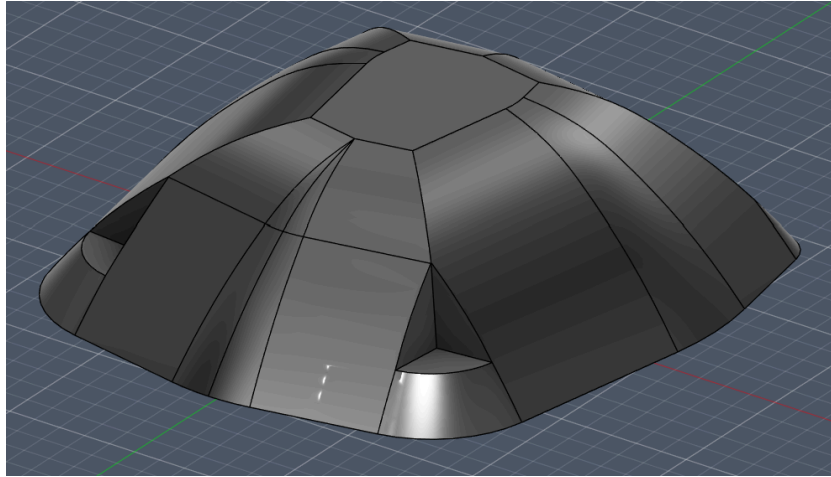


The canopy

The initial plan specified a 3D printed canopy; however, to reduce weight, the design was revised to utilize a fiberglass laminate manufactured over a 3D printed mold. This change was made after consultation with the construction coordinator. A 3D printed shell would have required a minimum wall thickness of 1.5 to 2 mm to maintain structural reliability due to the risk of cracking along print layer lines. In contrast, fiberglass enables a thinner wall with greater strength, producing a lighter final component.



The canopy 3D design.

The mold was fabricated using PETG filament with a 0.4 mm nozzle and 10% infill. Following printing, the surface was sanded progressively, beginning with 150 grit and continuing up to 800 grit, with a final finish at 1200 grit to achieve a smooth surface. The mold was then coated with varnish.



The mold. Bottom and top view.

The lamination process began with the application of a release agent to the mold. Once dry, the mold was waxed and polished using a paper towel. These preparatory steps ensured that the canopy could be released from the mold upon completion.



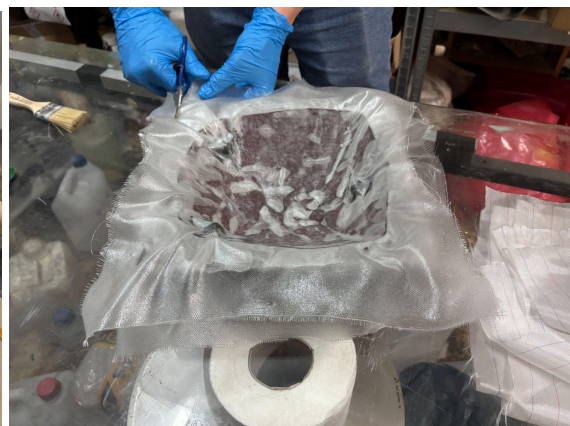
Mold waxing.

After polishing, one piece of 24.5 g glass fiber and four pieces of 81 g glass fiber were cut.



Cutting glass fiber.

Each layer, starting with the thinnest, was impregnated with resin (50 g of L285 and 20 g of H286) and carefully positioned within the mold to conform to its shape.



Fusing fiber with resin and placing it inside the mold.

In the regions designated for mounting slopes, small pieces of carbon fiber were added between the 24.5 g and 81 g layers to enhance strength. After all layers were in place, a delamination insert, cloth, and sponge pieces were placed on top to ensure optimal conformity to the mold.



Placement of delamination insert, cloth and sponges.

The entire assembly was then sealed in a vacuum plastic bag, and a vacuum was applied.



Placement mold in the vacuum.

After 24 hours, the canopy was removed from the mold. The final step involved varnishing the canopy white to maximize sun protection.



The canopy after taking out the vacuum.