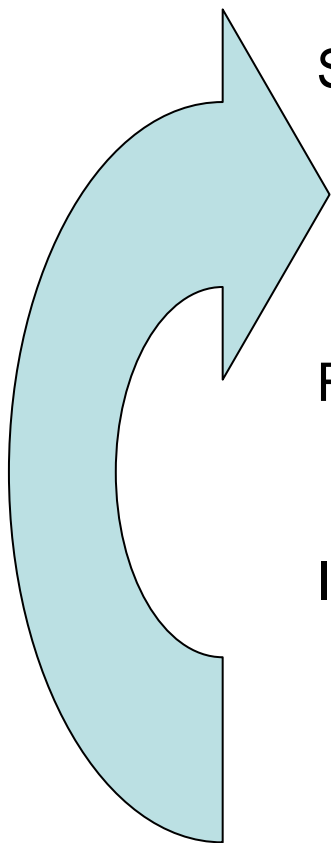


Vision Zero Safety philosophy

- Inspiration from other areas (i.e. occupational health and safety)
- People make errors, mistakes and misjudgements
- There are biomechanical tolerance limits
- The chain of events can be cut at many places
- Focus on injuries not crashes



Shared responsibility



System designers are responsible for the design, operation and the use of the road transport system and are thereby responsible for the level of safety within the entire system.

Road users are responsible for following the rules for using the road transport system set by the system designers.

If the users fail to comply with these rules due to a lack of knowledge, acceptance or ability, the system designers are required to take the necessary further steps to counteract people being killed or injured.

Road users have the right to know about the safety of cars and roads



Examples:

NCAP for vehicles
(www.euroncap.com)



EuroRAP for infrastructure/
speed limit
www.eurorap.org

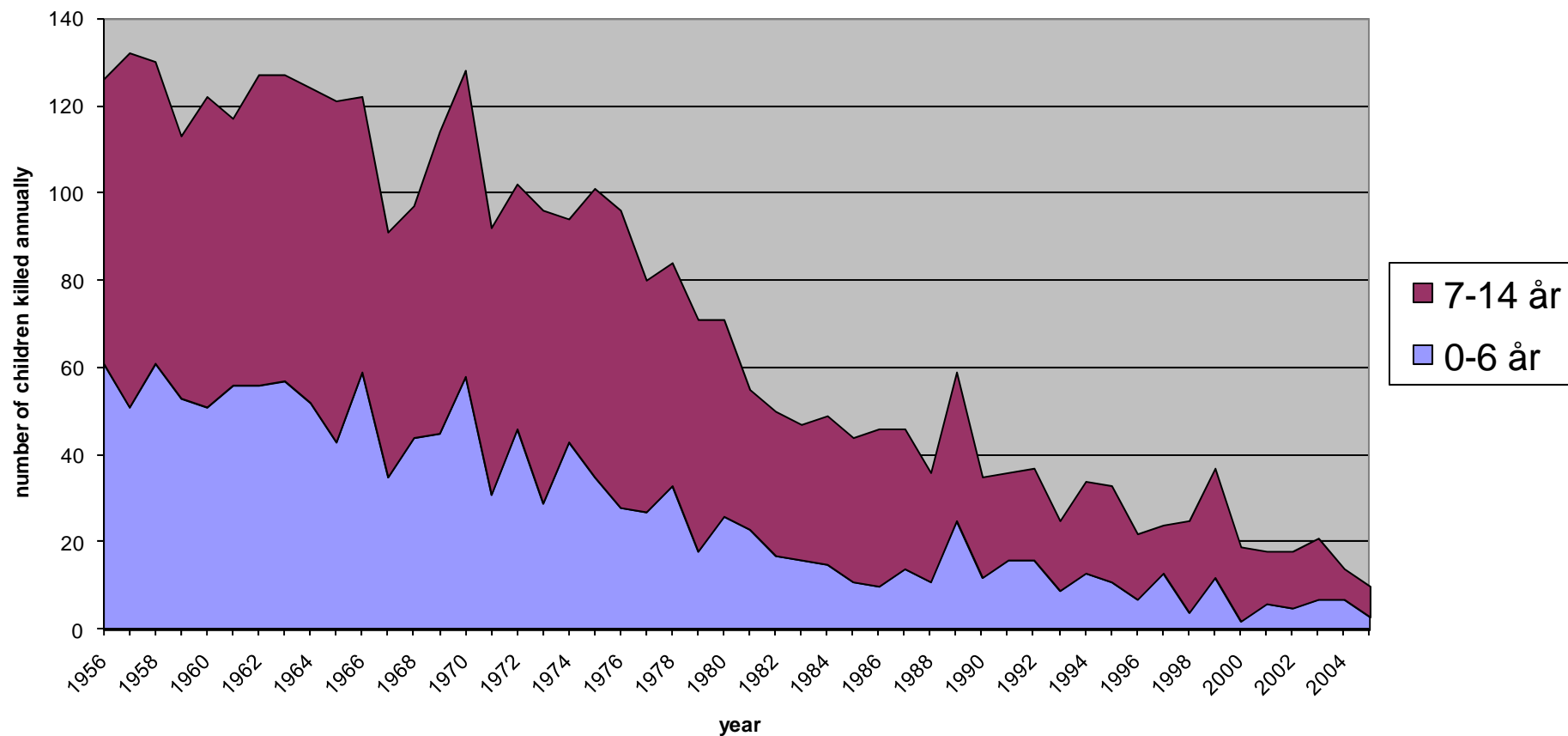
Vision Zero safety results and future targets

