

Safe System Approach

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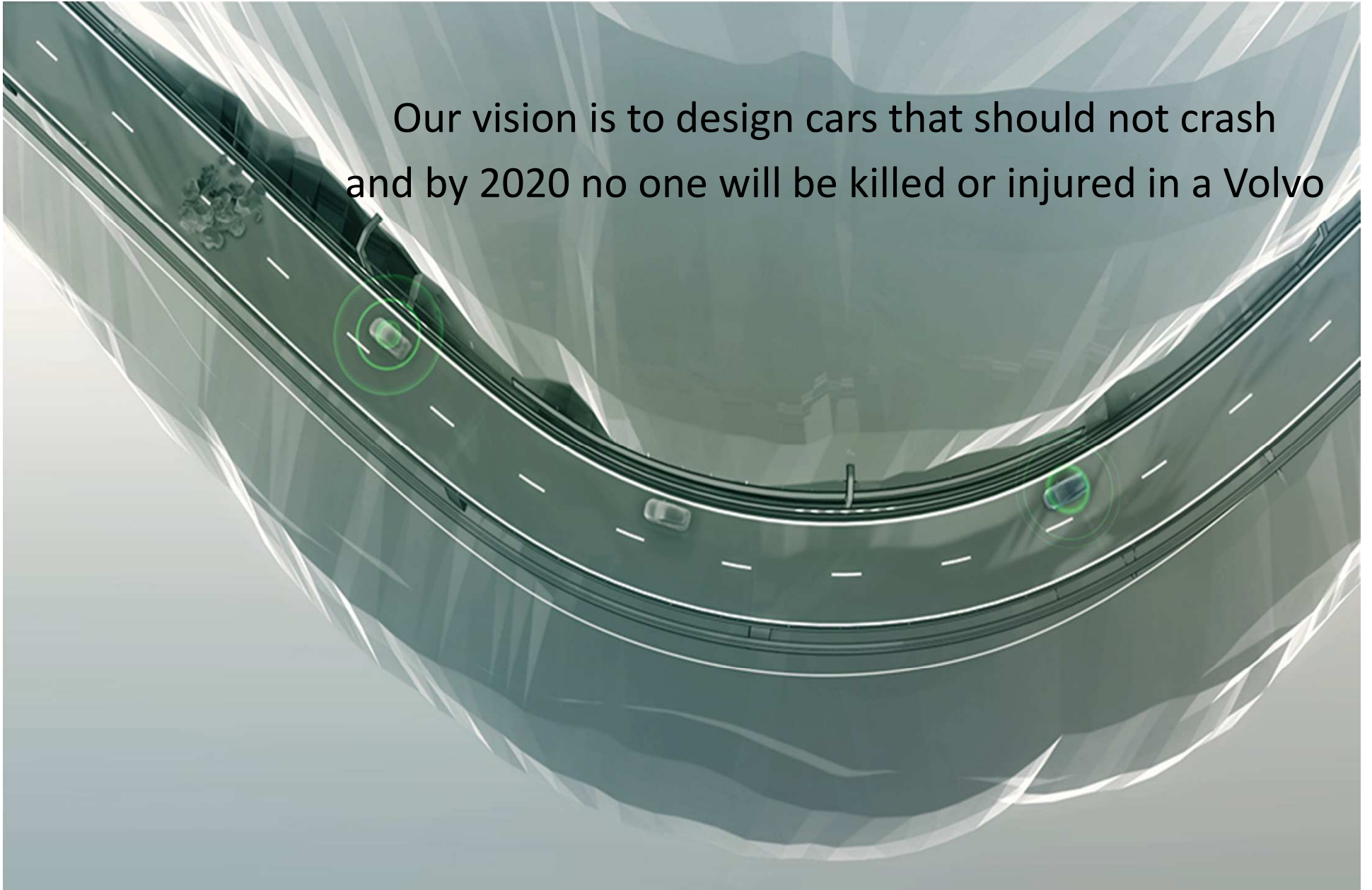
3. CONSIDERS that the level of road fatalities and injuries remain unacceptably high and STRESSES the importance of adapting motorways, roads, streets and vehicles to human capacity; thereby **AIMING towards the long- term "zero-vision"** for European road transport safety;

(9) By 2050, move close to zero fatalities in road transport. In line with this goal, the EU aims at halving road casualties by 2020. Make sure that the EU is a world leader in safety and security of transport in all modes of transport.

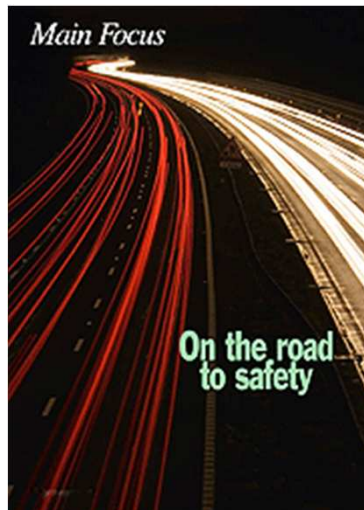
WHITE PAPER

Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system

Our vision is to design cars that should not crash
and by 2020 no one will be killed or injured in a Volvo



A management system standard



International
Organization for
Standardization

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Road traffic safety (RTS) management systems – Requirements with guidance for use

Élément introductif — Élément principal — Partie n: Titre de la partie

Warning

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Crash injury is largely predictable and largely preventable. It is a problem amenable to rational analysis and remedy.

- Road safety policy must be based on a sound analysis and interpretation of data, rather than on anecdote.
- Since human error in complex traffic systems cannot be eliminated entirely, environmental solutions (including the design of roads and of vehicles) must help in making road traffic systems safer.
- The vulnerability of the human body should be a limiting design factor for traffic systems, i.e. for vehicle and road design, and for setting speed limits.

