URBAQUA - PERGOLA - THE PASSIVE ECOFRIENDLY SHADING SYSTEM

Smart Solutions Client: International Water Technology (IWT)

SAXION UNIVERSITY OF APPLIED SCIENCES

GOAL: CREATE A PERGOLA

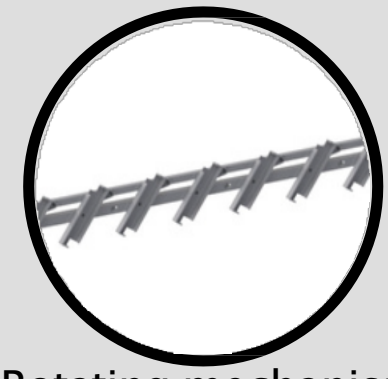
Heatstress is a recurring problem in urban areas. Rising temperatures in backyards are uncomfortable without shade and cooling. The main objective is to create a pergola that provides effective shade and to measure its impact on minimizing heat stress on houses using the Smart Tiny Lab (STL).

WHY THIS PROJECT?

The concept of the pergola originates from the Blue-Beez company. Saxion's clients suggested evaluating the impact of the pergola on reducing heat stress. The summer season provides an optimal period for such testing, that is why the team decided to build a pergola themselfs.

PERGOLA'S FINAL DESIGN

Panels



Rotating mechanism

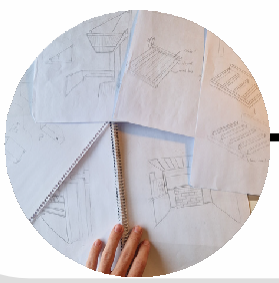
Corner beams

Panels 45° angle

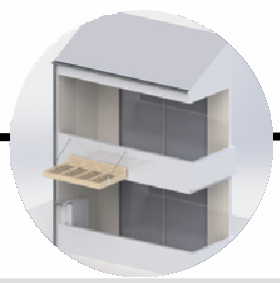
Panels 90° angle

HOW DID WE GET THERE?

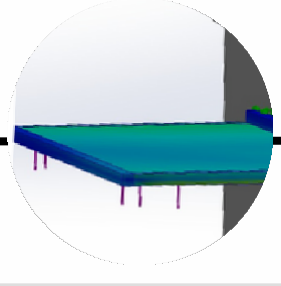
FIRST SKETCHES



PRELIMINARY DESIGNS



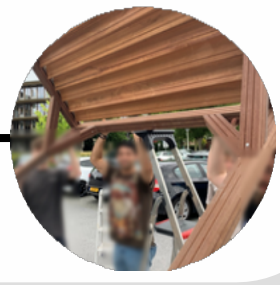
SIMULATIONS



FINAL DESIGN

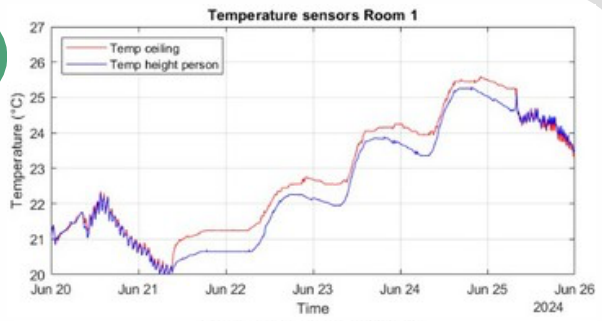
CONSTRUCTION

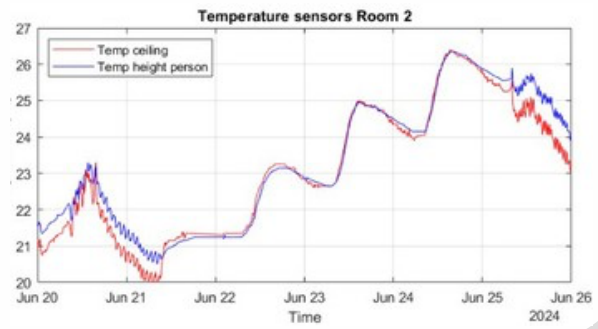
INSTALLATION STL



FIRST DATA ANALYSIS

The initial data obtained from the STL indicates that Room 1, which has the pergola with its panels half opened providing shade to the room, shows a noticeable reduction in temperature compared to Room 2 that doesn't. This data was collected during the period of June 21-25. Then the STL cooled down for tests with the panels in a 90° angle.





CONCLUSION

The simplicity of the pergola's design strikes the right balance between aesthetics, structural integrity, and functionality.

After the measurements took place at the STL, the data shows that a pergola reduces the temperature with 1-1.5 ˚C in a room. This difference in temperature shows that a pergola has a positive effect on urban heatstress by reducing temperatures. At night however, the heat stays inside unless there is cooling involved by opening a window for ventilation. More research is required to notice the full effect of a pergola in summer.

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