



Natural rocky shore where *Cystoseira* lives

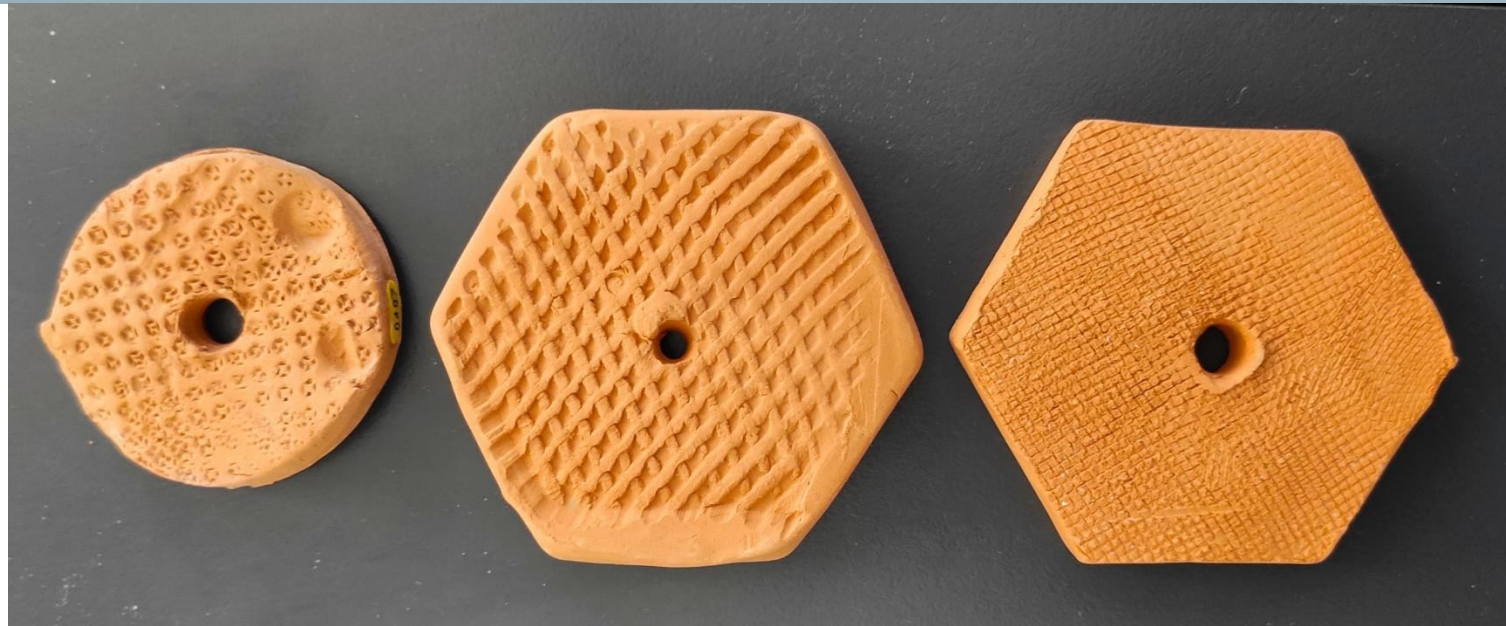




Natural reef with *Cystoseira*



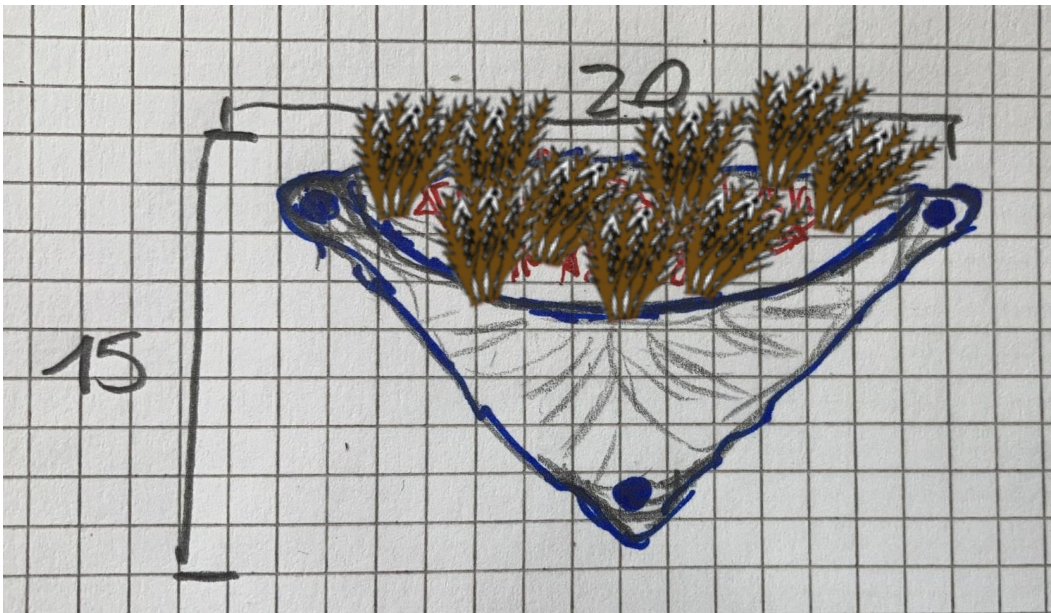
Detail of apical parts of *Cystoseira amentacea*





