Two-Session-Clustering Workshop

3rd March 2021 | SESSION 2: Seats that will reduce the weight and energy consumption of the entire electric vehicle

Presenter:
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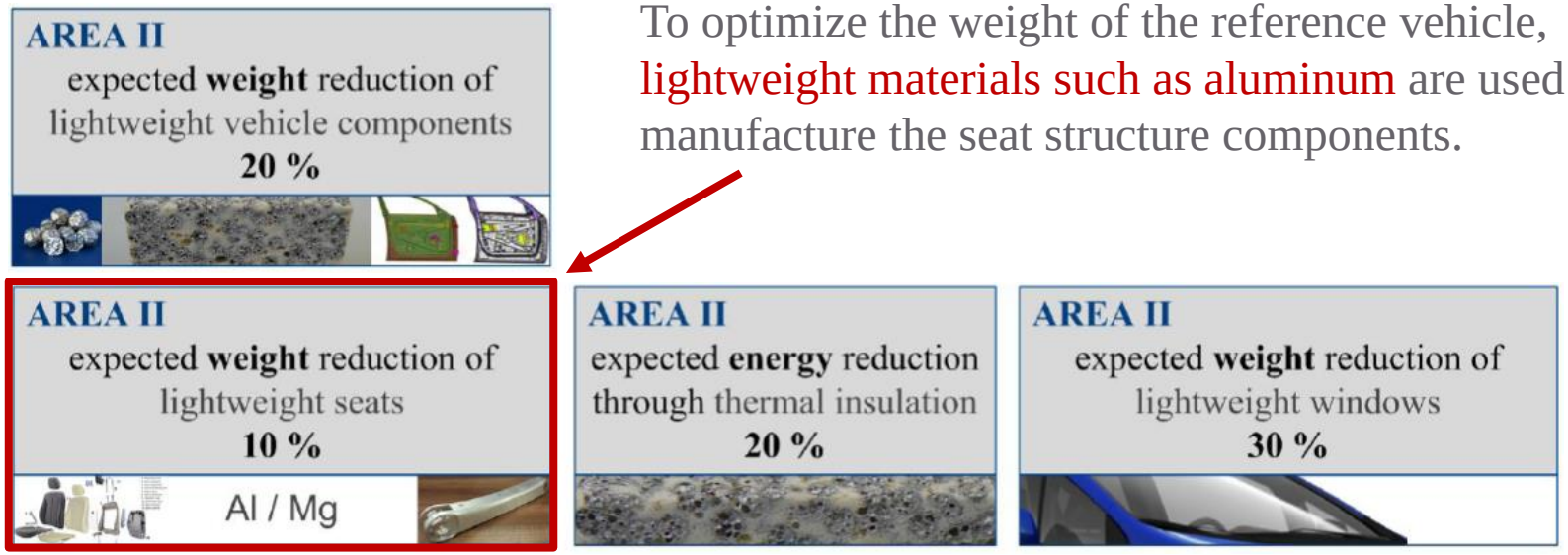
Seats that will reduce the weight and energy consumption of the entire electric vehicle

OBJECTIVES

- Objective of QUIET – AREA II "lightweight materials and thermal insulation":



To optimize the weight of the reference vehicle, lightweight materials such as aluminum are used to manufacture the seat structure components.

Main partners involved:

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

SeatTec Sitztechnik GmbH

→ Expected **reduction of energy consumption in** entire **AREA II** from these factors is around **10 %**.

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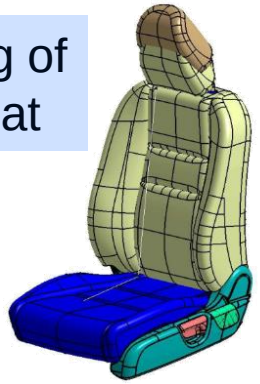
APPROACH

Analysis of SotA vehicle seat → Lightweight structure design & virtual analysis → Manufacturing of prototype seat



Analysis

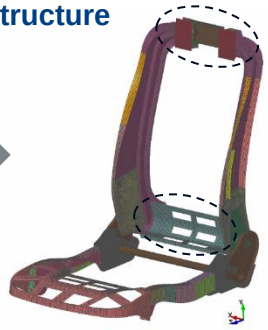
- ABC weight analysis of original seat structure
  → "frame seat plate" & "back complete" greatest potential for weight reduction

design & virtual analysis

- Design of lightweight seat structure by the CAD-tool CATIA:

