

Automotive composites industry – Development of a multifunctional, modular vehicle

Kompozitok a járműiparban – Többfunkciós, moduláris rendszerű jármű fejlesztése

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Introduction of the concept

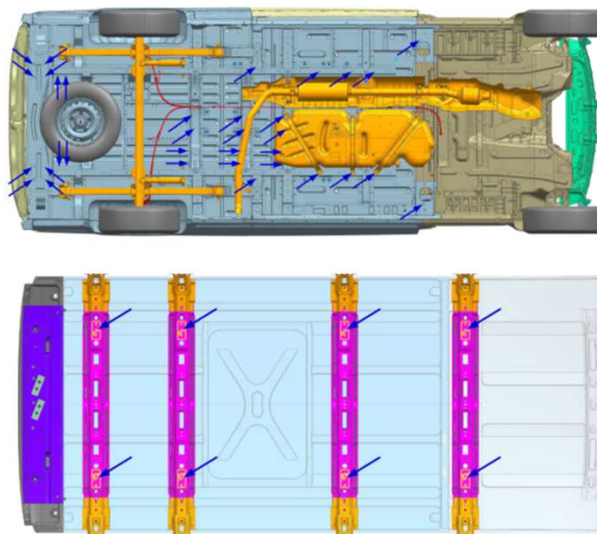
The aim was to develop a modular vehicle, that is capable:

- To be used as a van, camper or service vehicle
- There is a base vehicle prepared to be used with different modul elemets
- There are interchangeable functional modul elemets
- Which can be installed or removed easily (possibly without tools)
- Additional advantage is the ease and effectivity of the production and logistics

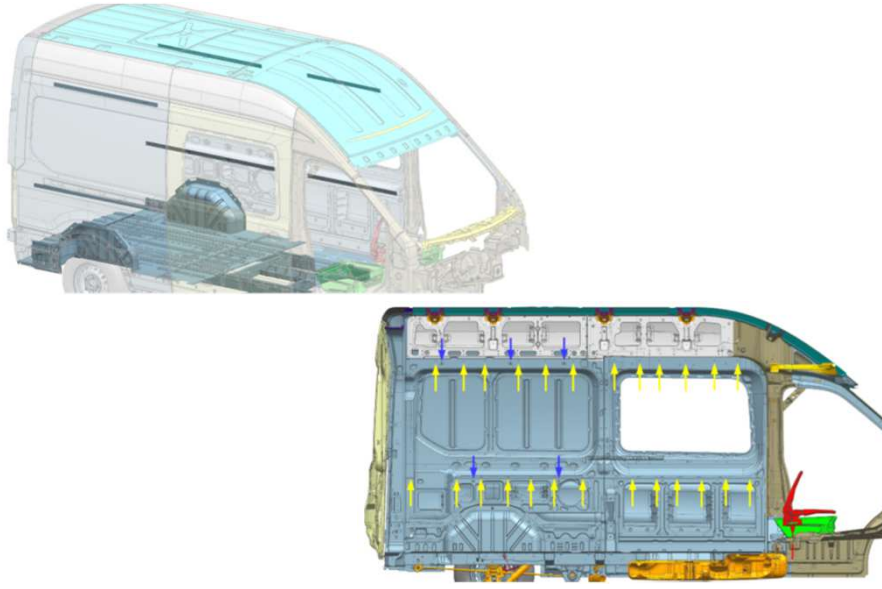
Design Brief

- Required specifications of base vehicle
- Base functions
- Base vehicle – technical data
- Installation – fix elements
- Applications

