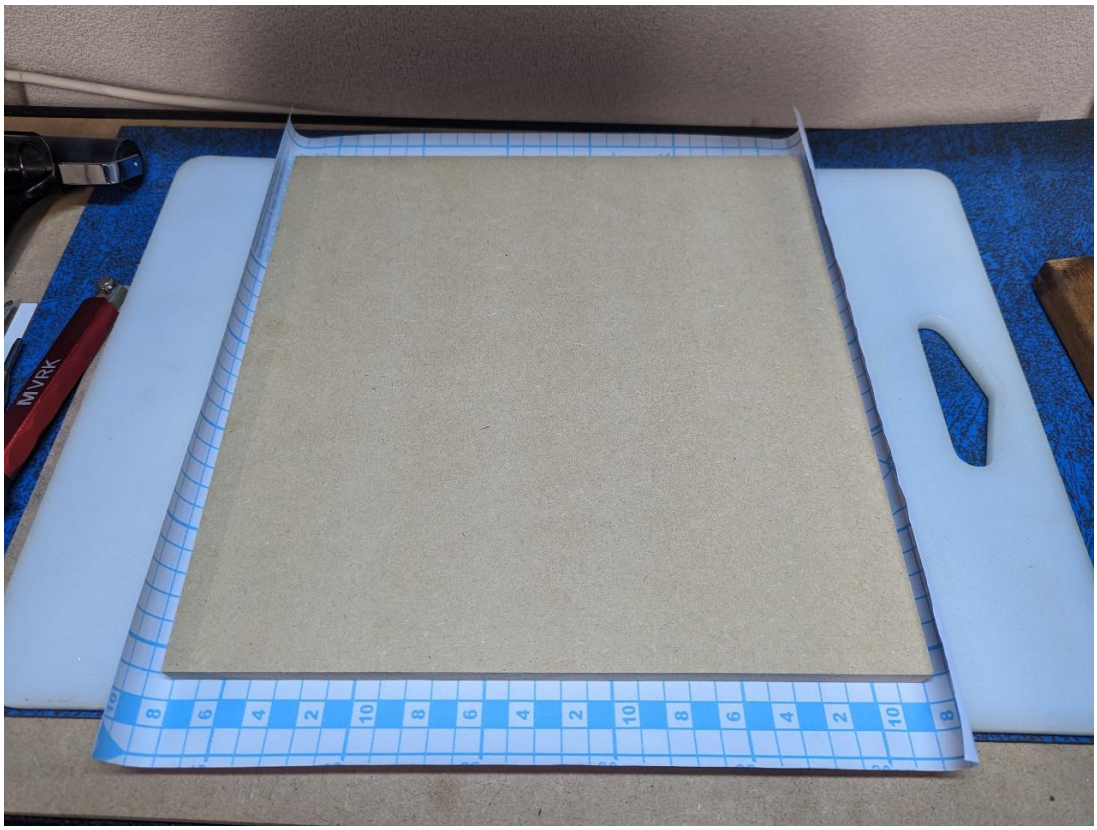


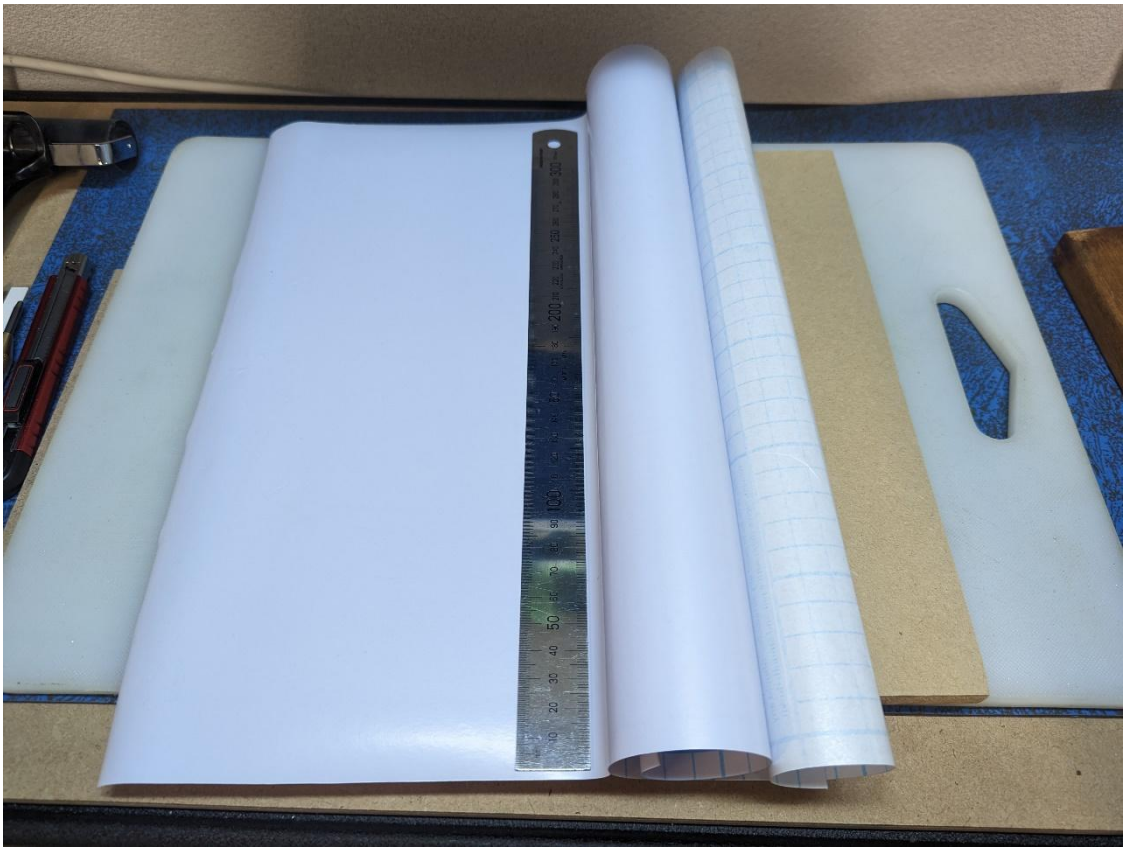
3. Cut the 70 x 70mm pine into 90mm blocks, a total of 24 blocks from two 1.2m sections. Using a 17 degree angle cut a slope across half of the top of 8 pieces, these pieces will support the top of a ramp section. If you have offcuts left from original pine, cut them to the same length and then cut a 17 degree angle across the entire top, these pieces can be as supports for ramps. Sand the edges of the blocks to remove any sharp edges.
4. Cut each Aluminium Angle (L shape profile) into 4 x equal lengths (approx. 250mm).
5. Cut each Aluminium Channel (U shape profile) into 3 x 290mm lengths.

