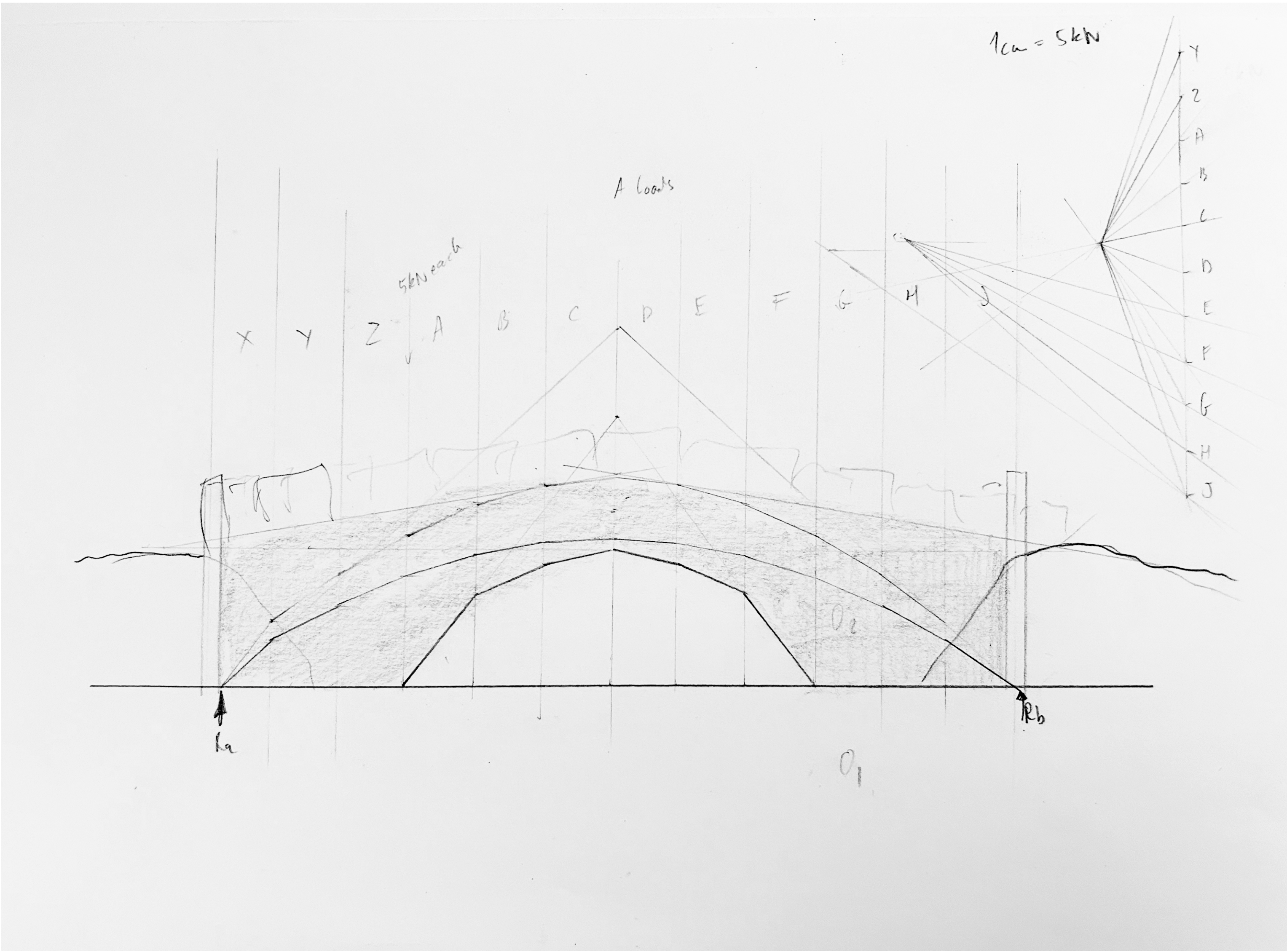
Section A:

1a)



b)
Looking at the bridge's condition from a fresh perspective, the condition of the brick surfaces is worn off, by erosion of the weather and usage throughout the years. Its structure of curves and shapes on the other hand is intact, meaning it is still holding up in good condition. The main load of the bridge's active and passive load is transferred to the bottom arch, with the foundation, I assume, to be under the water on hard ground. However, if the bridge only had that arch, the path the public would have to transit through would be too steep, so an additional shallower arch is added creating a more gradual slope, so people can comfortably walk on. This is important o there is a seemingless transition between the road on land and the road on the bridge.

c)
It is an efficient structure mainly because it has held up for so long in good structural condition. The material is suited for the environment as it can withstand the meteorological hardships the place may have gone through. Also, it is a solid and robust structure that feels secure, which makes its job simple. It works well and doesn't overcomplicate the aesthetic of the landscape, so it blends in shape- and color wise with the surrounding terrain respectfully. From that we can also say it is a good design.

2a)

The water exerts a consistent outwards force, so the cylinder that the wooden beams form would want to be bigger in radius. However, by having the fixed steel bands to hold it in place, the wood is pressed into the inside of these circles, and it provides resistance for the water not to spill out. In essence the wood wants to expand and the steel absorbers that force pulling it together.

b)
There is more pressure towards the bottom of the tank as there is more water pressing down from the top. Now, if the steel bands weren't closer together at the bottom, the wood's outward force per steel band would be much greater on the bottom and the force each steel band would have to bear would depend on the height it was set at on the tank. By adding more steel bands, the spacing between bands is less and therefore stress is taken away from the individual band. At the top, where water pressure is not that high, we don't need as much resistance. The aim is to have the same force acting on each individual steel band, so the more force there is in a given distance, the more bands are needed to keep the force balanced on each steel strip.

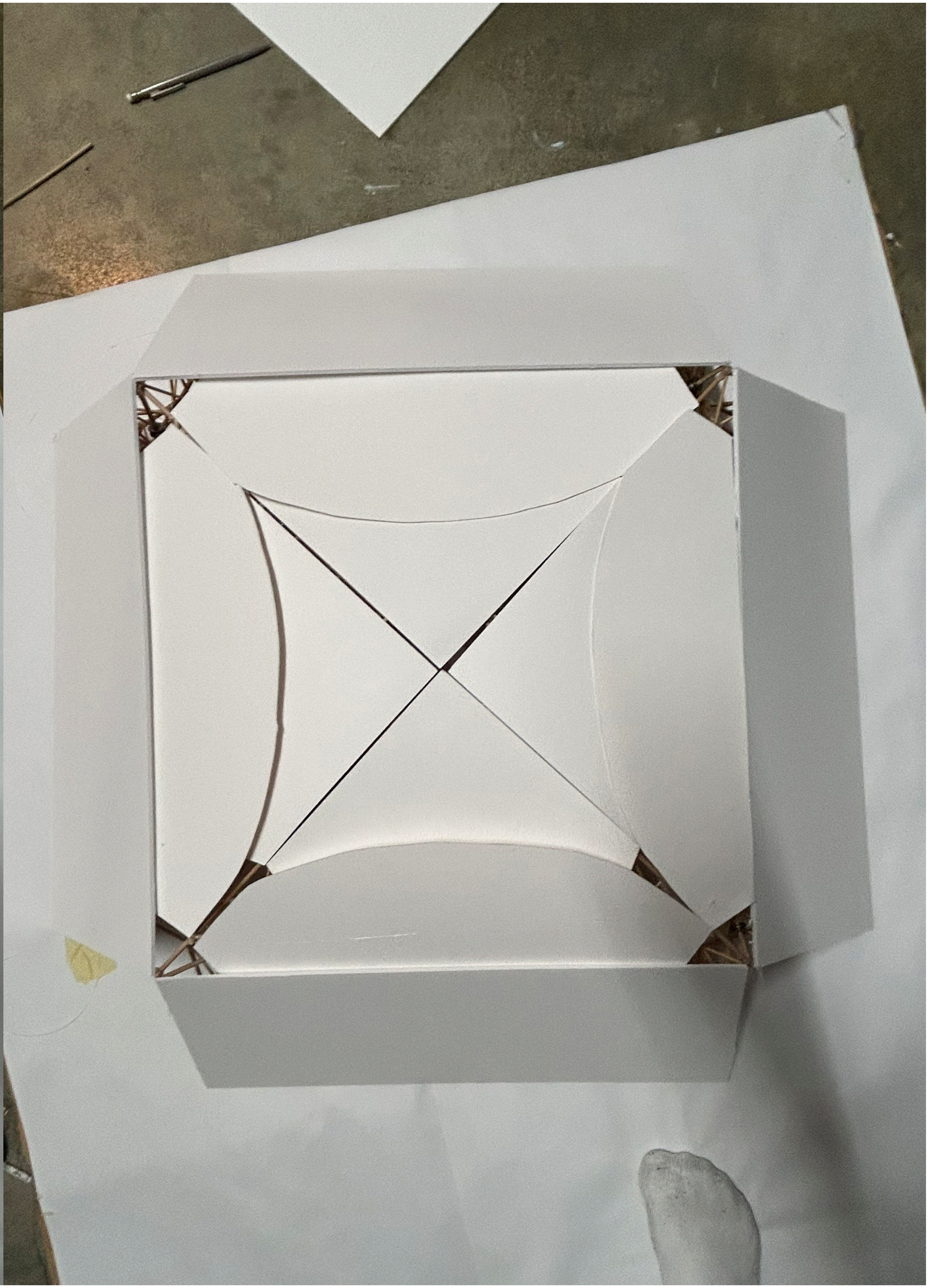
c)
The wood and steel framework are cheap and simple, so maintenance and building costs are not an issue. Also, the system is automatic as it is driven by gravity, so there isn't a complicated system that needs to be actively checked upon to make sure it functions correctly. Also, it is an icon for these buildings and for the area. It attracts attention, which translates to money, so there's profitability for the businesses surrounding it as well. I'm sure they thought of replacing it with other systems, but why change it when it is still working well?