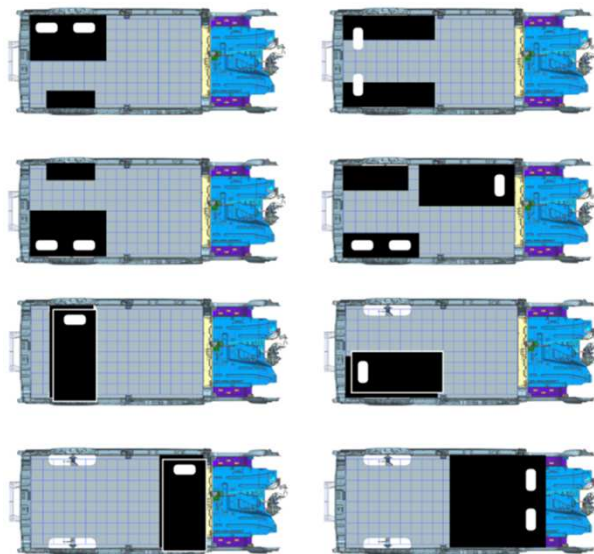
Hard spots of underbody and roof structure



Hard spots of sides



Raster size and examples for the modules



Mock-up



Mock-up – ergonomics trials

4-point bending tests of vacuum formed specimens



Specimen geometry, and 4-point bending tests of specimens

Production of interior panels

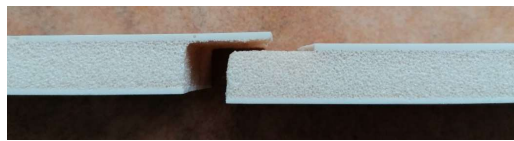


Vacuum formed rear door panels



Trimmed rear door panels

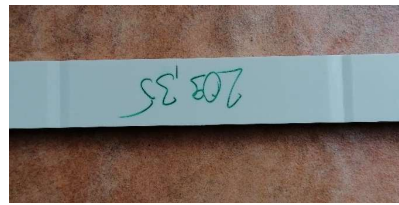
Production of sandwich structures - examination of technological parameters



Failure of PVC cored sandwich material made by reactive injection moulding (RIM): skin/core debonding, core cracking



Failure of PVC cored sandwich material made by reactive injection moulding (RIM): skin breaking and skin compression buckling

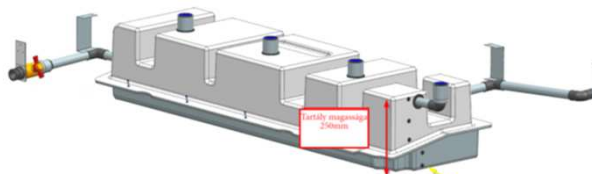


Production of RIM parts

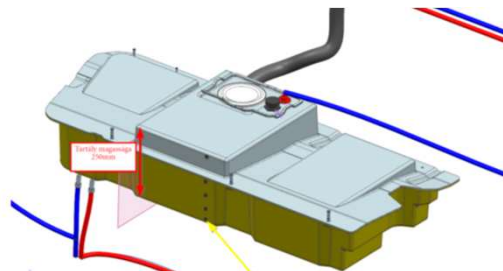


Reactive injection moulding of door window frame

Custom made GRP tanks - design



Custom made glass fiber reinforced grey water tank – location of sensors



Custom made glass fiber reinforced grey fresh water tank with connecting pipelines

Custom made GRP tanks - production



Custom made glass fiber reinforced grey water tank

Summary

A vehicle for multiple use was developed on a modular interior system.

This modularity gives the owner and manufacturer additional advantages.

Weight and thus cost saving is achieved due to the possibility to remove the modul elements not required.

All wooden materials are replaced by lighter, more resistant plastics in 3 categories:

- Stuctural parts made of composites
- Bigger non-structural parts & covers made by vacuum forming
- Smaller parts with rather complicated geometry made by reactive injection moulding (RIM)

Summary - II

Main advantages:

- Production is cheaper&more effective
- Easier for the dealers too: it is enough to keep the base vehicle on stock
- Customer has more added value due to the own assembly of the modules – hence lower price
- Rental companies have more flexibility
- Renters get the vehicle with all required functions but nothing unwanted
- Removing the unwanted modules leads to lower weight thus lower fuel consumption and environmental impact





Thank you for your attention