

Topic 2: Automated Adjustment of Automotive Seating Structures

:To satisfy passenger safety requirements, automotive seats are required to meet a large number of structural design criteria. They demand dynamic front and rear pulse sled tests including crash test dummies, luggage impact, as well as other quasi-static structural analyses. All these load configurations typically require **unique seat positions**.

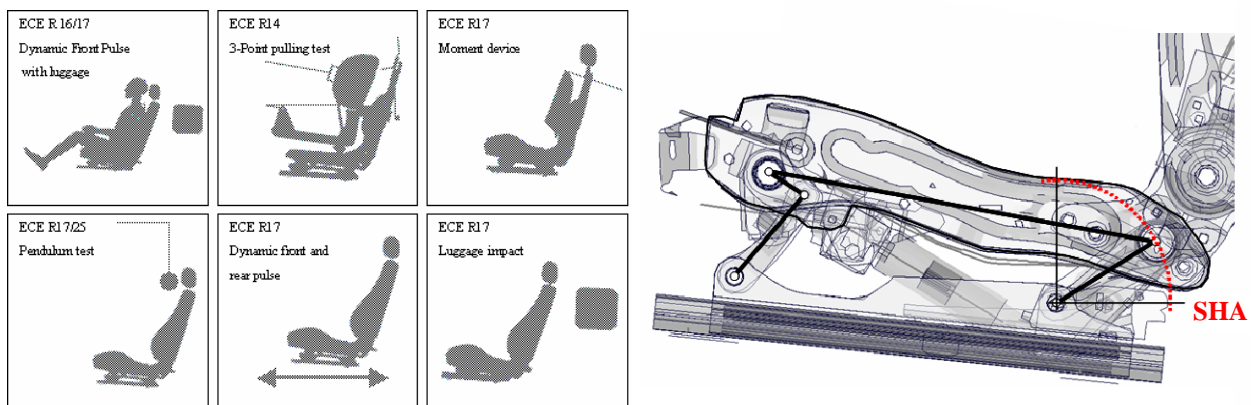


Figure 1: (a) Typical required legal design test

(b) Example of seat kinematics (here SHA)

Concepts of seat kinematics are classified by the number of relevant degrees of freedom the structure provides. These are typically the seat's longitudinal adjustment (SLA), height adjustment (SHA) tilting adjustment (STA) and the seat's backrest adjustment (SBA).

The **task of this software project** is to develop an interactive software tool to define the kinematics of seat concepts. It should consist of the following parts:

- GUI, (preferably Qt) for interactively defining the kinematic elements in 2D (beam, nodes, joint, boundary) and visualizing their transformation
- Class-specification, to implement the kinematic relationship between objects, and their transformation behavior
- Interface, for an output of transformation definition into an FE-Solver syntax (Abaqus / Pamcrash)

There exists a working process for positioning FE-Seats at P+Z Engineering in form of Excel-Sheets for specific seat concepts with an interface to Abaqus & Pamcrash FE-solvers. A development and test environment will be provided at P+Z Engineering.