3)

As seen from figure 5, both types of lintels are adjacent to each other, and built into buildings of the same characteristics, so they have the same structural purpose. It's safe to assume that the functionality and reason behind the design should be similar for both of them. It is specifically stated that the lintel on figure 6 is 'old' and the one on Figure 7 is 'new' (both for the door and the window lintel).
The first thing that jumps out is the visual difference between them. The old lintel is a reversed trapezium, whereas the new one is a regular rectangle. This might be due to the old window being slimmer, but still requiring a full-length support for the load above it, so the lintel must hang out of the imaginary square frame that the window creates.

‘the carp’

section b



the structure

The main structure cirles around a 4 legged truss arch that spans across the whole exhibition hall.

The four arms come together at the centre in a circular frame so when the ceiling retracts light can come in without obstruction (see openings on slide 8).

FIgure 1 shows the calculations for the shape of the arms, and the moment where the bifurcations for the entrace occur is set for maximum possible angle while still respecting the load line.

Figure 2 elevation shows the direction of the members in the truss so it supports the framework. accordingly.

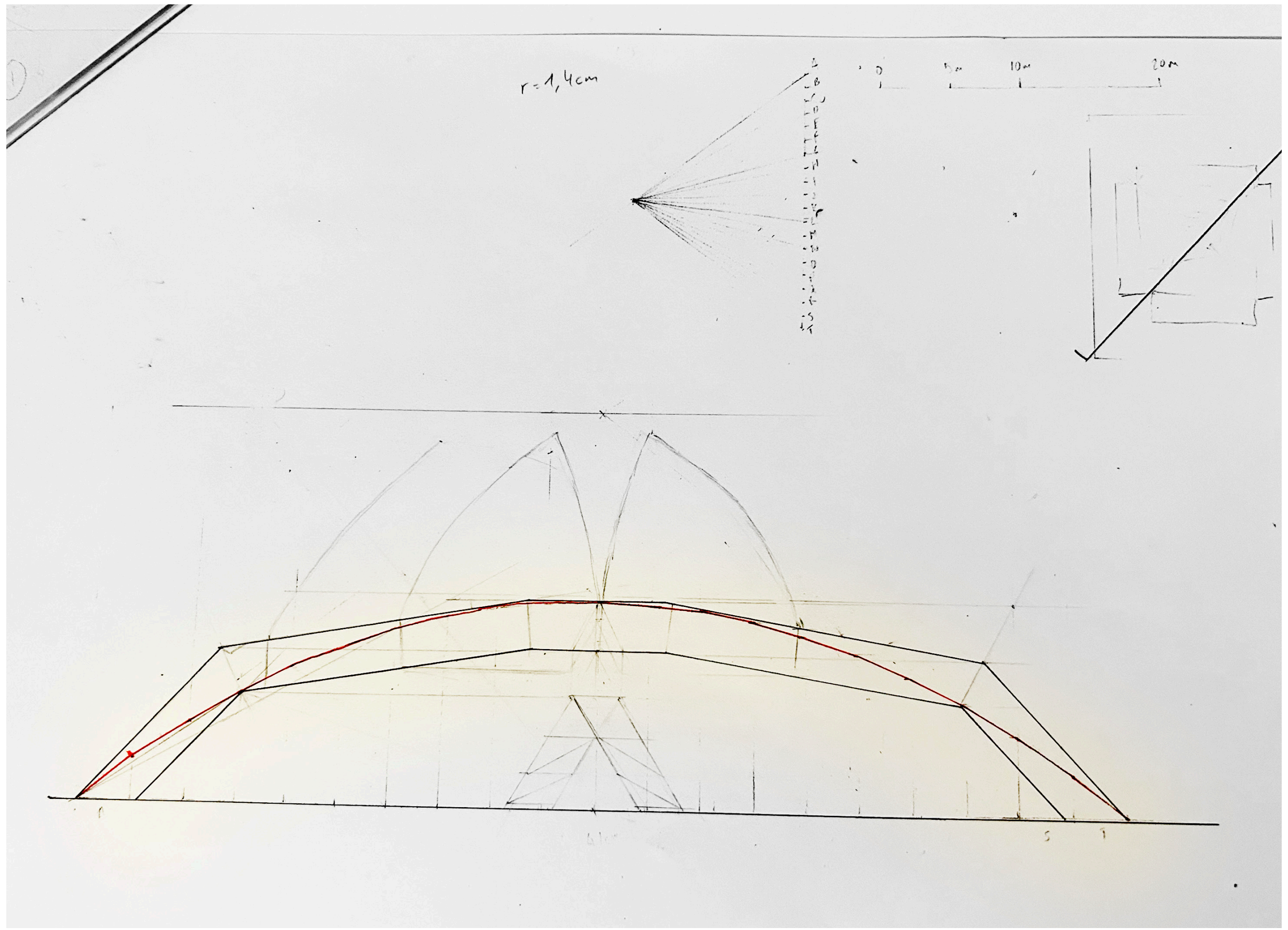
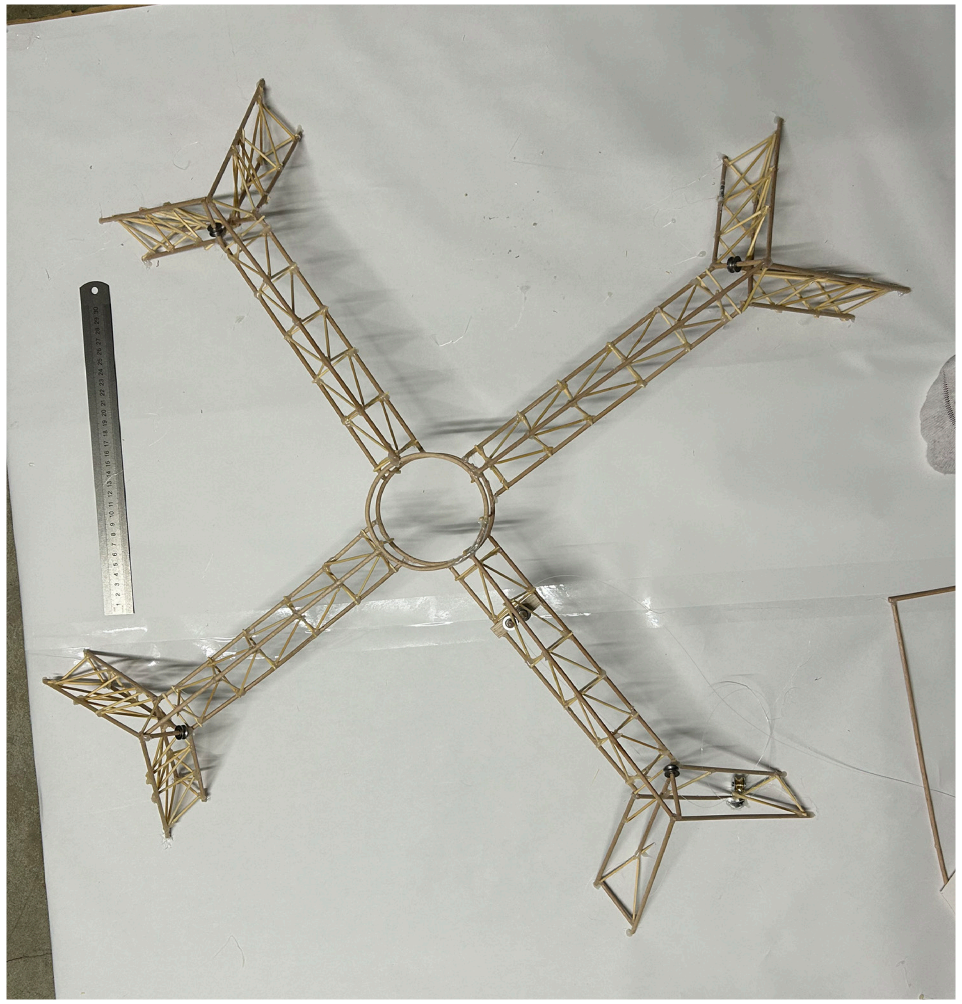


