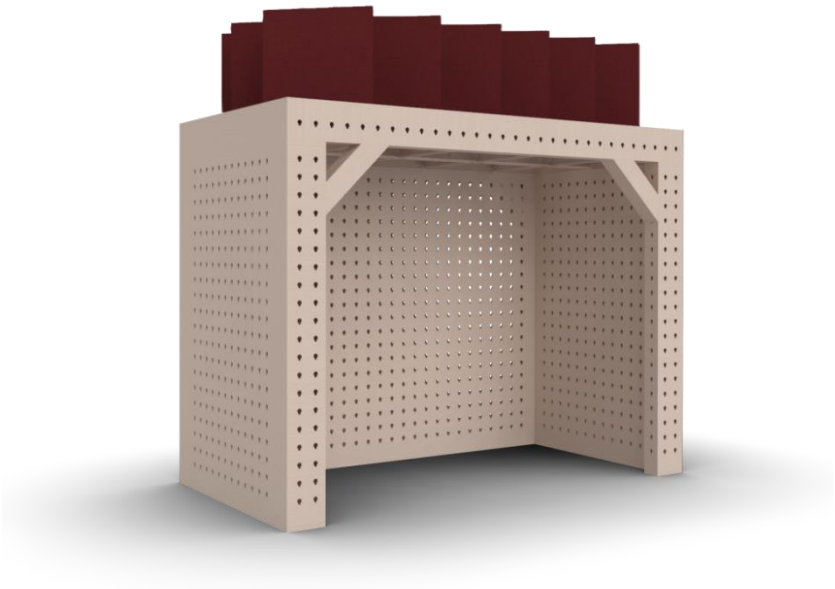
AN INDUSTRIAL DESIGN RECOMMENDATION TO STRENGTHEN THE COMMUNITY INSIDE THE CLIMBING HALL

PUBLIC SUMMARY



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1. *BACKGROUND*

The clients of this assignment want to build a climbing hall in Zutphen. They do not want only to build a building in which people can climb, but they also want to create an active community of climbers inside that building. Their vision is for their climbing hall will become a breeding ground for initiatives in areas such as renewable energy, (safe) climbing and inclusivity. Employees and climbers will be able to become co-owners of the climbing hall through these breeding ground activities. The climbing hall will also generate passive income through these activities, which in turn will help the community.

The clients did not have all the necessary wisdom or expertise to actualize their vision of their climbing hall fully. That is why they contacted Novel-T. Novel-T helps them fill in the gaps by formulating challenges or wishes into design assignments. Novel-T brought the designer (H. Klapwijk) in contact with them and facilitated a meeting between all parties in which the assignment for this thesis was formulated.

The goal of this thesis has been to start from scratch and go through both the analysis and concept phase to end up with a recommendation for a concept that serves as an answer to the research question: *"How can Industrial Design help to strengthen the community inside a climbing hall?"*

2. METHODS

In the analysis phase data from multiple surveys (2002 survey, Google reviews, 2018 Survey) were analyzed and an on-site interview was conducted to gain insight in the needs of the target group (climbers). From the analysis phase, it became clear that acoustics is an essential factor, which indirectly helps to strengthen the community.

In the concept ideation phase based on acoustic research, ideas and concepts that improved acoustics were explored by the designer, presented to the clients, and objectively scored in a CSM (concept screening matrix) based on how well they met the requirements. At the end of this process, the Air Lounge concept had been chosen.

Materials were selected for the concept with CES (Cambridge Engineering Selector). After that, a 3d model was made in SolidWorks and used both for simulating the strength of the concept under forces as well as for acoustic simulations.

The simulations of forces of the three worst-case scenarios have been performed in SolidWorks (see figure 1 - 3).

For the acoustic simulations, the acoustics of a climbing hall with people talking loudly have been simulated with and without the concept in I-Simpa.