From the WHO World report on road traffic injury prevention 2004 on the fundamentals

Common driving errors and
common pedestrian behavior
should not lead to death and
serious injury –the traffic system
should help users to cope with
increasingly demanding conditions

*From the WHO World report on road traffic
injury prevention 2004 on the fundamentals*

9. CONSIDERS that infrastructure, vehicles and road users should be seen as a system in which human error and inappropriate behavior should always be taken into account. Infrastructure and vehicles should be designed as to prevent and limit consequences of such failures;

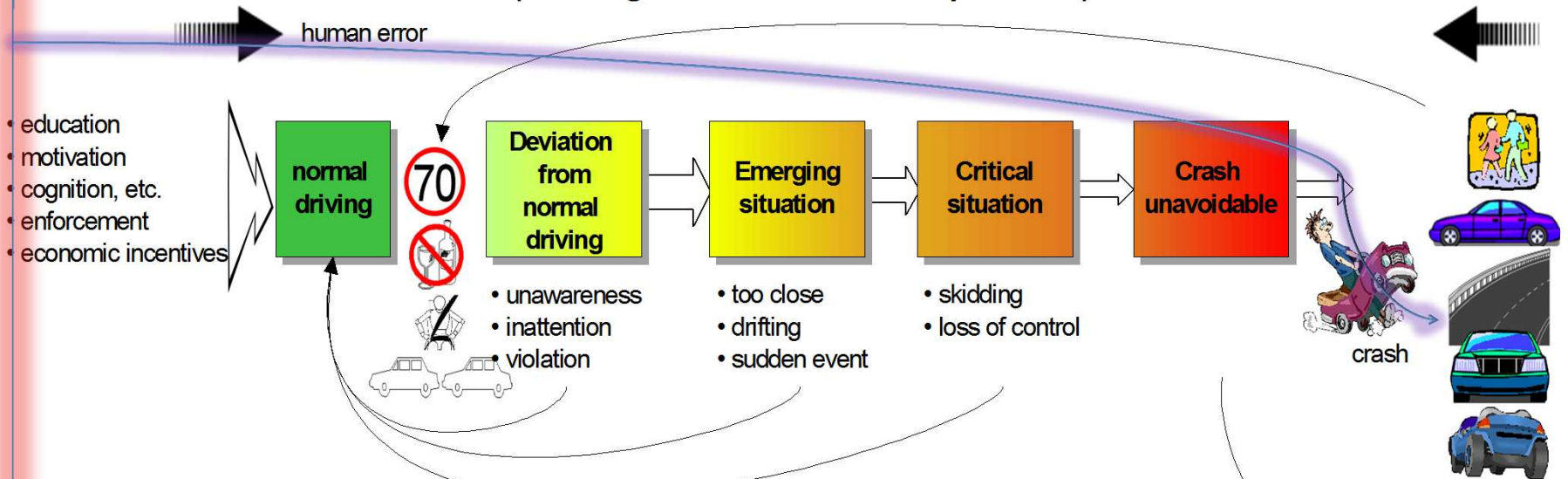
15. ENCOURAGES a strong cooperation between the bodies responsible for the infrastructure in the Member States and the vehicle industry in order to support the deployment of promising in-vehicle safety systems that can contribute to save lives on the European road-network. New technical solutions of which the effect is proven can contribute to make it possible to deal with problems like speeding and impaired driving (such as driving under the influence of alcohol, drugs and fatigue);

In essence two imperatives in one basic task

Build a chain of barriers that can
accommodate the errors not to
exceed human tolerance

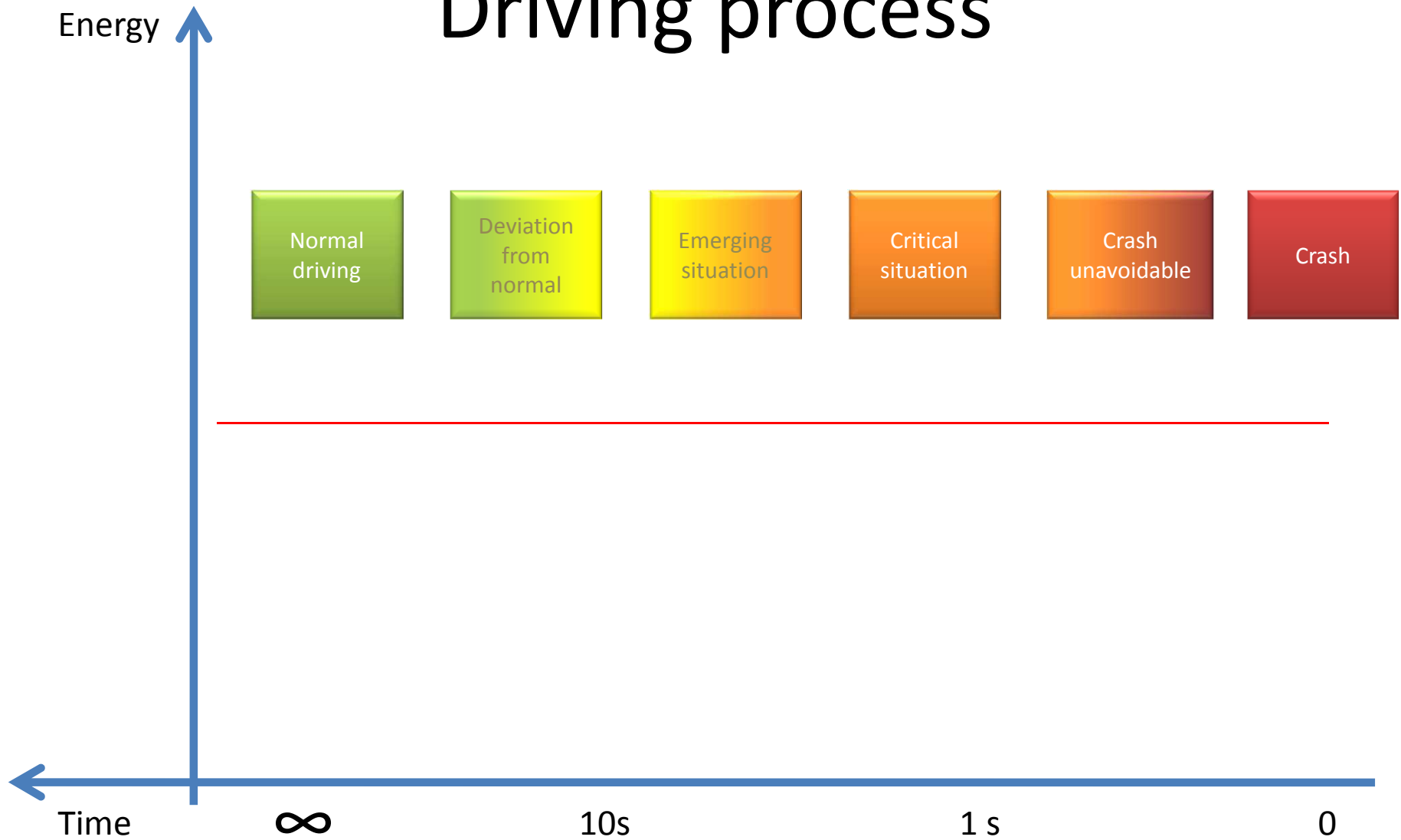
The crash sequence: (matching human error and crash protection)

what we
might hit:



