

VISION ZERO

ACADEMY

STRIVING FOR EXCELLENCE IN TRANSPORT SAFETY



Model for Safe Traffic

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Safety Culture

Pathological
Up to everyone to
protect themselves
the best they can

Reactive
Solve safety
problems as the
come along

Calculating
Balancing safety
and mobility

Proactive
Safety sets the
condition for
productivity
and/or mobility

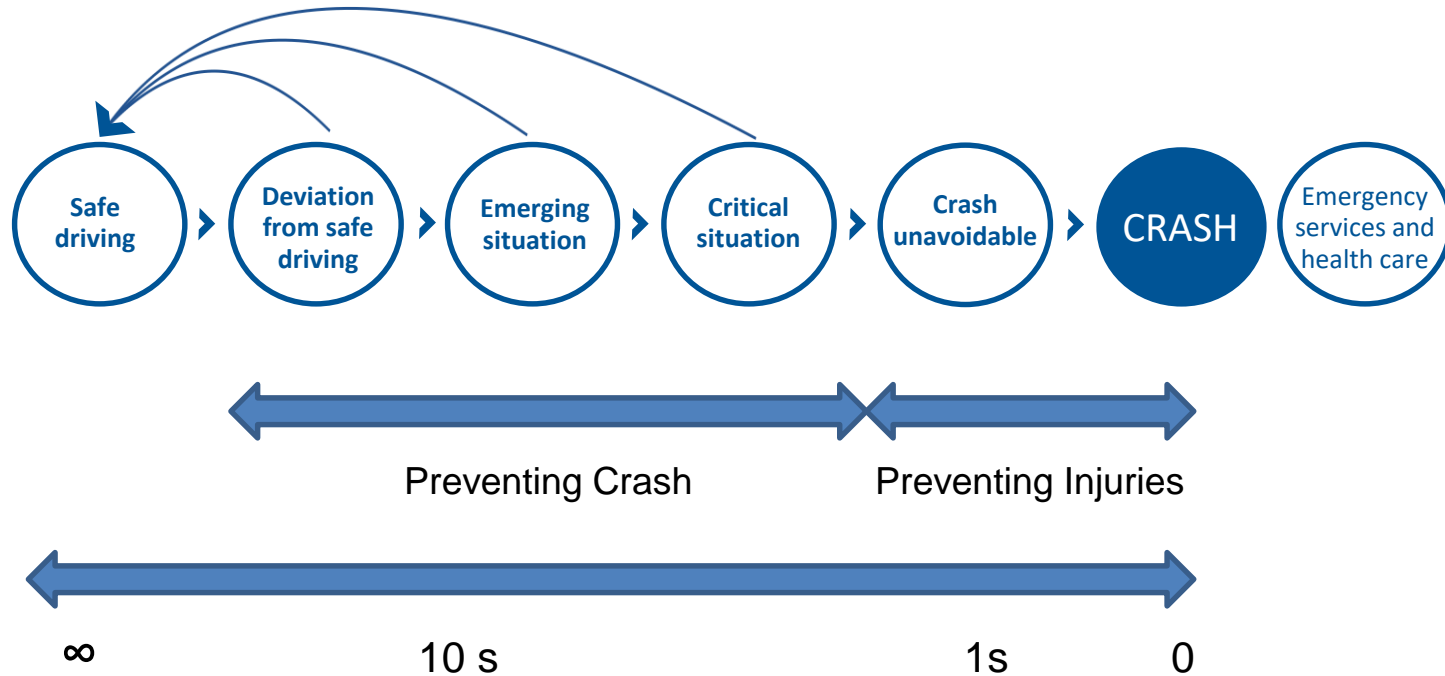
Maintenance
Maintain a high
safety level



Vision Zero

- **Humans have a biomechanical tolerance**
- **Nobody is perfect** — we all make errors or mistakes sometimes
- The road transport system needs to absorb such errors and mistakes, and to handle the impact energy in case of a crash
- All crashes should be survivable

