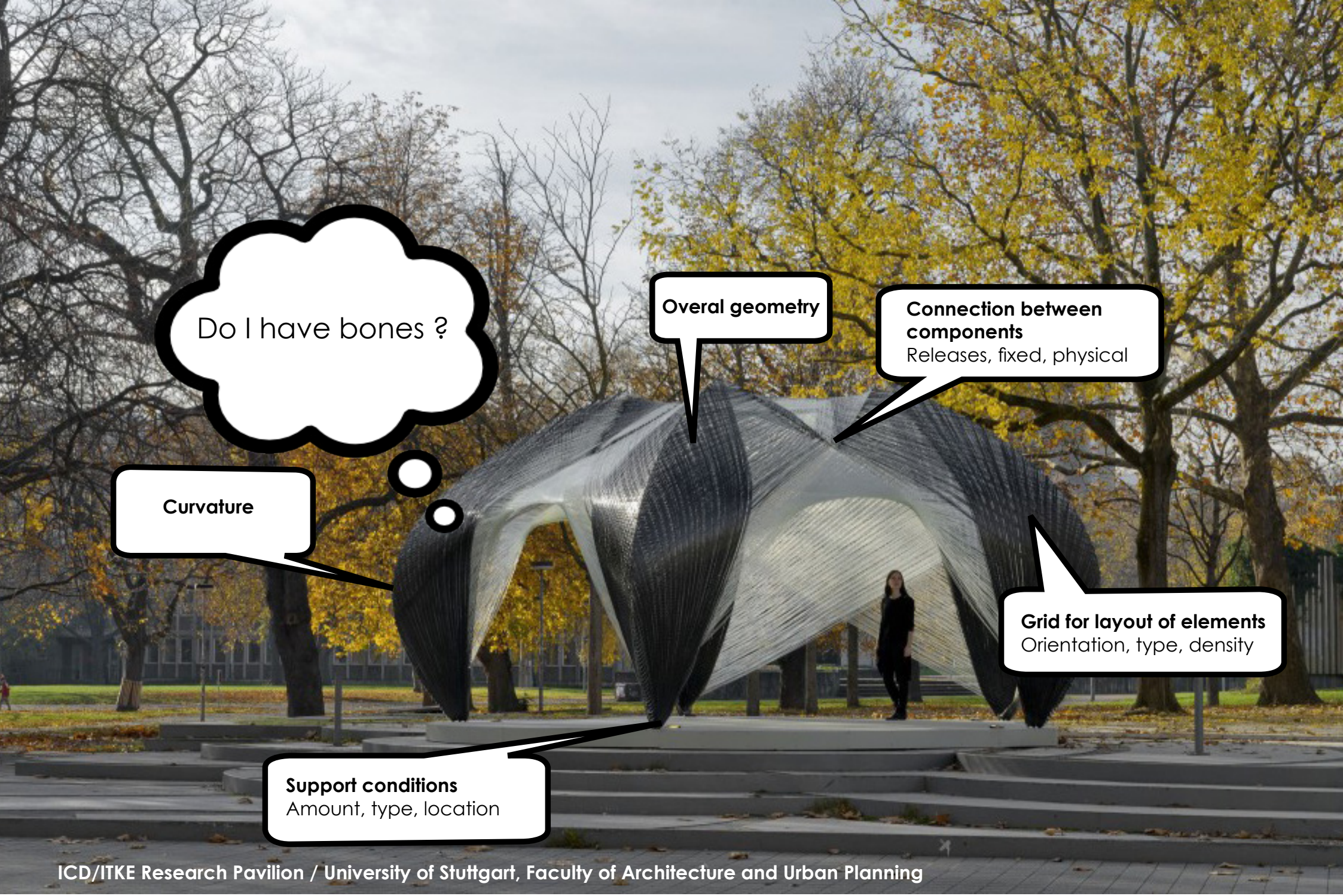

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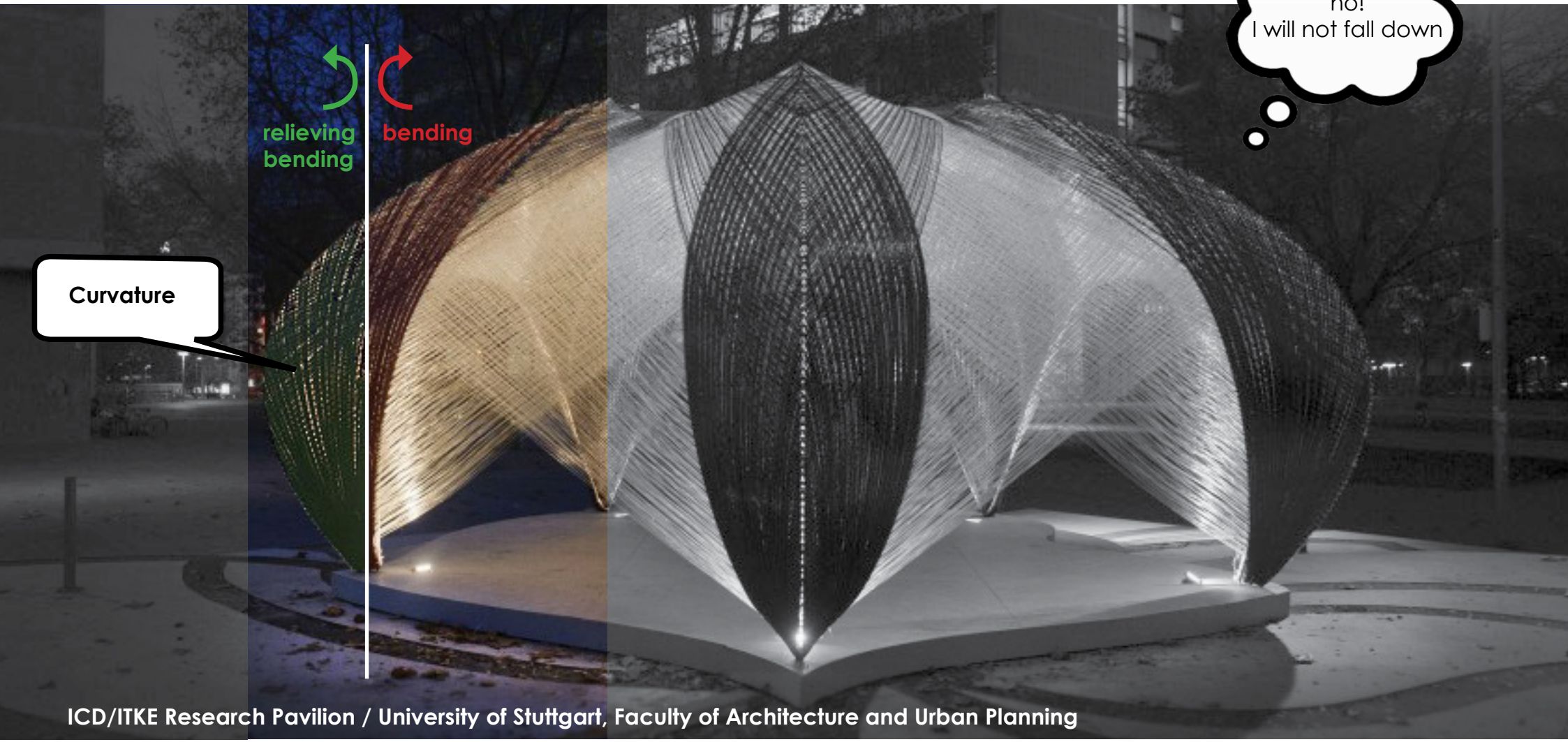
CURVATURE

The construction is symetrical at all axis and as such the loads are evenly distributed to the supports. The structure tends to fall towards the centre and the fact that, close to the supports, it appears the biggest amount of curvature towards the opposite direction (to the exterior) helps balancing the loads.



