Göteborg 2020-11-02

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 seatbelt 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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