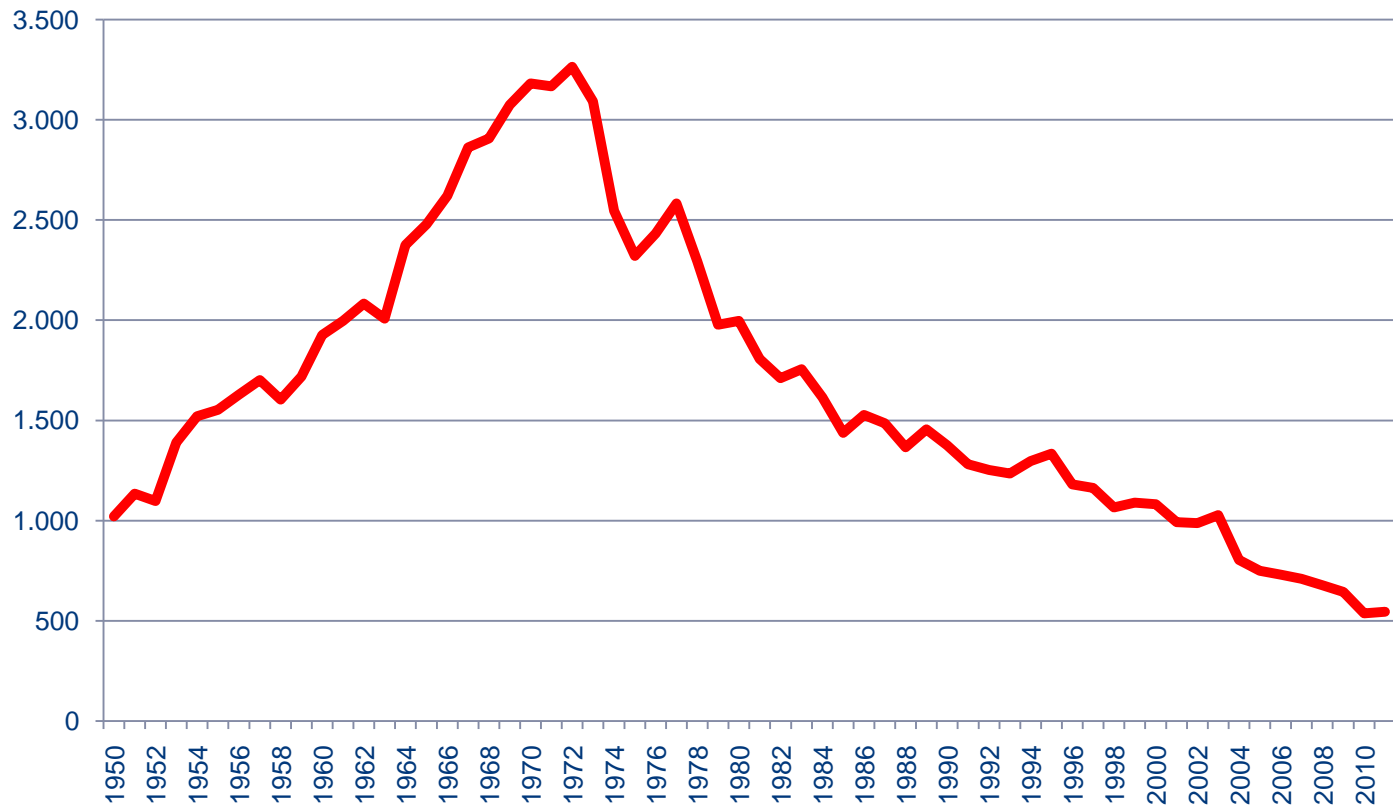




Road Safety in the Netherlands – from vision to practice and to SUCCESS

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Road fatalities in the Netherlands





- **Driving Down**
- **the Road Toll**

- **Professor Fred Wegman**
- **Adelaide Thinker in Residence**



Government
of South Australia

ADELAIDE
thinkers
IN RESIDENCE

SWOV

WETENSCHAPPELIJKE
ONDERZOEK VERKEERSVEILIGHEID

Research from South Australia

Data source	Extreme behaviour (%)	Illegal + system failure (%)	System failure (%)
Fatal crashes 2008	43.4%	22.9	33.7
Non-fatal metropolitan injuries 2002-2005	3.3	9.9	86.8
Non-fatal rural crashes 1998-2000	9.4	16.6	74.0