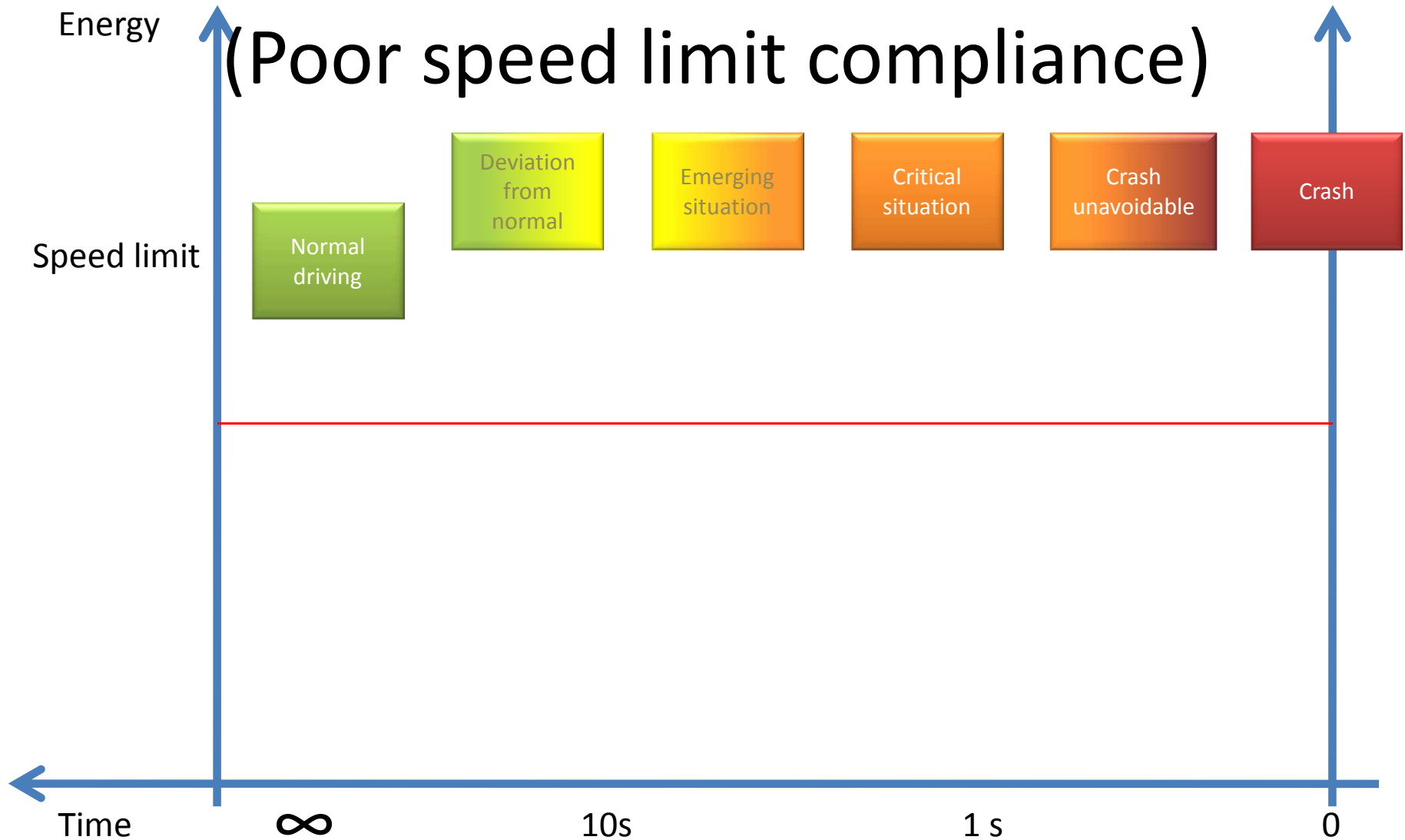
	• access to road transport system	• comfort • economy • social conformity	• warning system • supporting system	• intervention in driving	• immediate correction	• preparation for crash	crash protection
Vehicle		promote normal driving	(ISA, SBR, alcohol interlock)	(AICC, LDW)	(ESC, LDA, AICC2)	(pre-safe, emergency braking)	(seat belts, airbag, whiplash protection, pedestrian protection)
Infrastructure		promote normal driving	(speed warning, tactile warning, humps)	tactile edge lines	high friction surface		barrier design, roundabouts
Others		promote normal driving	• enforcement • insurance • contracts				• emergency service

