



More than just a Light Commercial Vehicle

Combining Commercial, Private and Recreational activities in one vehicle.

The Flex Cab +

In this Graduation Project, a combination between a Light Commercial Vehicle (LCV) and a Recreational Vehicle (RV) is created. A multi-purpose product that can be used for Commercial, Private and Recreational activities. As customers mainly buy an LCV for Commercial purposes, a large part of the challenge was to develop a hybrid concept that does not interfere with Commercial usage and matches with all safety and fiscal regulations.

This Graduation Project was made for Snoeks Automotive. Snoeks is the leading partner for car manufacturers to extend their product range in Light Commercial Vehicles (LCV's) by supplying them with interior modification concepts. Snoeks is currently most successful with their Crew Cab products. A Crew Cab is an additional backseat in the LCV with a separation wall behind the passengers. This allows the vehicle to be used for both private and commercial usage. e. Their latest innovation is the Flex Cab, a double cabin that can fold forward to increase the usable cargo space in the back of the vehicle.

But why stop there? In 2021, Recreational Vehicle (RV's) shipments increased by 40% compared to 2020 (RVIA, 2021). The RV industry is growing rapidly, indicating an increasing demand for recreational activities. With the current RV trends and the expertise of Snoeks Automotive, an interesting opportunity was found.

For the recreational functionalities, the target group was first analysed. It was found that this target group is highly divided (Topsector Logistiek, 2017), and that the best solution for the company would be to develop a base product with some "must have" recreational functionalities, after which customers can choose to customize the vehicle themselves. Functionality research showed that the most important functionality to add is the ability to sleep.

The developed product is the Flex Cab +. A Flex Cab that is even more innovative than the current one as it offers the additional functionality of sleeping. This idea offers both an improved commercial and recreational usage compared to the regular Crew Cab. Developing a product like this could be a big risk as the development costs can be high. This project aimed to prove that the additional functionality is achievable with minimal adaptations and complexity.

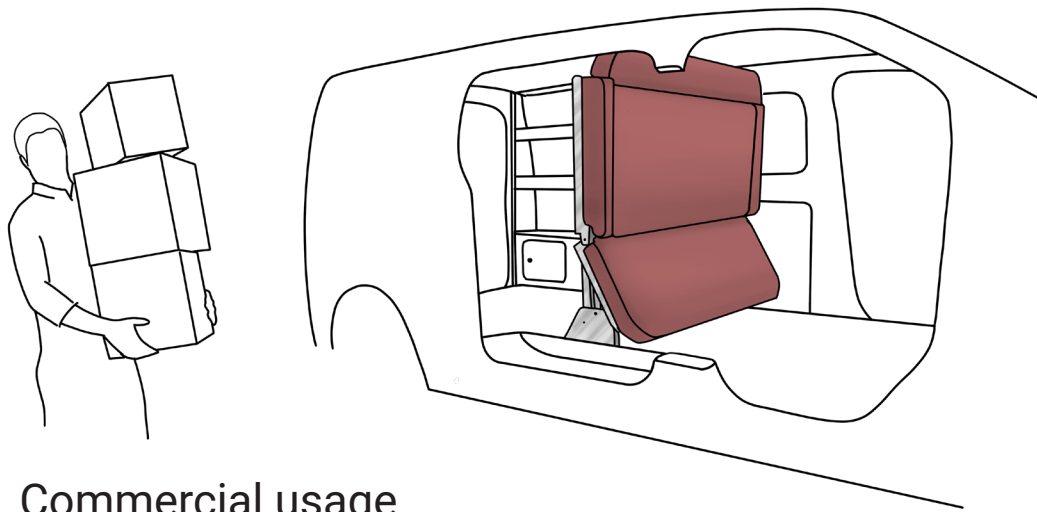
With the Flex Cab +, customers can use their LCV for commercial, private and recreational activities, as the product can be placed in three position: Seating, Sleeping and Flexed forward. Possible usage can be seen on the right.

This Graduation Project proves the technical feasibility of the Flex Cab +, and shows that with relatively minimal engineering, the Flex Cab can be improved with large impact. By simultaneously developing the regular Flex Cab and the Flex Cab +, the additional developments costs can be kept at a minimum.