Chain of events leading to a crash

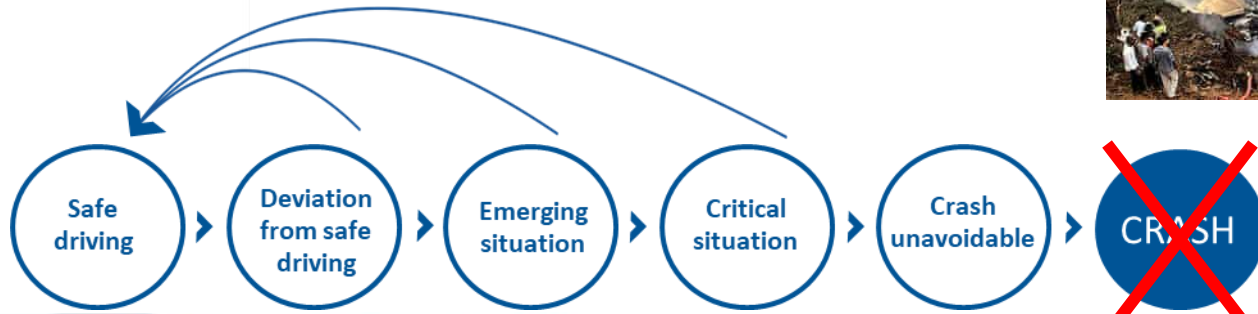


Question:

What is the difference?

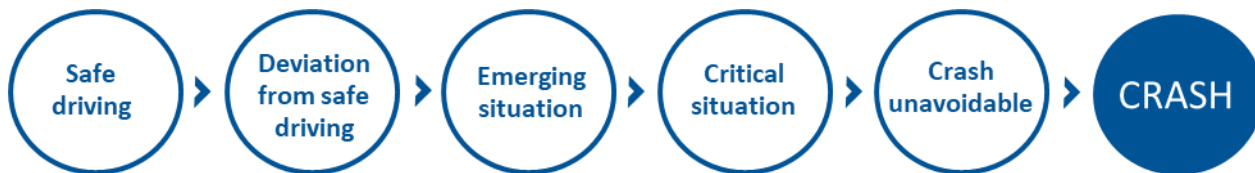


Energy to handle in a crash



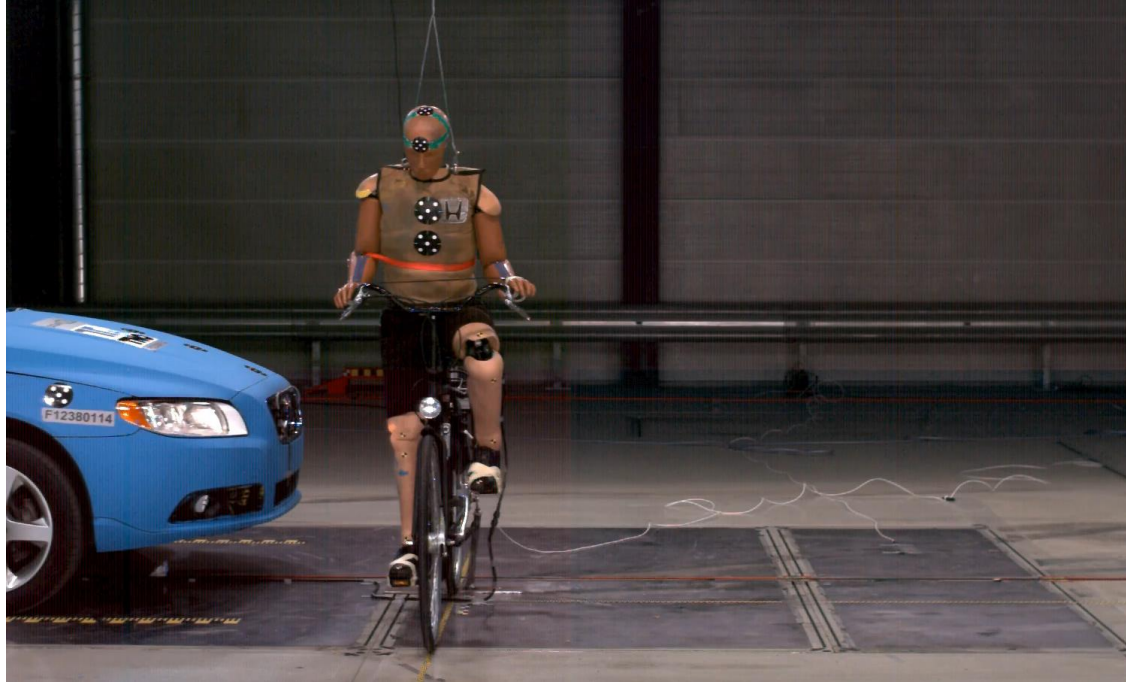
Impact energy can **not** be handled!