Driving process

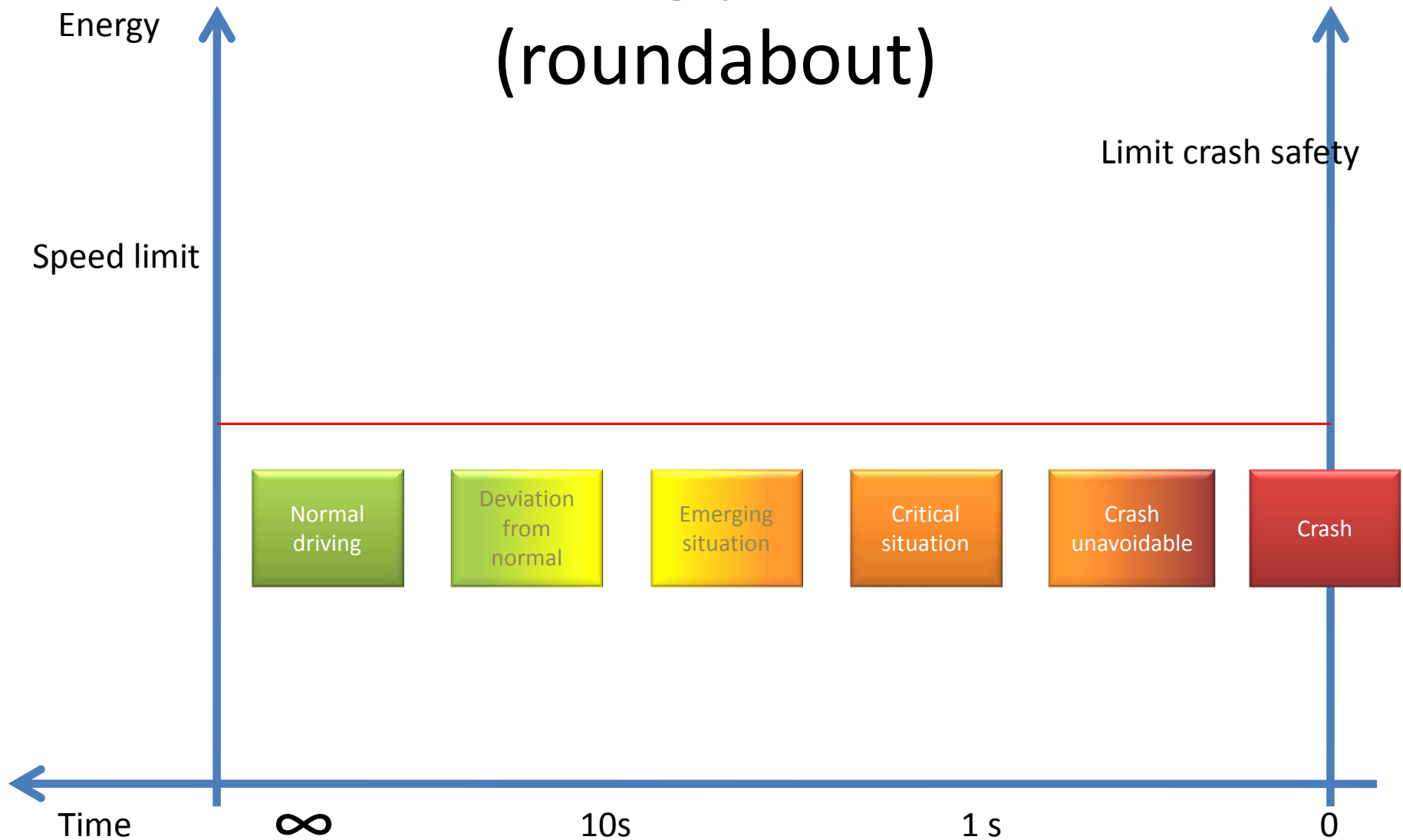


Driving process

(Poor speed limit compliance)

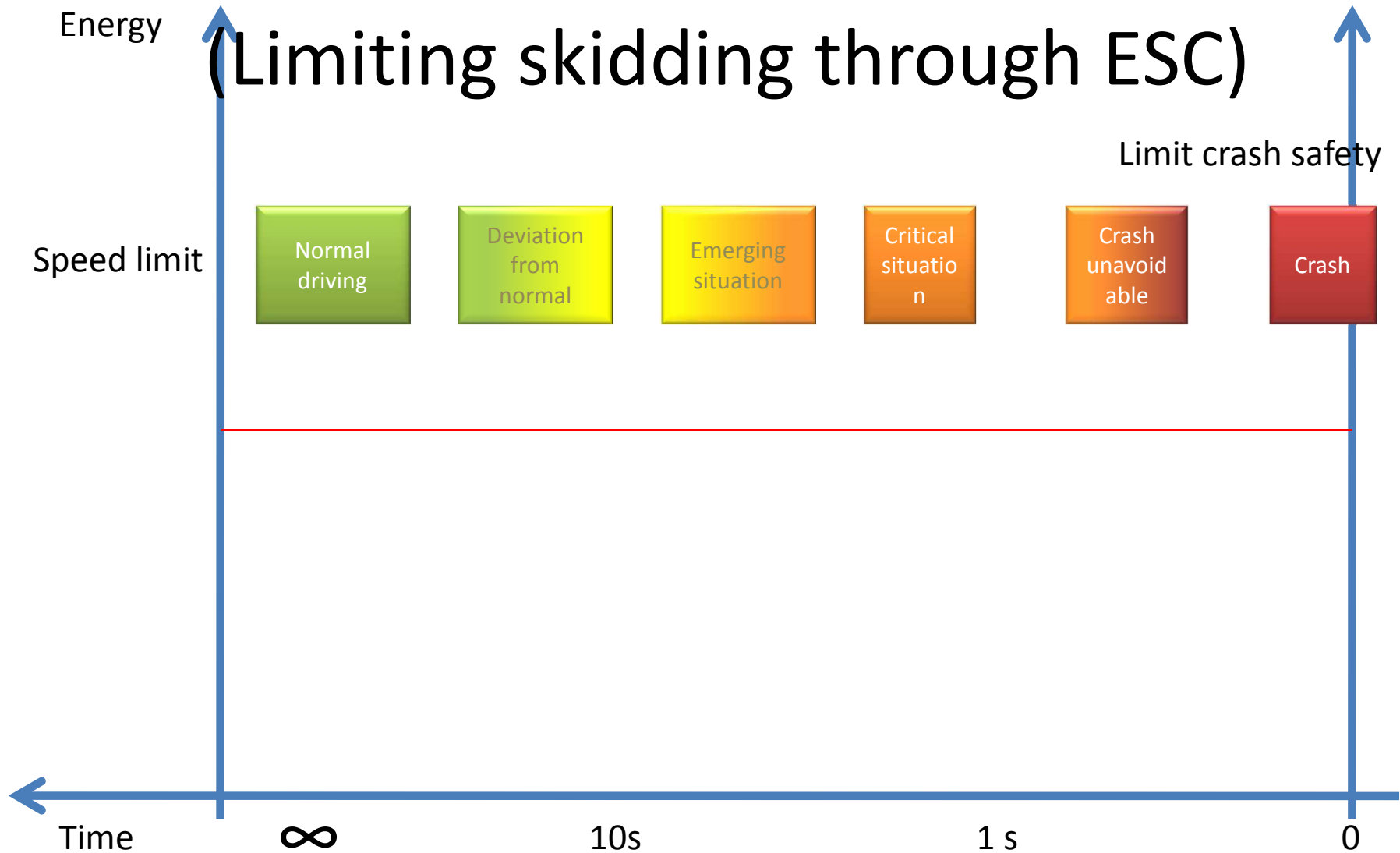


Driving process (roundabout)