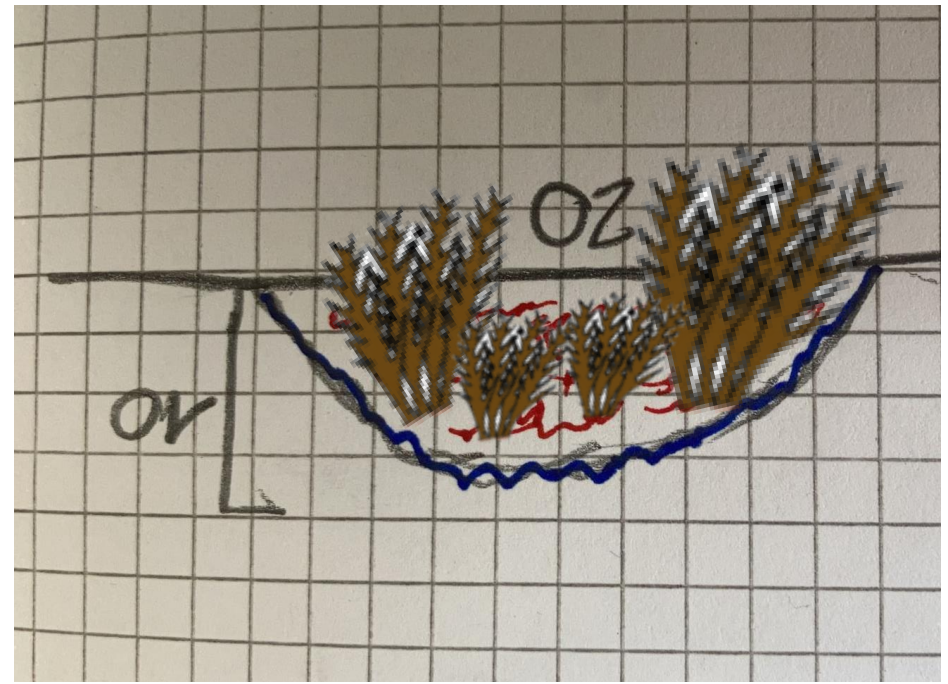
Artificial reef with clay tiles, after last summer's deployment