Impact
energy can
be handled!

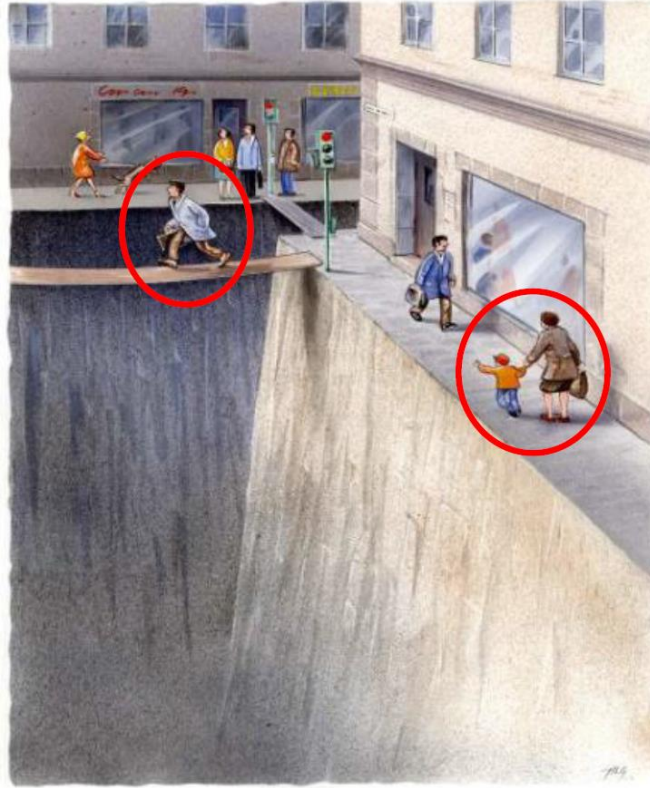




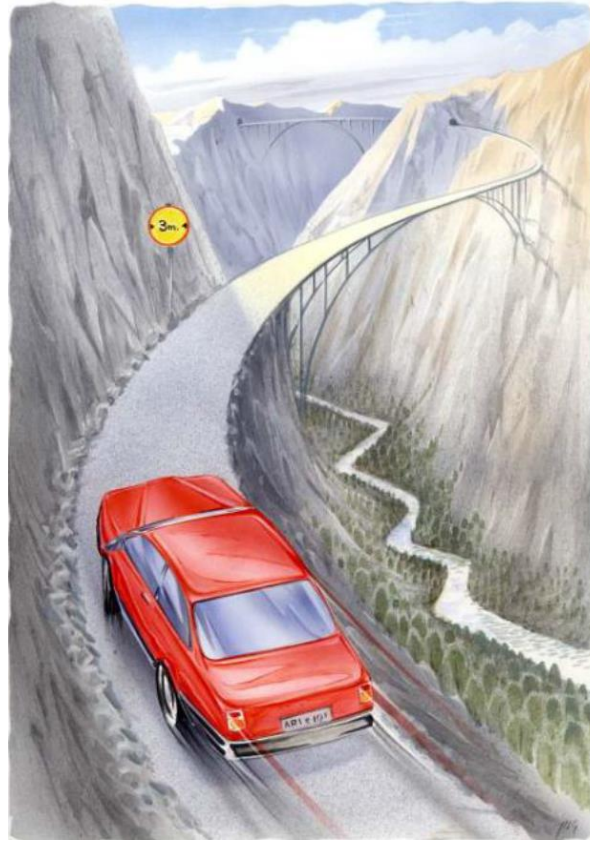
In simple words

- The main goal is **not** to eliminate crashes
- The main goal is to make sure that speed (energy) always aligns with the ability to protect road users when a crash occurs
- The challenge is, we (humans) do not have a very good perception of the dangers related to speed









