

## 02 Robo\_Composite\_Fold

### Robotic folding of Aluminum composite panels

**Year:** 2019 2<sup>nd</sup> master semester. **Function:** Structural system / Cladding pattern. **Client:** Academic project. **Status:** Prototype. **Digital tools:** Rhino, Grasshopper, Kangaroo 1.0 and KUKAprc plug-in.

The main objective of this project was to curve fold aluminum composite sheets with the help of an industrial robotic arm from KUKA (Figure 2).

The initial form finding process started by using an origami component by Daniel Piker, which was used to simulate curve folding behaviour in thin materials. However, the material has a 3.5 mm LDPE core which not only increased bending stiffness of the material but also added structural stability to the folded module.

I used 3 different modules to generate 2 slightly different patterns (Figure 1). Crease lines were milled, with a "V" shaped mill tip, all the way through the back layer and core. A finite element analysis was carried out to later to verify if the maximum required bending force is lower than maximum payload capacity of the robotic arm (Figure 3).

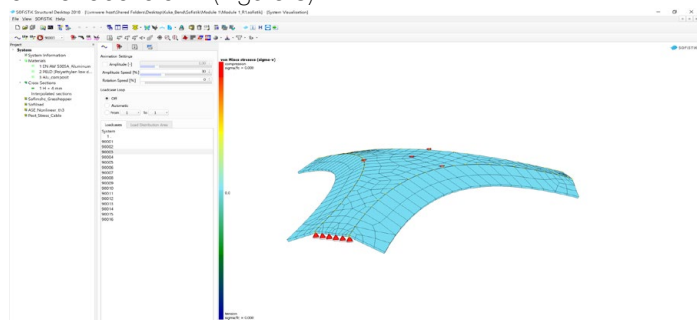


Figure 3: F.E.A. Model in SOFiSTiK

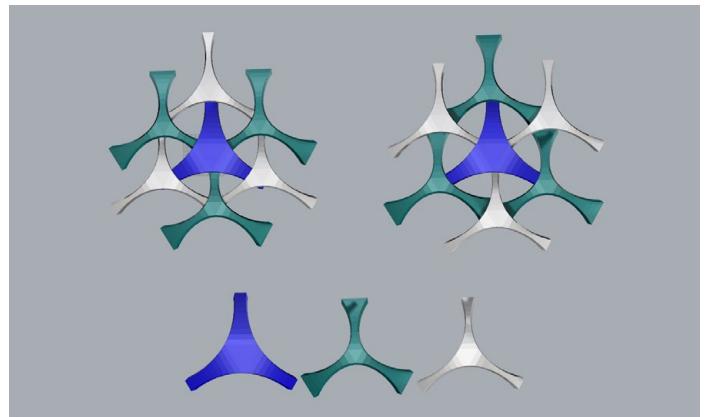


Figure 1: Form finding process with Kangaroo 1.0

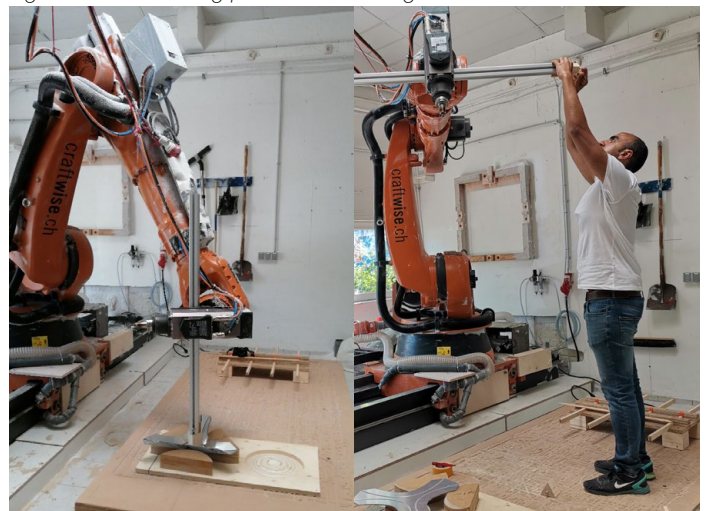


Figure 2: KUKA robotic arm setup and adaptive mold below