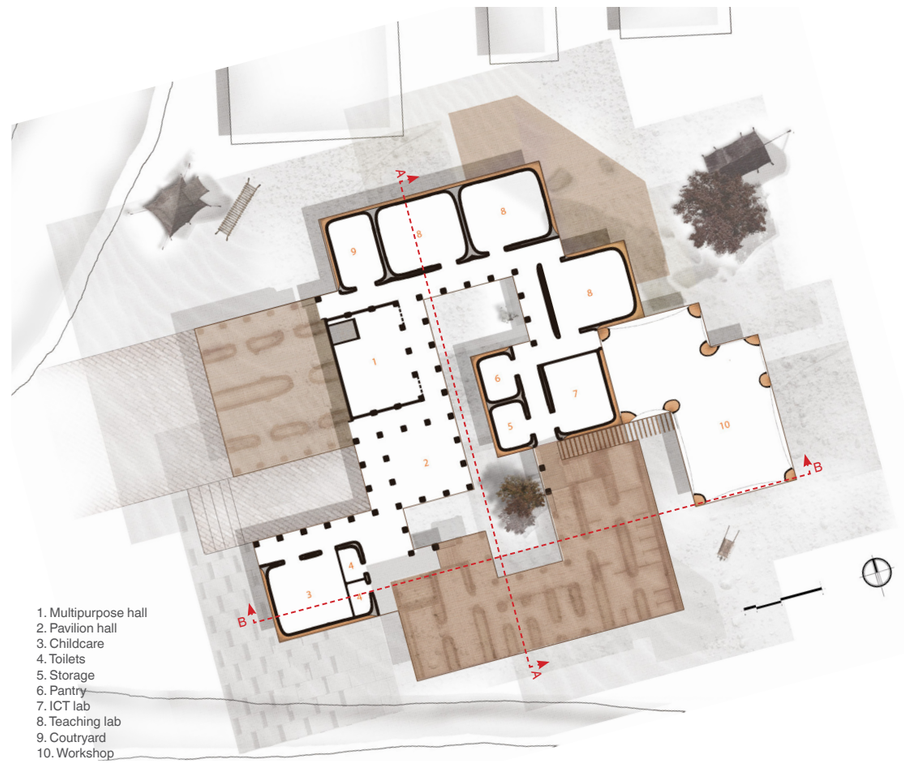
Adobe Creative Community

A Skill based Community Center

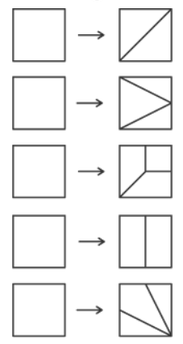
Adobe Creative Community is a vocational and technical training center for unskilled people, located in the refugee camp Zataari in Jordan. This center aims to help unskilled youth in improving their stature based on Maslow's Pyramid of basic needs and, simultaneously, in contributing to the community.

Computational means were applied in the design process in order to find only-compressive structure, whilst considering both spatial connectivities, mechanical properties of adobe bricks and construction techniques. Orientation, connectivity and adjacency were translated into computational parameters to determine a rough layout plan. Topological tessellation rules were applied to the mesh to structurally optimize the final shape. In the construction process, firstly the main ribs are built by using bent steel rebars to define the shape and, then, bricks are laid to fill the remaining parts.

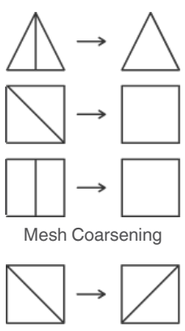
As a result, Adobe CC is a free-form and only-compressive structure where people can not only learn and practice masonry skills, but also see what it is possible to achieve through them.



