

Design of compact and ergonomic bicycle storage for high-speed trains at SIEMENS.

Public summary

Michel Schmale

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The task stated by Siemens was to develop a concept for bicycle storage for the Velaro line of high-speed trains. Railway companies and governments are beginning to require that new trains have the ability to carry a certain number of bicycles (German Parliament, 2019). To accomplish that Siemens uses relatively simple bicycle holders which either store the bicycle in a horizontal or vertical orientation. These solutions either have a large footprint or are difficult to use. Especially with the increased sale of electric bicycles in recent years, heavier bicycles are becoming more common.

The approach is to use the first stages of the design thinking process to guide the creative process. The first two stages “emphasize” and “define” are used to understand the problem. After that in the ideation phase, different possible solutions are explored.

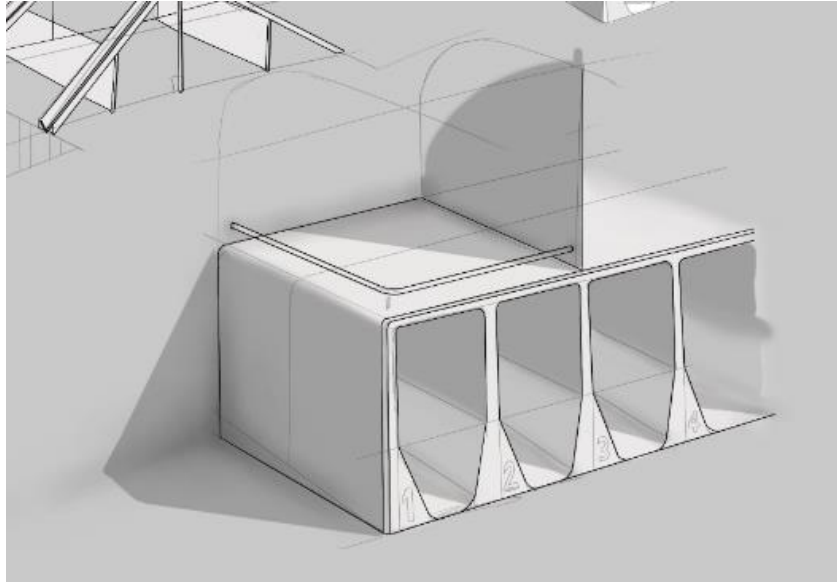
In the beginning of the project a survey of over 90 participants was conducted. The goal was to understand what the different reasons are of people bringing their bicycles with them on high speed trains. The main goal of travellers with bicycles is to go on a recreational trip, only a small fraction of responses indicated that they are bringing a bicycle on the train to commute to work.

Also, people who do not bring bicycles on the train were asked about their experiences when travelling with other passengers who bring bicycles. The responses of these non-users were more negative towards the idea, finding that bicycle holders might be too hard to locate on a train and that bicycles take away too much space in the train.

A stakeholder analysis was done to understand the different needs of the stakeholders. The most important stakeholders were identified. To compare all the stakeholders a power-interest matrix was created, where the interest and decision-making power is ranked among the different stakeholders. Additional research was conducted by analysing the interior design of different versions of the Velaro train. This is useful to guide the final design process.

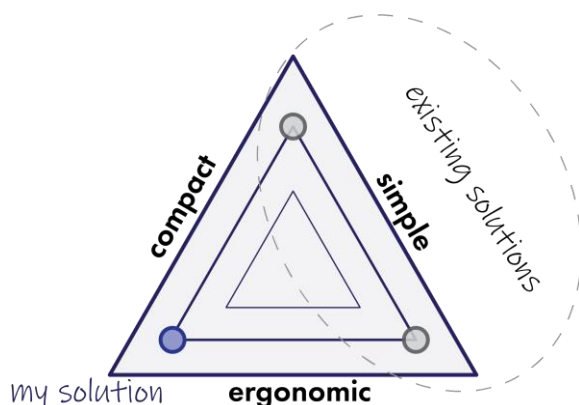
From this research requirements for the solution were created, this relates to the “define”-stage of the design thinking process.

With these requirements the ideation phase was started this includes various idea sketches 3D models and physical miniature models.



This is a sample of one of the different concepts which were worked out in the ideation process. This example shows storage boxes which will house the bicycles to be stored. On top of the boxes a luggage shelf is installed to improve the overall footprint by removing the need for dedicated luggage shelves. This concept was ultimately not chosen, but represents the different approaches taken to solve the problem.

The outcome of the design process is a concept for a bicycle holder which combines space saving attributes with a small footprint. With this combination of attributes, a space saving design could be implemented without sacrificing the usability. It will increase the complexity of the product significantly though.



Improving the footprint of the holder while maintaining access to the holder by users of different abilities, can improve the overall design of the train’s interior. The gained space could otherwise be used to fit more seats into the carriage or to add more amenities for the passengers like more legroom or increased luggage capacity.

Sources

German Parliament, 2019. *German Parliament*. [Online]
Available at: <https://www.bundestag.de/presse/hib/667950-667950>