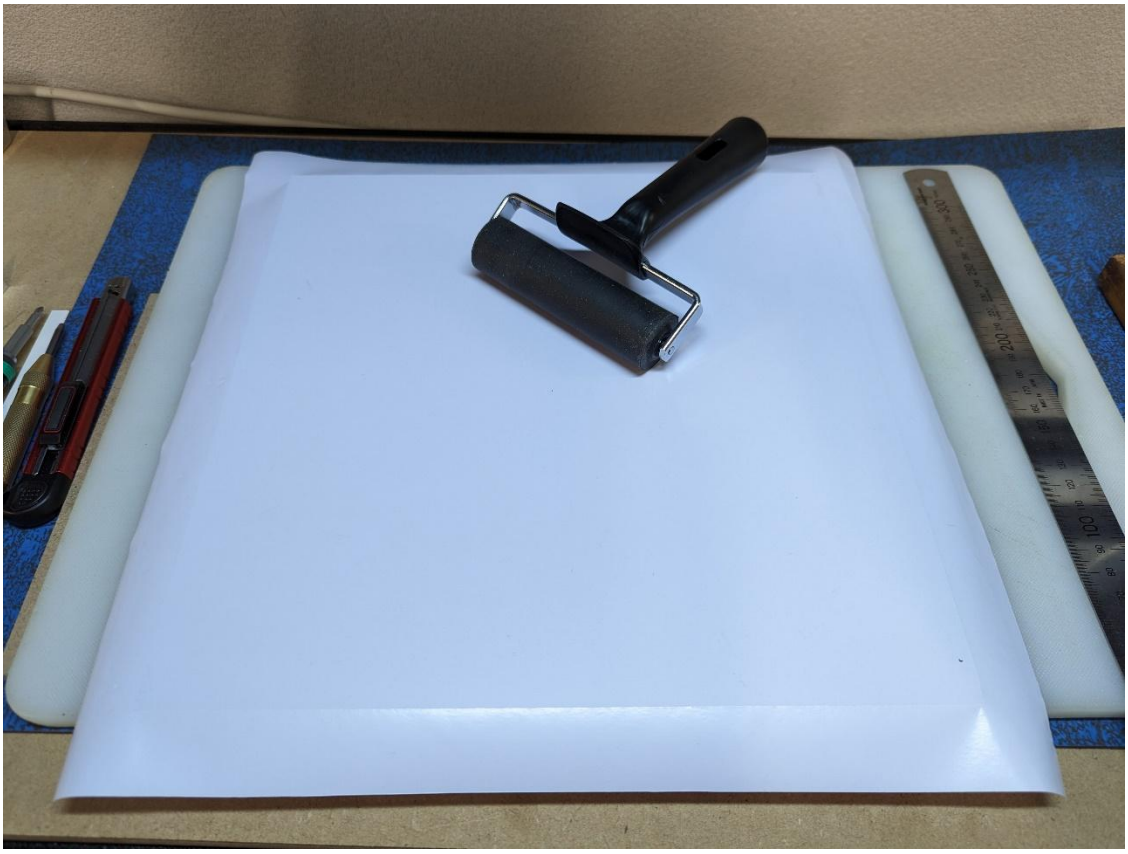
Finishing the Base plates

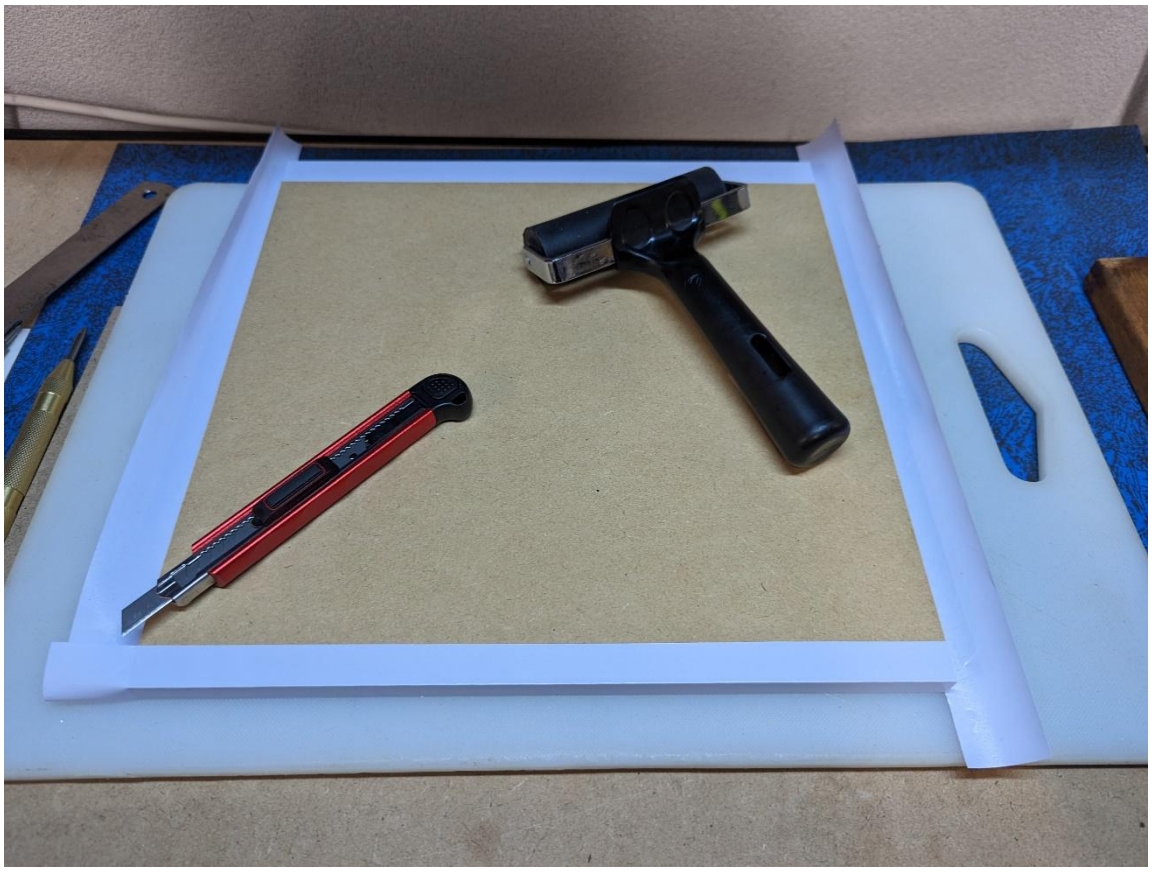
1. File ends of Aluminium to remove sharp edges (if necessary).
2. Using Aluminium Angle (L shape profile), drill 3mm holes 8mm from the edge of the long side of the L at positions 25mm, 125mm and 225mm.
3. Countersink drill holes on underside of Aluminium Angle (L shape profile).
4. Cut one roll of white vinyl wrap into four 350mm x 350mm squares and the other roll into four 350mm x 365mm rectangles for the ramps. Keep excess to cut into strips to cover the tops of the 12 Aluminium Channel (U shape profile) sections.