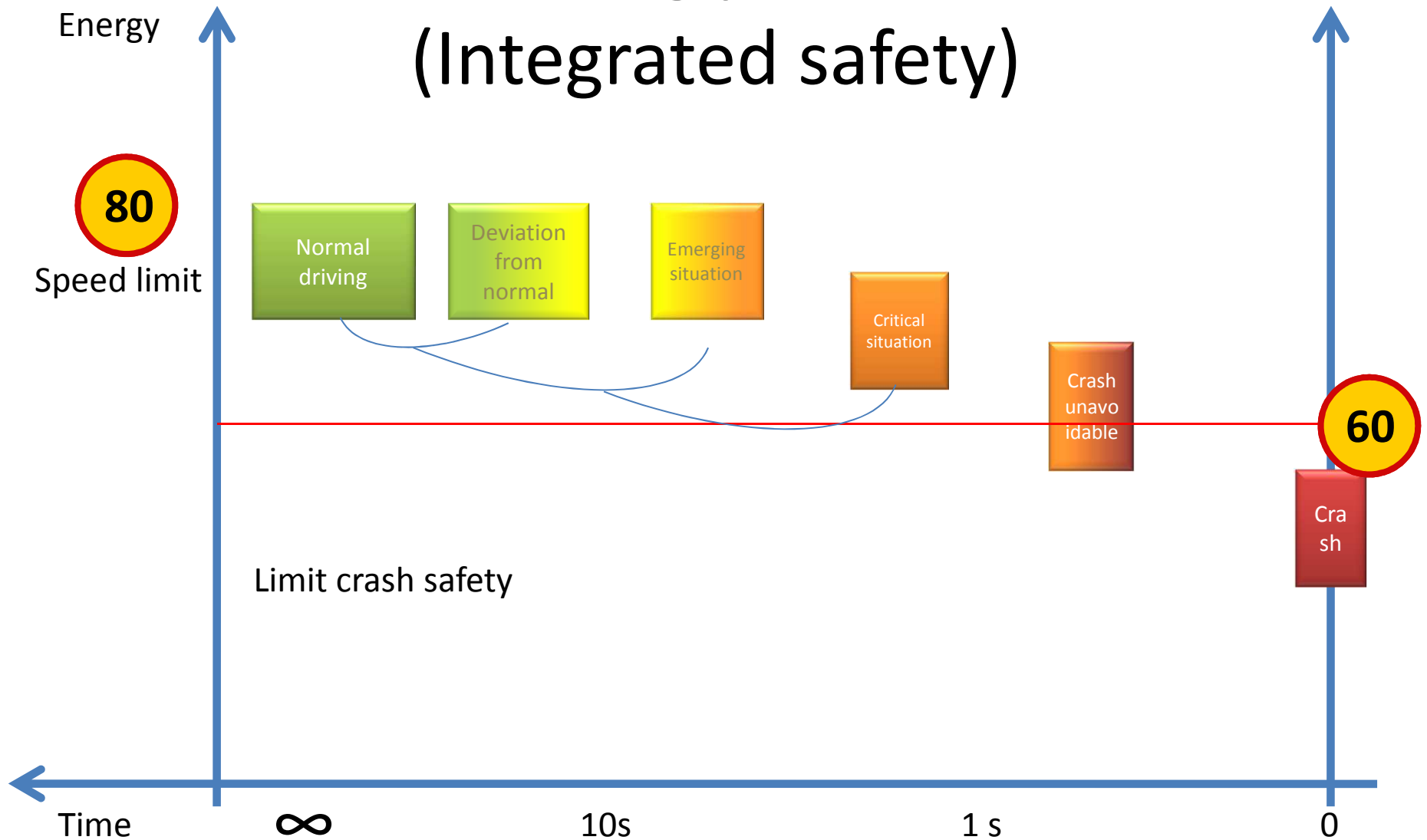


Driving process

(Limiting skidding through ESC)



Driving process (Integrated safety)