FIGURE1 - the red load line should be inside the main truss frame at all times



skeleton truss without roof panelling

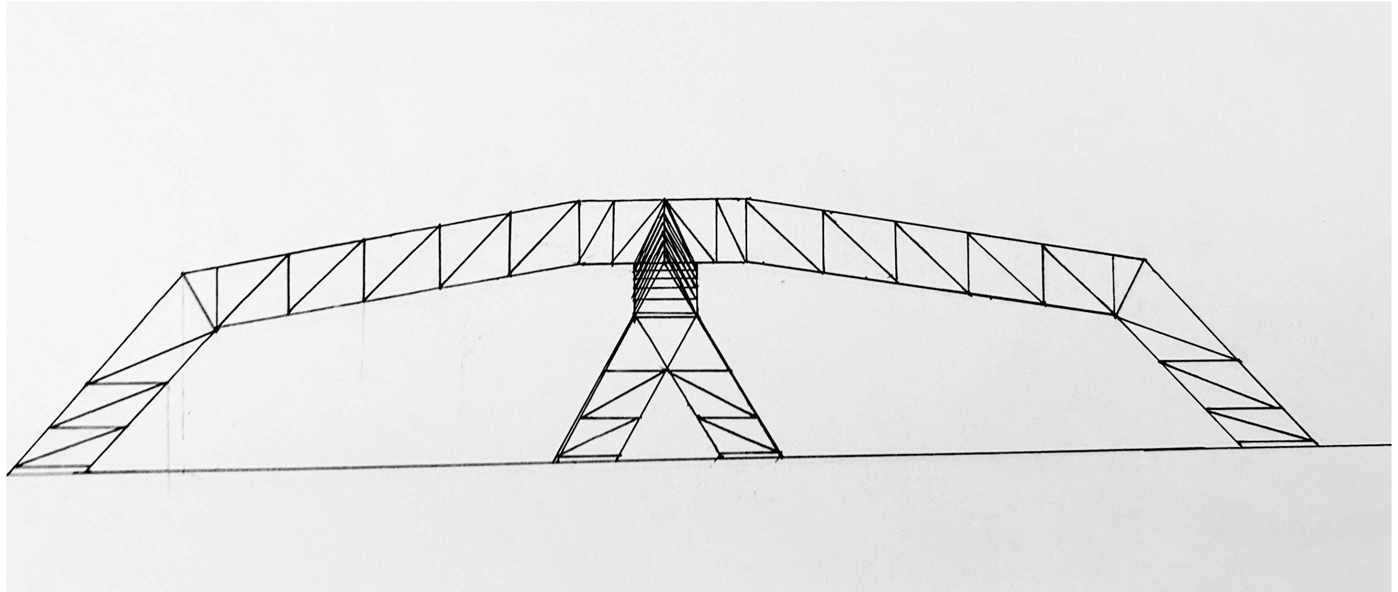


FIGURE 2 - members inside the truss allign with force direction for support

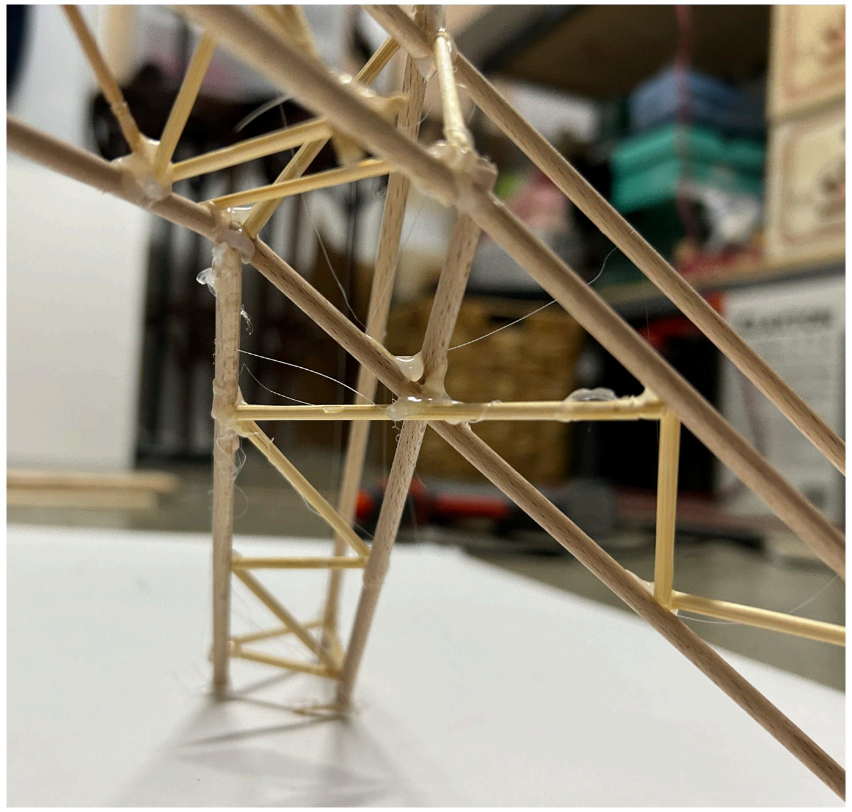
to consider...