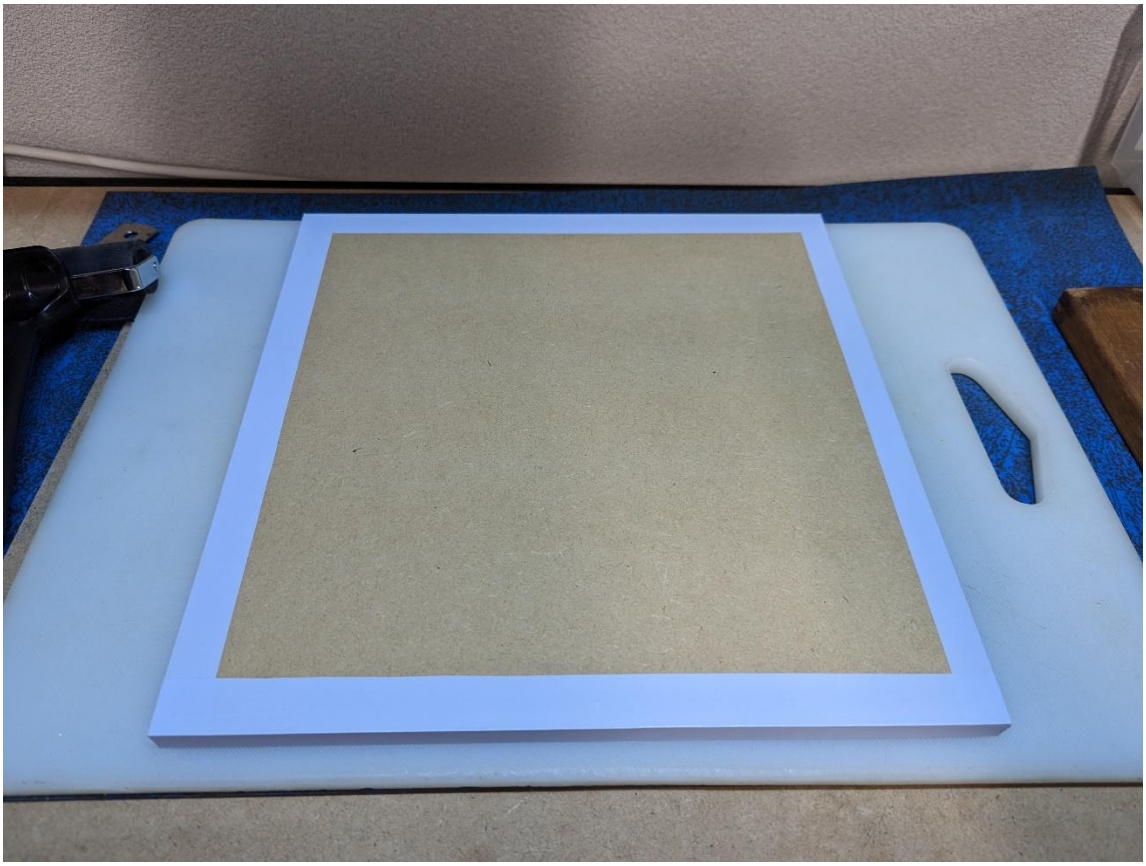
5. Cover top side of the base boards with vinyl wrap and have 12mm down the sides and 18mm wrapped underneath. Use the ruler to smoothly apply the vinyl and the roller to ensure it has adhered fully as well as creating clean edges without bubbles. Use the craft knife to cut off excess vinyl on the corners.



