THIN GLASS INSTALLATION

integrated design for glass projects

Reflection

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Aspect 1: Graduation process

How is the graduation topic positioned in the studio?

The discussed thesis engages two chairs within the "Building Technology" track, of Architectural Glass and Design Informatics. It is conducted under the guidance of James O'Callaghan and Paul de Ruiter of the two respective departments. Within the chair of Structural Design and Mechanics, the thesis project is investigating the possibilities of Thin Glass in the built environment, under the spectrum of a design workflow where the material data could be utilized to achieve informed design outcomes.

Moreover, the current project extends the knowledge on cold bent thin glass design and identifies tangible guidelines to existing issues in design. This evolves, under the spectrum of a digital and optimized workflow, as a result of a meticulous material understanding and analysis.

What is the relationship between the methodical line of approach of the graduation studio and your chosen method?

The methodical approach of the studio starts from technical-scientific study and ends with design research or execution of design. The approach for the current thesis was based on this guideline, choosing to first complete a technical-scientific study to identify the possible issues and gain adequate background knowledge and continues by researching through design, which provides more general, yet practical aspects. The findings from the first part are a vital part for the second part since they contain the overall analysis of the material as well as additional information regarding glass design and principles. An integral part of the thesis is the final case study and prototype that proves the efficiency of the method, but also provide an insight into the aspects that require better calibration and further research.

How did the research approach work out (and why and why not)? And did it lead to the results you aimed for? (SWOT method)

The research approach required studies within several areas, vital for the desired outcome. Since the main goal of this research is to explore design possibilities with cold bent thin glass panels within a computational method, a detailed analysis was needed. Therefore, throughout the course of this project, 5 different areas have been investigated. Namely, glass design, material testing, computational design, glass connection design and structural simulations. Each area entails various difficulties but all fall under the umbrella of glass design with computational tools, making each one an important aspect of this thesis project. Each area provided with useful information, but also opened numerous additional aspects for further research or others that were indeed simplified due to time limitation.

The desired results are fairly achieved, leading to better understanding of the material, and paving the road for more architectural applications of thin glass.

How are research and design related?

The produced case study, as a design outcome, is a result of the conducted research. The proposed computational method as a design workflow highly depends on material studies and analysis as well as on the discretization of the process into tangible parameters.

Aspect 2: Societal impact

To what extent are the results applicable in practice?

Firstly, from the perspective of materiality, the discussed thesis provides sufficient information as per the properties of the product and its capabilities. Also, guidelines are provided for the specific case of cold bending thin glass panels, as it is considered the most optimal design solution from a structural viewpoint. Thus, vital design issues have been faced.

Secondly, the proposed computational method provides an insight into suitable tools to complement the design process.

In conclusion, there are still several points to be further elaborated, but with the author's expertise the results are one step prior to being implemented in practice, considering that additional research could be pursued, and the proposed tools are adjusted to project preference.

Does the project contribute to sustainable development? What is the impact of your project on sustainability (people, planet, profit/prosperity)?

While thin glass is already being produced for the use in other industries, however its architectural application is limited. The composition of it, as well as its thickness requires less raw material compared to the same amount of regular float glass. Gradual integration of the material in the built environment would substantially reduce the raw material for regular glass, resulting in reduced carbon footprint. Additionally, the specific product used for the current project (Falcon glass by AGC) is produced with the float process, while other aluminosilicate glasses are produced with methods requiring high energy consumption.

Furthermore, considering that the proposed computational method works in an optimization loop, leaving several design goals open to the user, sustainable aspects, related to each project could be used as parameters.

Finally, exploiting methods and materials that are already in practice in different fields open new horizons both for the architectural industry and the people involved.

How does the project affect architecture / the built environment?

With the use of thin glass in the built environment, there are several design opportunities to be explored. Considering the integration of the proposed method in practice, architectural design could gain more complexity as well as clarity and resistance. Thin glass is a lightweight and flexible material, yet incredibly strong. Design wise this could potentially provide with intriguing design outcomes. Structurally, the material's weight would result in lighter structures overall. In view of the glass extensive use in a lot of elements in the built environment, the two aforementioned points are great advantages. Finally, the computational method provides with informed and verified design outcomes, making the process more efficient and open to optimization.