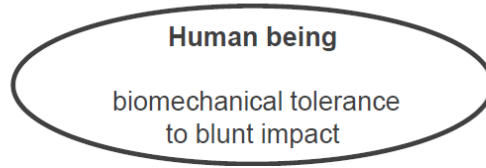
VISION
ZERO ACADEMY

Autoliv
Saving More Lives

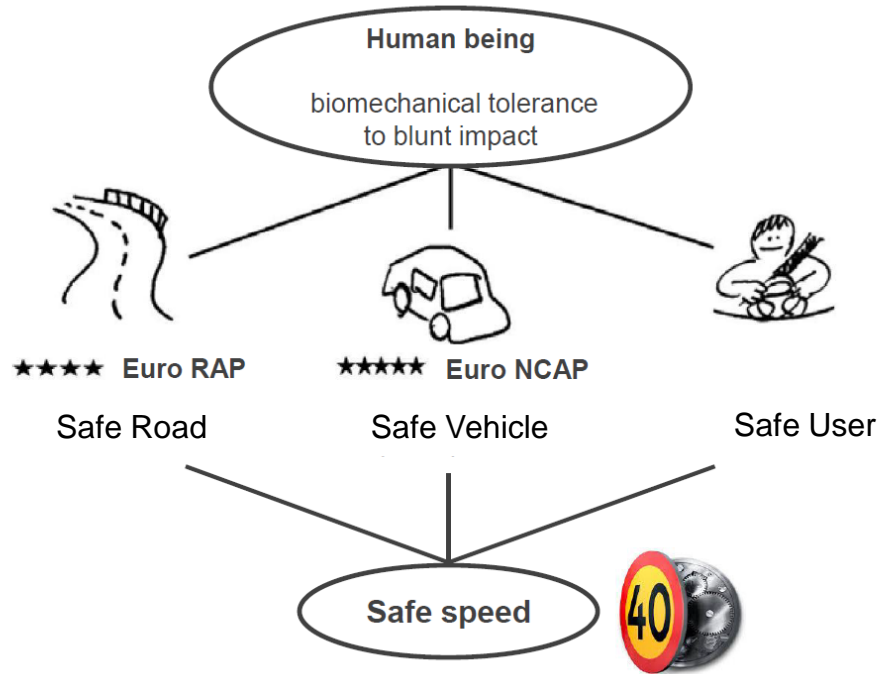
 **TRAFIKVERKET**
SWEDISH TRANSPORT ADMINISTRATION



