ERASER
Evaluations to Realise a common Approach to
Self-explaining European Roads

13th January 2012

Stockholm

Rob Eenink, SWOV

Contents

- Partners
- State-of-the-art: what are SERs? (WP1)
- Features to make a road self-explaining: User pilots (WP2)
- Safe speeds and credible limits: tool for road authorities tested (WP3/4)
- Dissemination (WP5)

Coordinator:
SWOV Institute for Road Safety Research

Partner 2:
Dresden University of Technology, TUD

Partner 3:
Kuratorium für Verkehrssicherheit, KfV

Partner 4:
Transport Research Laboratory, TRL

Partner 5:
Lund University

- "Traffic systems having self-explaining properties are designed in such a way that they are in line with the expectations of the road users. The […] "Self-Explaining Road" (SER) is a traffic environment which elicits safe behaviour simply by its design."

- Expectations on speed (safe, limit), lay-out, other road user types and behaviour

- Necessary, helpful, but not 'self-enforcing'

- Categorisation, e.g. flow, distributor, access

- Homogeneity within, heterogeneity between categories

- Few countries have actually applied a SER approach (Denmark, Germany, Netherlands)

- Relevant features tested:
  - Road and lane width
  - Openness of the road environment
  - Number of lanes
  - Median treatment (separation)
- Test in:
  - Austria (48), Germany (49), Netherlands (101), England (49), Ireland (28), Sweden (32)
  - 24 pictures of rural roads, different widths per country

Separation	Width	Environment	Lanes			
			2+2	2+1	1+2	1+1
Physical (Phy)	Wide	Open	X	(X)	X	
		Close	X	(X)	X	
	Narrow	Open	X	(X)	X	
		Close	X	(X)	X	
Double white line (DWL)	Wide	Open		X	X	X
		Close		X	X	X
	Narrow	Open		X	X	X
		Close		X	X	X
Intemittent middel marking (IMM)	Wide	Open				X
		Close				X
	Narrow	Open				X
		Close				X

"Purple" analysis design, focusing on 2+x roads versus 1+2 roads

"Blue" analysis design, focusing on 1+2 roads versus 1+1 roads. (Separation = Double White Line).

