

UNECE GRSP Ad-hoc Group Data on Equitable Occupant Protection (DEOP)

Minutes of the 1st meeting held on January 26, 2022. Digital meeting with 42 participants.

Adoption of the agenda

The agenda was approved.

Welcome and introduction

Pernilla Bremer of the Swedish Transportation Agency opened the meeting and welcomed all participants.

Presentations

1. Anders Kullgren, Head of research at Folksam, Professor Chalmers University of Technology, presented “Developments in car crash safety since the 1980s”. Risk for injuries of various types in crashes occurring 2000-2019 is studied, adjustments are made for accident year and car mass. There is a clear risk reduction in cars launched 2010–2019 compared to 1980–1989. The analysis is separated for sex and age groups, but not height or size (stature). The study shows that the trend of risk reduction for newer cars is equal for male and female occupants. The risk for any injury as well as permanent medical impairment remains significantly higher for females compared to males. Young females were found to be at higher risk for cervical spine injuries compared with both males and older females.

Questions asked:

What about different crash types? All crashes together, the data do not allow a split.

What about crash severity? Not an issue as the method is paired comparison.

What about size further to sex and age? Size is not a variable of the data.

What about neck injury and size? Not addressed in the study as size is not regarded.

2. Anna Carlsson, PhD at Chalmers Industriteknik, presented “Data on equitable occupant protection”. The presentation is a summary of an extensive literature review, which was presented at GRSP in 2019, and now updated with data from studies until 2021. The review shows generally that the fatality rate has not changed for female occupants over time, but it has decreased for male occupants. The risk is generally higher for female occupants for all injury severities and the greatest difference between female and male fatality risks is in the age of 18-35. There is a shift from fatalities to non-fatal injuries and disability for both females and males. Cervical spine injuries, known as whiplash injuries, are dominating the amount of permanent medical impairment.

Questions asked:

No questions. It was mentioned that we should be careful when looking at old data.

3. Isabella Ostermaier, Project Manager Accident Research Vehicle Safety at ADAC, presented “Restraint Systems - for all occupants?”. This is a study of severe frontal impact accidents. The accident data do not indicate an increased risk of injury for women or men, but different injury patterns can be identified. Older car occupants have a higher risk of injury than younger ones. Injuries to the head, abdomen and

pelvis are more common for elderly. The second part of the presented study is a series of frontal crash tests with a variation of test dummies (THOR 50th, THOR 5th, THOR Obese, and Elderly ATD dummy). The study compared conventional and adaptive restraint systems and showed that adaptive systems could reduce the load on occupants in the tested frontal crashes. The test results indicated that elderly female and the small female dummy predicted slightly higher injury risk than the 50th male dummy. Care should be taken on the population group of taller and obese persons. This group needs special restraint systems and are not in the focus of actual developments, as the test results have shown.

Questions asked:

What about adaptive airbags or other safety features in the accident data? This has not been part of the accident data.

What about size further to sex and age? Size is not part of the accident data.

This is a study of severe crashes – what about the less severe ones that still have a big impact on everyday life? The focus has been crashes where airbags have been deployed.

Further discussion

Suggestions on further work were discussed briefly.

1. In addition to fatal and near-fatal injuries, injuries with long-term consequences should be studied; may occur also in lower severity crashes.
2. We should explore and understand the indicated difference of injury risks between females and males at younger and older ages.
3. We should revisit whiplash injuries with new data. However, general older data can be much useful, and for this reason it was proposed to review results from a 10-year-old study, ADSEAT, which included computational female model development. The Chalmers Tech University indicated that they could give a presentation on this.
4. We need to understand if we have the needed range of test devices (ATDs) available, though the solution to equitable occupant protection might not be to use more types of test dummies when evaluating vehicle crash safety performance.
5. It will be crucial to look at standards connected to regulations, as a biased input to a regulation in this respect might cause a biased output.
6. The NHTSA indicated that they may give a presentation in the next meeting. Mentioned potential themes were human body models scaled to different sizes, or a general update on NHTSA's research within the field of the Ad-hoc Group.

Next meeting

In March 2022; date TBD.