Our idea for the development of the holders for algae

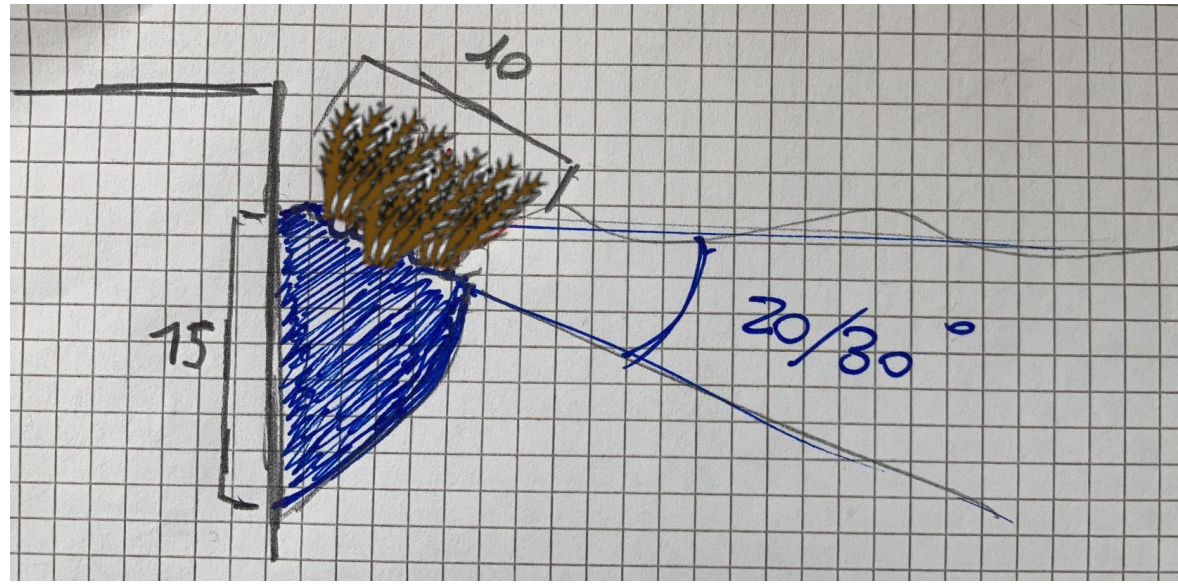


Front view

Thickness: 10 cm
Width: 20 cm
Length: 15 cm



Top view



Wave incidence angle

Software di disegno in 3D

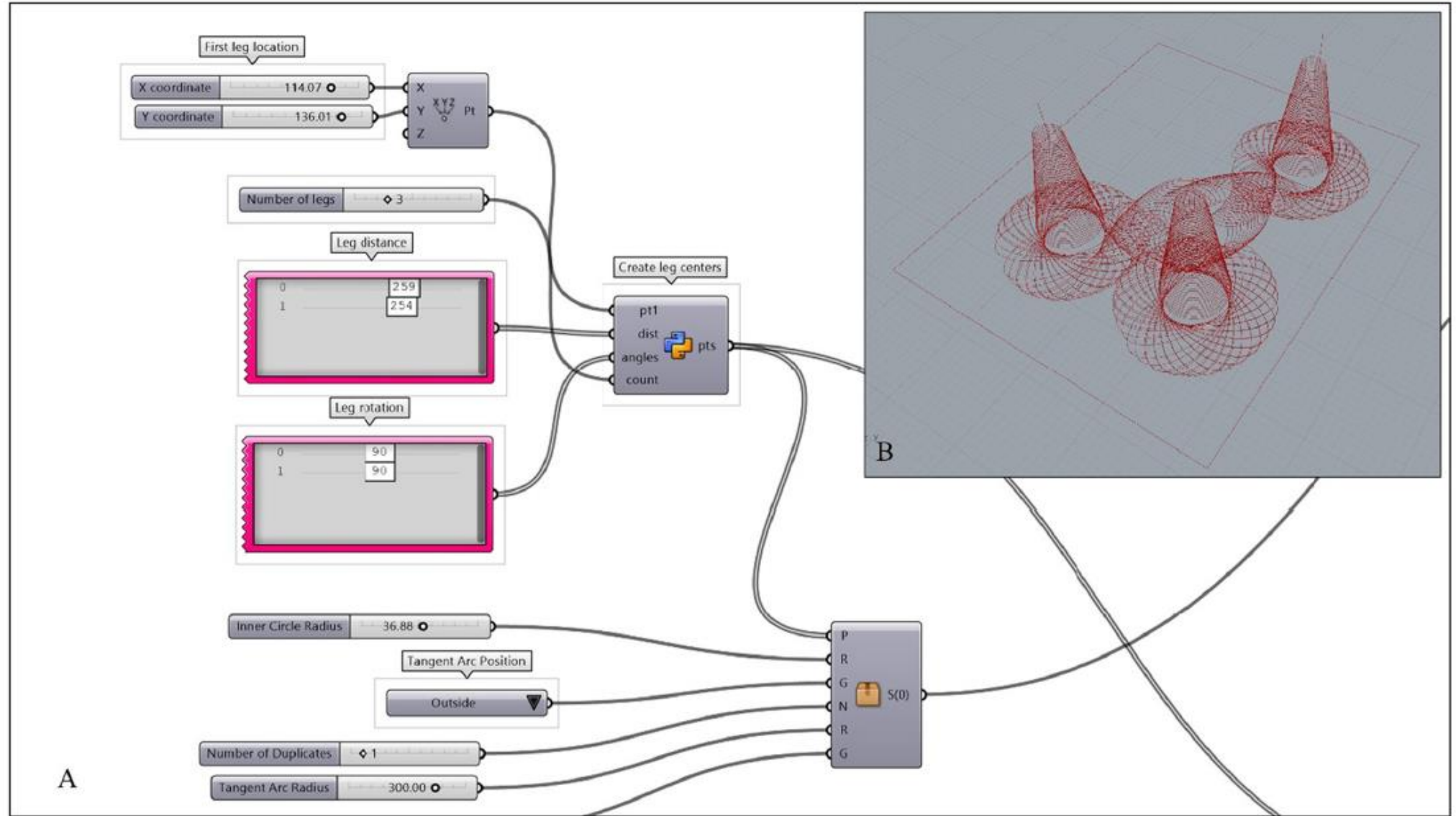
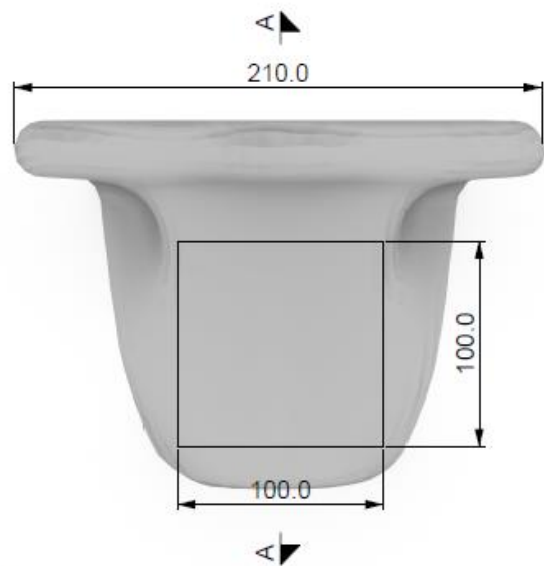
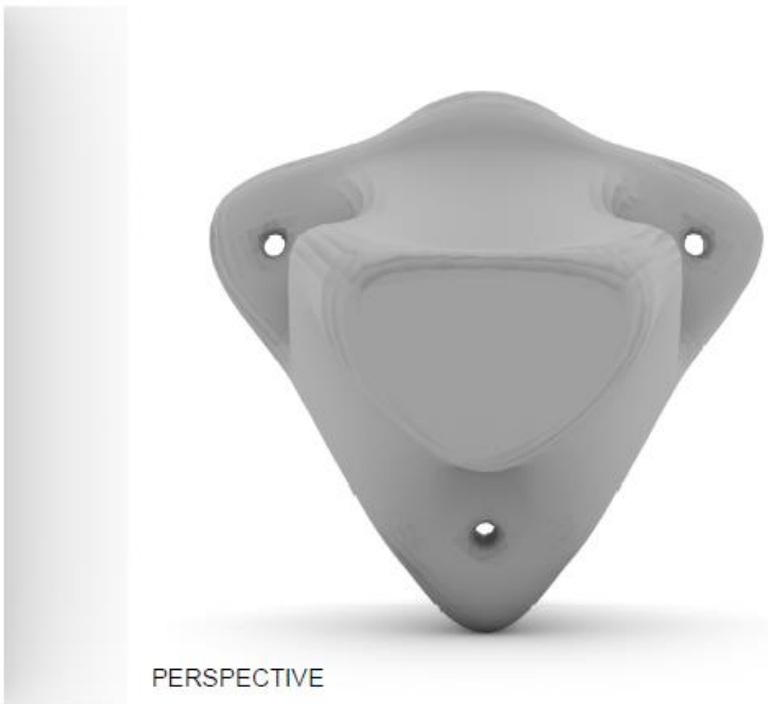


Fig. 1. A) GSPD design-tool canvas in Grasshopper3D, B) The toolpath outcome after parameter selection as appear in Rhino.