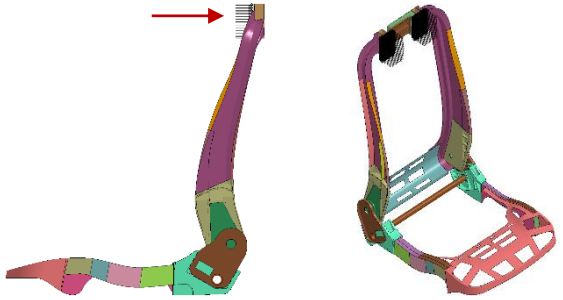
1st iteration step

final aluminum steel seat structure



…sheet metal parts, other aluminum

- Virtual test of strength by finite elements method according to EU & US regulation:



Regulations: UN ECE R17 (6.2), FMVSS 571.207 (S4.2. d)

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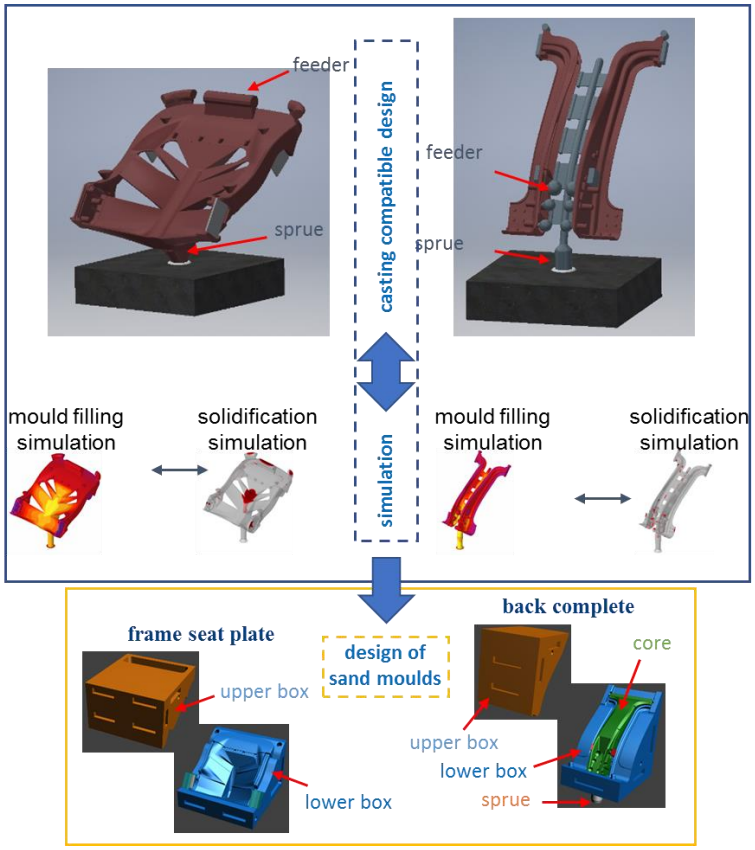
APPROACH

- Manufacturing of prototype parts, build-up of the improved seat

Manufacturing of prototype seat

Design works for low-pressure die-casting (LPDC) process:



LPDC: preparatory works and LPDC-process:

Designing and forging sheet metal parts for assembling back complete:

Assembly of entire seat

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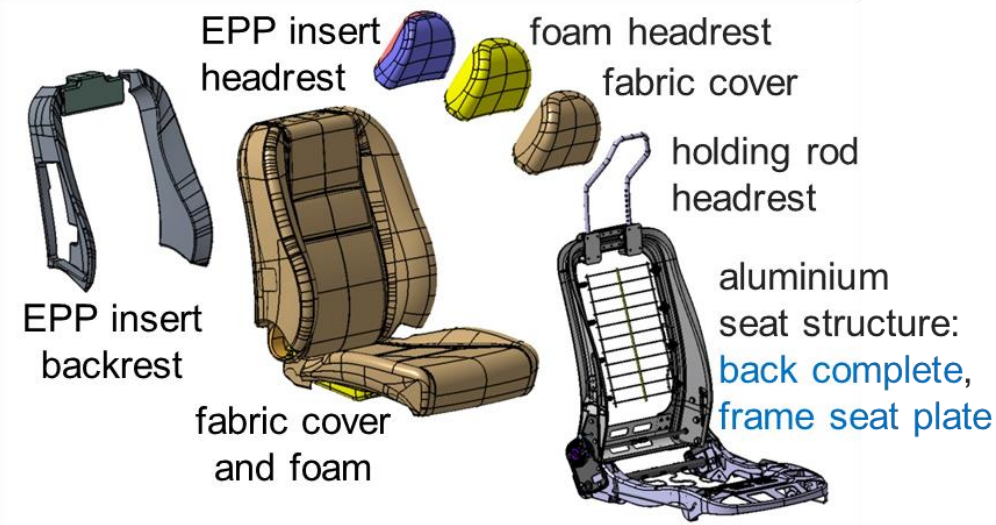
RESULTS