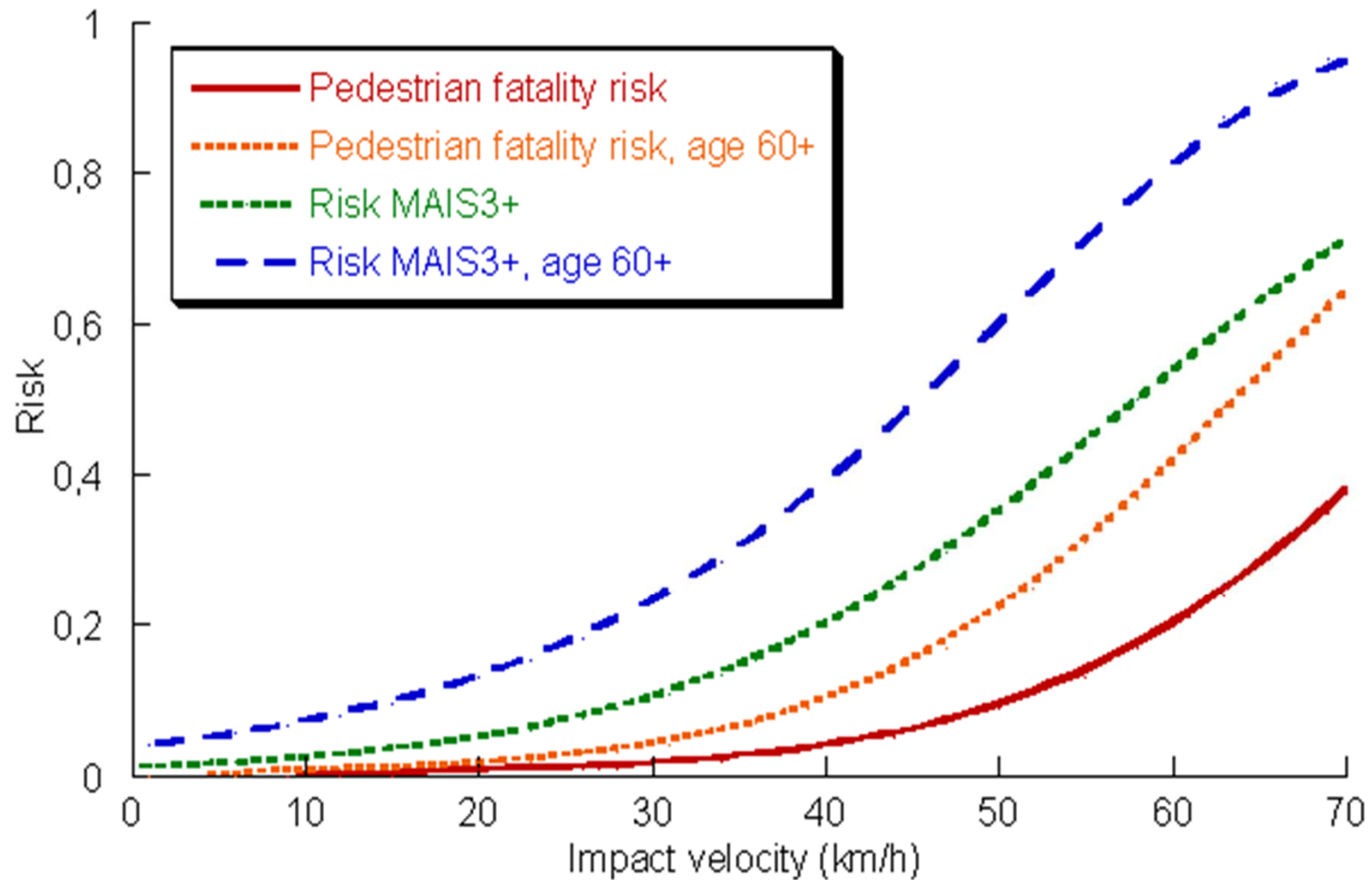
Safety as a function of rules, road design, driver behaviour, car design and advanced technology

More drivers give way to pedestrians at lower speeds

Social interaction is better at low speeds

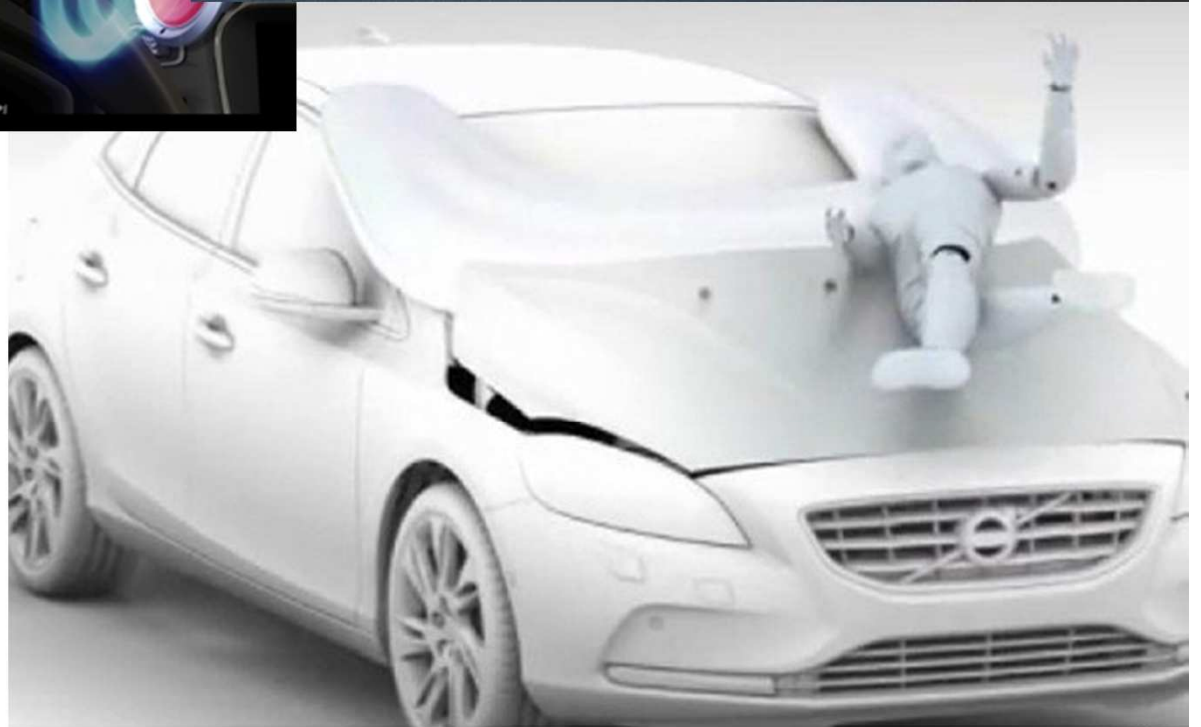
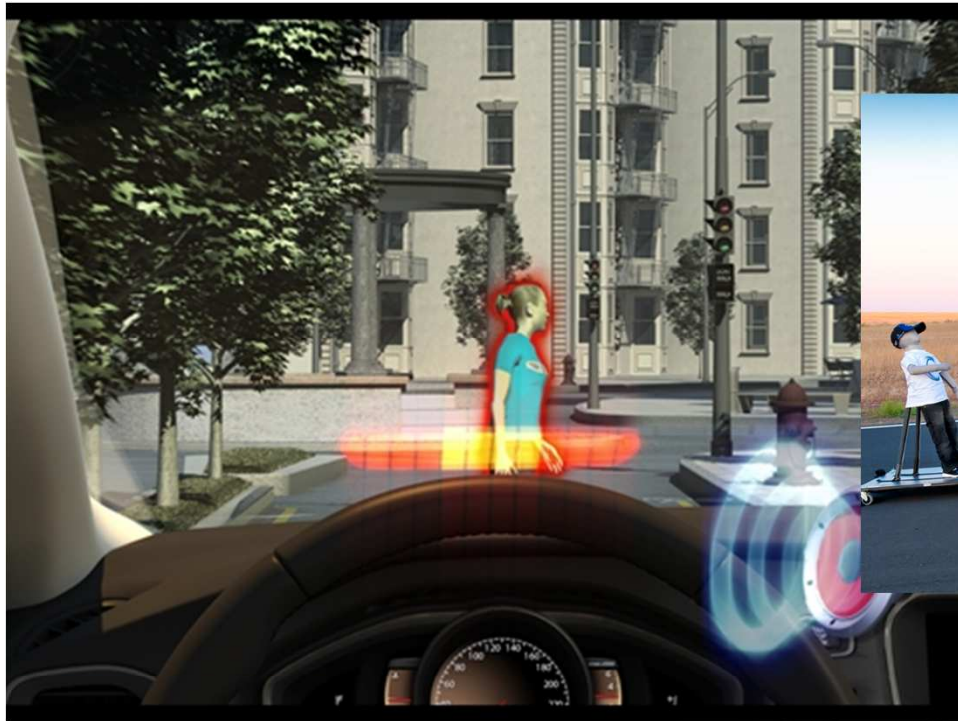
Injury risk and severity is strongly related to speed at impact