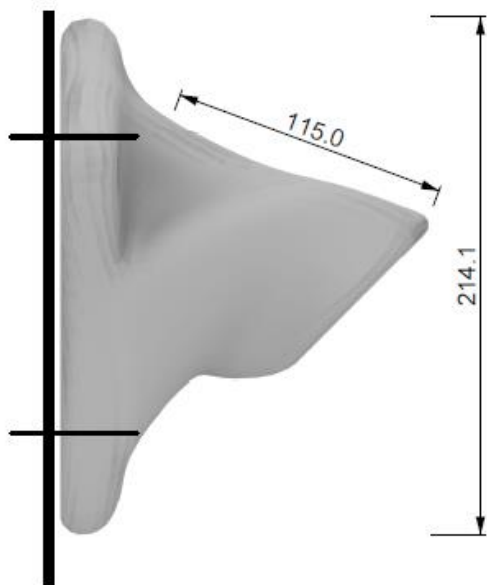
Primo prototipo



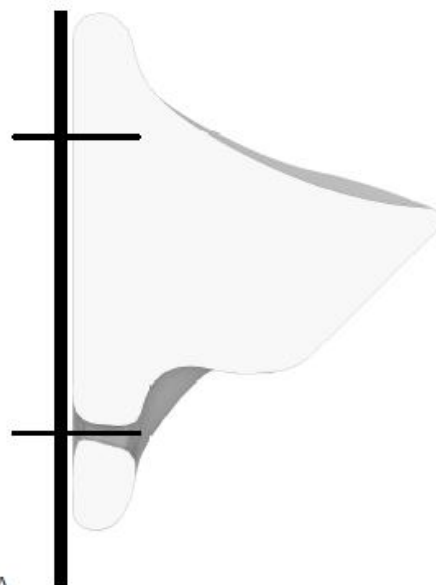
TOP VIEW



PERSPECTIVE



SIDE VIEW



SECTION AA

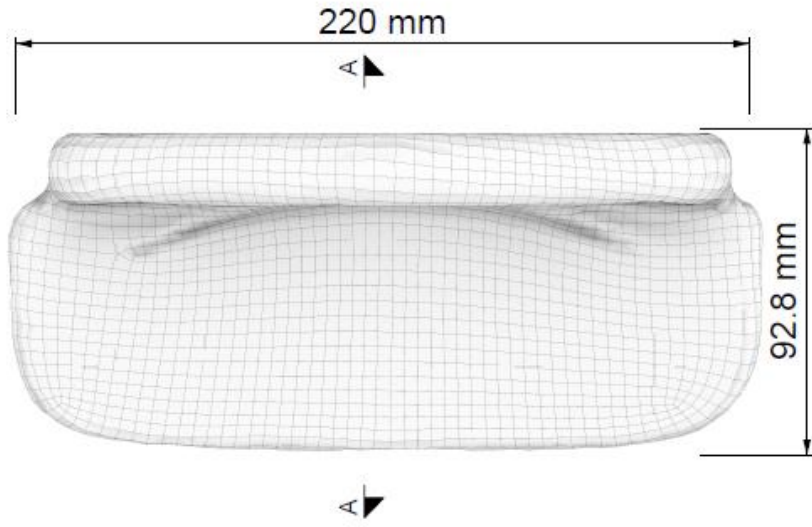
DETAIL.
Hole size for approx 5mm diameter screw.
Might vary based on 3dprint technique and resolution

DESIGN OPTION

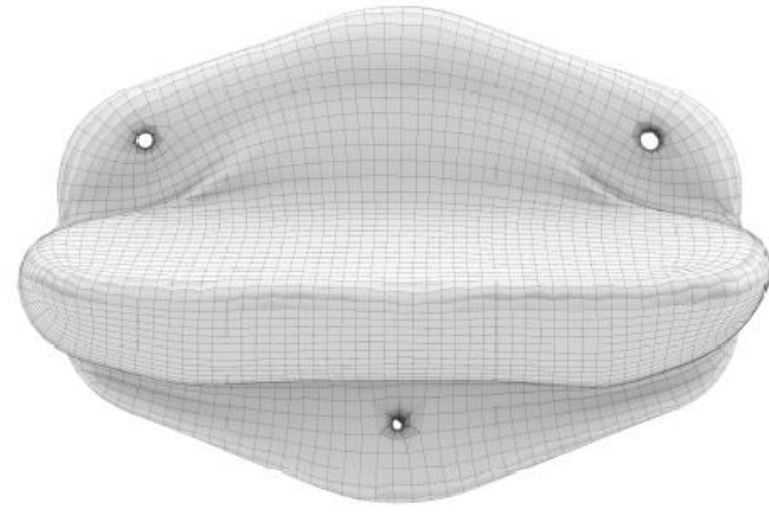
Volume : 0,0017 m³ approx.
Weight : 4.08 kgs approx.