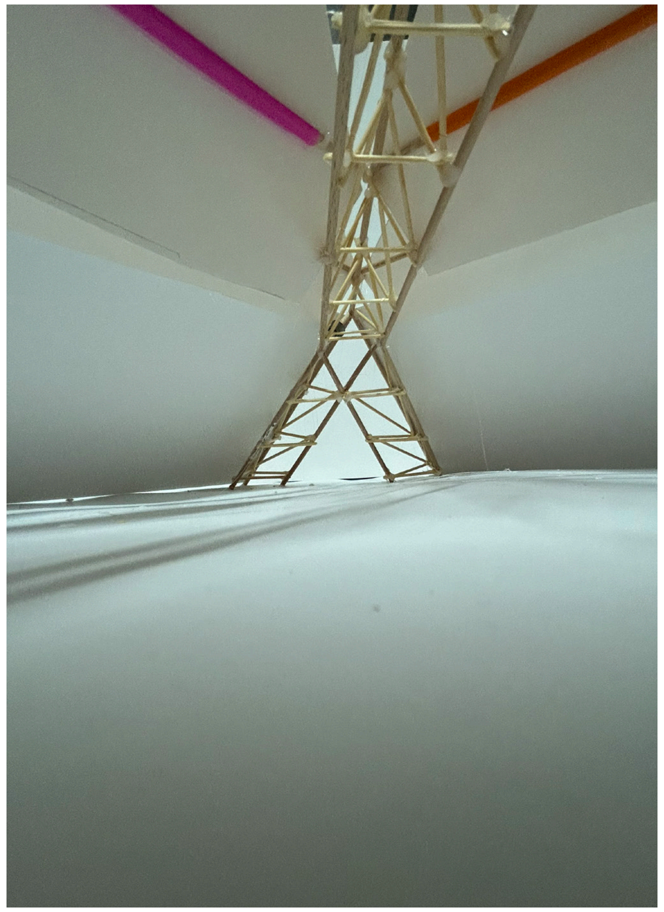
- At the end of each of the 4 legs, there must be a bifurcations that increase the stability of the main structure. It also allows for a natural entry in every corner of the hall, making it accesible from every angle. This makes it more receptive to visitors and doesn't limit the flow of movement inside the building as it is symmetricall in all ways.

- The walls cave into the legs and come together at the junctions of the truss bifurcation, adding to the aesthetic of a curved building while still acting as walls to separate the spaces.

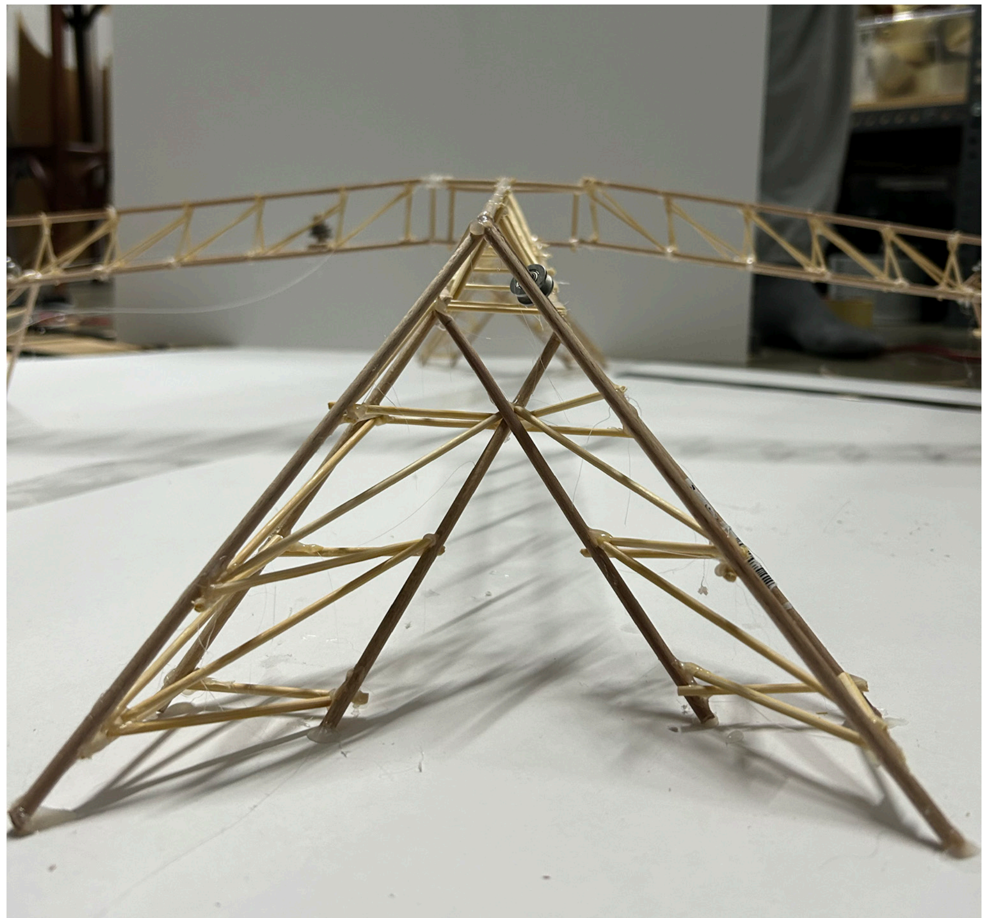
- A flexible moving ceiling (explained on slide 7) will be implemented to allow for the possibility of having a completely sealed hall and allow for light to shine in in sunny days. These modules will also supply additional weight on the truss parabola, which will increase its stability. Also, this flexibility offers shelter and protection in the case that the weather requires it.

- The truss shape must be a triangular prism, to allow for the rotation of the roof modules explained on slide 7. This way when the panels close, there aren't any gaps left and the hall can become completely sealed.





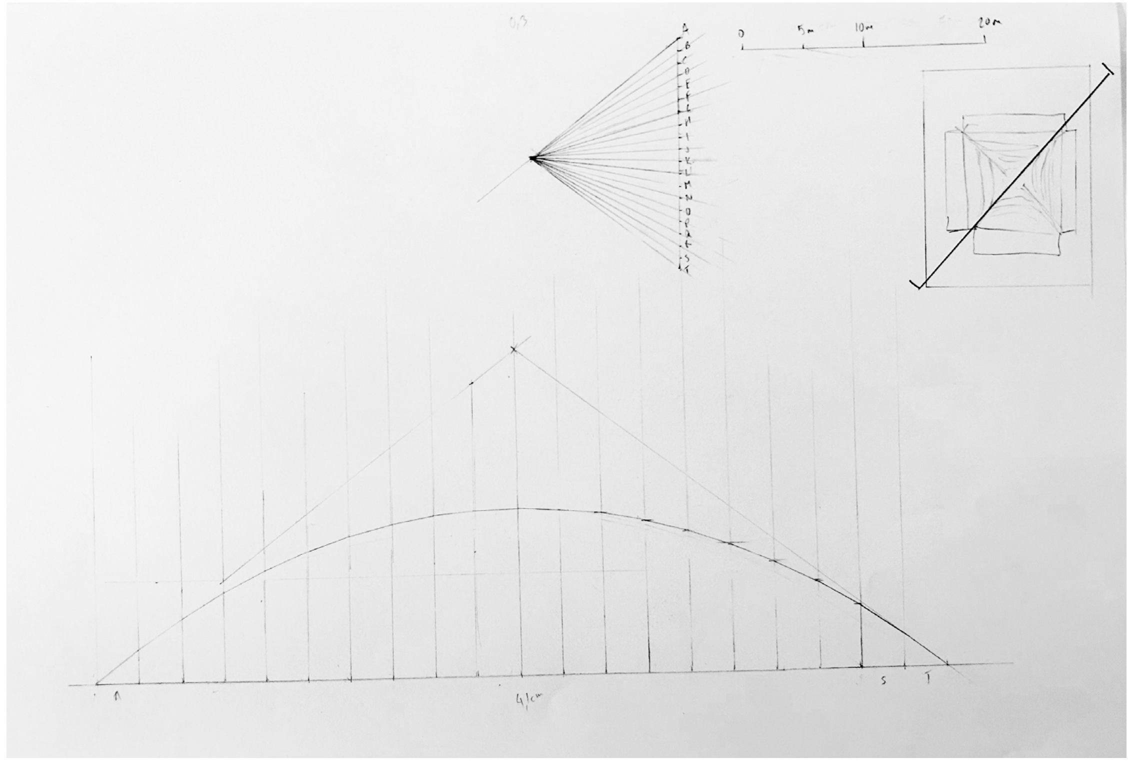
view from inside towards one of 4 entrances.