Lisa Wundersitz & Matthew Baldock: The relative contribution of system failures and extreme behaviour in South Australian crashes (2011)

Not only fatalities

- Fatal crashes and injury crashes are not telling the same story
- Fatal crashes are not telling the whole story
- Injuries form a substantial proportion of road crash costs (NL 50%)
- Major problems with data on injury crashes: definitions, data quality, international comparability
- European Union: a common “injuries reduction target”
- 2011 IRTAD report ‘Reporting on serious road traffic casualties’



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- Describing and explaining progress in road safety
- Implementing effective interventions
- Towards a Safe System approach: for example the Dutch Sustainable Safety
- Special emphasis on crashes with motorised two-wheelers

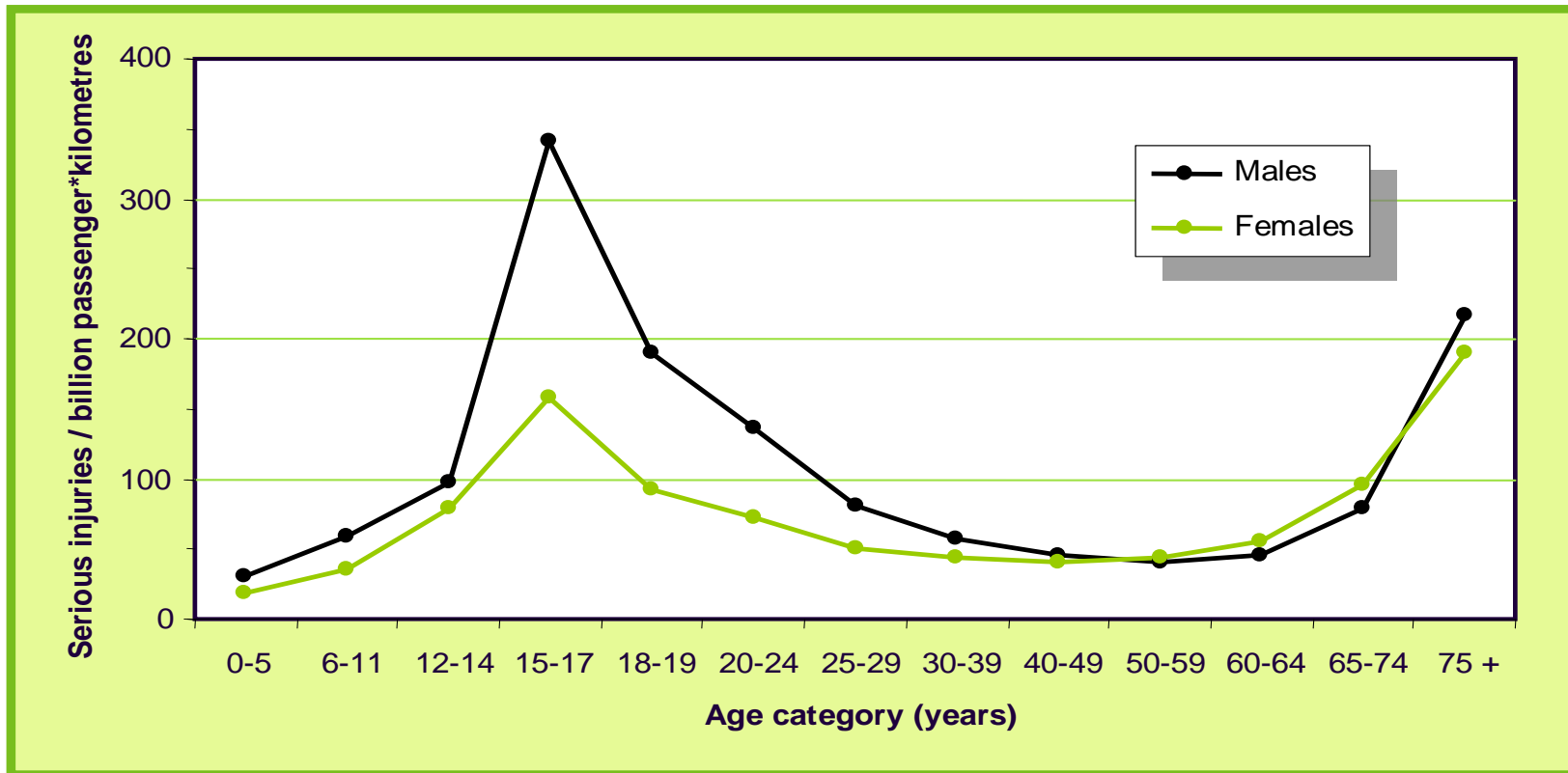
- How to speed up your learning curve?
- Let the Dutch story inspire you, don't try to copy it!

