The glazing of interior doors

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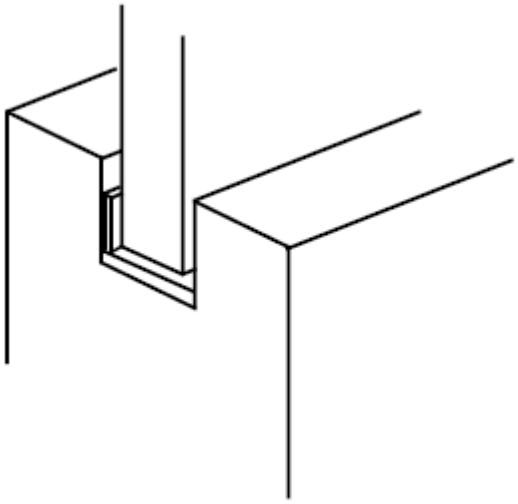
Straight profile interior doors without a visible fixation between wood and glass

Background information

This assignment was provided by Albo Deuren (Albo Doors). Albo is an active manufacturer and seller of doors for over 35 years. To keep up and stay ahead of the competition, they need constant improvement of their products, through innovation. Doors seem like straightforward products, but after all these years they can still be improved, which is what this assignment is about: to create a fixation between the wood and the glass of a door that is strong, elastic and provides a waterproof seal for the wood in the rebate. It is relevant to do this now, because competitors are working on the very same thing on this moment. In the picture on the right, a part of the rebate can be seen with a glass plate in it. On the left side of the rebate, a shim can be seen which keeps the glass plate in the middle of the rebate.



1. Schematic overview of a rebate

Approach

To make sure the process would go as smoothly as possible, a research question was made: *how can straight profile interior doors be glazed without a visible fixation?* The first thing that was done to answer this question was to do elaborate market investigation, starting with a lot of products containing glass and wood and how these products were made up until how competitors made their doors and what techniques they would use for that.

When the idea phase was started, it was clear that there were a couple of techniques, spread over different markets, that could possibly lead to a solution for this assignment. After completing the idea phase, five ideas made it to the concept phase, where eventually four concepts made it through:

1. A shim. By making a shim way larger than its original size, it could fill up the total rebate of the door. This way, the glass is tightened between the wood and the shim, and the rebate is therefore made waterproof. Within the rebate, a sealant is still needed to provide an elastic bond. In later meetings with Albo this concept was forsaken because it could not provide a bond that was elastic enough.
2. Formerol. This is a material that is very elastic at the beginning and moldable like clay. When it dries, it becomes like rubber. It will take the shape of the rebate and the glass, and after some time forms a bond between them that is strong and elastic. The only problem is that the rebate won't be waterproof yet, and the material itself is relatively expensive.
3. Gluing. The third option is gluing all the wood to one big glass plate. The hinges and door handles will already be attached to the glass (just like it happens with a glass door), and the wood is glued on it. This way there are no problems with elasticity and waterproofness, but it would be a big investment for Albo.

4. The fourth concept is a solution the competition is using. They fill the rebate with a sealant (kit) and put the glass in it which causes the sealant to rise. When it reaches the top of the rebate, the excess sealant is wiped/cut away, resulting in a very strong, elastic bond between the glass and the wood that is entirely waterproof. Because the top layer is of a different material than is the case at Albo, it cannot be directly copied.

Results

From brainstorms and discussions with Albo, Formerol was chosen to be the (first) final design. This was bought and tested. Formerol appeared to be good to work with, it was very clean and made a good elastic bond between the glass and the wood, although not very strong. Because Formerol is relatively expensive as opposed to kit, it was chosen to discard this material. The solution as was presumably used by the competition was then chosen as the (second) final design. This method was again tested at Albo but did not work in reality. The kit flowed out of the rebate in an uneven way and could still be seen from the outside. This resulted in the third and true final design; a bit of kit in the rebate to attach the glass to the wood in a strong but elastic way and putting some hydrophobic sealant on the inside of the rebate to seal it from water. This solution is simple, but also cheap and can be implemented immediately.

Conclusion

The assignments objective has been reached, because there is now a way of glazing interior doors that allows for an invisible fixation between the wood and the glass of a door. Recommendations are to investigate which waterproof sealant is the best option for Albo, and to then work on a marketing plan for this new way of glazing that gives doors a sleeker look.

2. The final result