All Dimensions in mm

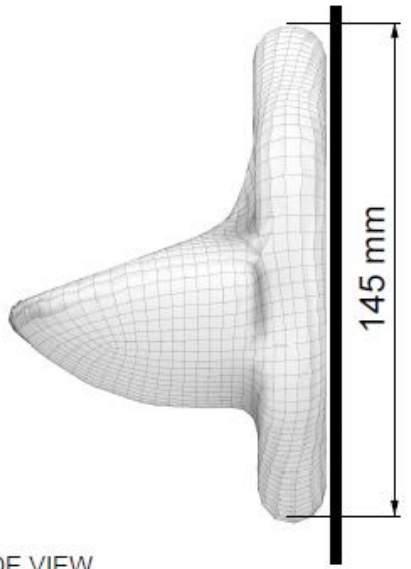
Secondo prototipo



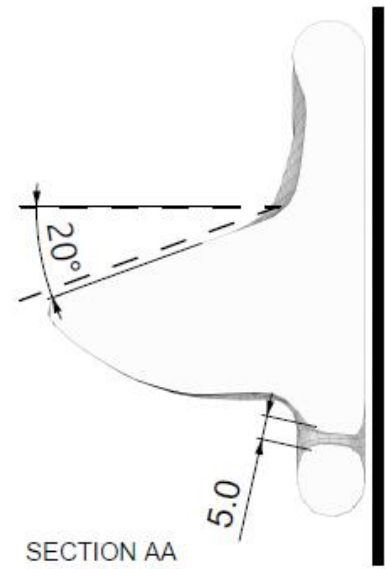
TOP VIEW



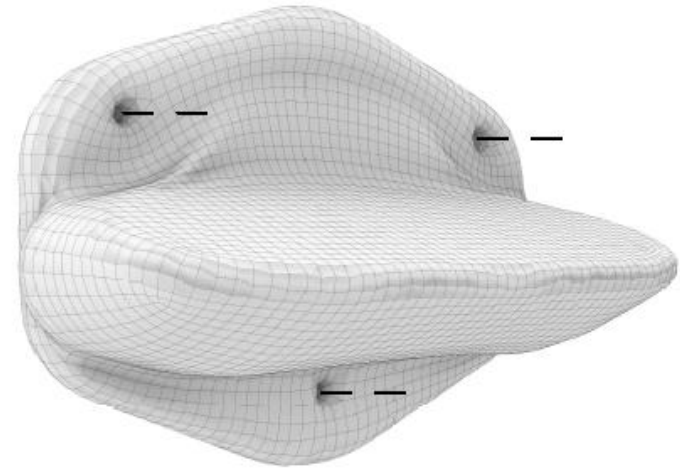
FRONT VIEW



SIDE VIEW



SECTION AA

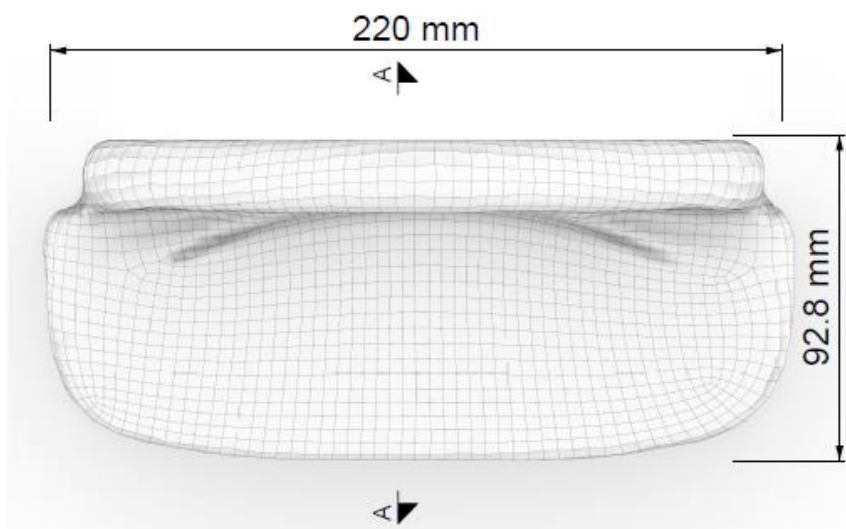


PERSPECTIVE

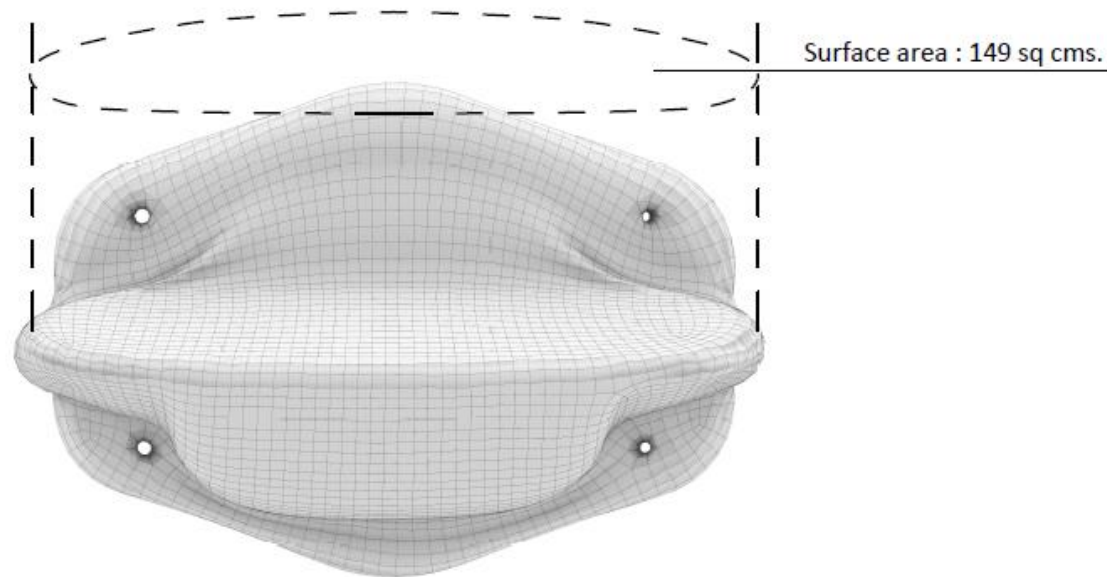
DESIGN OPTION
Hole size for approx 5mm
diameter screw.
Might vary based on 3dprint
technique and
resolution

Volume : 0.00095 m³ approx.
Weight : 2.3 kgs approx.