- 15 years ago 6 killed/100.000 inhabitants/year
- **2008:** 4.4 killed/100.000 inhabitants/year
- Future plans and strategies leading to less than 1 killed/100.000 inhabitants/year

- **Is this possible??!!**



Children killed in traffic in Sweden 1956-2005



Swedish Policy for Traffic Safety for Children

- The safety of children is not a question for the child – it is a question for parents and society
 - Education for parents, school staff, traffic engineers etc
 - Measures focussed on safe environment (bicycle lanes etc), bicycle helmets, child seats in cars, safe school busses (belts, alcohol interlock)
- Result of this strategy is a fatality rate of
 - Less than 1 killed/100.000 children/year (0-14)

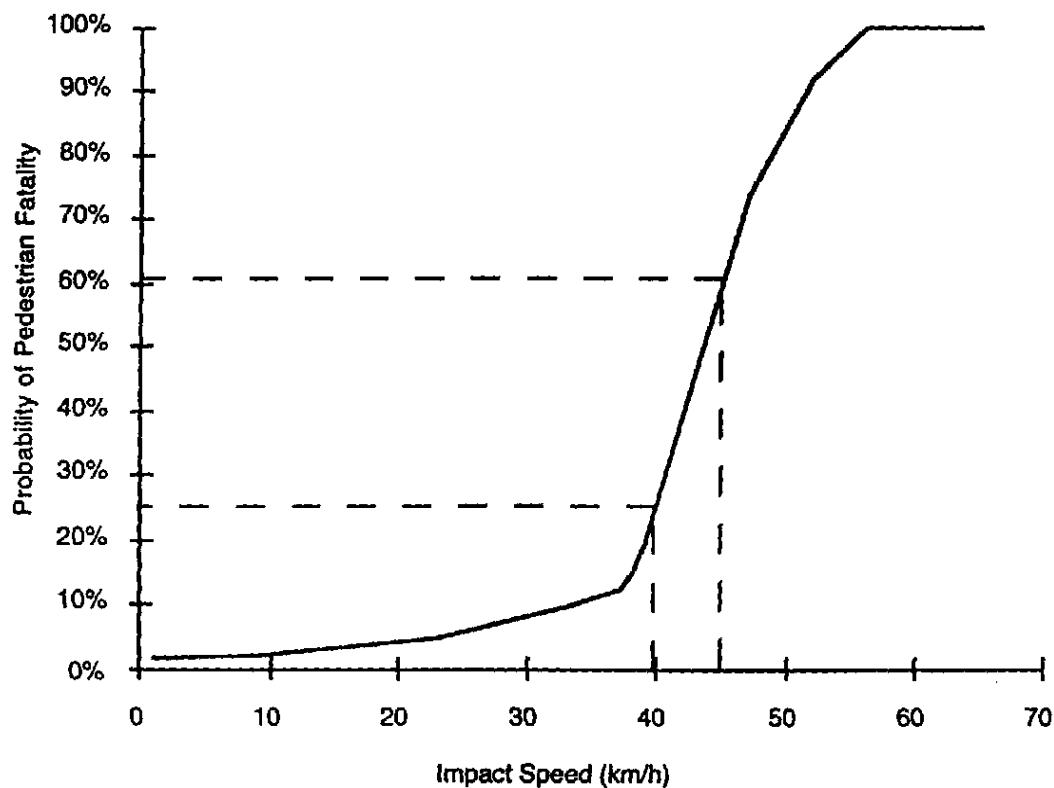
Kinetic energy

- People are blind to kinetic energy!

