Optimization of the rear middle seat

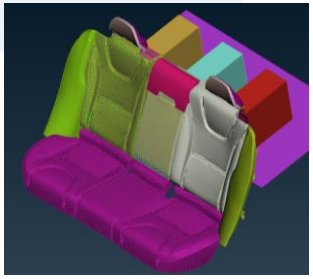
Problem description

- *Load case:* luggage load case (3 boxes, with defined size and weight, hit the rear seat under a prescribed deceleration)
- *Requirements:* maximum dynamic forward X displacement of the upper left corner equal or less than a defined value
- *Constraints:* weight less than that of the reference middle seat. Other constraints (manufacturing, ...) are not considered
- *Goal:* to produce a concept idea of the rear middle seat structure with the same or better performance and with a lower weight

Workflow

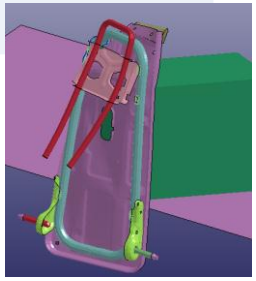
Reference model

- Complete rear seat subject to the luggage loadcase



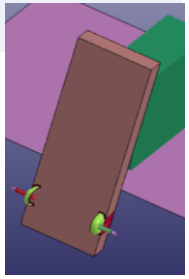
Simplified model

- Focus only on the structural components of the middle seat



Volume to optimize

- Definition of the volume where to find the optimized structure



Concept design

- Translation of the LS-TaSC solution, which satisfies the optimization problem, into a feasible and manufacturable design

Result

	Maximum forward X displacement	Weight (evaluated from LS-Dyna model)
Reference seat	158 mm	4.25 kg
Concept proposal	159 mm	3.75 kg
	0 %	*-11.8 %*

Conclusions

LS-Tasc has provided a solution which guarantees the same performance and which is 12% lighter than the reference middle seat. The LS-Tasc solution has also enabled us to better understand the crash event providing useful information on how to get a design simpler, lighter and with the same previous performance.

Antonio D'Elia, antonio.delia@escenda.com