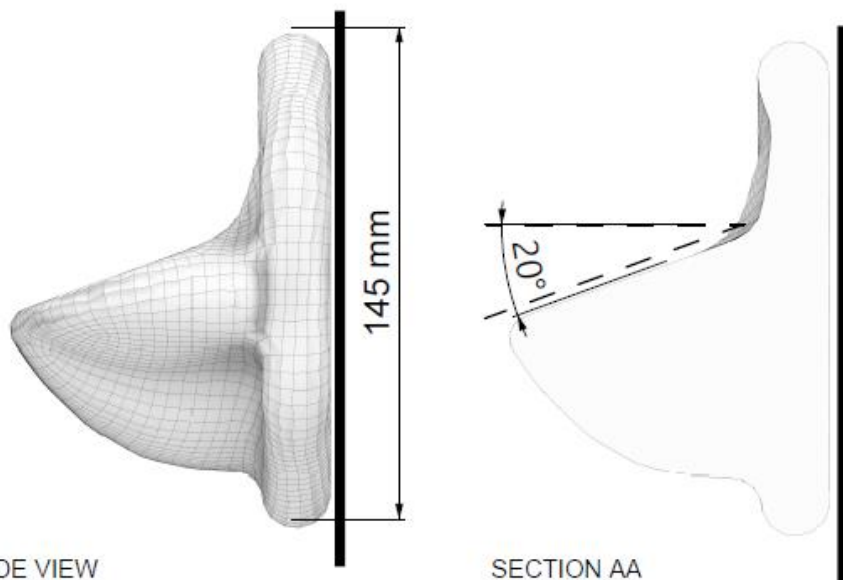
Terzo prototipo



TOP VIEW

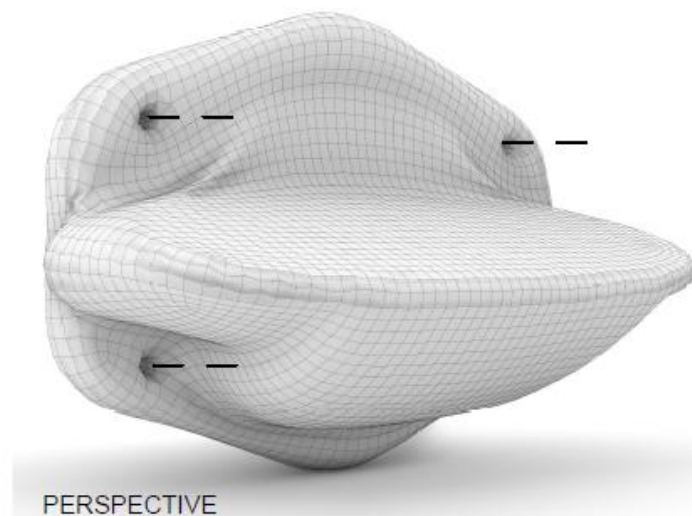


FRONT VIEW



SIDE VIEW

SECTION AA

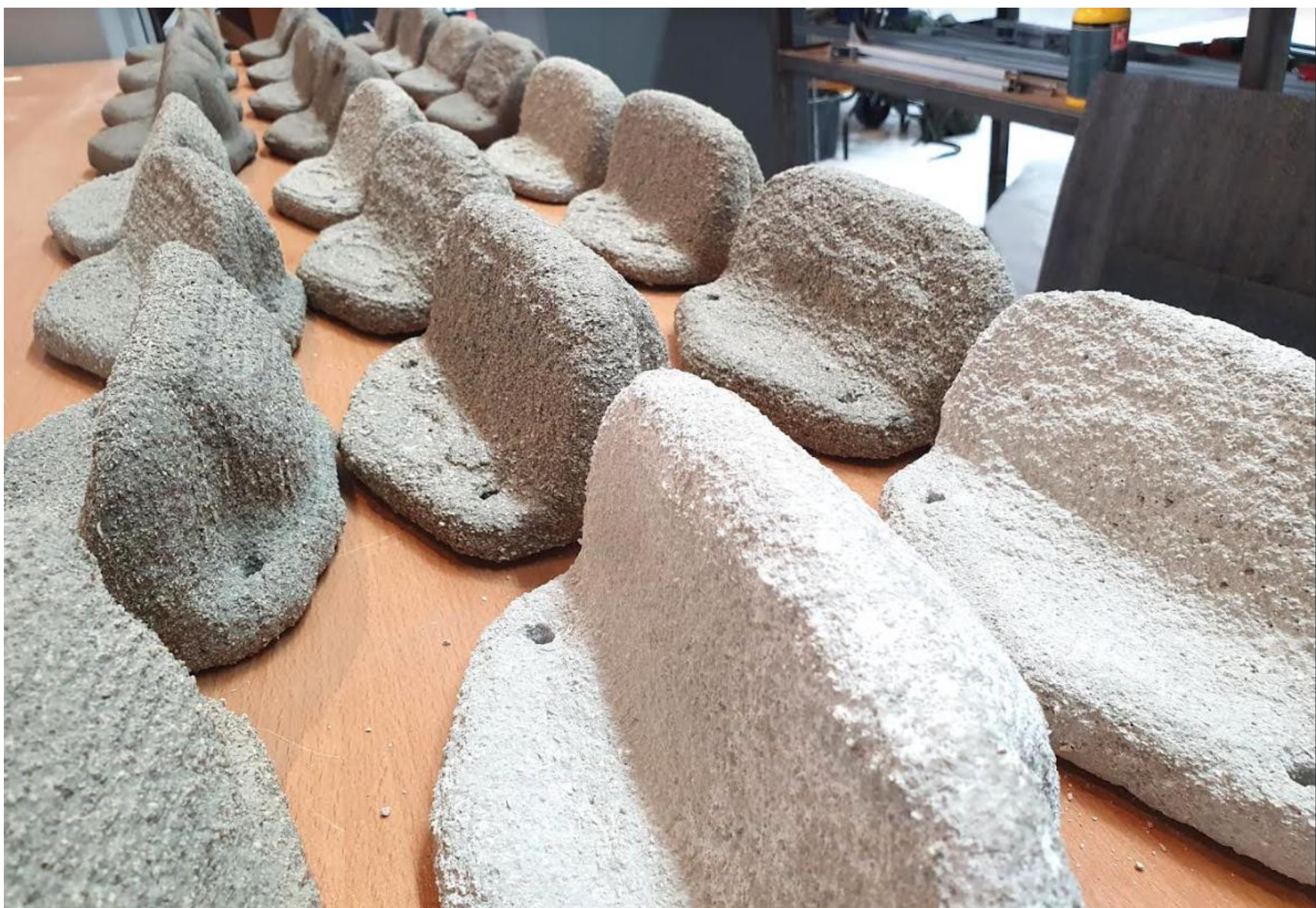


PERSPECTIVE

DESIGN OPTION
Hole size for approx 5mm diameter screw.
Might vary based on 3dprint technique and resolution

Volume : 0.001011 m³ approx.
Weight : 2.429 kgs approx.