Traditional, reactive and, effective approach

- Based on an analysis of crashes in the past
 - Looking after high numbers
 - Looking after high shares
 - Looking after negative developments
- Trying to identify high rates/risks
 - Identify risk increasing factors
 - Reduce relatively high risks
- Trying to understand risk differences
 - $I = E \times C/E \times I/C$ (Exposure x Crash risk x Injury risk)
 - Safety performance indicators SPI's



For example: age-related rates/risks



Effective interventions in traditional areas ('evidence based interventions')

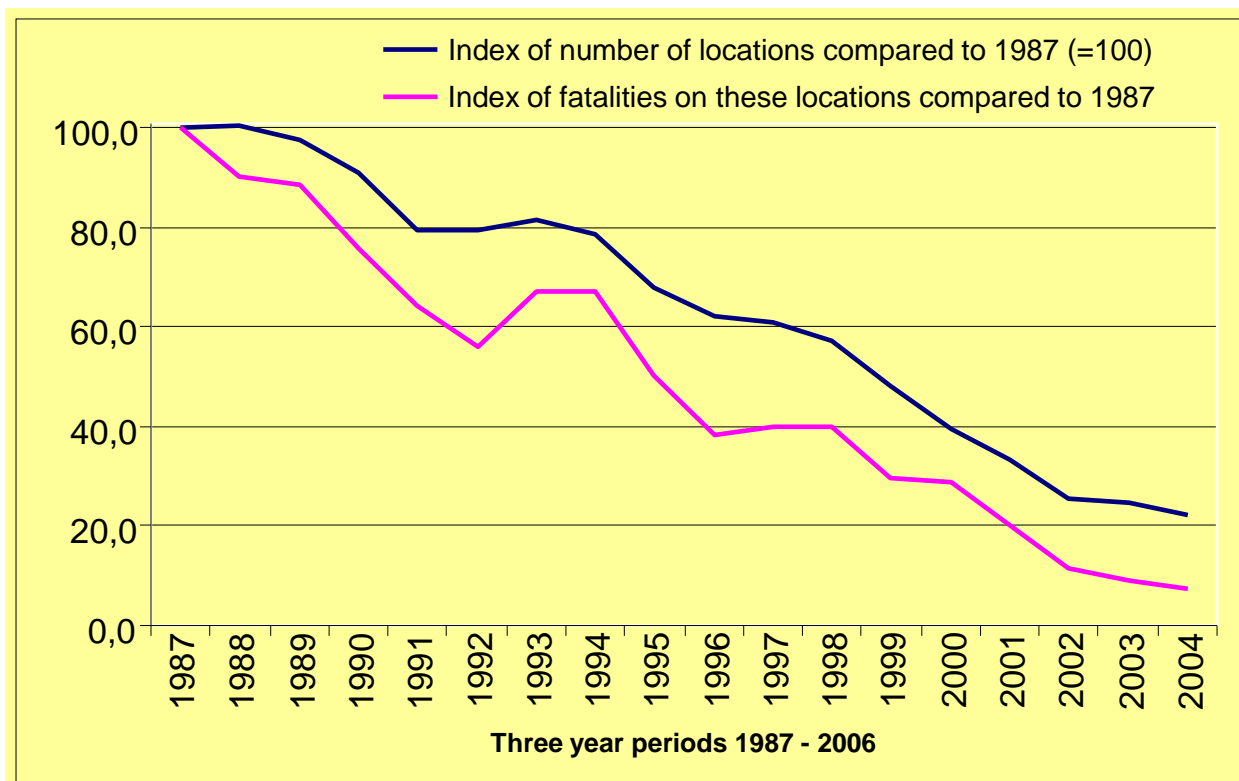
- Human behaviour (legislation + enforcement)
 - Speed, alcohol, seat belts and safety helmets
 - Driver education, schools, mass-media campaigns
- Infrastructure: planning, black spots, safe designs,
- Safe vehicles, crashworthiness, inspection, special attention for trucks/buses and motorised two wheelers
- Post-crash response
- Always new developments: such as drugs, mobile phones, ageing society

Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5
Road safety management	Safer roads and mobility	Safer vehicles	Safer road users	Post-crash response



Example #1: Dutch high risk locations

Less than 2% of road deaths at high risk locations;
was 10% 15 years ago



Example #2 : Drinking and driving

- Drinking and driving is involved in less than 1% of kilometres travelled
- Drink-driving is seen as socially unacceptable
- Only a few percent is above the legal limit (0.05%)
- Remaining offenders have a rather high BAC
- So, almost no offenders, but those who offend, do that substantially, and they are overrepresented in severe crashes (20% of fatal crashes)

- We need to develop targeted new strategies for 'high-core offenders'!
- And/or, eliminating drinking and driving: alcolock?

Which road safety problems remain?

- More and more a diffuse problem; sharp edges have been eliminated; remaining problems are more and more related to basic risk factors in traffic and generic/inherent problems
- Besides that, specific problems because of risk increasing factors: novice road users, alcohol/drugs, fatigue, distraction, etc.
- Traditional, reactive approach is coming to the end of its life-cycle

Our road traffic today is still *inherently* dangerous



How to deal with 'problems that remain'?

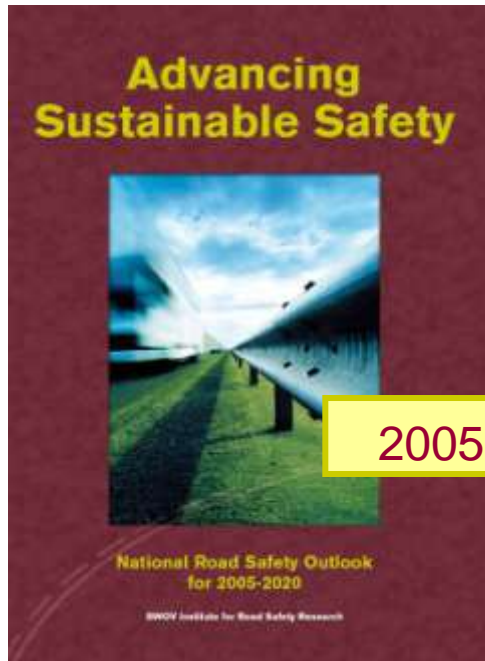
- Both (generic) basic factors and risk-increasing factors have been and will be relevant
- The relative importance of generic problems have increased over time and of specific problems has decreased
- The character of future interventions on reducing risk factors will be different, because the nature of remaining problems will be different
- Road safety policies will need to shift focus towards generic problems and less towards specific problems

Our fundamental road safety problem

- Today's road traffic is *inherently* unsafe
- The road system of today has not been designed with safety in mind, as is the case with air transport or rail transport
- Which means we are almost fully dependent on whether a road user makes a mistake or error in preventing a crash
- Another approach is needed: *Safe System Approach*



Sustainable Safety: the first example of a Safe System Approach



- Aims
 - Prevention of serious crashes by eliminating conditions/circumstances where serious crashes *can* occur
 - Reduction/elimination of probability of serious injury when a crash occurs