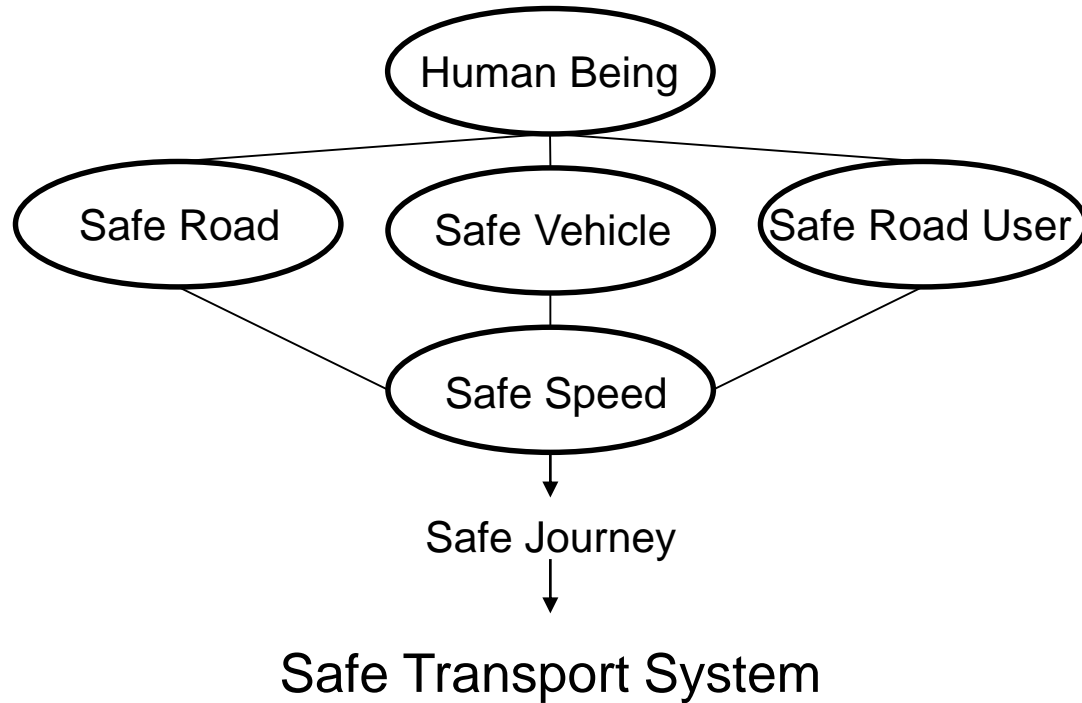
Model for safe traffic with passenger cars



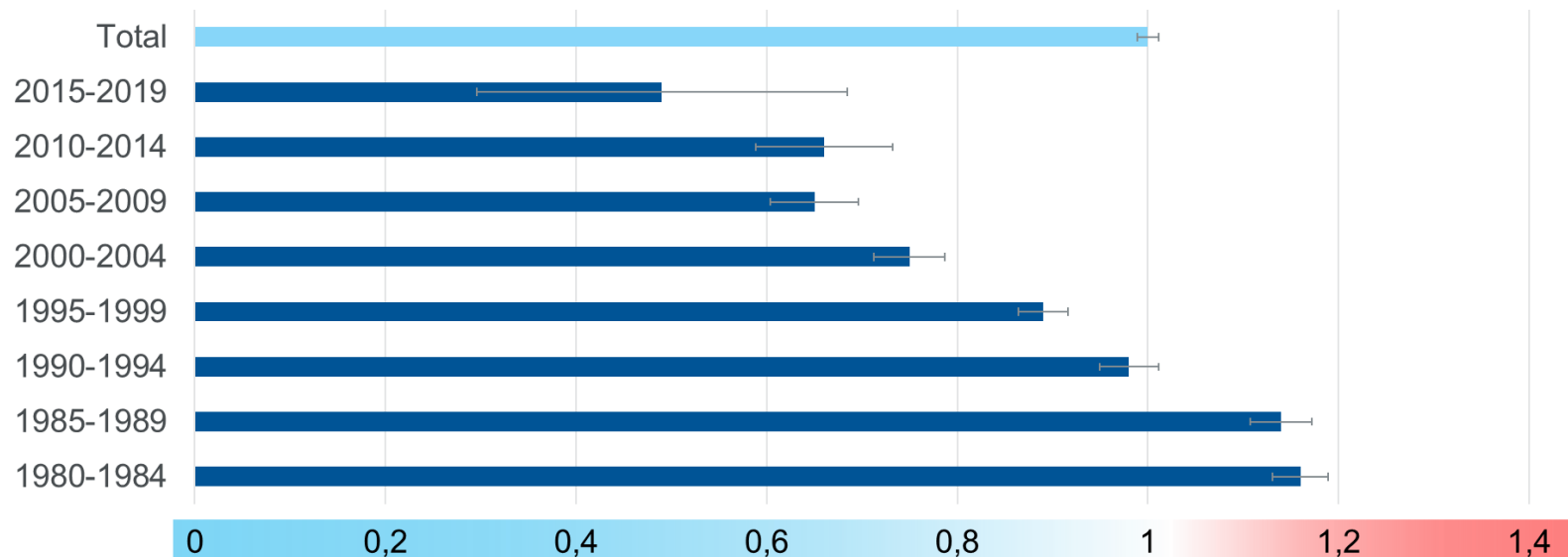
Model for safe traffic with passenger cars