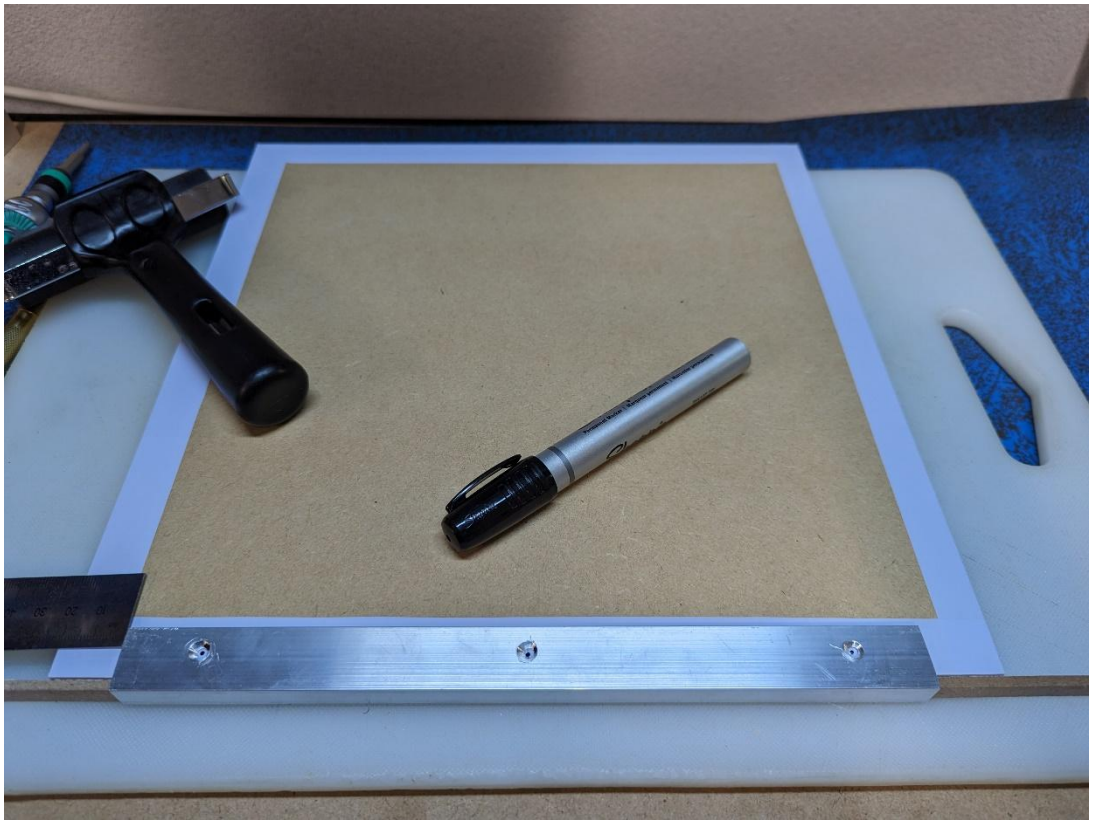








6. Using two of the 10mm x 200mm x 3mm wall section as guides, install the Aluminium Angle (L shape profile) to the sides of base boards centre aligned (20mm from edge of the board). Use a marker or hole punch to mark the location of the holes. Screw down the Aluminium Angle using the 4G x 12mm screws.