"Green" analysis design, focusing on 1+1 roads

Narrow condition
Open/2+x

Wide condition
Open/2+x
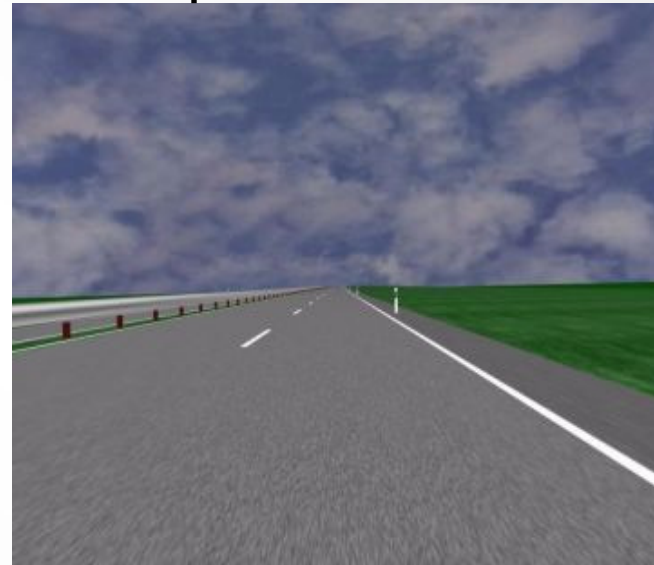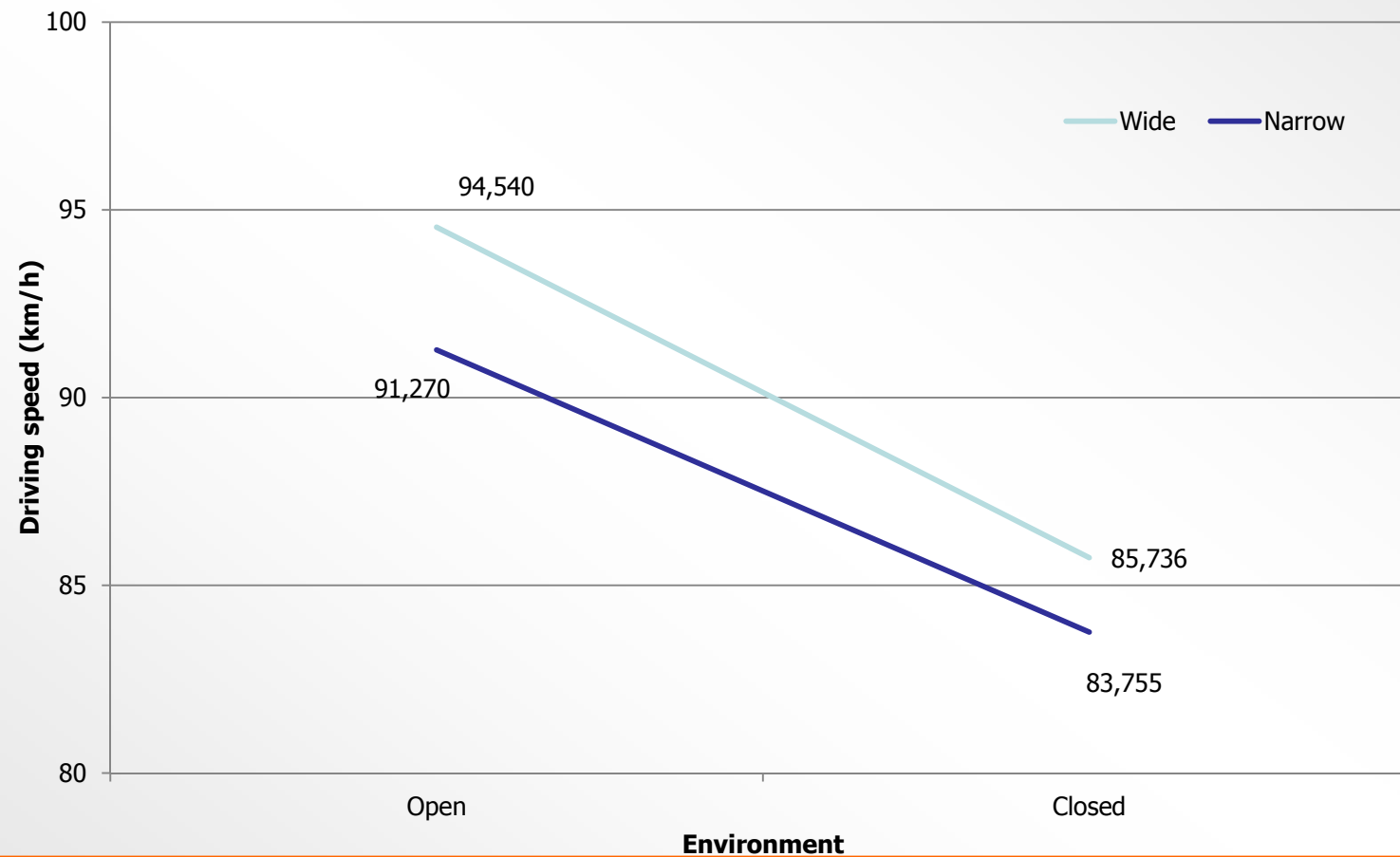