

# 1 Structural design Aluminum tube

The structure consists of 5 segments of aluminum tubes. Each segment will be connected to each other via telescope connections (tube in tube connection). 2 out of the 5 segments will be having a smaller thickness at the edge to reduce to total weight and the bending moments in the middle of the piece. The art piece will be hung from winches on a platform via cables. The platform will be hung from the old church in the attic and will be stabilized at the timber beams. The timber beams need to be insulated before the stabilizing cables can be connected.

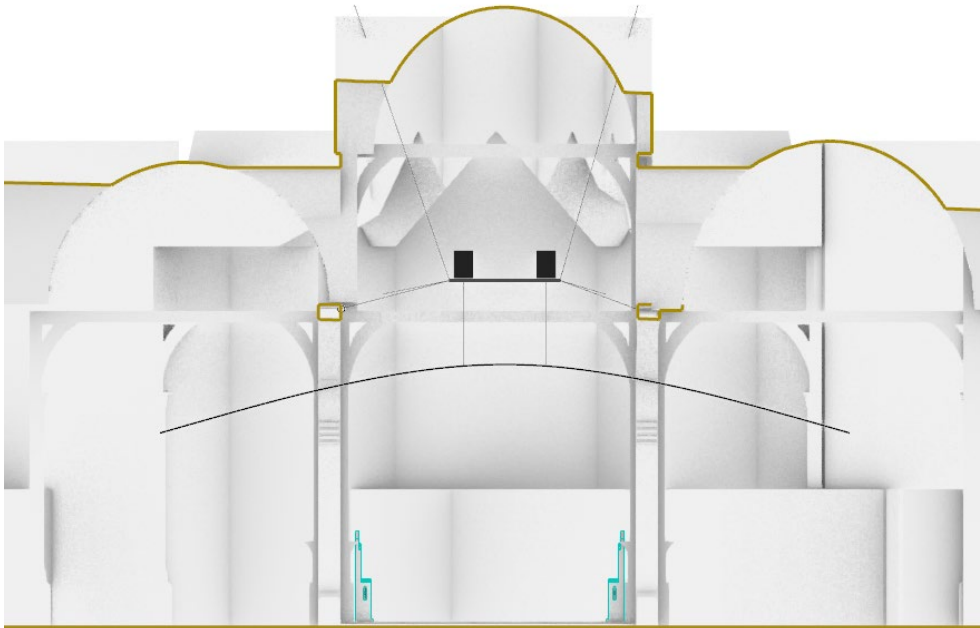


Figure 1. Section structure Art piece

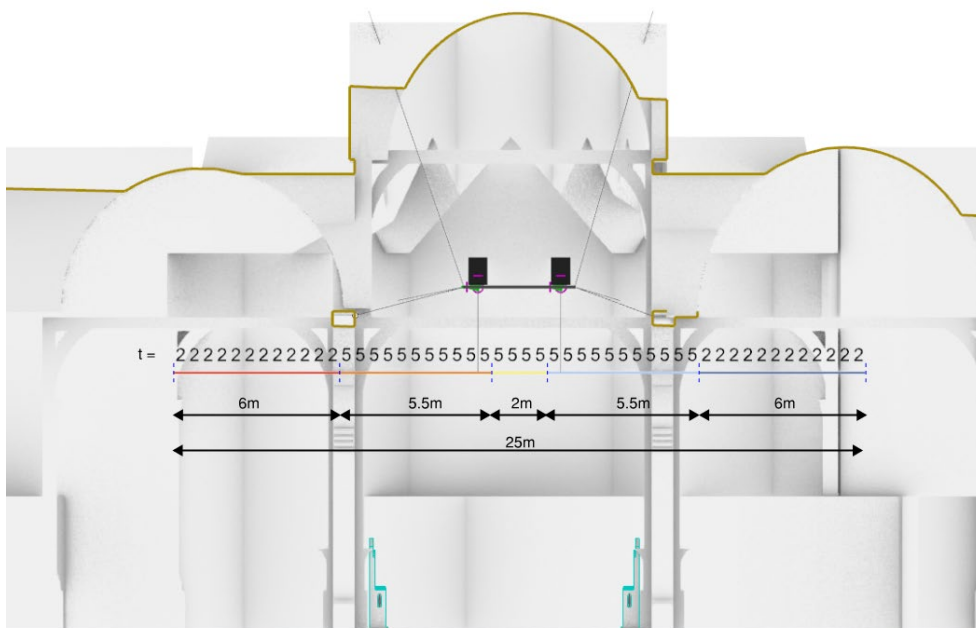