The risk of injury MAIS 3+, and fatality, related to impact velocity, for different age groups. From Stigson and Kullgren 2010.





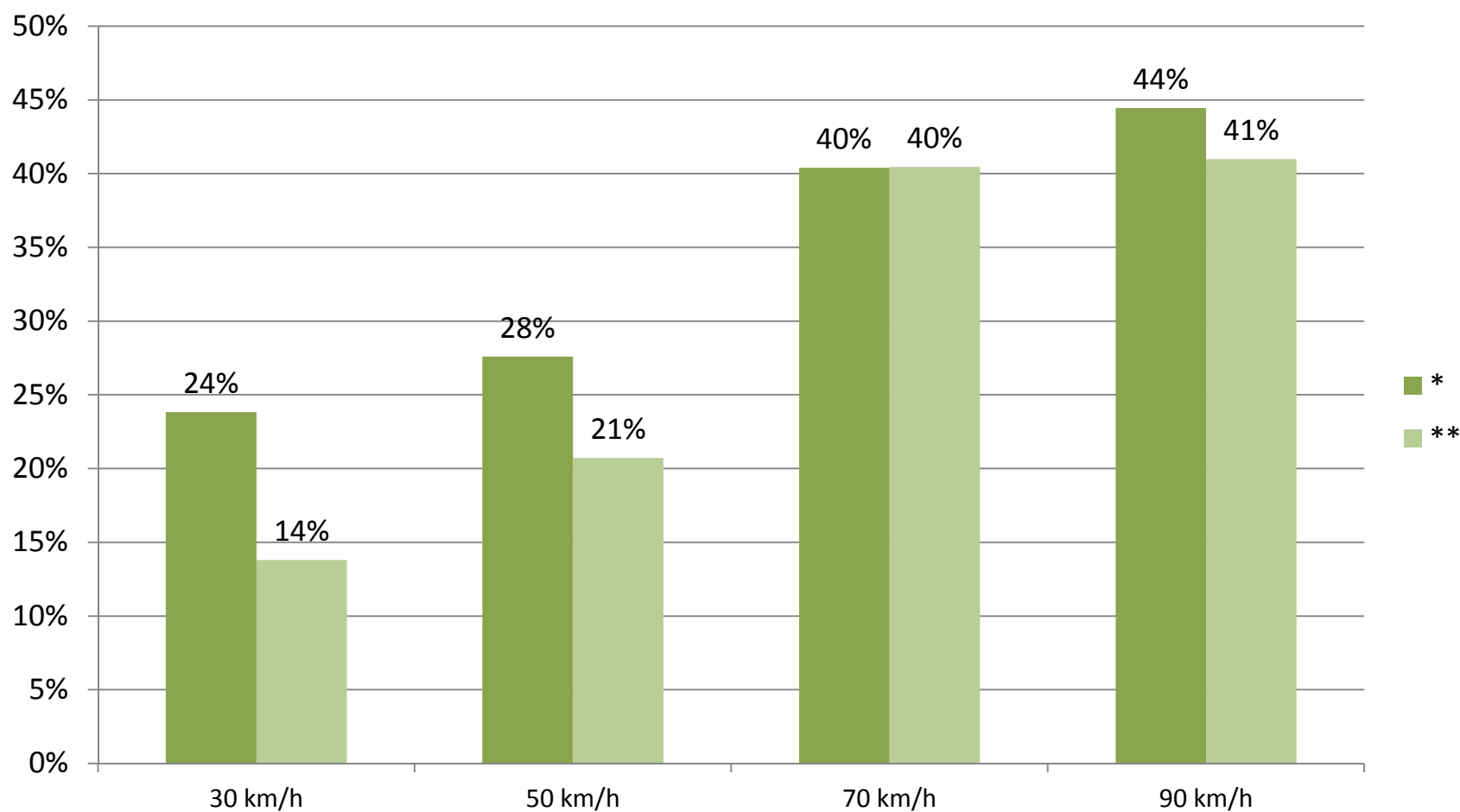




Volvo

Comparison of mrsc in one and two star cars in different speed limits

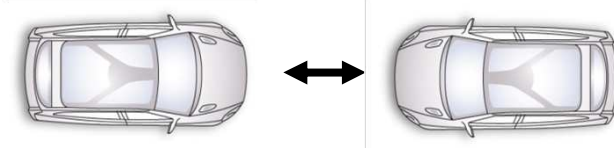
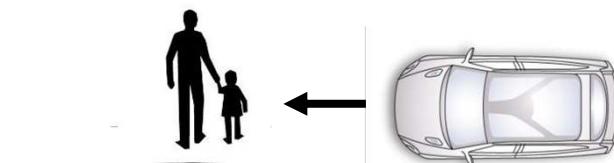
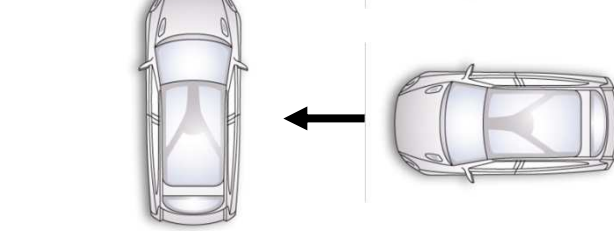