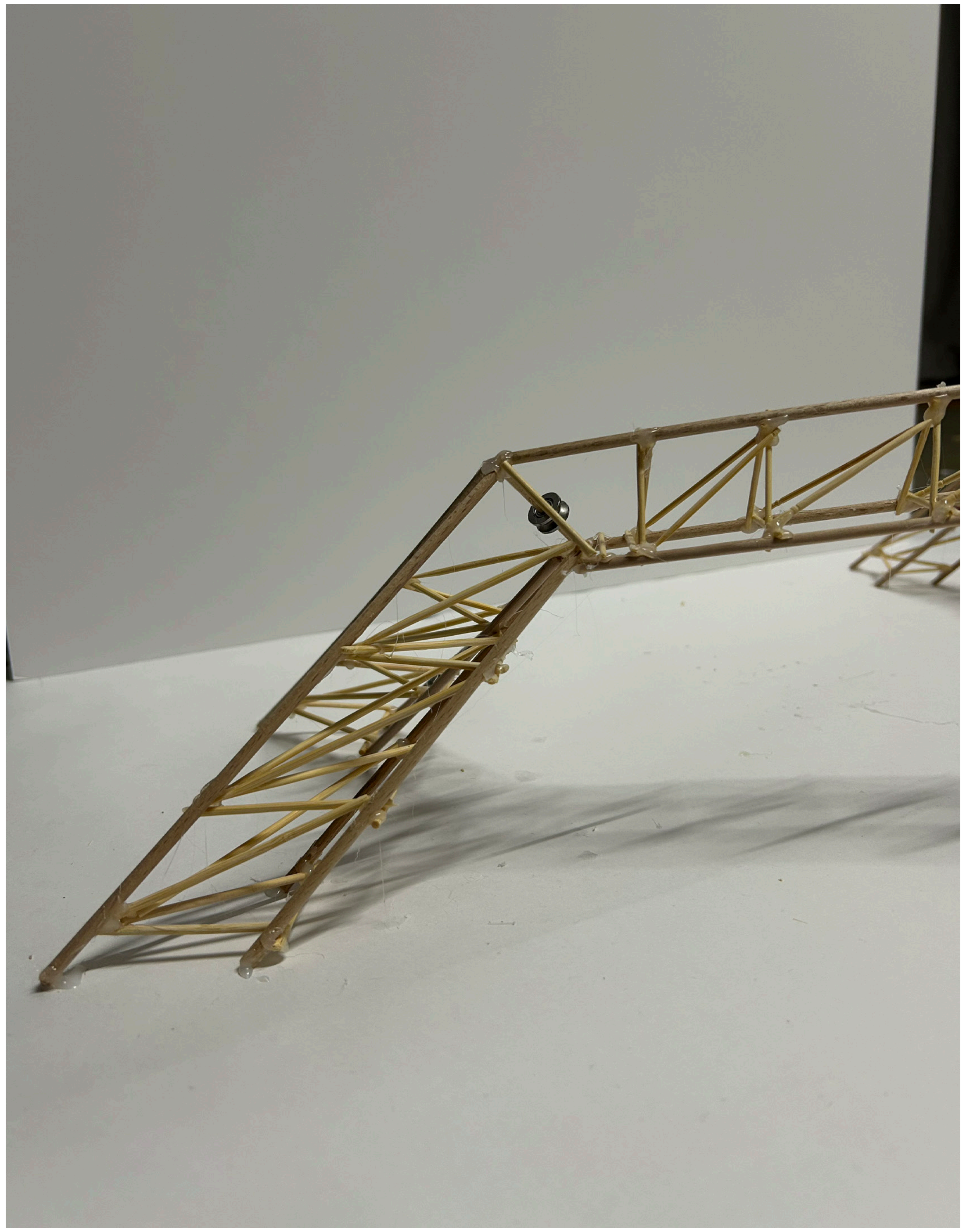
bifurcation of arms leaves space for entrace

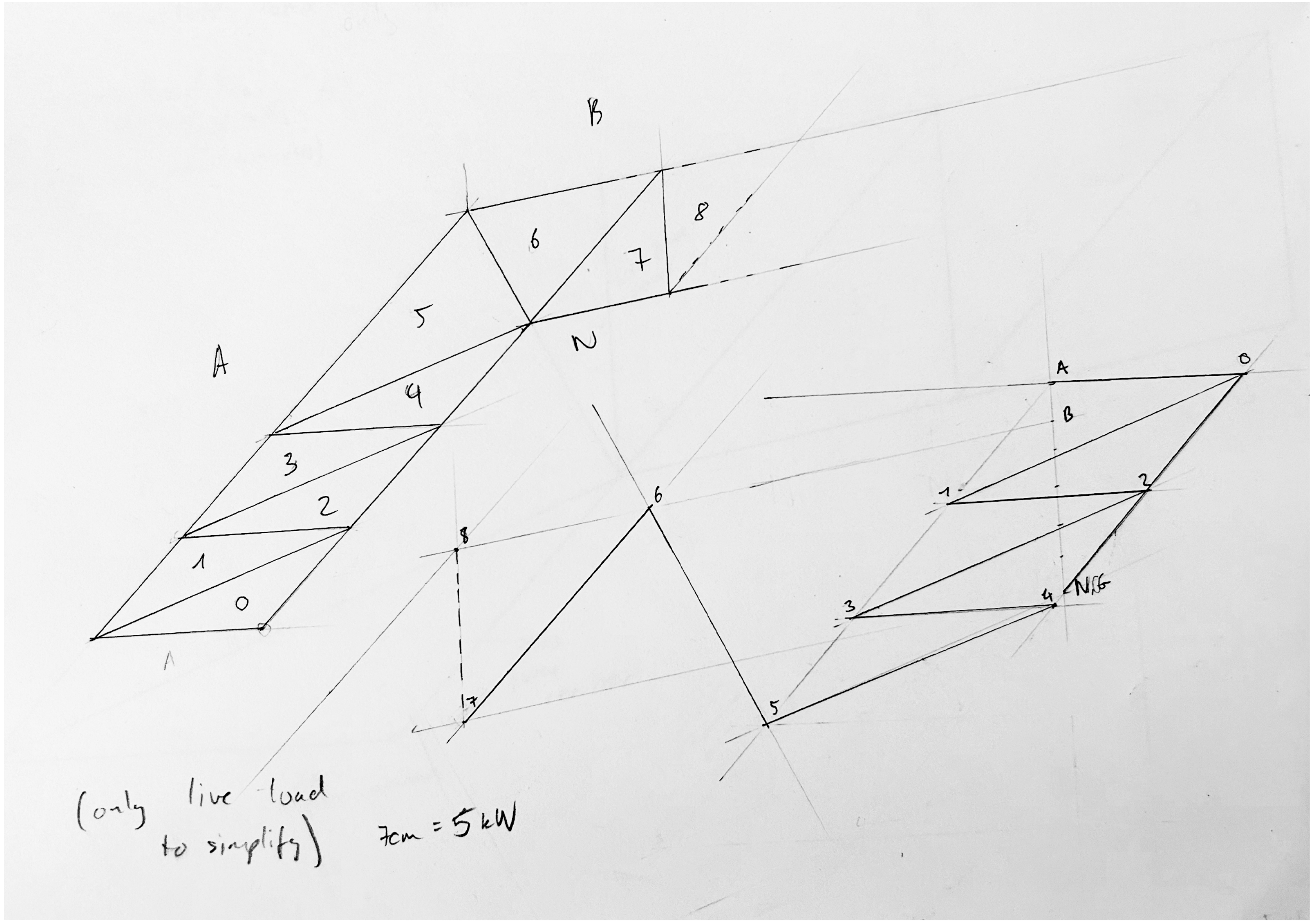
force polygons

to simplify calculations, I used a 2d representation of the section of truss on the roof, istead of a 3d diagram.

