Master Thesis Proposal:
Evaluation of sitting postures of car passengers –
with focus on slouched sitting postures

Background and aim
In general, evaluation of passenger car safety systems is done with crash test dummies and virtual tools of
humans, positioned in nominal sitting postures. However, occupants may have a wider range of sitting postures
than the single nominal sitting postures. Changing posture is part of the natural sitting, in order to achieve
comfort. Slouching, meaning pushing the pelvis forward, is one way of varying the sitting posture.

When slouching, the seat belt position on the body will change and thereby also the seat belt to body interaction
during a crash. This poses challenges with respect to protection in a crash. The strive is to help ensure that
protection is provided based on the comfort needs in a relevant range of sitting postures.

Therefore, there is a need to increase the knowledge on how passengers choose to sit in vehicles. More
specifically, the aim is to understand what parameters affect slouched sitting posture and how slouched sitting
posture varies over time. Also, the aim is to understand how slouching affect the belt fit.

Task description
Main tasks:
- Identify and evaluate parameters influencing the initial sitting posture with focus on slouching
- Evaluate how slouching varies over time
- Propose concepts of how to limit the extent of slouching sitting posture (a theoretical discussion in the
  report, no physical prototypes will be developed)

The focus will be on adult passengers. The methods includes user studies in vehicles. Also, methods includes
sitting posture evaluations with virtual tools. The expected outcome of the master thesis is an increased
knowledge of what parameters are affecting slouching, how slouching affect belt fit and proposals of how to
limit the amount of slouching.

The thesis is suitable for two master students with knowledge and interest in ergonomics, data collection, data
analysis and user studies. The work will be carried out at Volvo Cars Göteborg during spring 2020. Driver
license B is required. Applications are handled individually. At least one of the students need to be fluent in
Swedish. Skills in Catia is needed for evaluation with virtual test tools.

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