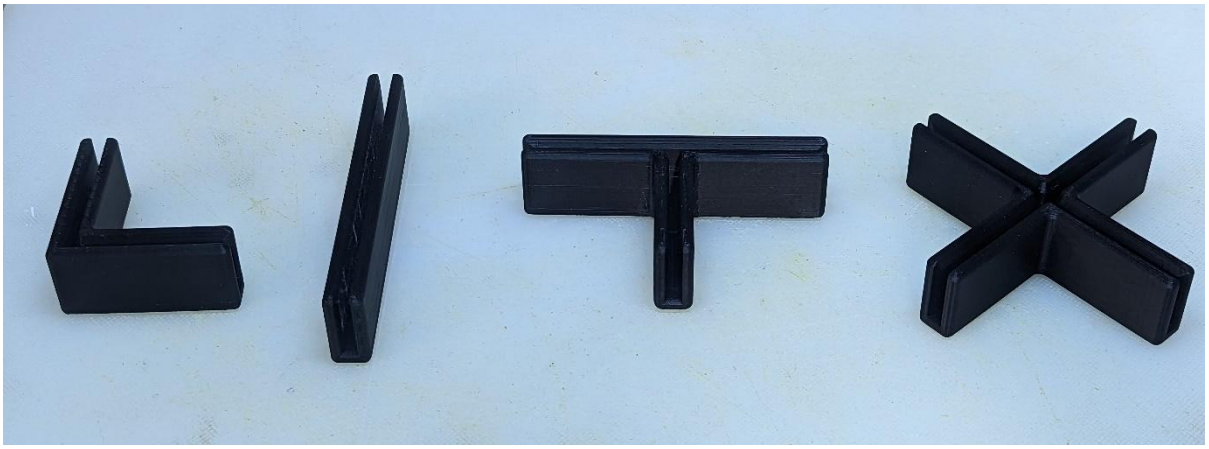
The base tiles should sit nicely side by side and the join can be covered with the vinyl topped Aluminium Channel (U shape profile) sections.

Storage of Tiles

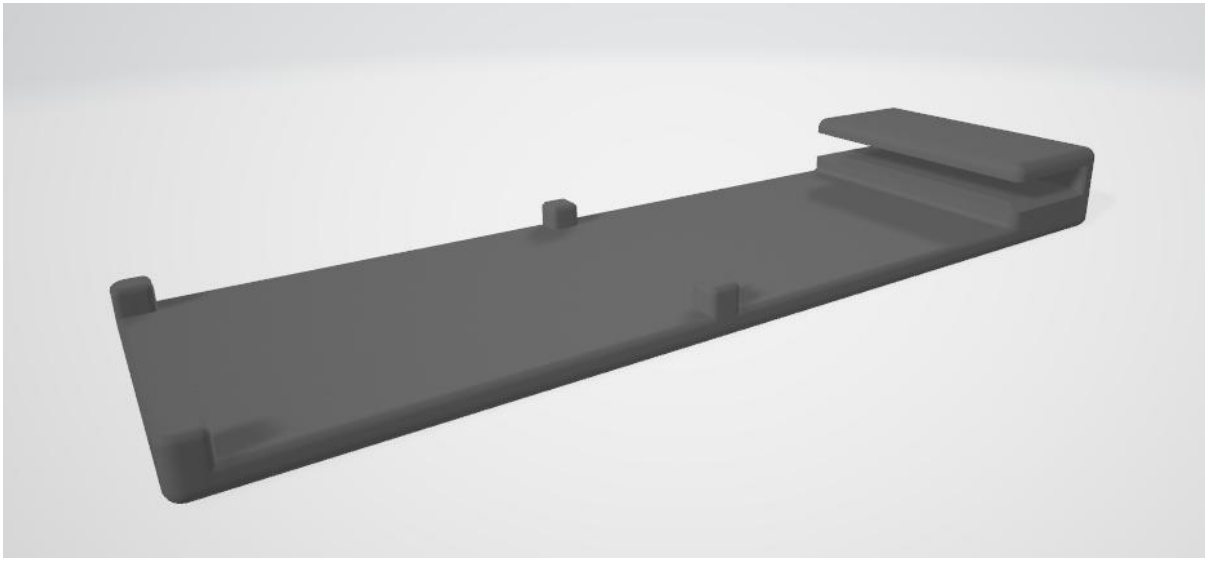
Ensure that the tiles are stored with the top side against each other to protect the vinyl being damaged by the aluminium on the base.

3D Printing

Print 3D designs for Wall Joiners L, I, T and X shapes. Print 12 of each of the L and I joiners and 6 of each of the T and X joiners.



For Open Maze only: Printing 3D design for victim hanger. Print 6 of the victim hangers. The hangers are designed to fit onto the walls and sit off the wall to minimize heat transfer to the wall itself.



Assemble Victims (Open Maze only)

Victims have both a coloured/reflective component and a visual letter component.

The coloured component can use 3M Blue Painter's Masking Tape (48mm wide) and the reflective component can use Aluminium Foil Tape (48-50mm wide). Both tapes available from Bunnings.

Please see the rules for more details.

** End of document - Robcocup Maze Course Flat Pack.docx - DM - 17 May 2026 **