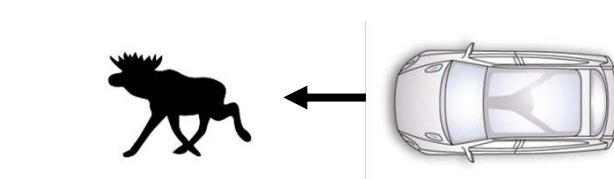
MRSC 5 %+, n=542



Shared responsibility

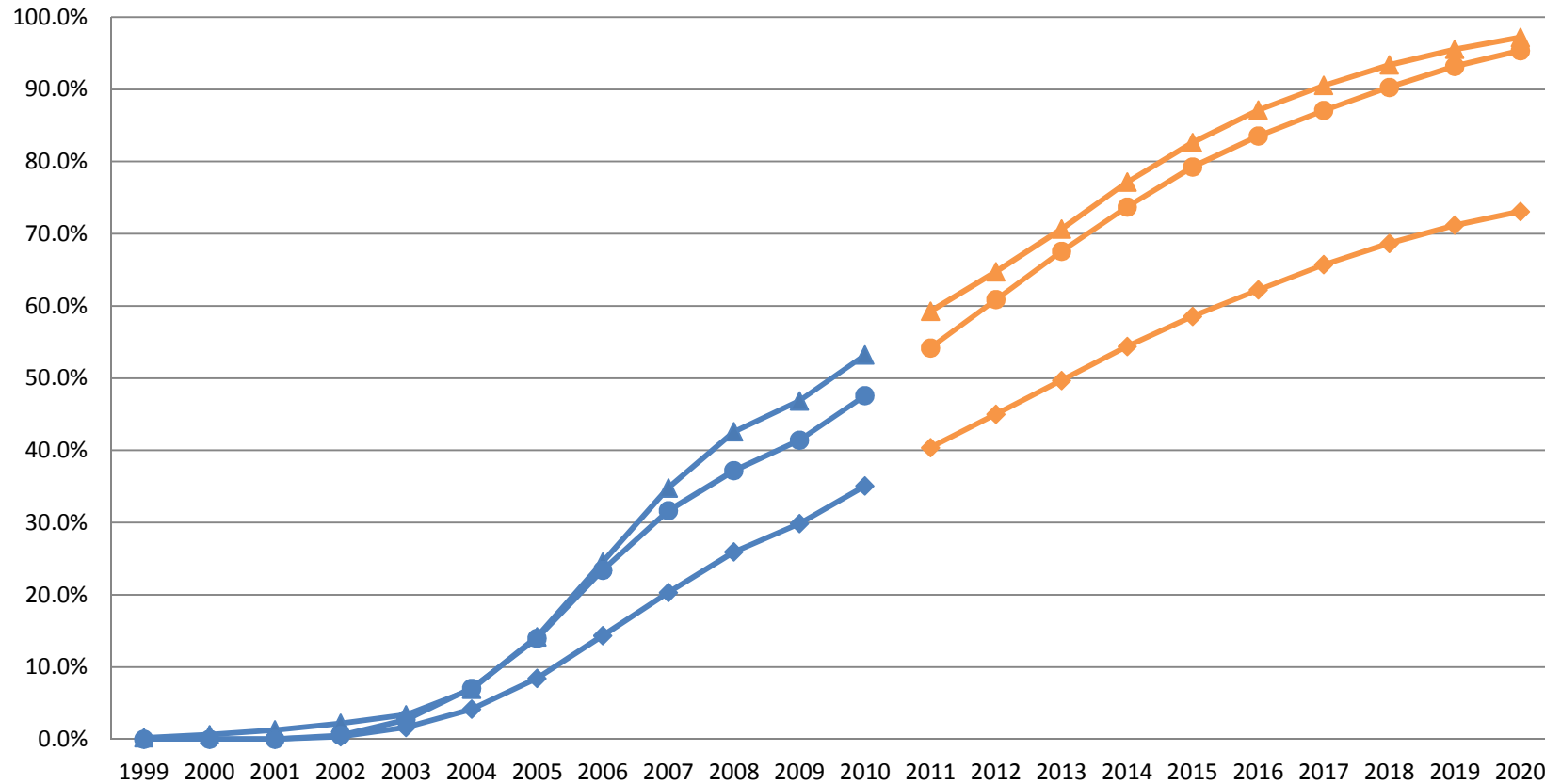
Passive

Active

80		Head-on	60 + 20
40		Pedestrians	10 + 30
70		Side	55 + 15
△ 40		Rear-end	△ 20 + △ 20
110		Large animals	80 + 30

Safe cars

Proportion of traffic flow with certain safety systems



SUMMARY

- Traffic safety is an integrated part of a sustainable transport system, and must react to the changes
- The expectations from society, industry and consumers is a safe system in the (quite near) future
- Integrated safety, in a system's perspective, is the key to elimination of health losses, and biomechanics will remain the limiting factor!

SUMMARY

- It is more probably more important to define and regulate the pre-conditions of the system than to divide the responsibilities post impact
- It is more important to define what is normal driving on a minimum requirement level than to regulate in every situation what the driver must do
- In an ideal world, regulations support integrated safety and make it work.

SUMMARY

- Error and violation must be handled separately throughout the whole process of regulation
- Norms and rules must also be treated as two separate issues – only in the perfect world they match

Thank you for the attention