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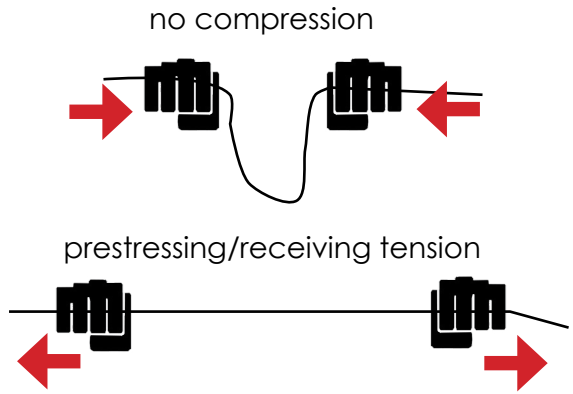
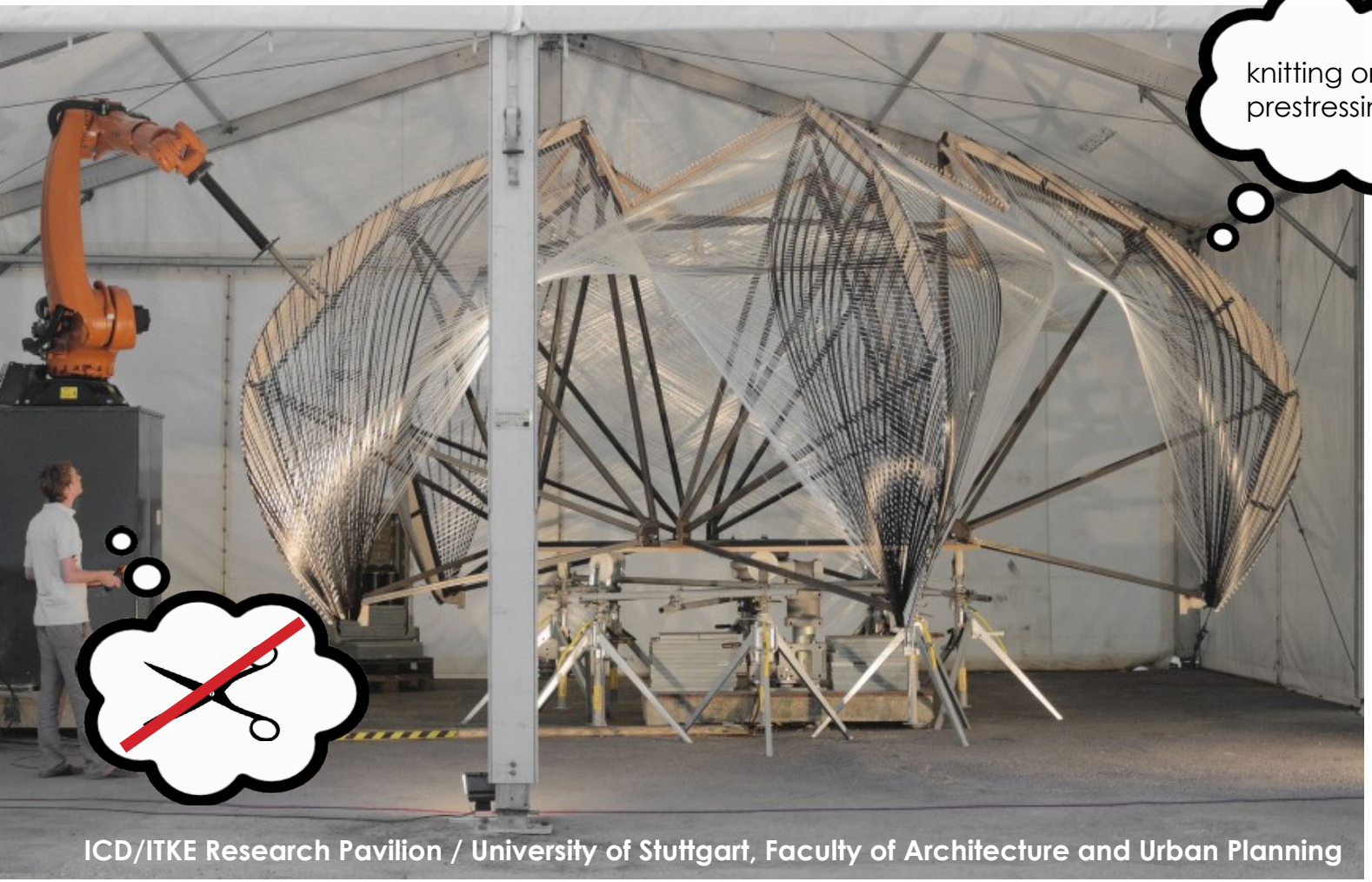
OVERALL GEOMETRY

