Adaptive seat to reduce neck injuries for female and male occupants

Gender as a resource of new innovation

EvaRID – a crash test dummy model of an average female

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More than 1.2 million fatalities (UN/WHO)

- Killed
  - 1/10
  - AU 12/1, SE 7/1

- Serious Injuries
  - 1/10
  - AU 120/1, SE 30/1

- Minor Injuries
  - 1/100
  - AU 120/1, SE 30/1

Source: Road Crash Costs in Australia 1999, Report 102, Bureau of Transport Economics (Insurance data) and Road Traffic Injuries in Sweden 1999, National Statistical Data (police reports)
Whiplash Injuries

- Most common in rear impacts
- Different level of protection in different car model and seat designs

Based on Krafft (1998)
Whiplash injuries

- App. **70% of the costs** of all injuries leading to permanent medical impairment for the insurance companies
- Europe: **300 000** injuries annually, **15 000** result in long term suffering
- **Costs: > 4 billion €** in Europe (estimated on insurance costs)
Whiplash – Risk of injuries
Development of the crash test dummy, BioRId

1996-1999
Whiplash protection concepts

Risk reduction in permanent medical impairment, 45% for females and 57% for males. (Kullgren & Krafft, IRCOBI 2010)
ADSEAT the project

Aims
- Provide guidance in how to reduce the risk of whiplash injuries by development of seat evaluation tools.

- Budget: 3.45 million Euros, 2.5 million Euros from the European Commission, FP7.
- 12 partner
- Duration: 42 months, 2009-2013
ADSEAT Partners
ADSEAT

Average female
Stature \{ to be defined
Weight \} in ADSEAT

BioRID
50\textsuperscript{th} percentile male
Stature: \sim1.77\,m
Weight: 77.7\,kg

Stature [mm]
EvaRiD
Platform for implementing research findings ADSEAT

WP1 Real World Data
- Size selection

WP2 Biological Tests
- Anthropometry
- Response corridors

WP4 Assessment Criteria & thresholds
- Threshold values

WP5 Seat design
- Use model in evaluation studies
Volunteer test, rear impacts

Number of volunteers

Severy et al., 1955
Mertz och Patrick, 1967 and 1971
McCormick et al., 1993 and 1995
Geigl et al., 1994
Scott et al., 1993
Matsushita et al., 1994
Szabo et al., 1994
Siegmund et al., 1997
Kaneoka et al., 1999
Hell et al., 1999
Linder et al., 1999
Davidsson, 1999
Watanabe et al., 2000

Male
Female
EvaRID simulation volunteer tests
BioRID & EvaRID
Thank you for your attention

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