

## Combining thin-glass and wood to create a roof for bicycle stands

# REFLECTION

This research is primarily aimed at getting to know the material. Thin-glass is a product of recent developments within the glass-production industry, which has not yet found its place in the building industry. The material is still undergoing innovative changes to adapt it for use in various applications. We have not yet visualized or researched how it could influence architecture.

The combination of thin-glass and wood appears to bring out the best qualities of both materials as they compliment each other with essential qualities required for building constructions. Their ability to bend and tolerate stresses opens up new possibilities for use in architecture. This enables us to experiment and create new light-weight structures in a variety of forms.

These materials have been selected for our building structure. Further knowledge was required about their building characteristics, strength, potential weaknesses and possible methods of processing. In this respect both materials come from two very different backgrounds.

Wood has been used as a construction material in numerous innovative ways for hundreds of years, illustrating its diversity and great potential as a building material.

On the other hand, thin-glass is a new product, which has not yet found its place in architectural designs. Very little research has been made on the material in general, so we have to rely on the findings of research already conducted in the field of design, in order to determine how we could use it. Wooden constructions would probably have a bigger influence on later design concepts.

One of our main objectives was to explore how these materials could be formed and combined to create new shapes and structures.

This information would help us with the second step of our research, which is to gather information about other design projects, and how they can be interpreted for use in our design concept. Reference will be made to general shape analysis, construction methods, joining connections and constructive water management.

The third step was to design a number of roof structures using the information already gathered. Potential 1:1 scale mock-ups would help to illustrate these, and enable us to select one and elaborate on it for our final design.

The faculty lab of building technology is divided into 3 branches: climate design, facade design and structural design. The emphasis in this research is put on the development of a facade system, which basically involves the study of structural capabilities of thin-glass. Both labs are represented by Dr. ir. Christian Louter (*structural glass*) and Dr. ir. Tillmann Klein (*facades*) as mentors.

### III

The quest to design a bicycle shed out of thin-glass, caused us to study existing literature to gather information about its properties. Several designs were made to investigate different forms, which were then evaluated and lead us to research even further, so that the final design could be selected and optimized.

### IV

Over the years roof structures have been built in different forms, to serve a variety of purposes, e.g. roofs for parking spaces, covers for stations and bus stops, markets, industrial halls, passageways, etc. They are primarily designed to provide shelter from precipitation from above.

Our choice of material allows us to create an aesthetically pleasing design, allowing for more light to enter. Its lightweight construction would also make it less cumbersome or obtrusive.

The primary objective of the roof structure is to offer protection from precipitation. The structure could be further developed to include an enclosed façade, which would be a step towards creating an enclosed air space.

This lightweight construction could also be added to an already existing building. It could then include additional options, such as climate regulating functionalities.

This can all contribute towards introducing thin-glass as an innovative construction material. Hopefully this could provoke the industry into producing panels that are large enough in size and affordable in price, to provide an alternative to the flat, heavy and fragile float glass of today.

