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VIRTUAL
Open Access Virtual Testing Protocols for Enhanced Road User Safety

Event: Urban Mobility Days 2020, Session: Innovation and city design for urban road safety
Location: On-line
Date: 1/10/2020
Traffic safety

- 1.35 million
- 1/10/100

Source: VTI/Hejdlösa bilder
Vehicle occupants PMI 10%+
(Source: Swedish Strada 2015)
Whiplash – Injury risk

The relative whiplash injury risk for females

- Kihlberg (1989)
- O’Neill et al. (1972)
- Oternalski et al. (1982)
- Morris & Thomas (1993)
- Maeg et al. (1999)
- Dolins (1997)
- Richter et al. (1998)
- Chapline et al. (2000)
- Kraft et al. (2000)
- Jakobsen et al. (2003)
- Stonvik et al. (2008)

Males (normalized to 1)

Source: Carlsson 2012
Seat performance, risk of PMI (whiplash)
Kullgren et al. (IRCObI 2013)

Urban Mobility Days 2020
Seat performance, risk of PMI (whiplash)

Kullgren et al. (2013) Development of Whiplash Associated Disorders for Male and Female Car Occupants in Cars Launched Since the 80s in Different Impact Directions, IRCOBI Conference.
Current safety testing, occupant diversity

Small occupant  
5th percentile  
female

Average occupant  
50th percentile  
female

Average occupant  
50th percentile  
male

Large occupant  
95th percentile  
male

Weight: 49 kg  
Height: 1.51 m

Weight: 62 kg  
Height: 1.66 m

Weight: 77.7 kg  
Height: 1.77 m

Weight: 101.3 kg  
Height: 1.87 m

Source of pictures: www.humaneticsatd.com, crash-test-dummies/frontal impact/HIII

Urban Mobility Days 2020
VIRTUAL: Open Access Virtual Testing Protocols for Enhanced Road User Safety

- Duration: 48 Months, started 1 June 2018
- Funding: € 6.99 Million
- Partners: 15
- Countries: 9
- www.projectvirtual.eu

Aims:
Reduce loss of life and health in road crashes for all road users.
Share and foster knowledge: Open Source (OS).
Identify protective innovations: Virtual Testing, OS-HBM 50F and 50M.

Urban Mobility Days 2020
Vision: By 2030, injury protection performances of new cars will be assessed for both women and men!

Benefits:
• Inclusive crash safety assessment
• Best performing innovations identified
• Improved safety for everyone

Urban Mobility Days 2020
Urban Mobility Days 2020
International collaboration

Urban Mobility Days 2020
VIVA+ models, 50F and 50M

- Scalable model architecture
- Basis for addressing diversity such as age, height and weight
- Released under the LGPL Open Source license, LS-Dyna

OpenVT Gitlab platform

This is the OpenVT platform, the platform for open access virtual testing protocols for enhanced road users safety.

Urban Mobility Days 2020
VRU Assessment

Passive Safety

Active Safety

Standardized virtual testing protocol

Open Source Tools

Urban Mobility Days 2020
In-Cash Simulation

Validated Models

Vehicle Model

OS-HBMs (VIVA+)

In-Crash Simulation

Post processing of HBM Results

Injury probability

p(injury)

p(fracture)

Urban Mobility Days 2020
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