Model for safe traffic



Crashworthiness (year of introduction)

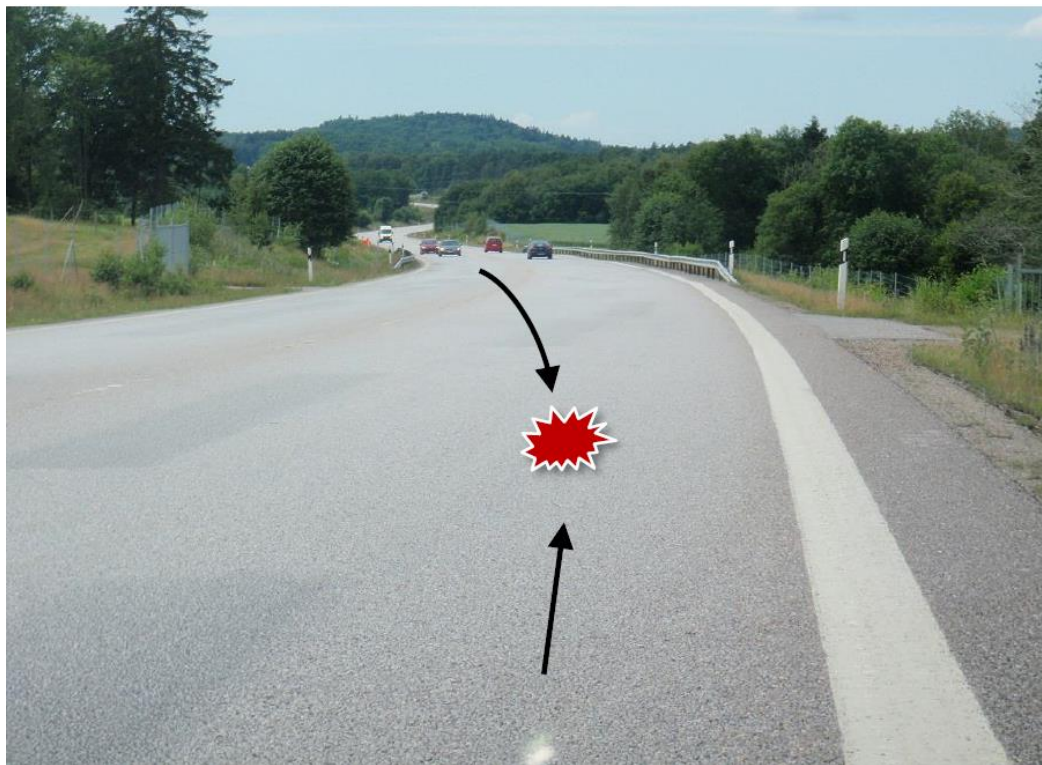


Source: Kullgren, A. et al. (2019). *Developments in Car Crash Safety and Comparisons between Results from Euro NCAP Tests and Real-World Crashes*. Paper 19-0291. Proceedings of Enhanced Safety of Vehicles (ESV) Conference, 2009

A tragic example

STA's in-depth studies of fatal crashes

- 90 km/h speed limit
- Road width 13 m
- AADT 5500
Annual Average Daily Traffic
- Head-on collision between
two passenger cars