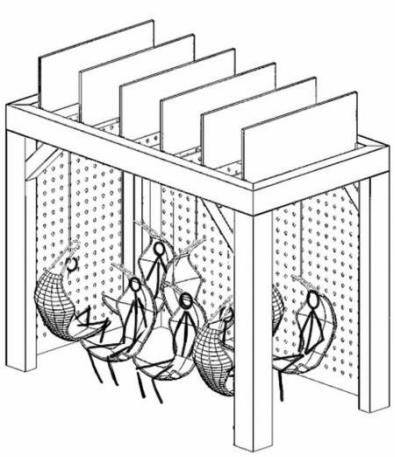

Figure 1. Worst-case scenario 1

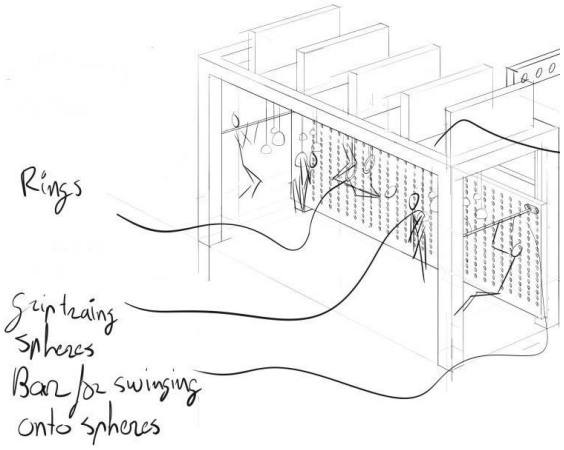

Figure 2. Worst-case scenario 2

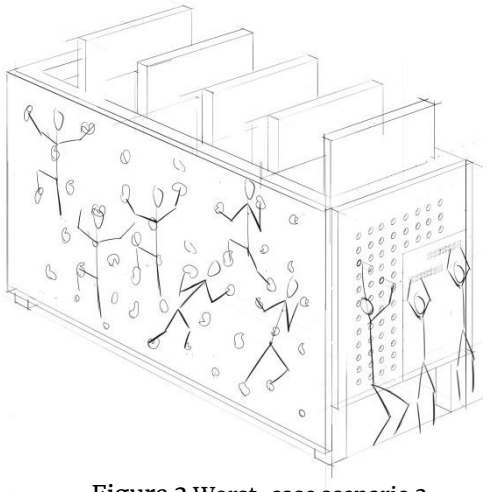

Figure 3.Worst-case scenario 3

Results

The result of this design research is the Air Lounge concept, which enables the climbing halls to improve their acoustics and to be even more flexible in the arrangement of their furniture and training equipment. Many of the interactions with the concept will be developed in an open-source development process in which climbers can cooperate with their climbing hall and create new modules for the Air Lounge.

The concept will be primarily made out of Birch; it will use AISI 9255 (steel) for its mounting plates and tailor-made acoustic panels from (Primacoustics, 2018) to absorb sound.

The geometry of the beams and mounting plates of concept has been optimized based on the simulation of forces (see Figure 4).

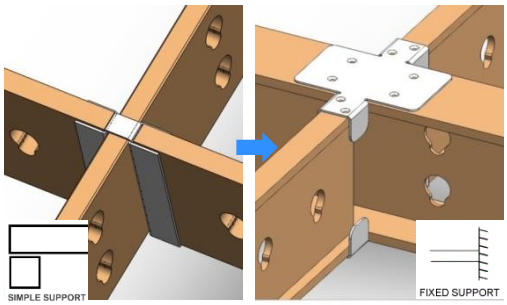

Figure 4. Example of geometry changes

The acoustic simulations have resulted in a different orientation of the acoustic panels to optimize the absorption of sound (see Figure 5 and Figure 6). The acoustic simulations conclude that although the Air Lounge may not create an optimal acoustic environment in a climbing hall, it will certainly make a noticeable improvement.

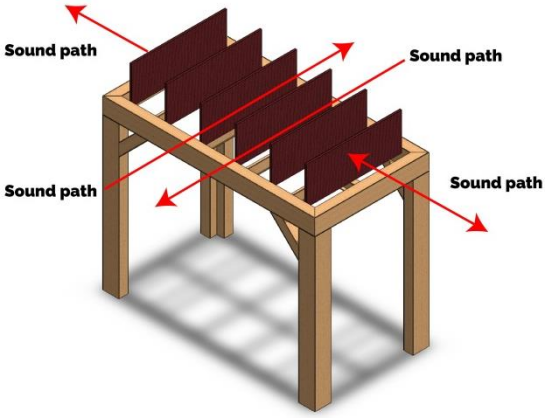

Figure 5. Old Sound paths

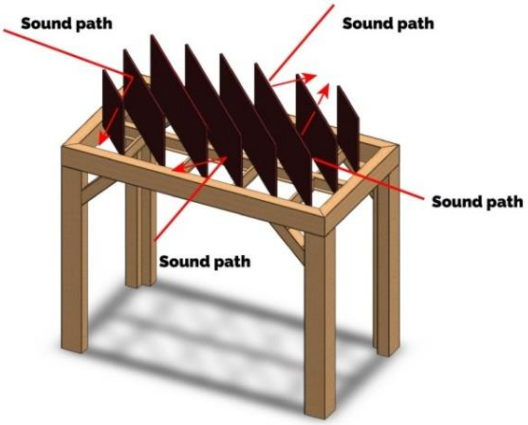

Figure 6. New sound paths

Conclusion

The research question for this assignment was: *"How can Industrial Design help to strengthen the community inside a climbing hall?"*

This concept helps to strengthen the community:

1. By improving the acoustics: this makes it easier to start and maintain a conversation.
2. Through its design: this is done through games such as vertical twister that can be played on it and for example with the hammock chairs that allow the user to turn their chairs towards each other.
3. Through the open-source development of interactions: the cooperation between the climbers and the climbing hall will strengthen relationships and make the climbing hall feel more personal.

The concept meets most requirements well and is therefore on the right track. There are, however, a few steps left that need to be taken before the concept can be made:

1. Expert advice on the strength of the structure is needed.
2. Screws need to be added to the concept.
3. The optimum size and amount of acoustic panels need to be found.
4. The frame needs to be designed in different shapes and sizes.
5. It needs to be investigated how to best store the modular panels.
6. The requirements need to be weighted to understand which requirement to prioritize for further development.

References

Primacoustics. (2018). Saturna. Retrieved from http://www.primacoustic.com/saturna/