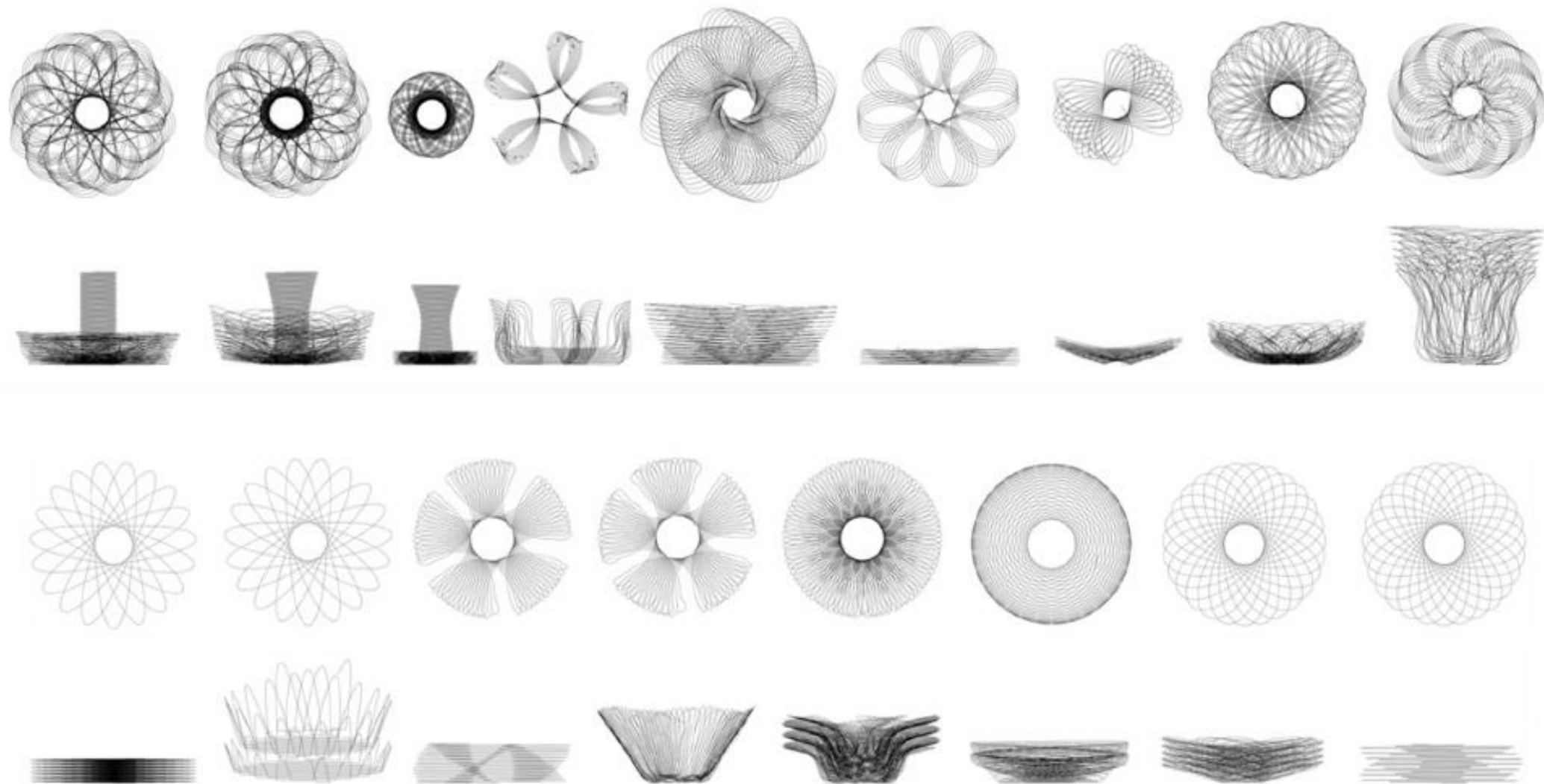
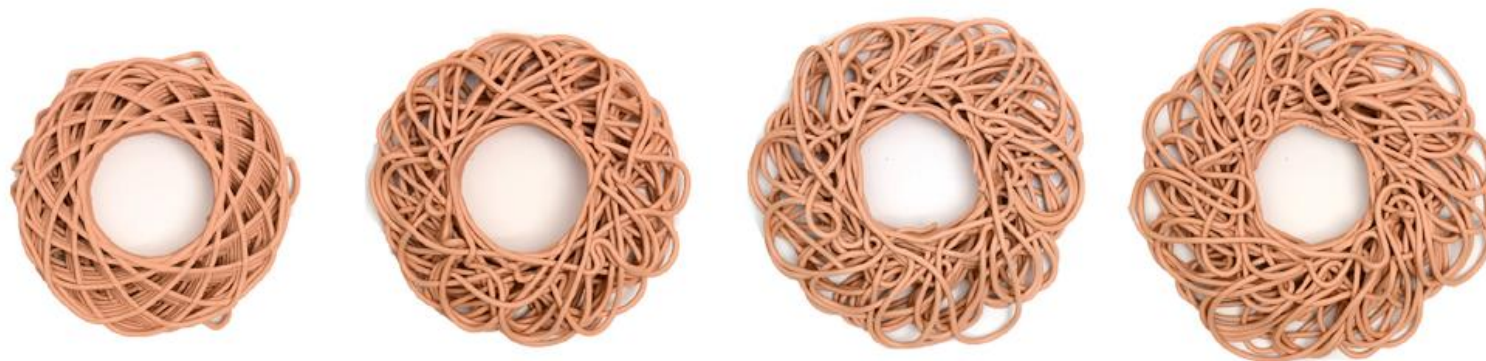


Fig. 2. Views of some tabular tool-paths generated with the GSPD design tool.

Fase di stampa mediante stampante 3D



Fig. 3. Repeating pattern design with different climbing angle parameters. Leftmost- the most moderate climb with 0.01° constant climbing angle. Rightmost - the steepest climb with an angle of 2° . During the printing the machine tool head is way up and the clay just pulled along.