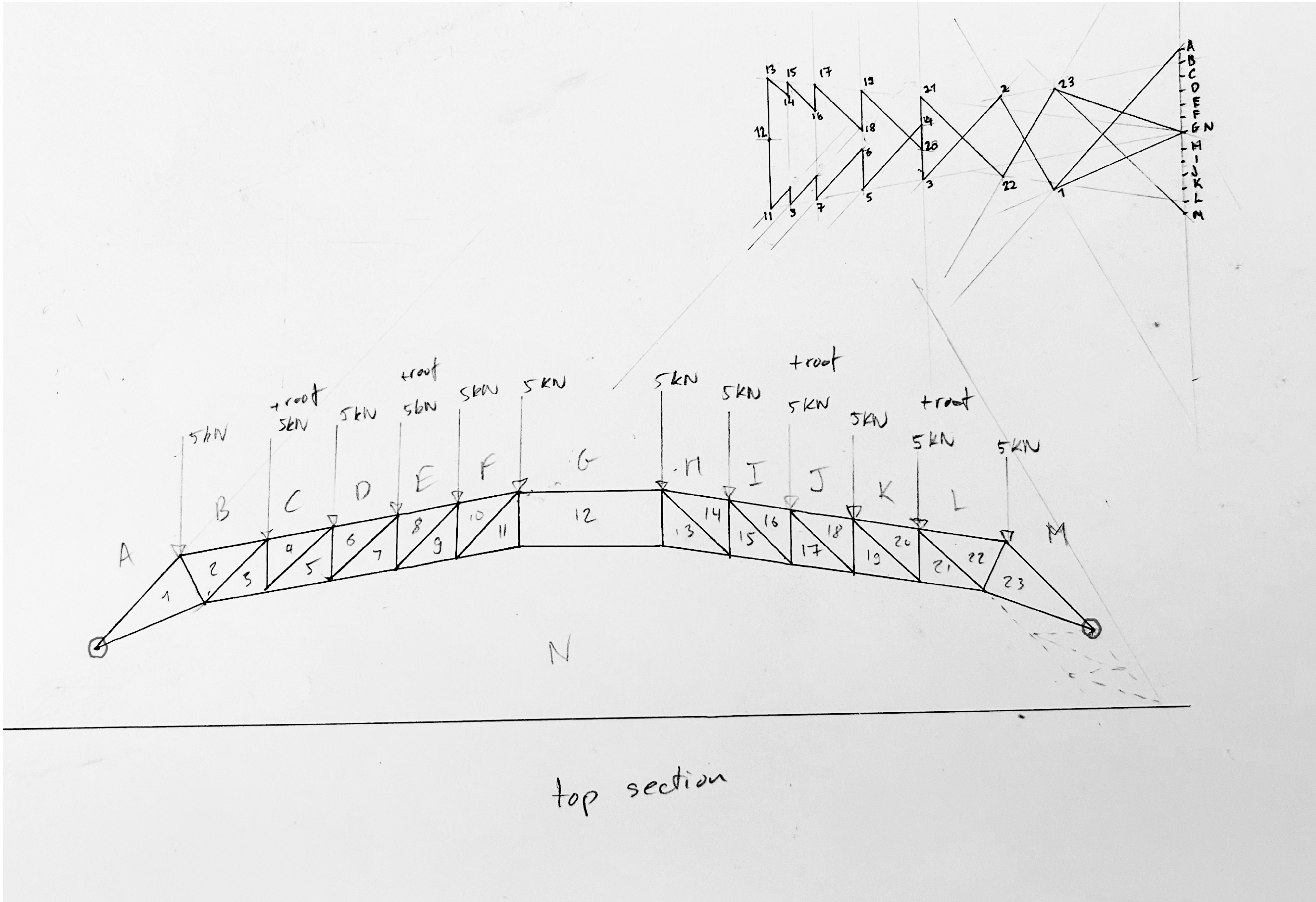


initial force polygon of the load line accorss the whole frame of the hall





force polygon of a section of the truss on a bifurcation on one of the legs



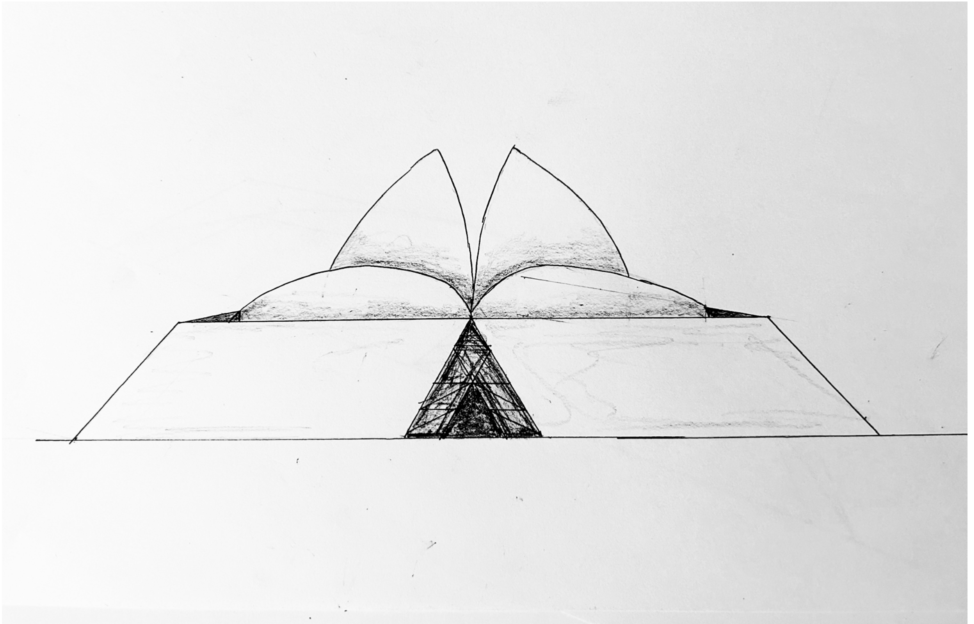
force polygon of the span of the whole truss structure to a joint on each leg

the roof

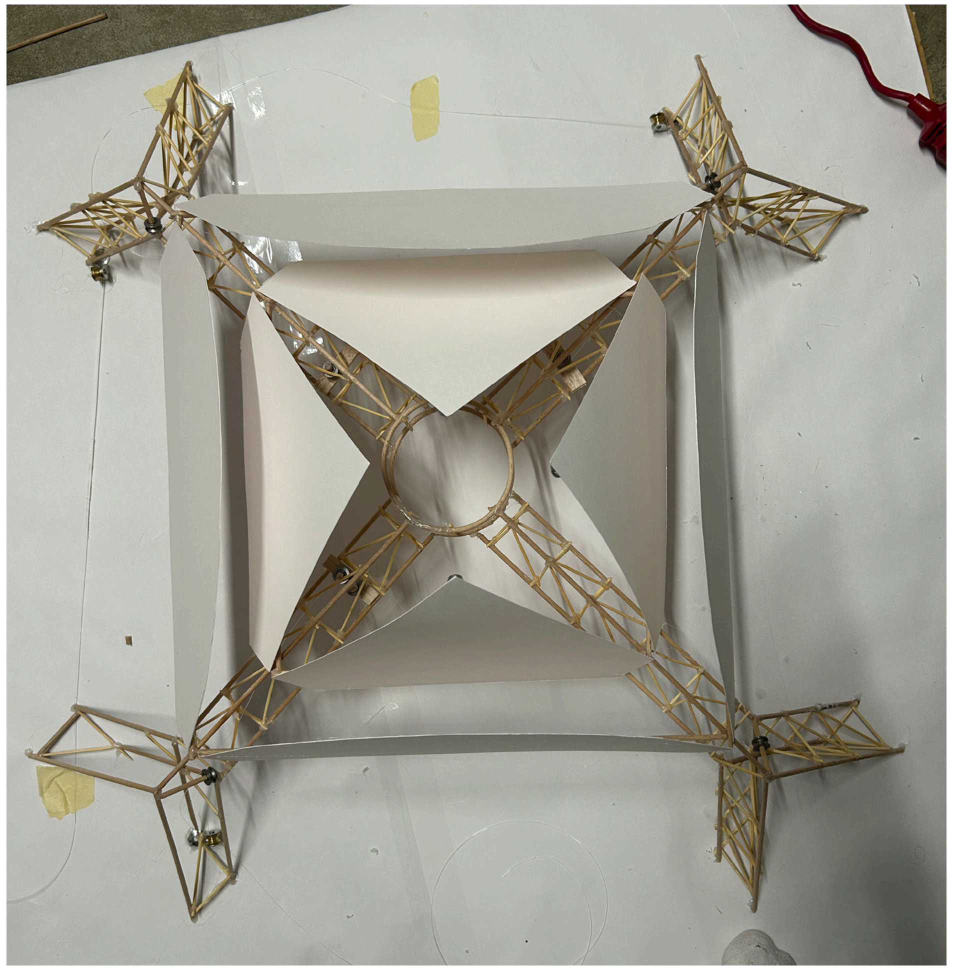
By having a continuos fram covering walls and ceiling, the roof can be molded over to create a seemless look. Why moving roof? Light penetration can be adjusted to taste, and depending on the circumstances and events the hall hosts.