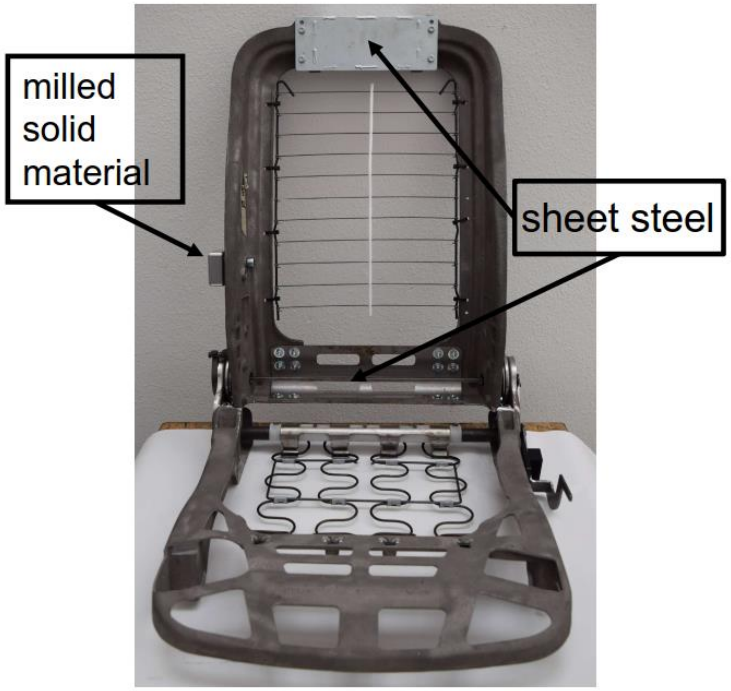
Lightweight structure design

- Summary of design phase: QUIET prototype seat structure with proposed expanded polypropylene (EPP) inserts:



Manufacturing of prototype seat

- Bare metal structure of prototype seat:



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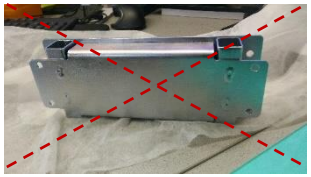
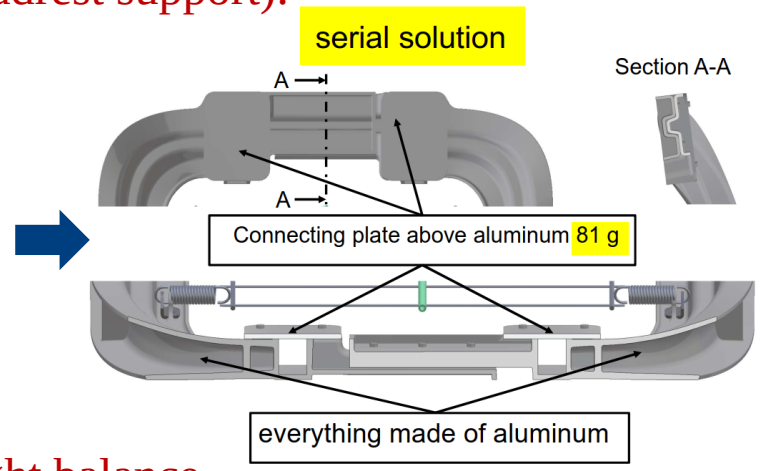
RESULTS

- Manufacturing of lightweight prototype parts with low-pressure die-casting (LPDC) process
- Designing and forging sheet metal parts, milling foams, finishing seat covers
- Assembly of QUIET prototype seat

- Manufactured prototype seat

- Design of backrest for serial production (headrest support):





Summary: weight balance

Seat structure	Total weight [kg]	Weight loss [%]
Original Honda FIT EV	21.4	-
Manufactured prototype	19.7	8.0
Serial, developed from prototype	17.8	16.8

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Get in touch with the QUIET consortium!

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