Meshing Rules



Mesh Refining

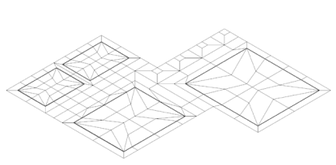


Mesh Coarsening

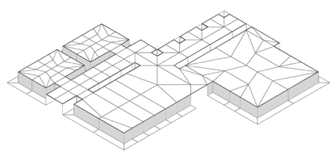
Mesh Direction

Structure Model

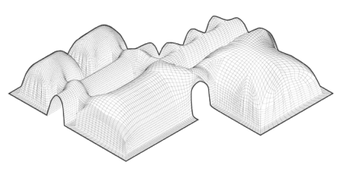
Free Form Vaults & Domes



Room and Support Mesh

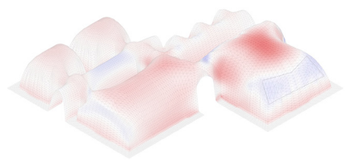


Combined Opening Mesh

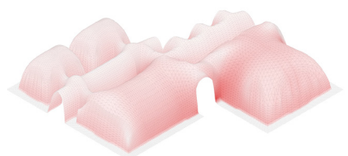


Dynamic Relaxation of the Mesh

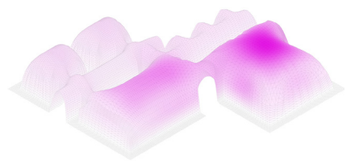
Structural Validation - 1



Principle Stress 1



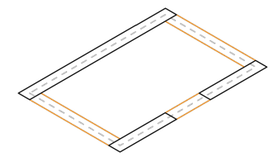
Principle Stress 2



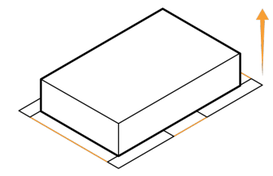
Deflection

Structure Model

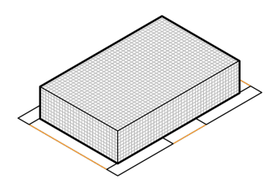
Ground Floor (G+1 Spaces)



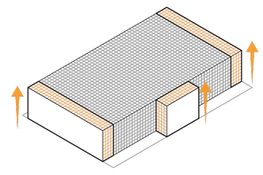
1. Offset walls and identify openings



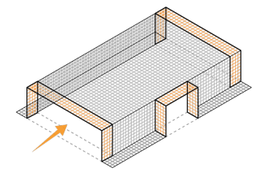
2. Extrude the Room



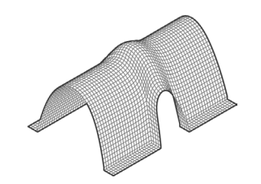
3. Regular Grid of 1.5 m



4. Extrude Doors

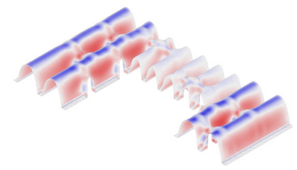


5. Final Mesh relax with openings

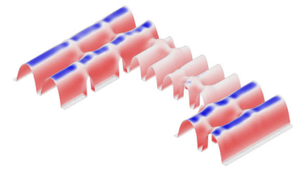


6. Relaxed Mesh

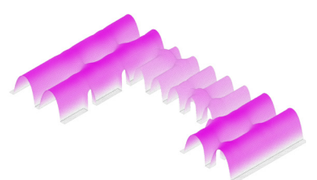
Structural Validation - 2



Room and Support Mesh



Room and Support Mesh



Room and Support Mesh

Brick Testing Results

Brick Type	Sample Size	Compressive Strength [MPa]		
		At 10 % Def.	At Break	S.F. = 2
Adobe Bricks	62	0.7	1.33	0.6
Adobe + Starch	32	0.8	2.7	1.35
Adobe + Wood Chips	22	0.9	2.1	1.05
Adobe + Straw + Starch	5	1	5.8	2.9

Design Values

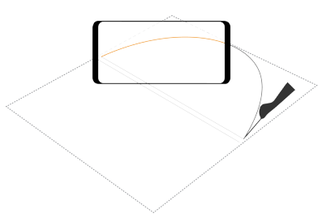
Brick Type	Adobe+Straw+Starch
Compressive Strength [MPa]	1
Tensile Strength = 1/10 Compressive Strength [MPa]	0.1
Young's Modulus [MPa]	80

Results : Structural Validation- 1

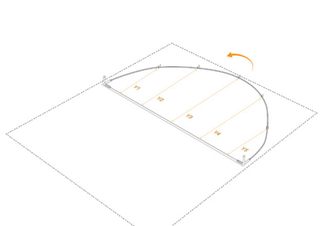
	Allowable	Peak Developed
Compressive Strength	1 MPa	0.1 MPa
Tensile Strength	0.1 MPa	0.03 MPa
Deflection	18 mm	7 mm
Cross Section	300 mm	