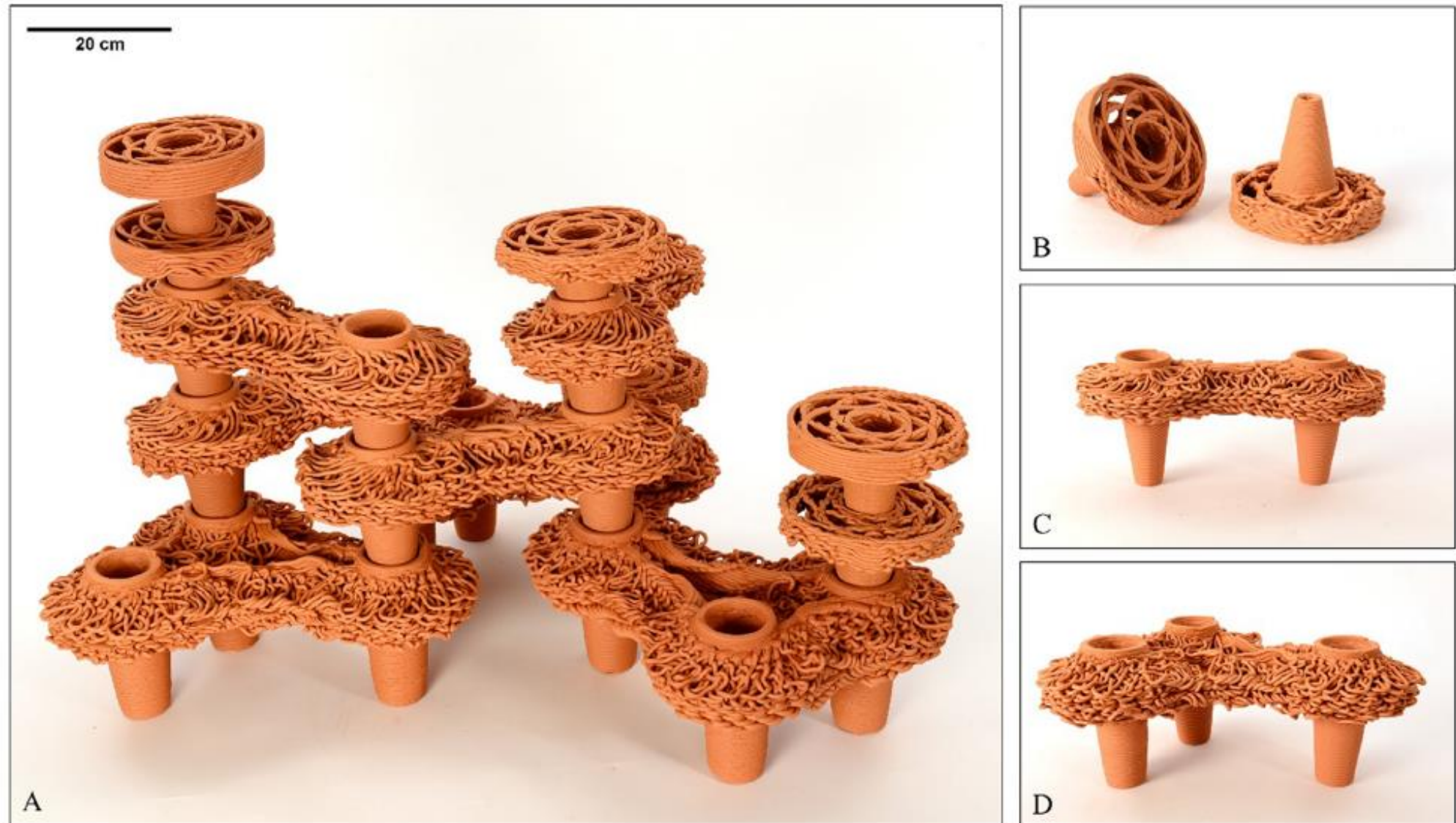


Fig. 5. Self-locking system design of the bio-inspired tabular units. A) constructed reef; B) one-leg unit; C) two-leg unit, which is made from two parts; and D) three-leg unit, also made from two parts.

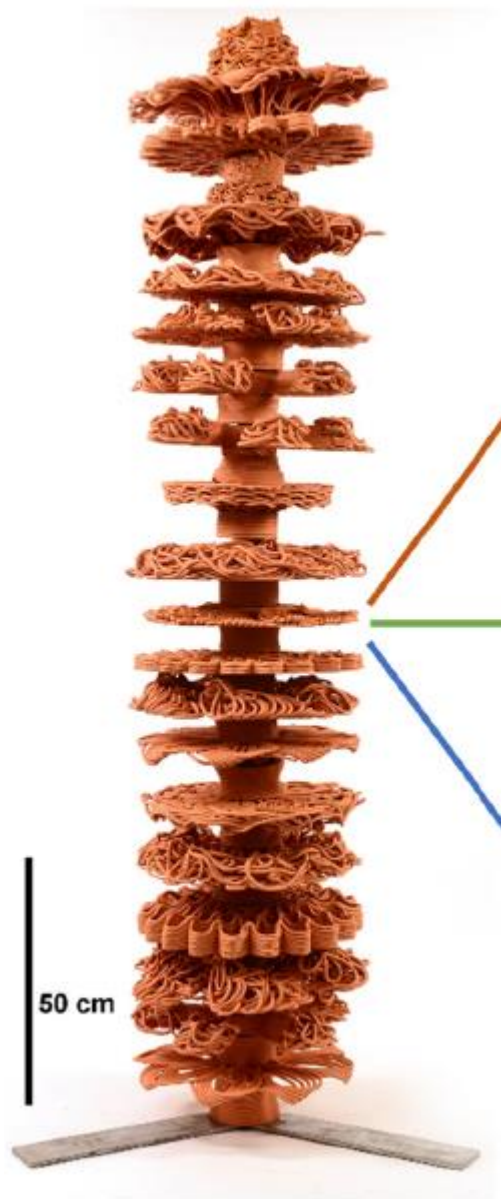


Fig. 7. Underwater views of the tabular designed ARs that were developed using the GSPD method.