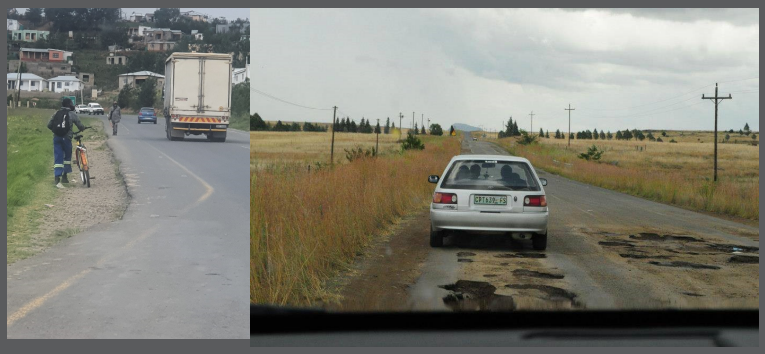

Session 3.7 Road safety concepts

Conducting Road Safety Audits & Appraisals

Presented by: RTS & AGTT

January 2022

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1

Road safety concepts: development

1960: Road user to blame

- Change behaviour

1970 System interventions

- 3Es Engineering, Enforcement, Education

1990 System wide targets

- Reduce 50% Decade of Action

2000 Safe systems

- Vision zero

Source: WHO

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Safe system approach

The Safe System approach is about acknowledging:

1. human beings make mistakes and crashes are inevitable
2. the human body has a limited ability to withstand crash forces
3. system designers and system users must all share responsibility for managing crash forces to a level that does not result in death or serious injury
4. it will take a whole-of-system approach to implement the Safe System approach

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SANRAL Geometric design guide

A safe road should:

- Warn and inform road users of changes in the approaching road environment;
- Guide and control road users safely through the road environment;
- Provide a forgiving roadside environment;
- Provide a controlled release of information;
- Provide an aesthetically pleasing landscape;
- Maintain road user interest and concentration;
- Not surprise road users;
- Give consistent messages to road users; and
- Provide good visibility for all road users.

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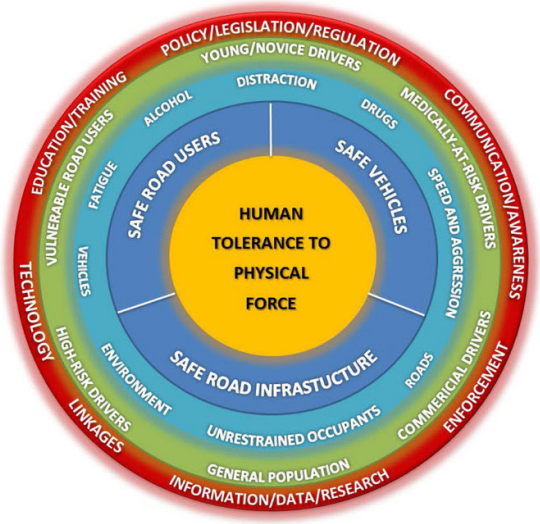
Safe systems



SOURCE: RSM

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Periods of road safety research

Time line

Perspective of consideration	Early years of motorisation	1950-1960s	1970-1980s	1990s	2000s
Road safety management (OECD, 2008)	n/a	Focus on driver interventions	Focus on system-wide interventions	System-wide interventions, with targeted results and leadership	Safe-system approach
Road safety research paradigms (OECD, 1997)	Vehicle control; descriptive research ("what")	Mastering traffic situation ("why"); research around the classical 3E's Engineering, Education, Enforcement	Managing the traffic system ("how"); mathematical models; cost-benefit analysis	Managing the transport system; multi-dimensional analysis	Cross-disciplinary analysis; theory development
Main road crash causes (Wegman et al., 2007)	Crashes as a chance phenomenon	Crashes are mono-causal; Crashes caused by the crash-prone	A combination of crash causes fitting within a 'system approach'	The road user is the weak link: more behavioural influence	Better implementation of existing policies; Systems' management perspective

Periods of RS research, according to various perspectives. Hakkert & Gittelman 2014

SOURCE: RSM

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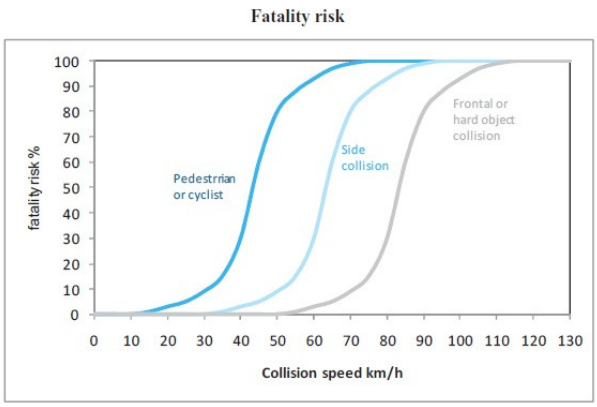
SPEED: Fatality risk

SOURCE: RSM



Source: Wramborg, P. (2005). A New Approach to a Safe and Sustainable Road Structure and Street Design for Urban Areas. Paper presented at Road Safety on Four Continents Conference, Warsaw Poland.

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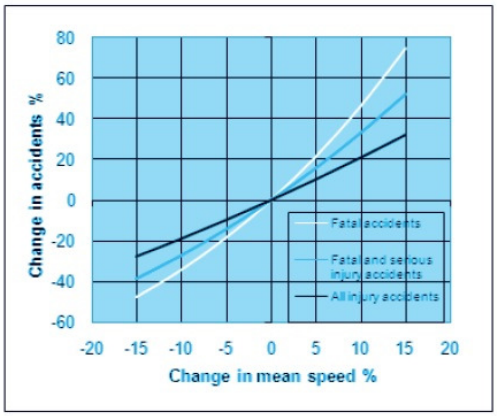
Speed: Nilsson's power law

SOURCE: RSM

The Power Model: relationship between change in mean speed and crashes



Source: Nilsson 2004.

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Speed: issues in road safety

Design speed

weakest link in chain

Setting speed limits

driver perception of road versus traffic conditions, 85 th percentile versus road context

Speed differentials

traffic flow relationships, shock waves, vehicle performance, road design

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Speed: issues in road safety

Setting speed limits

South African Manual

?

With Department of Transport

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Conflicts and conflict studies

Sources of conflict

- Crossing paths
  - Vehicle lines
  - NMT-vehicles lines
- Merging and diverging
- Weaving
- Speed differentials
- Side friction
- Access

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Conflicts and conflict studies

Traffic Conflict Techniques

Traffic conflict is defined as "an observable situation in which two or more road users approach each other in space and time to such an extent that a collision is imminent if their movements remain unchanged"

Not widely used:
Required specialised knowledge, expensive, unreliable
New approaches with video data analysis

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