Results : Structural Validation- 2

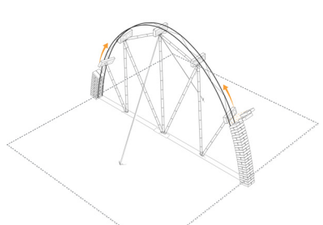
	Allowable	Peak Developed
Compressive Strength	1 MPa	0.2 MPa
Tensile Strength	0.1 MPa	0.05 MPa
Deflection	9 mm	5 mm
Cross Section	300 mm	



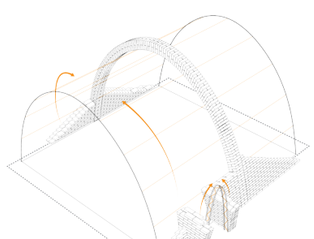
Step 1:
The curves can me marked on the ground using Augmented Reality



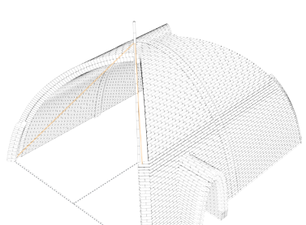
Step 2:
Bend the rebars into catenary arch between the nails using the coordinates



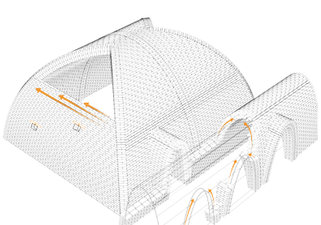
Step 3:
Add bamboo and ropes to increase the stability of Form work.



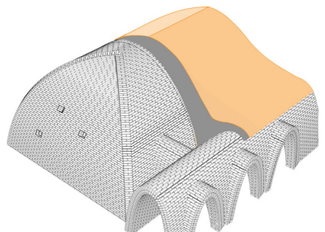
Step 4:
Use rebar and rope supports to lay bricks for side wall



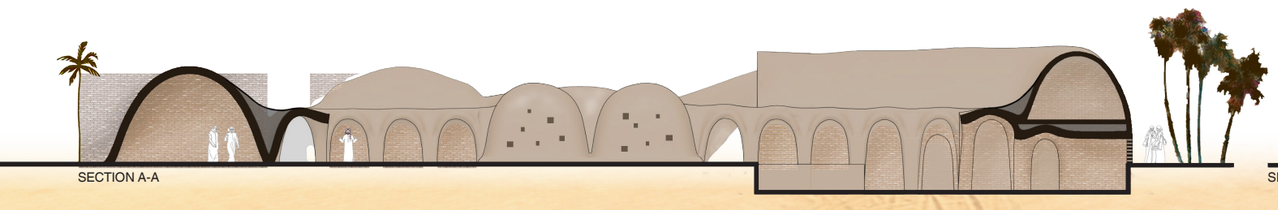
Step 5:
Mark vault vertex with bamboo and ropes

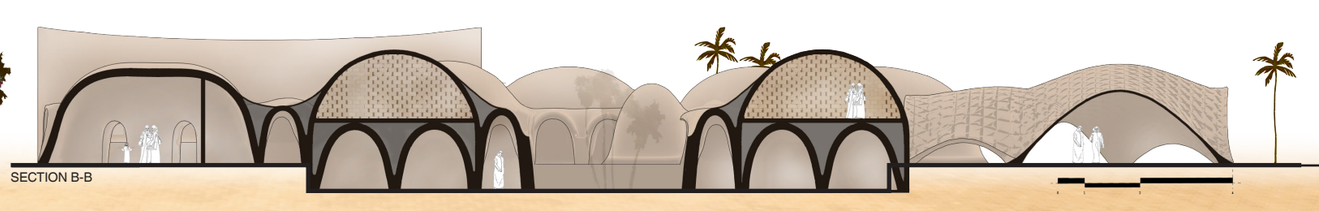


Step 6:
Close brick gaps after three rows. Create cross vaults at fixed intervals in perpendicular direction



Step 7:
Finish outer walls with clay and fill in joineries





TU Delft
AR3B011 - Earthy
Course Coordinator: **Dr. Ir. P. Nourian**
Mentors: **Ir. S. Azadi | Ir. H. Hoogenboom**
Ir. D. R. Visser | Dr. Ir. F. Veer | Ir. F. Shnater
Group 1: **Aditya Parulekar | Andrea Fumagalli | Divyae Mittal | Filip Zielinski | Prateek Wahi | Tarang Gupta**