

# A new design for a door handle spring considering alternative materials and constructions

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Client: Themans

Themans is a company specialized in hinges and lock systems for residential and non-residential buildings ("S2 - home - Themans S2", 2018). They try to design innovative concepts with focus points on sustainability, user comfort and consistent design. Themans works together with S<sup>2</sup> (safe and secure), Ansa, Cisa and Roto to sell their products.

The overall objective Themans is aiming for with this assignment is a solution for a door handle spring. A door handle spring is used to move the door handle back into the horizontal position after pushing the door handle up or down. A door handle can move in two different directions, left- and right turning, so the handle spring needs to be able to work in those directions as well. Every door handle has a spring characteristic on its own, but this function fades over time. Therefore, most companies place a spring in the original design of the door handle to prevent the lever from hanging. The current handle springs Themans uses aren't very stable or don't fit all their backplates. Themans wants to strive for a spring, which can be placed by the user themselves when the handle doesn't stay horizontal anymore, fits in every design and works for every possible movement. To keep the focus on the consistent design it's important to implement the spring in every handle of Themans without changing the original design of the existing handle. The challenges emerging here are not only the shape of the spring but also the different possibilities of materials.

The main research question for the thesis is: 'Is it possible to improve the current door handle spring considering strength, user comfort, flexibility and working mechanism?' To answer this question applied research and two tests are done. The literature research is about the current door handle spring solutions and different materials and constructions with spring properties. The findings in the literature research are converted into designs ideas. For a door handle spring, the working mechanism is the most important part. Therefore, prototypes have been made to test the mechanism. The test consists of using the prototype 20 times and measure the needed force with a moment wrench. This tested resulted in a list of improvements for some of the prototypes and for others prototypes the conclusion that the idea doesn't work the way it was mend too work. For five prototypes, the improvements are applied and the prototypes are developed further into final concepts.

The final concepts are evaluated by two different methods. The first method is a comparison with the requirements stated at the beginning of the thesis. The requirements are giving weights of importance between 1 and 5, with 5 being a high priority and 1 more a wish than a requirement. The weights are determined in consultation with employers of Themans. The second method is an evaluation session with the employers of Themans. In the evaluation session, the employers were asked to use the concepts and describe their train of thoughts. The final question of the session was 'Which concept would you want Themans to add to their portfolio?'. Both results show that one concept scores the bests in both and is therefore worth developing further.

The result of the thesis is a concept that is worth developing, but is not production ready yet. Therefore, the chosen concept still needs some more research done for the durability, production techniques, material composition and strength.

## Reference

S2 - home - Themans S2. (2018). Retrieved from <https://www.themans.nl/>