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Side Impact Protection



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Improved Concepts for Side Impact Protection

Traffic Accidents and Side Crashes

General Characteristics of Side Crashes

Typical Injuries in Side Crashes

Protection Strategy

Protection Devices



Examples







Side Impact: deformation or impact direction is directed against the side of the car 3

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Accidentology (German Federal Statistical Office)

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Traffic accidents seized by the police in	2003: 2,259,567	
Of it with injured people:	354,534	
of it with material damage:	1,905,033	
Deaths in frontal crash (Europe):	11,760	lateral crash: 10,500

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Accidentology, (Most Common Side Impact Scenarios) Technical perfection, automotive passion.

Side Impact: the side of one of the colliding partners is deformed



Side Impact, MBS simulation (FMVSS 214)



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Injuries

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Sequence of contact between structure and occupant (common scenario) 1st contact: door trim to thorax and or pelvis 2nd contact: door trim to legs 3rd contact: head itself hits top roll region of door, or head hits B (C pillar), or goes through window and hits front of striking vehicle

Injuries

Head, very frequent and severest injuries (skull fracture) due to direct contact
Neck, serious injuries are not frequent
Thorax, consequences of rib fractures are a common cause of severest injuries

Abdomen, injuries of organs due to localised loading (liver, splenic laceration)

Pelvis, very commonly injured, mostly fractured (pubic ring, iliac wing fractures) **Lower limbs**, lateral bending of femur is frequently observed

Protection Strategy



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Protection Devices, Crash Pads

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Wood Fiber Crash Pad





Injection Molded Crash Cones

MBS simulation determines properties of parts in an early development stage





Protection Devices, Head Airbag in Door Trim

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Side Impact Head Airbag: lid opens outboard to window





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Protection Devices, Ripping Behaviour of Foils

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