

# Creating a rebated lift-off hinge

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Themans Hang en Sluitwerk B.V. is a company, delivering total solutions to housing and utility construction. To realise this, they own and develop the brands s2 and Ansa. They sell, assemble, develop, keep the stock and do all ingoing and outgoing logistics of their products. The client sees possibilities to develop the concept of a rebated hinge. Resulting in the following project aim:

“Create a concept for a rebated hinge combined with a lift-off hinge to make it easier to install, while keeping its durable properties and comfortable control.”

This aim is used as guide in the design process. This started off with an analysis of the stakeholders, existing hinges, installation and NEN norms. It also included information found on relevant topics. This information is used to get a complete view on the market, as well as elements that are of concern when designing the new product.

After having this information, it is placed a bit more into perspective with background information on bearings, the use in hinges as well as how the use of plastic has evolved the life span of hinges. Also including an explanation on the materials currently used. And concluding how this information can be used in the design of a new rebated hinge. This analysis was followed by a short breakdown of the forces in the current product and how these influence the wear of lift-off ball bearing and rebated hinges.

All gathered information is used to shape the requirements, resulting in three important aspects. Each with its own set of requirements. The specifications, these requirements show the different dimensions and surroundings the hinge should adhere to. The instalment and use requirements are there to improve the installation of the hinge, while keeping a high-quality hinge. The requirements based on NEN-norms will ensure hinge performance, these requirements were used only as a guideline because this is hard to test.

Ideation is the next phase, the ideation was inspired by the research on existing hinges, as well as the requirements. Ideas were sketched and different possibilities envisioned. Considering, but not limited by, the list of requirements. These ideas were placed into a morphologic scheme to create a good overview of which ideas could be used in which way.

A wide array of these ideas was taken from the morphologic scheme and were used to create three different concepts. These concepts were all developed to the same extent. 3D printed prototypes were made to get a better feel of the product and then these concepts were graded on the requirements, their adjustability, way of installation, and space for bearings. Between the best two concepts, there is not one better than the other. One concept made use of a whole new mechanism, which made it a challenging but innovative design. While the other concept had a simpler mechanism but looks a lot like the existing lift off ball bearing hinge. Therefore, this product could be susceptible to the same weaknesses as the existing hinge. In the end, the most innovating concept was chosen. Because even though this is the most complex, there is more freedom to change things.

After finalizing the design, another prototype was made to test the hinges on their instalment. After concluding the design choices, future steps and other design directions are shown.