The structure behaves as a membrane. It is prestressed (a secondary assisting structure was needed for the prestressing process) in order to get the shape and carry the loads. This is based on the fact that this is the way that threads or ropes work. They can receive only tension (axial force).
Although at the scale of the threads, there is only tension, due to the overall geometry and the netting of the threads that consists of the folding lines, the structure finally becomes stiff and can receive compression and consequently bending. Folding reinforces the structure, as it gives thickness to the bending axis.





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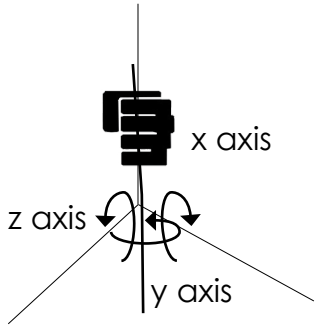
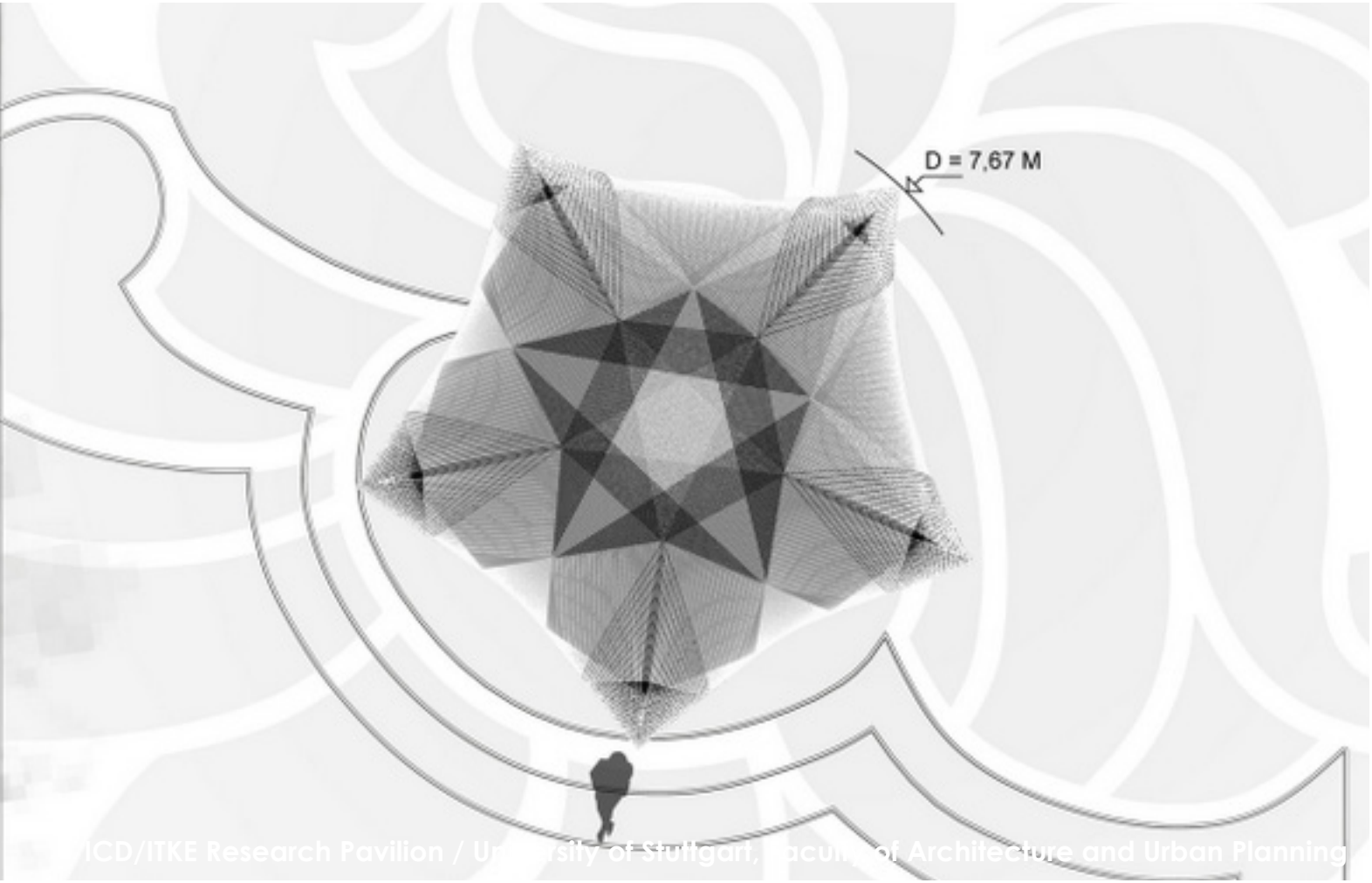
GRID FOR LAYOUT OF ELEMENTS / CONNECTION BETWEEN COMPONENTS

