The Flexikom 2.0

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Bachelor Industrial Design, University of Twente. 18-01-2021

Themans is a company that is specialized in the industry of locks and hinges. In 2011, Themans developed the Flexikom lock box. This lockbox showed improvements with regards to its overall universality and compatibility to all single- and multipoint locks of Themans. Moreover, the Flexikom lock box also showed innovation, as the lip and the strike plate were designed to be adjustable. For nine years, the Flexikom lock box successfully satisfied the needs of Themans and of the clients. However, as time goes on, the market that surrounds the Flexikom lock box slowly develops. As a result, the needs of Themans and their clients also change. To satisfy these needs once again, the development of the Flexikom 2.0 was initialized, with the main goal of improving the current design of the Flexikom lock box.

To achieve this goal, the problems of the current Flexikom lock box were investigated and defined. In short, the current design of the Flexikom lock box has a large total amount of parts as it lacks in its modularity, and is outdated, as the lock box is not up to date with the needs of its surrounding market. Additionally, the current Flexikom lock box is not able to be used by a client of Themans to introduce off-site maintenance, as the designs of the adjustment systems in the flexikom lock box are too complex.

"The goal of the Flexikom 2.0 design is to: implement an improved modular system, to reduce the total amount of parts. To introduce the use of plastics and make the adjustment systems of the Flexikom 2.0 simple and intuitive, to make the new design compatible with the introduction of off-site maintenance."

In order to create a proper foundation for the list of requirements of the Flexikom 2.0. The project started with a literature research into Dutch- and European assessment guidelines related to lock boxes to find the required specifications regarding the durability, burglary resistance and fire-resistance of a lock box. Furthermore, the current design of the Flexikom lock box was analysed for aspects of the design that needed improvement. These aspects could then be translated into requirements for the Flexikom 2.0. In the product analysis, requirements were made for the following aspects: The adjustment distance range of the adjustment systems of the lip and strike plate, together with their accessibility, simplicity, and intuitiveness. The use of plastics, the universality, and the modularity.

Next, a Process tree was created, in the process tree all the possible actions that are to be executed by the different users of the Flexikom 2.0 are defined. The process was created as a tool to check whether any aspects were missed in the product analysis. With the help of the process tree, new insights were obtained with regards to the specifications of the adjustment system of the lip that significantly facilitated the development of both adjustment systems.

Based on the findings from the literature research, product analysis and the process tree, the List of Requirements was made. By doing so, the conceptualization phase could be initialized. Starting with the concepts creation of the adjustment systems. In this concept creation, concepts were created for the adjustment systems of the strike plate and lip. Then, these concepts were rated from a scale of 1-10 on 10 different criteria. In addition, the criteria were given an importance factor from 1-3 to increase the influence of more important on the final score of a concept. Two concepts came out to be the most compatible for the Flexikom 2.0.

Consequently, four variations of combinations of the two highest scoring adjustment systems were created. By comparing the four variations, a conclusion was made on the most optimal combination of adjustment systems. This conclusion led to the development of the first concept. In which solutions to the aspects of improvement found in the product analysis were also implemented.

With the help of a 3D print of the first concept, the first concept could be analyzed for further improvements. Due to the improvements that could still be added to the concept, it was decided to develop an iteration on this concept that would resolve the found points of improvements. The project came to an end after the development of this iteration. Compared to the current design of the Flexikom lock box, the iteration showed promising improvement in its modularity and an increase in the simplicity, intuitiveness, and rigidity of the adjustment systems. Furthermore, the iteration met all the requirements apart from the requirements that were found in the literature research. As the requirements found in the literature research could only be determined by the tests described in the assessment guidelines.

After concluding the results of the assignment, future recommendations were added to the report to aid Themans in the continuation of the development of the Flexikom 2.0.