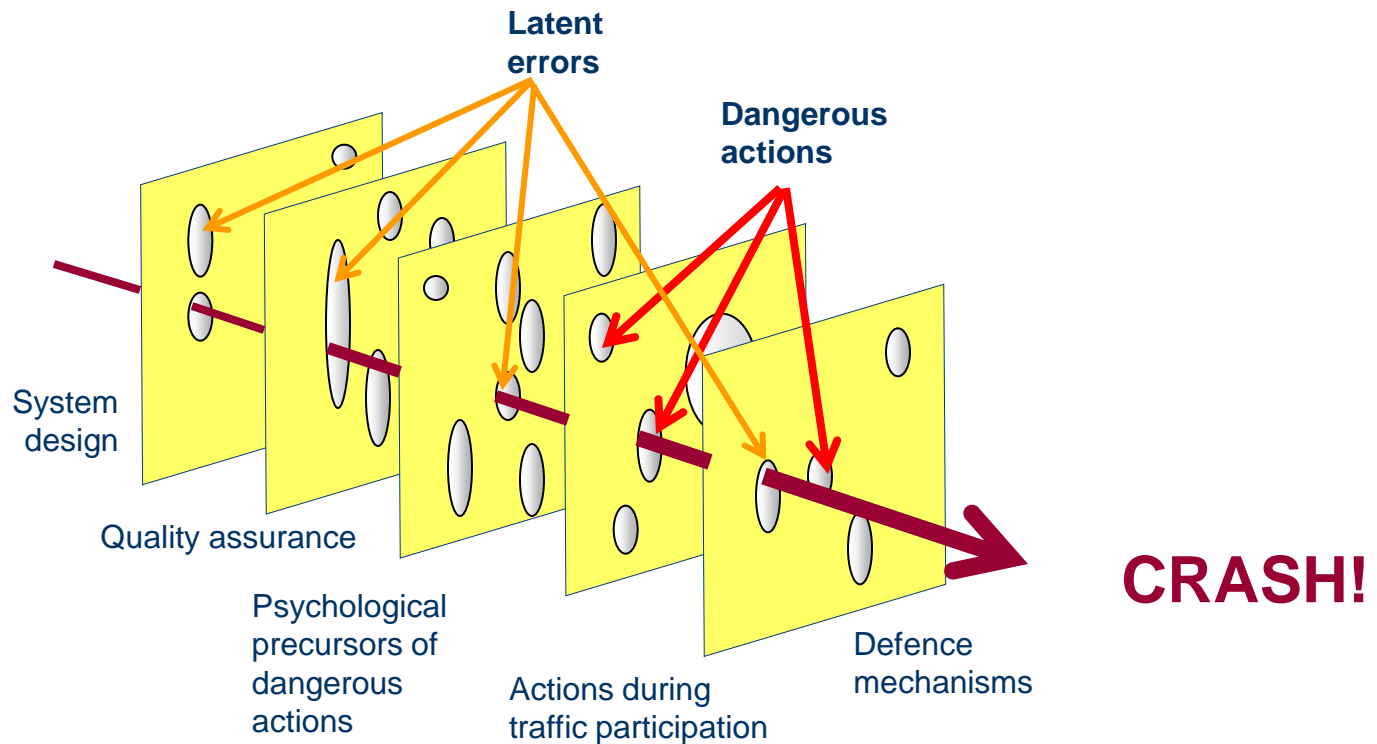
Copies are downloadable from
www.sustainablesafety.nl

Putting people at the center

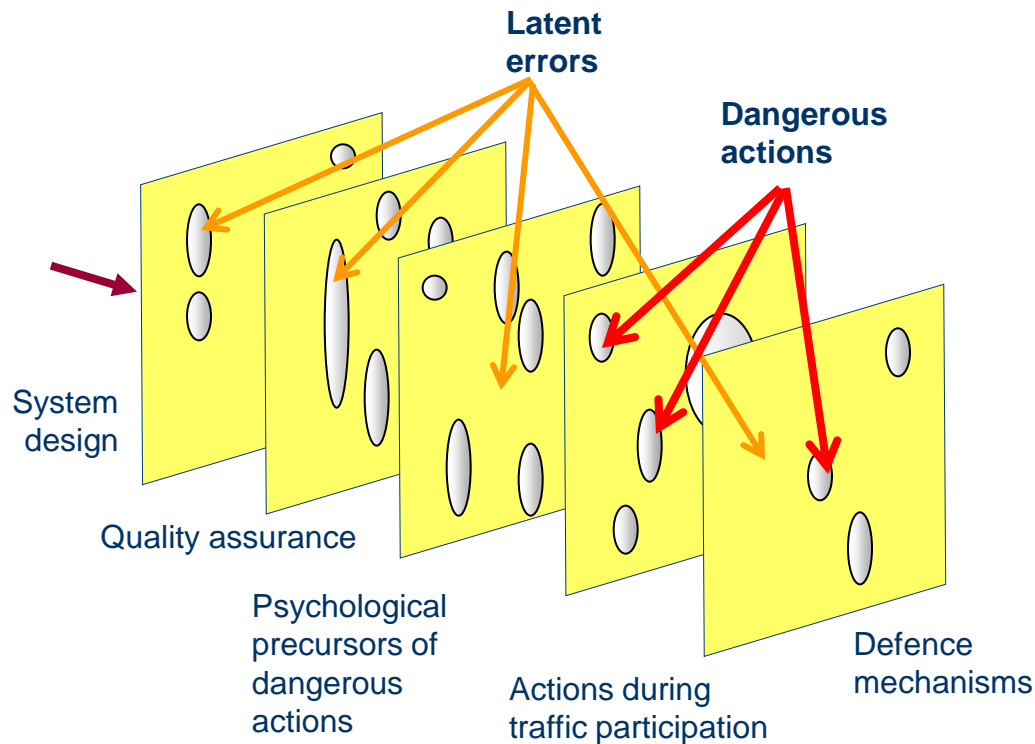
1. The road system should be designed to expect and accommodate *human error*, because it is inevitable that road users make mistakes and sometimes violate the law (and crashes occur); this concept has been accepted and implemented in other sectors of transportation
2. In a crash, interaction between vehicle – roadway – human body must be managed so that serious injury likelihood is minimized, if not eliminated