Figure 2. Overview section dimensioning Aluminum tubes

# 1.1 Tube splices

The tube itself is connected through telescope connections (tube in tube). Connections consist of countersunk bolts, ranging from M4 to M8.

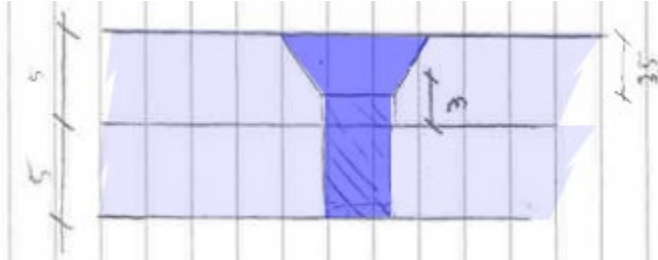


Figure 1. Countersunk bolts M8 in the aluminium tube

At the telescope connections there are two possibilities; connect on the sides, or connect on the top to transfer the bending moment in the tube. For the 5mm thick tubes, 8 M8 on the top are needed.

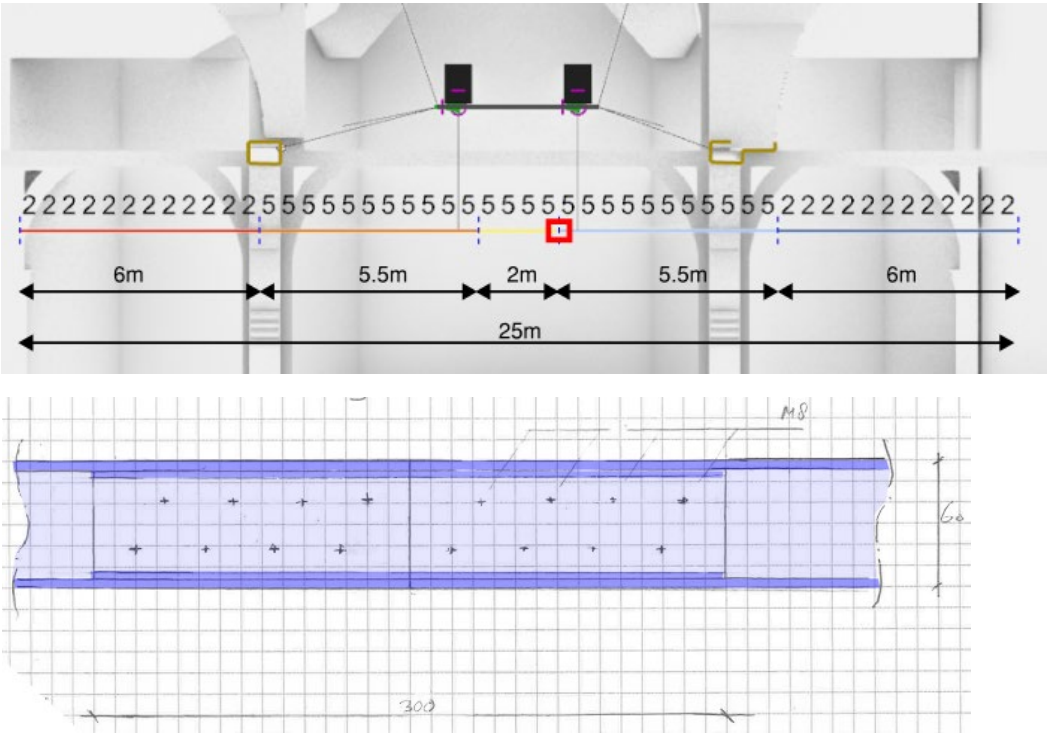


Figure 2. Top view of telescope connection

At the thickness change from 5mm to 2mm extra tubes are needed to make the connection. In the 2mm thick tubes, 8 M4 are needed on the top.