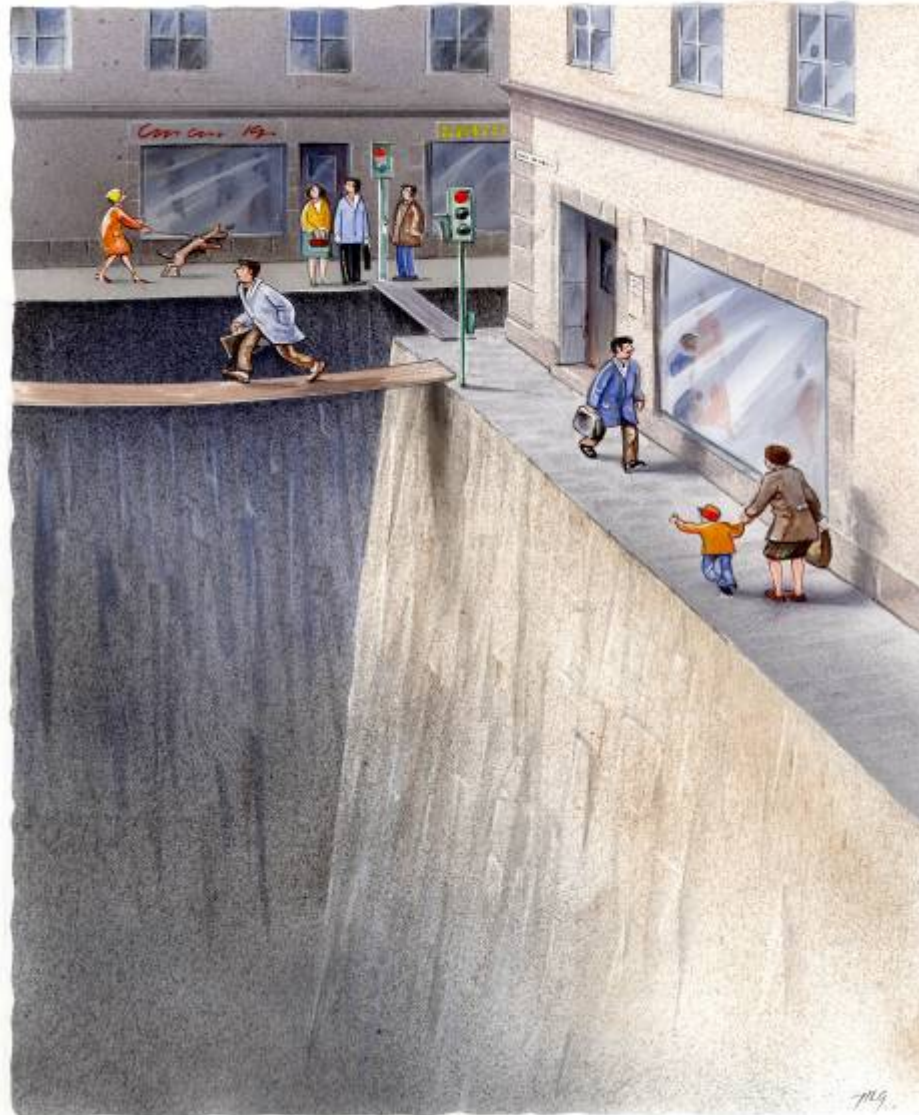
➡ That's why you can't put all responsibility on the road user...