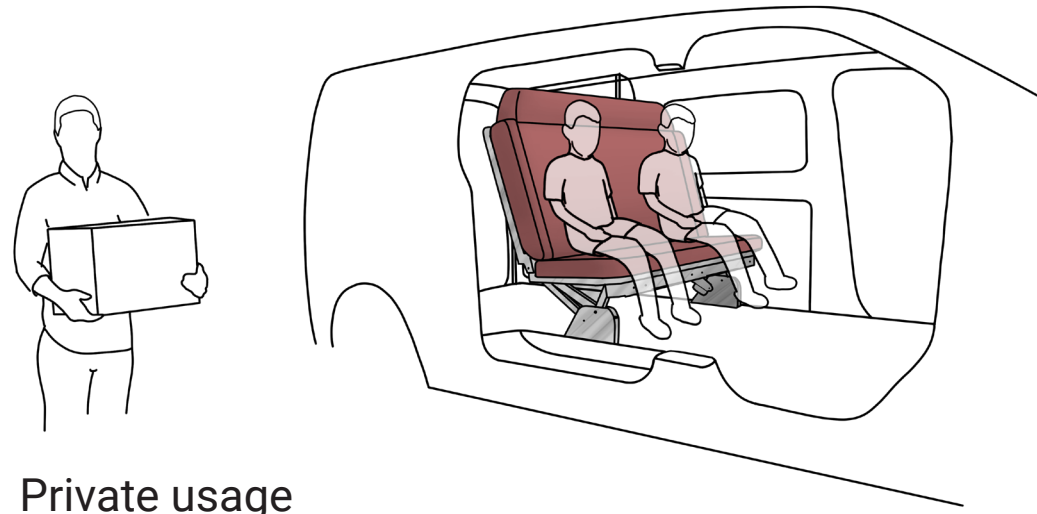
The concept was first validated on a theoretical level, by verifying the possible sleeping length, comfort and configuration. After the theoretical validation, a physical prototype has been made to verify the functional mechanism of this product and prove the technical feasibility within the vehicle.

A supportive frame in the back of the vehicle is needed and can be used to place shelves at the sides of the LCV. These shelves can be used for both commercial and recreational storage. This way the flex cab + offers optimal Commercial and Recreational usage as can be seen below.

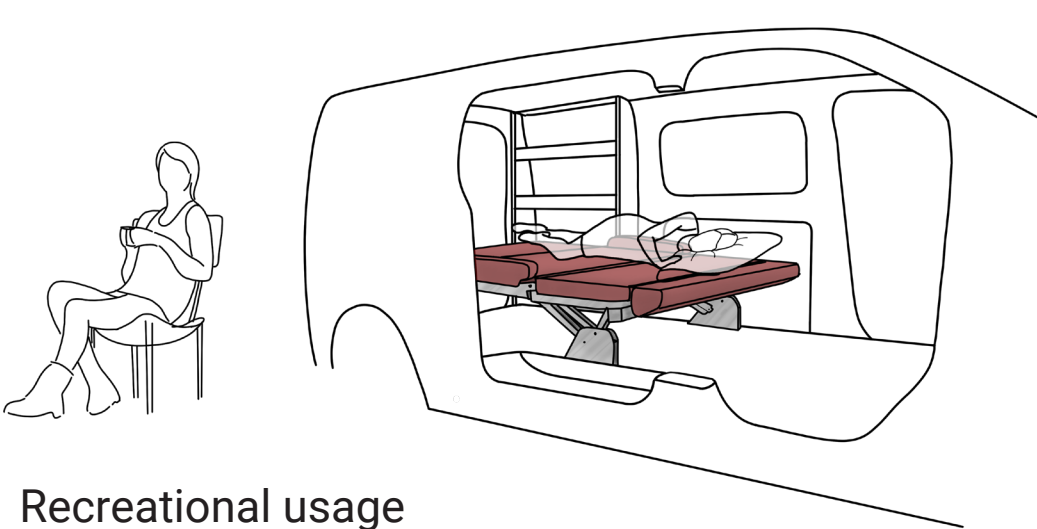
For more information, please contact the designer or read the full Graduation Report in the TU Delft Repository.