Proactive Safe System Approach (Swiss cheese model, based on Reason)



Safe System Approach: prevention of system gaps/latent errors



How to avoid crashes by preventing errors and violations in the future?

1. Adjust the environment to the human measure in such a way that man commits fewer errors and, consequently, runs a lower risk
 - Make potentially dangerous situations less frequent or even eliminate them
 - Design an environment resulting in fewer errors
 - If errors are committed, let the environment being forgiving for errors
2. Deal effectively/efficiently with violations: a) 'normal road users', b) novice drivers and c) excessive behaviour/recidivists/'delinquents'

Preventing 'errors' crucial for cyclists and pedestrians





Main characteristics of Dutch Safe System Approach

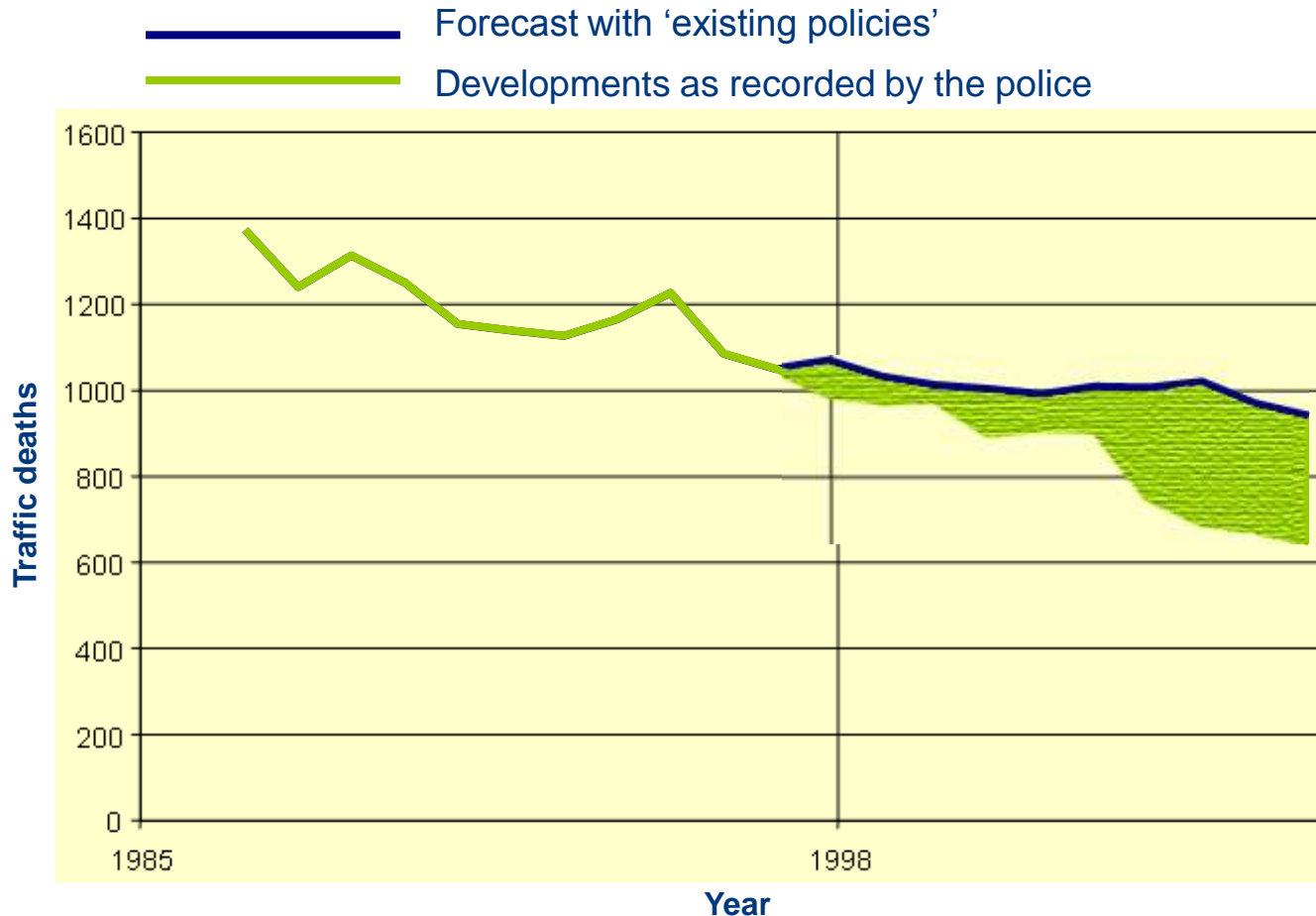
- **Ethical**
 - We don't want to hand over a traffic system to the next generation with current casualty levels
 - A proactive approach
- **An integral approach**
 - Integrate man, vehicle and road into a safe system
 - The whole network, all vehicles, all road users
- **People are the measure of all things**
 - Human capacities and limitations are the guiding factors
- Reducing **latent errors (system gaps)** of the system
- Use criterion of **preventable injuries**