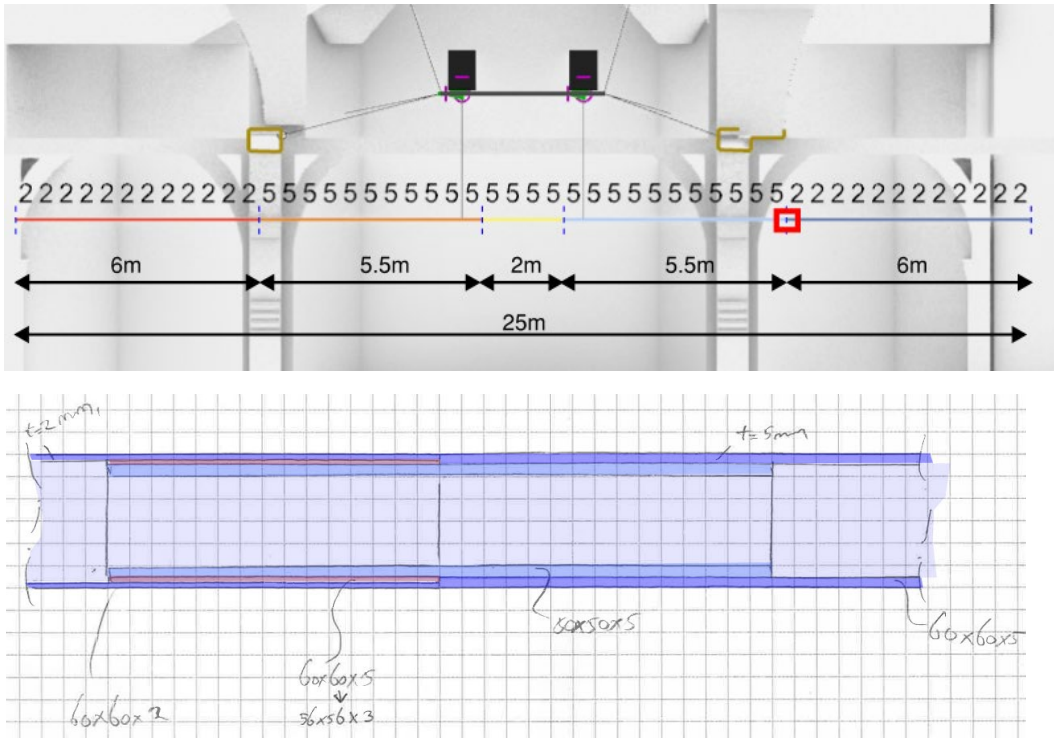
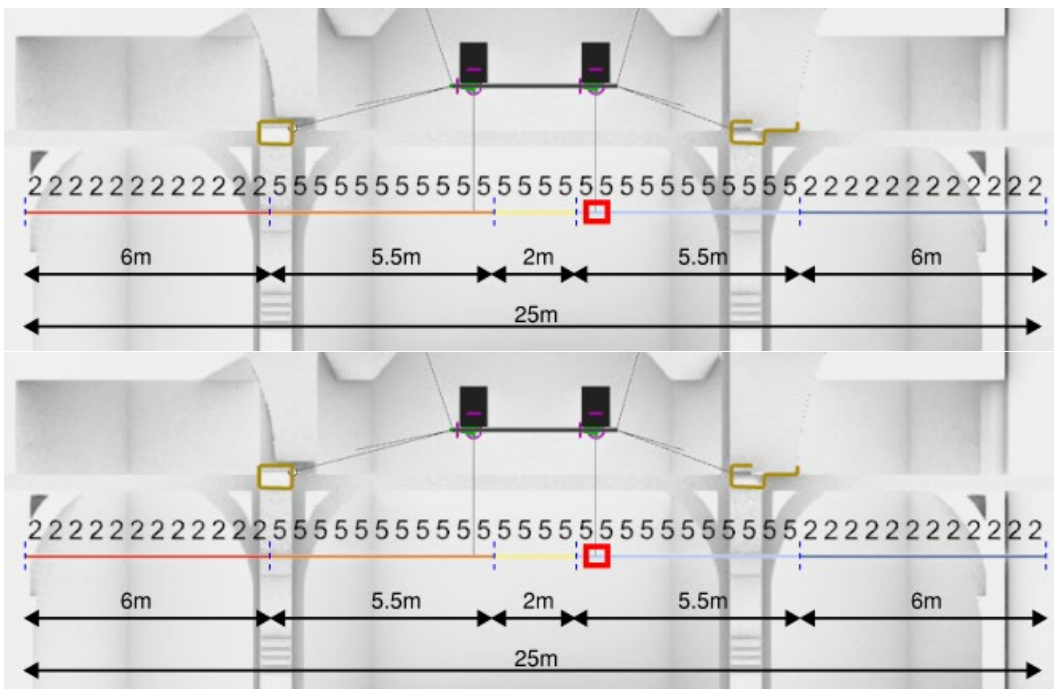