The threads are aligned to the direction of the internal stresses in the structure. So, wherever the concentraton of internal forces is big, the grid of the knitting is more dense and consequently the structure is more reinforced in these points. A sceleton is thus created (black coloured areas). Actually, the white fibres are of glass and mainly used as a spatial partitioning element, they serve as the formwork for the following layers, whilst the black ones are stiffer carbon fibres contributing primarily to the load transfer and the global stiffness of the system. The connections between the elements can be considered as pin connections, since they do not allow moving in any diraction but allow rotations around all axis





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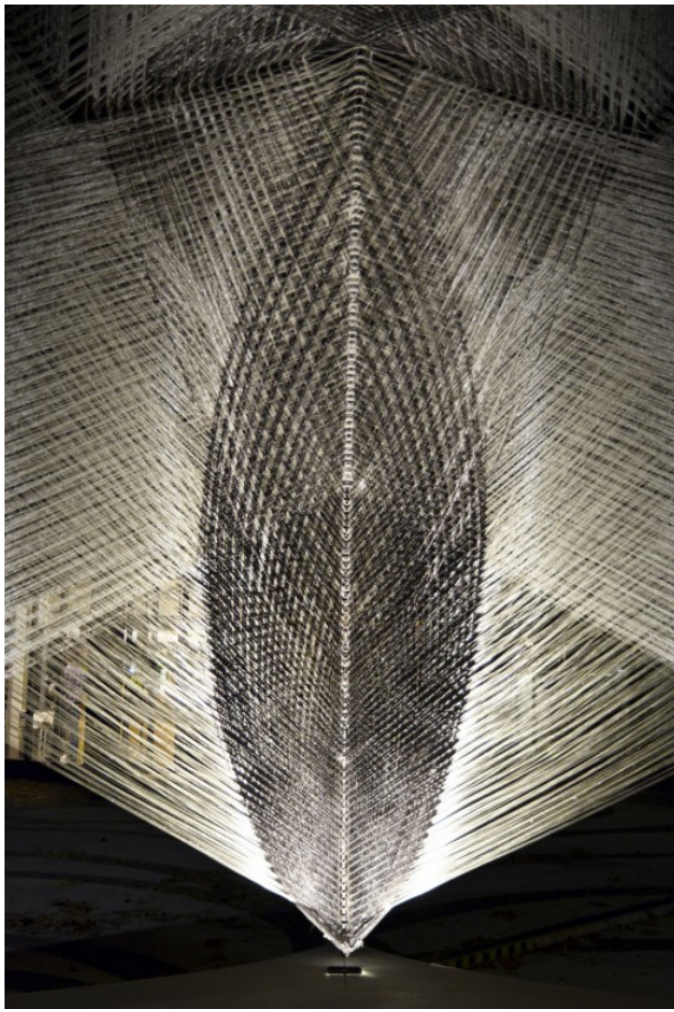
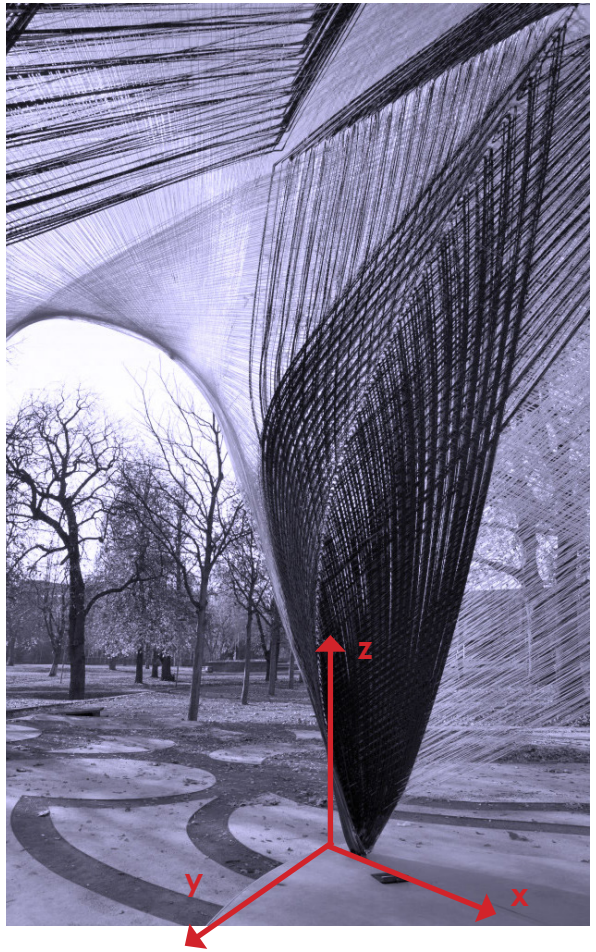
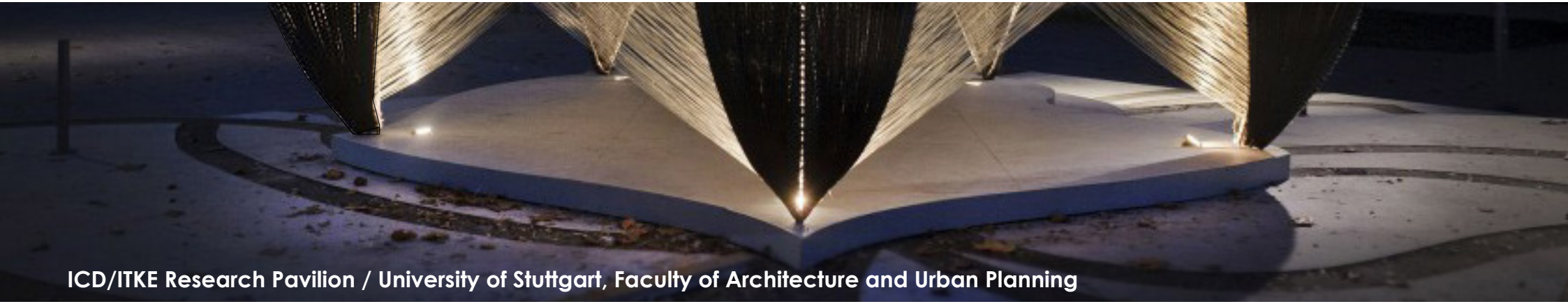


SUPPORT CONDITIONS

6 supports are holding the structure to the ground. The supports, that have a similar behaviour with a rope knot connection of the structure with the ground, prevent the structure from moving along none of the axis x, y, z, but they allow rotations around the 3 axis.

Maybe a small bending along x axis is appearing at the support due to the fact that the "column part" of the structure close to the ground becomes a bit thicker (all the threads are not passing from the same point), and as thus the structure is a bit reinforced along this direction. Also, because the threads are prestressed, it is possible that small bendings could also develop along y and z axis (Any rotation around these axis would tend to change the length of the threads, something that is restricted due to prestression).





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