Expanding traffic calming schemes (inside/outside urban areas)

	1998	2003	2008
Inside urban area			
30km/hour	8.900 (15 %)	29.000 (45%)	50.300 (70 %)
50km/hour	50.600 (85%)	36.500 (55%)	21.600 (30%)
Total inside urban area	59.600 (100%)	66.400 (100%)	71.900 (100%)
Outside urban area			
60km/hour	2100 (3 %)	+/- 10.000 (15-20%)	35.400 (57%)
80km/hour	63.300 (97%)	54.000 (80-85%)	25.500 (43%)
Total outside urban area (excl. motorways)	65.400 (100%)	64.000 (100%)	62.100 (100%)

Development in fatalities: comparing predicted with recorded numbers





Ten years of implementation

- The number of fatalities decreased by an average of more than 5% per year (1998-2007); a more than two times faster decrease than in the ten years before (1988-1997)
- Many measures were implemented, mainly in the area of infrastructure and enforcement
- These measures have *with a large degree of probability* contributed to this 1998-2007-decrease
- This resulted in a decrease of 300-400 fatalities in 2007, which is more than a 30% reduction
- We invested € 530 million per year; € 350 million on road infrastructure
- The benefits to society exceed the costs by a factor of 4

Safety problems related to motorised two-wheelers

- Growing exposure + high risks
- Own poor behaviour (single vehicle crashes, high speeds, external perturbations)
- Overlooked (perception and appraisal) by other road users (at intersections)
 - Rider hit by a car fails to see rider in time
 - Left turning car fails to see oncoming rider





Improving risks of motorcyclists

- Visibility and conspicuouesness
- Safer riding behaviour
- Vehicle measures
- Infrastructure measures
- Protective clothing and helmets

- And reducing exposure?

Lessons learned

- You need *bold ideas to meet big challenges*
- *Sustainable Safety* is ambitious and bold, meets a big challenge
- Our approach: from vision/theories/knowledge, to 'capacity building', to implementation, to evaluation and, if appropriate, to adaptation
- Acceptance by decision makers, road authorities and professional road safety community is needed
- Good cooperation between decision makers, research community, road safety managers, and practitioners
- Work on creating acceptance by road users (media!)
- Work with a step-by-step approach

Conclusions

- Based on a Dutch version of a Safe System Approach (Sustainable Safety), actions and packages of measures were implemented (1998-2007)
- A new vision energized the professional community, resulted in more action, gave more focus to actions and improved efficiency of interventions
- Safety improvements observed in infrastructure, human behaviour and vehicles
- Cost beneficial interventions with 30% fatality reduction over 10 years (no real success for serious injuries!)
- Next strategy sent to Parliament last week: 2012 - 2020

‘If crashes can occur, they will occur’