It has two modules containing 4 element each. The lower module is the one adjacent to the walls (module 1) and the top module which closes above the cirle truss (module 2)

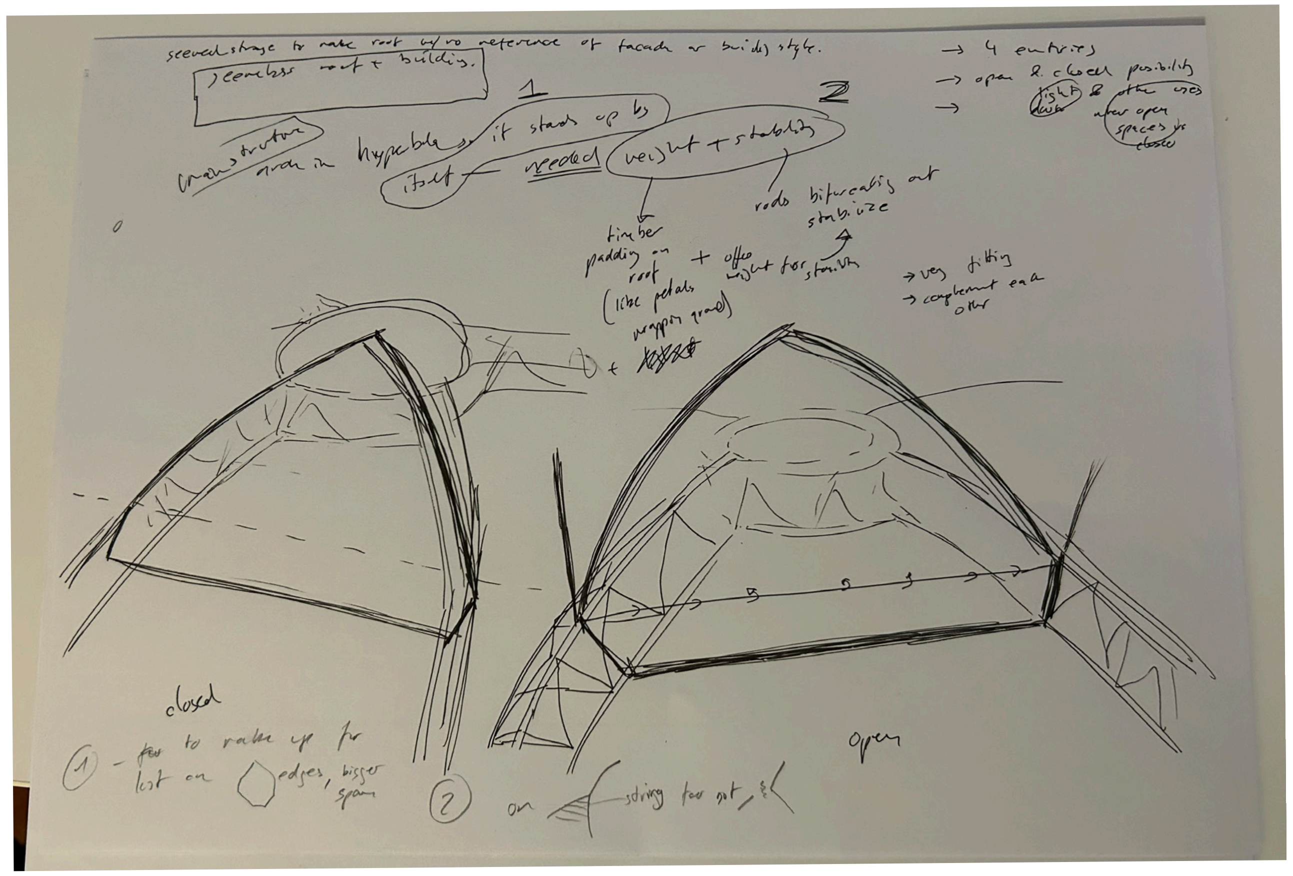
It has an opening mechanisms, where pulling a string (threaded trough the empty space of all 4 truss legs) flaps open all roof modules. Important to note that when the roof is open, no string is visible, so the light shinig through has a regular pattern without any cabling ob-struction.