Probab. of pedestrian fatality as a function of impact speed

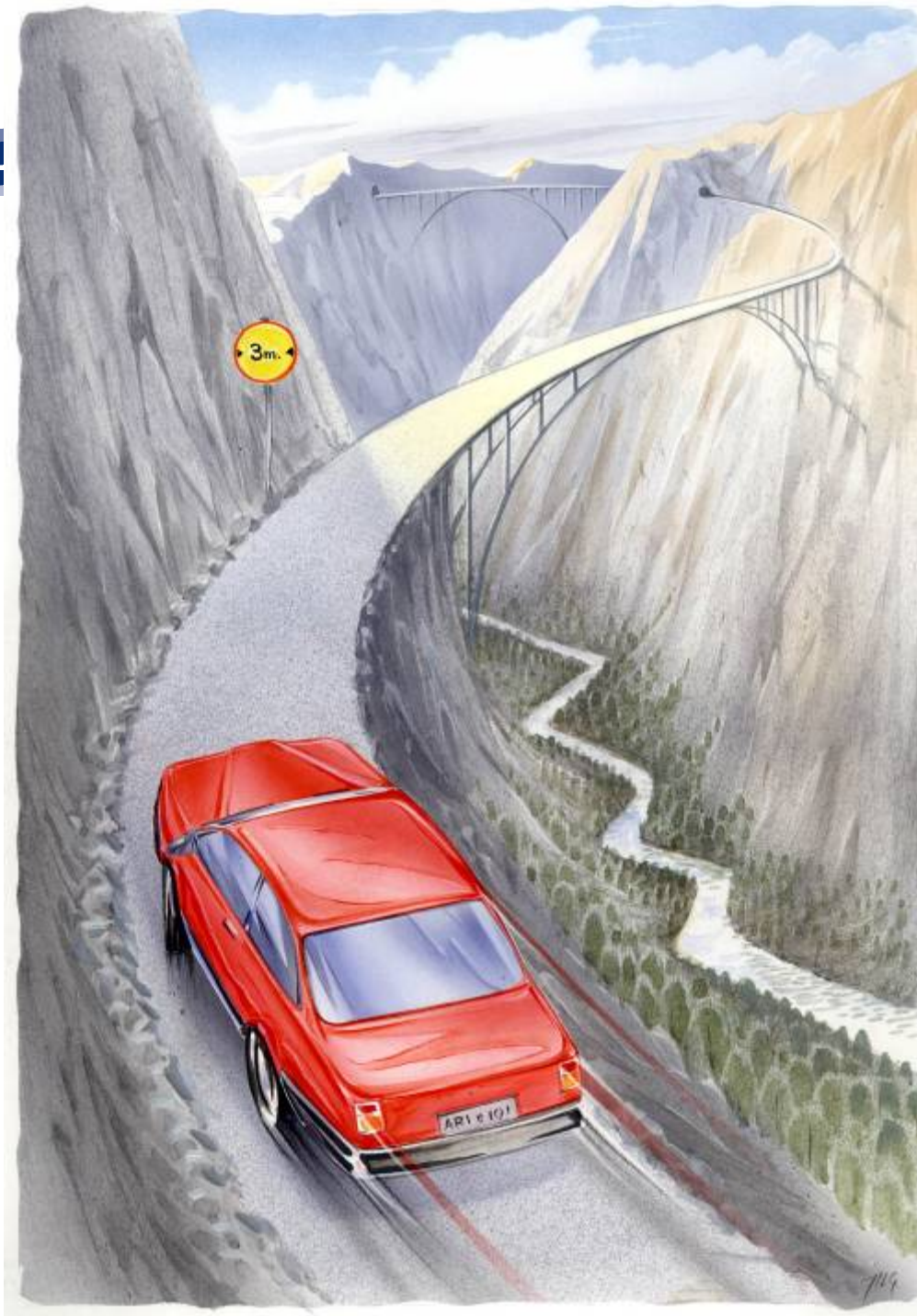
Figure 2: Probability of Pedestrian Fatality by Impact Speed.
Derived from the Interdisciplinary Working Group for Accident Mechanics (1986) and Walz, Hoefliger and Fehrmann (1983)











The safety properties of cars and roads are key factors for dealing with the problem

- Alternative design can reduce fatality risk with up to 2 or 3 factors of ten.







Relative fatality risk/km/year

1

10

200



Traditional safety philosophy

- A safe road is said to be wide and straight
- These design characteristics is said to give drivers room for evasive manoeuvres and thereby avoiding accidents
- But - the traditional road design philosophy do not lead to less fatalities/km/year!





Traditional safety philosophy (cont.)

When crashes occur in these environments the level of violence exceeds human tolerance
- thus – resulting in fatalities.

Vision Zero philosophy

- People make errors, mistakes and misjudgements
- Personal injuries is the problem - not accidents
- Human tolerance for biomechanical forces is the starting-point for design

Vision Zero philosophy Integration and Separation.

1. Vulnerable road users should not be exposed to motorised vehicles at speeds exceeding 30 km/h
2. If 1. cannot be satisfied then separate or reduce vehicle speed to 30 km/h
3. Car occupants should not be exposed to other motorised vehicles at speeds exceeding 50 km/h in 90 degree crossings
4. If 3. cannot be satisfied then separate or reduce angle or reduce speed to 50 km/h

Vision Zero philosophy

Integration and Separation (cont).

5. Car occupants should not be exposed to oncoming traffic (other vehicles of approximately same weight) at speeds exceeding 70 km/h or 50 km/h (if oncoming vehicles are of considerably different weight)
6. If 5. cannot be satisfied then separate, homogenise weights or reduce speeds to 70(50) km/h
7. Car occupants should not be exposed to the road side in speeds exceeding 70 km/h or 50 km/h (if road side contains trees or other narrow objects)
8. If 7. cannot be satisfied separate, remove objects or reduce speed to 70(50) km/h





Reduction in
Motorcycle
fatalities -83%

Typical view of Exclusive Motorcycle Lane

2+1 roads

- First built in 1998
- Now 2000 km
- Up to 90% reduction in fatalities
- Production cost 200-300 US\$/m
- Popular among road users



Speed limit, road design and car design goes hand in hand!

- Crash test 90km/h into tree
- Crash test 90km/h into guard rail