Vehicles involved

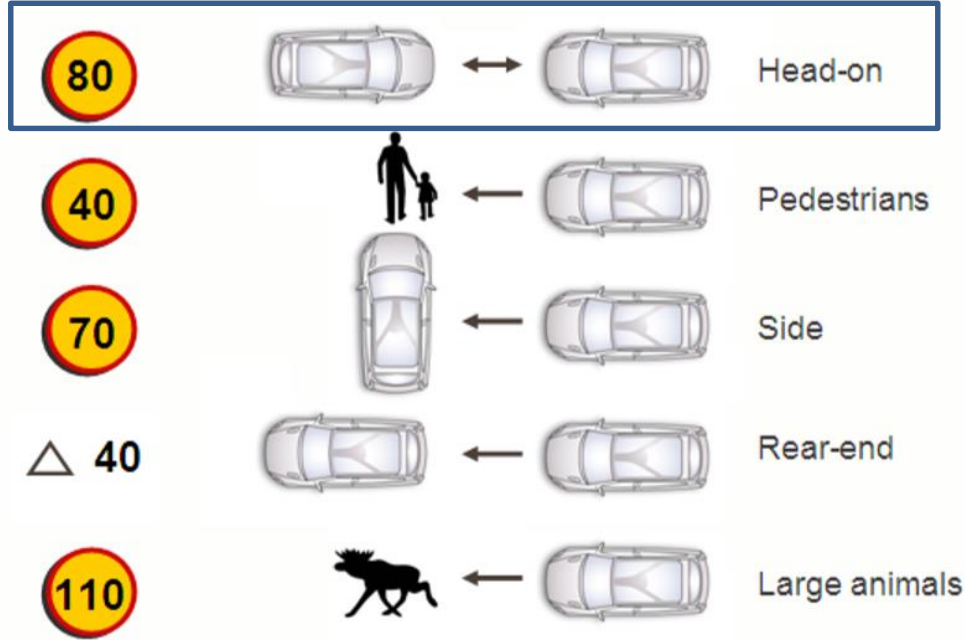


BMW 320, Model Year 2007
5 star Euro NCAP (2005)



Volvo V70, Model Year 2010
5 star Euro NCAP (2007)

Design speeds for modern cars



The posted speed limit is higher than the design speed



Speed is energy — and energy is the key factor

- Design speed maximum speed to avoid serious injuries and fatalities

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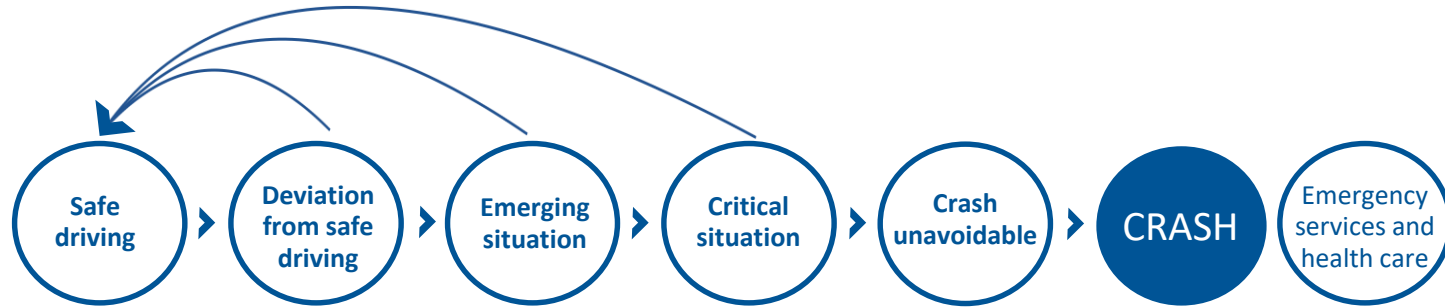
- Posted speed speed limit

=

- Operation speed actual driving speed

Design speed = posted speed = operation speed ➡ SAFE SPEED

Chain of events leading to a crash



Speed management



Autonomous Emergency Braking
($>1G$)



Protective clothing



Summary

- Humans have biomechanical limits
- Nobody is perfect — we all make errors or mistakes sometimes
- The road transport system needs to absorb such errors and mistakes, and to handle the impact energy in case of a crash
- Speed is energy — and energy is the key factor
- Safe traffic can only be achieved with a combination of countermeasures that support and complement each other

Thank You

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