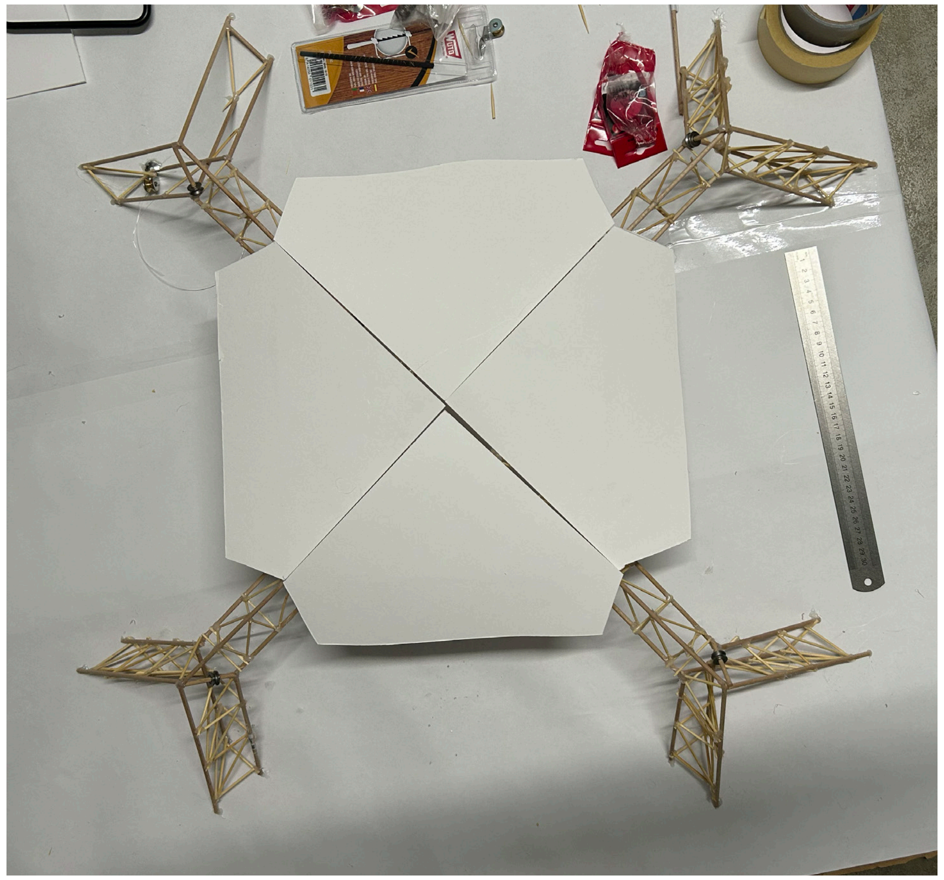
sketch of roof opening



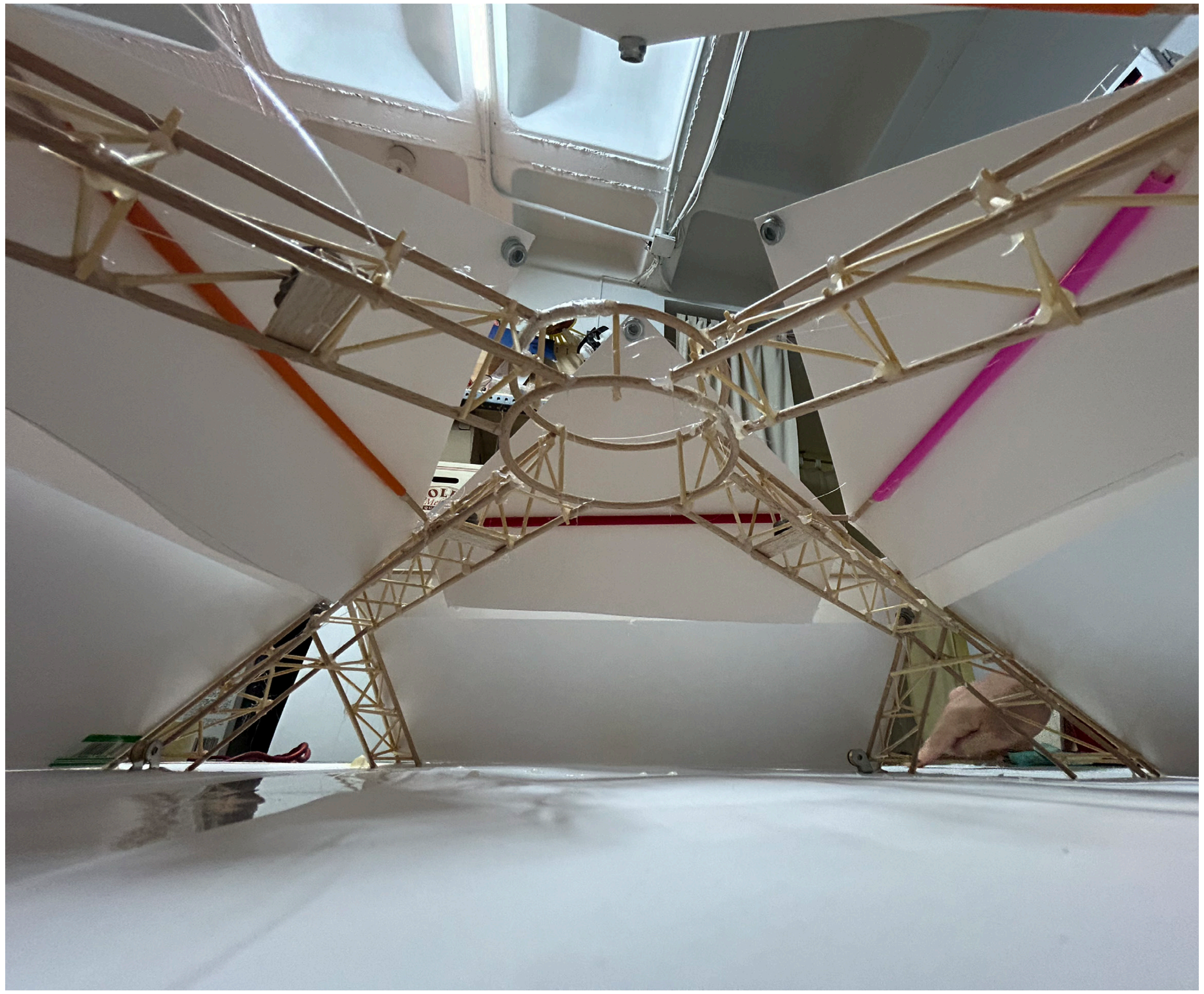
Module 2 of open roof from above



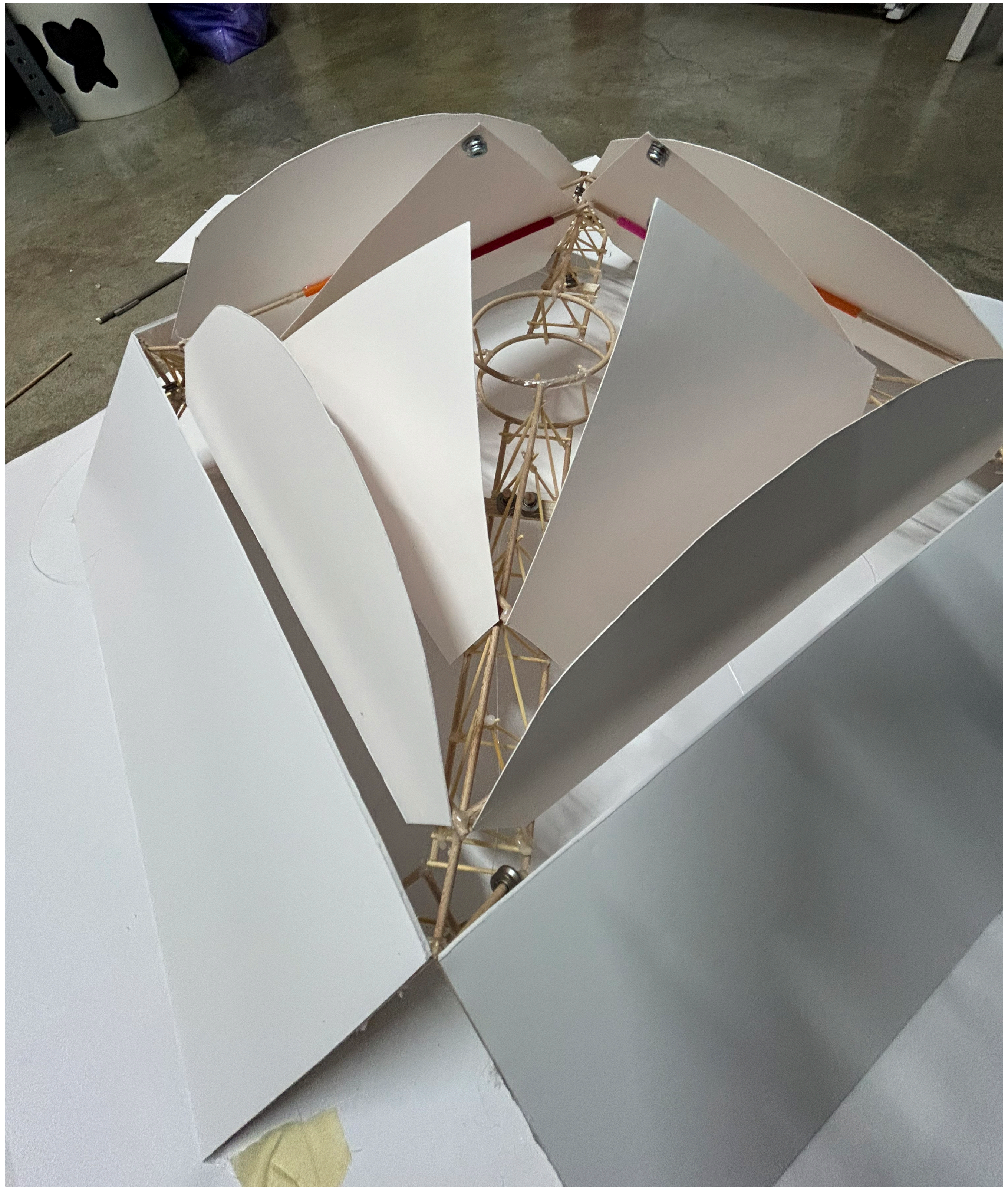
first idea of singular module shape (to allow for smooth rotation over an axis)



top module of closed roof from above



view from inside, while open, revelas toplight



full view of both open modules of roof