



Technische
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Biomechanics of vehicle pedestrian impacts: developments in injury prevention through accident data analysis, computational modelling and staged tests

Lecture of

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Protecting pedestrians in the event of a vehicle collision is a difficult engineering challenge, and pedestrian injury prevention has traditionally received far less attention than vehicle occupant protection. The challenge for pedestrian protection is largely twofold: pedestrians are vulnerable road users due to the lack of protection in comparison to vehicle occupants, and the motivation for vehicle manufacturers to improve vehicle front-ends for the protection of pedestrians is less than for vehicle occupants. The dominant factors of vehicle design for pedestrian injury are shape and stiffness, and optimising these is made more difficult by the wide range of vehicle impact speeds and collision configurations. Nonetheless, significant improvements have been achieved, and the combination of field accident studies, staged tests with crash dummies and cadavers and computational modelling have led to a good generalised understanding of the relationship between pedestrian injury and vehicle design. Today, mandated and consumer-based impactor tests largely drive the improvement of vehicle front-end design for pedestrian protection. However, despite the improvements brought by these tests and the introduction of active safety measures, significant challenges remain in bringing further improvements. This talk will summarise developments in pedestrian safety and address the ongoing challenges. Particular challenges relate to the representativeness of the subsystem impactor tests, elimination of ground contact injuries and management of impact energy for the broad range of pedestrian vehicle interactions.