Figure 3. Side view of telescope connection from 5mm to 2mm thickness

## 1.2 Cable support

The tube is hung via L-profiles to the cable of the winch. 4 M6 bolts can be used to connect the L-profile (20x20x4). Hole for electrical shouldn't be placed in the same cross-section cut as the bolted connections. Some tolerance can be applied by using slotted holes in the L-profiles.



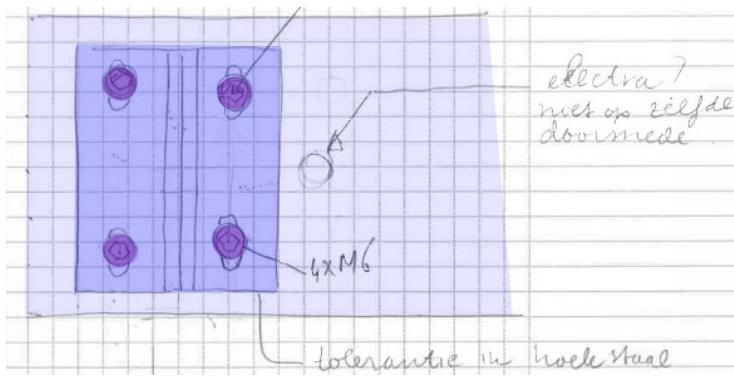
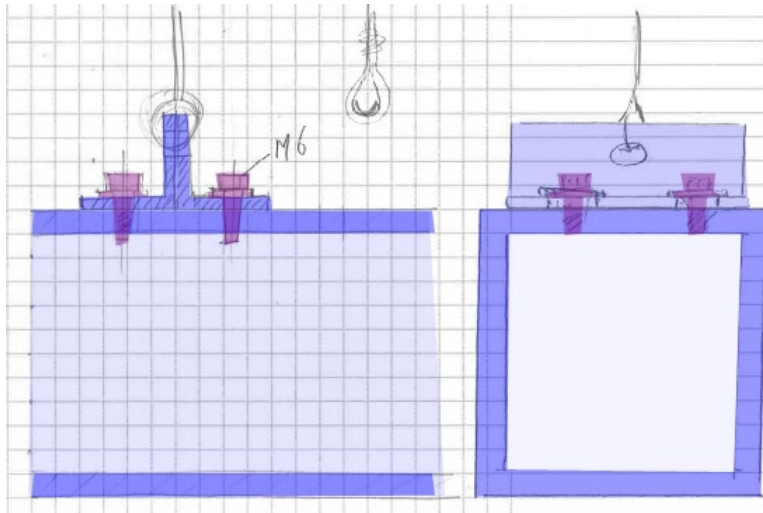


Figure 4. Connection principle of tube to hanging cable