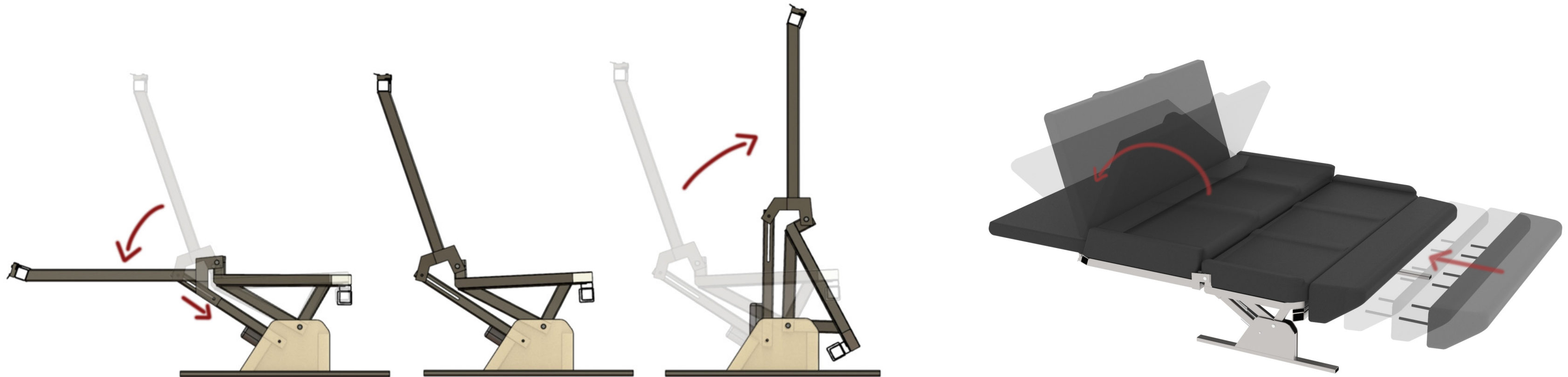
Commercial usage



Private usage

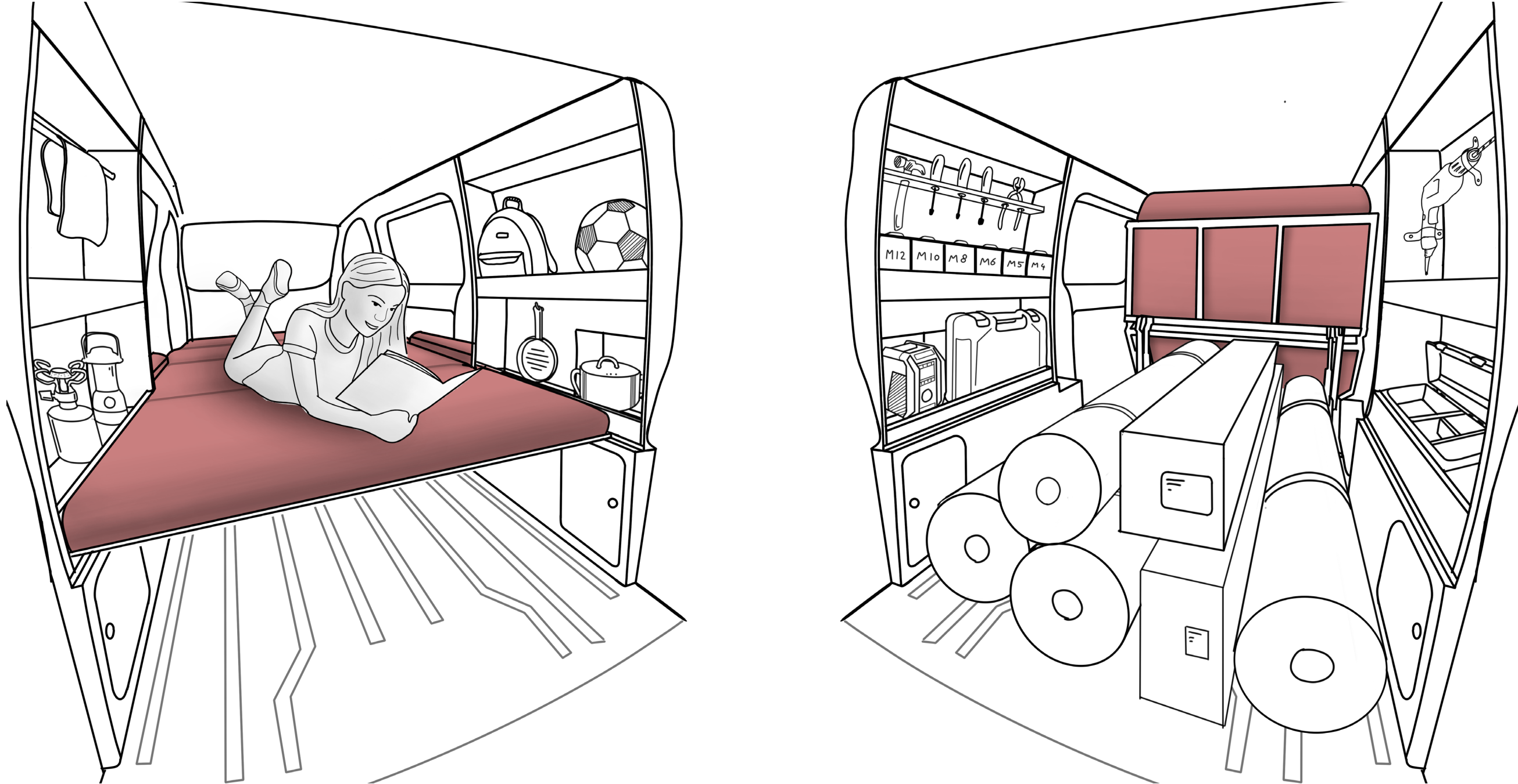


Recreational usage



The Flex Cab + can be positioned in three different positions: Sleeping, Seating & Flexed forward. These positions allow optimal Recreational, Private and Commercial usage with the same vehicle.

Using a modular headrest and a double backrest, an optimal sleeping length can be achieved.



The Flex Cab + offers ideal storage for both Recreational and Commercial usage. This way the vehicle can be used for any desired activity without interfering with other functionalities.

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24 / 08 / 2022
Integrated Product Design

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