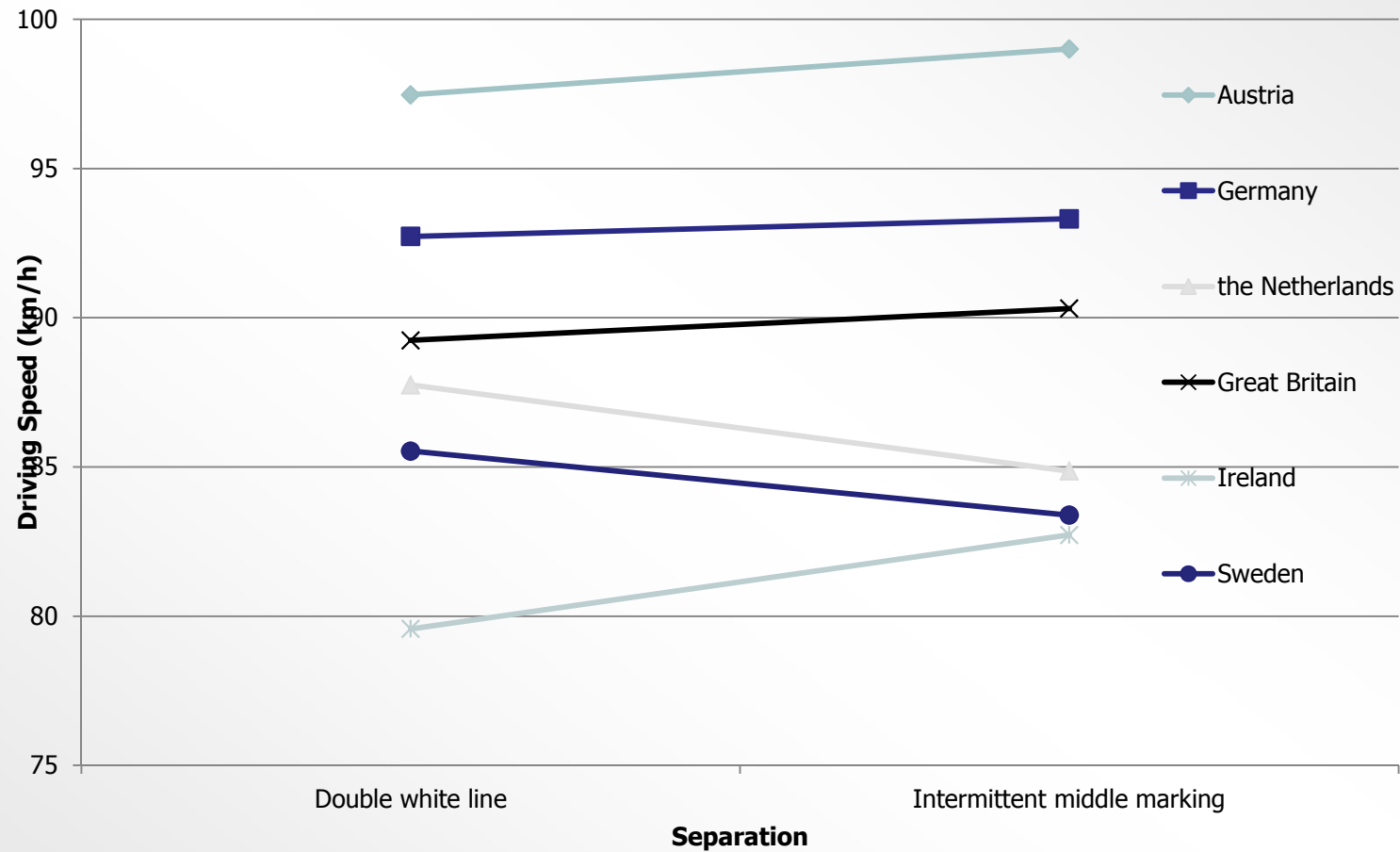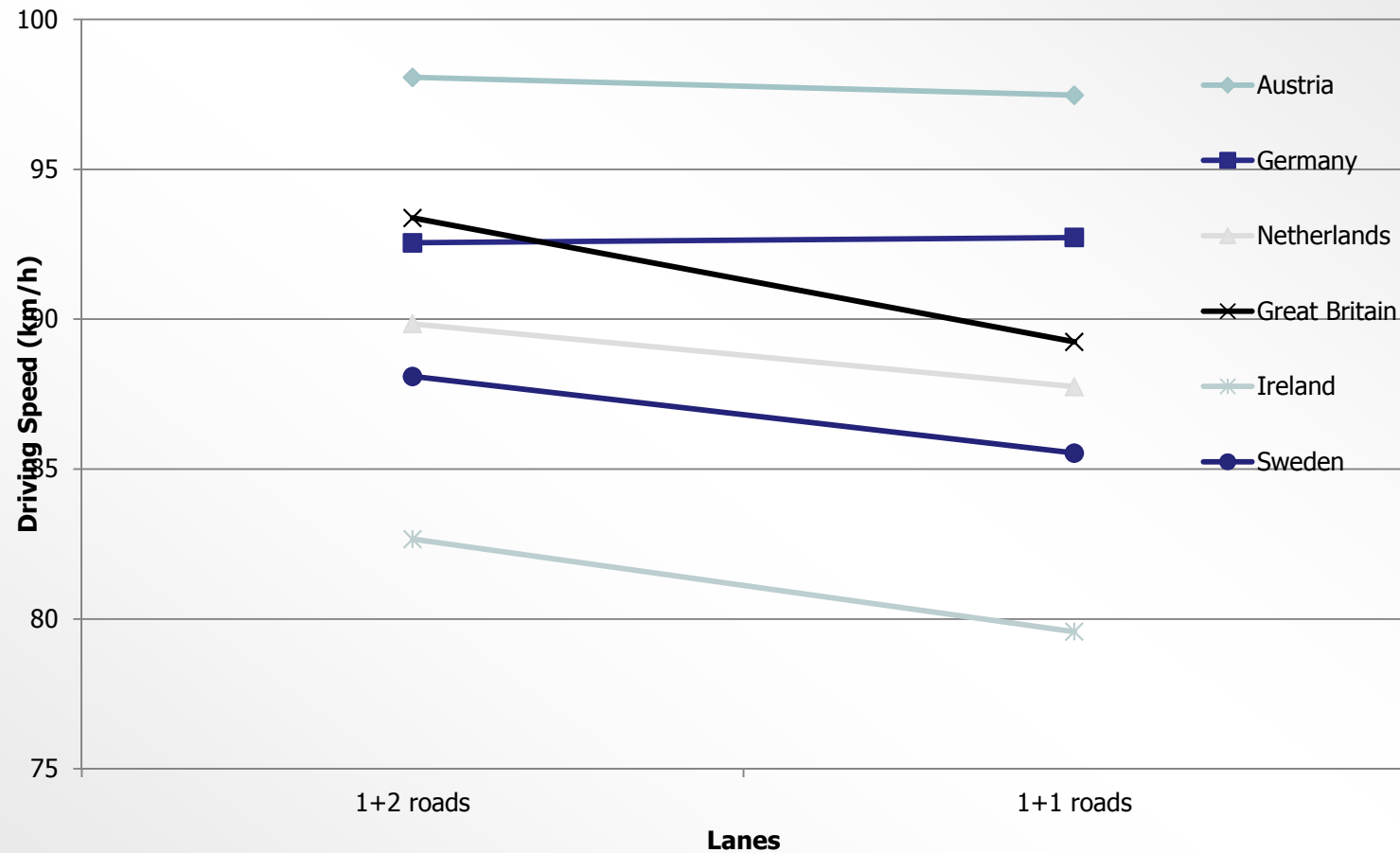
- Camera's on 2 intersections
- Effect of limit change (100 => 80)
- Comparison between stated speeds and actual speeds
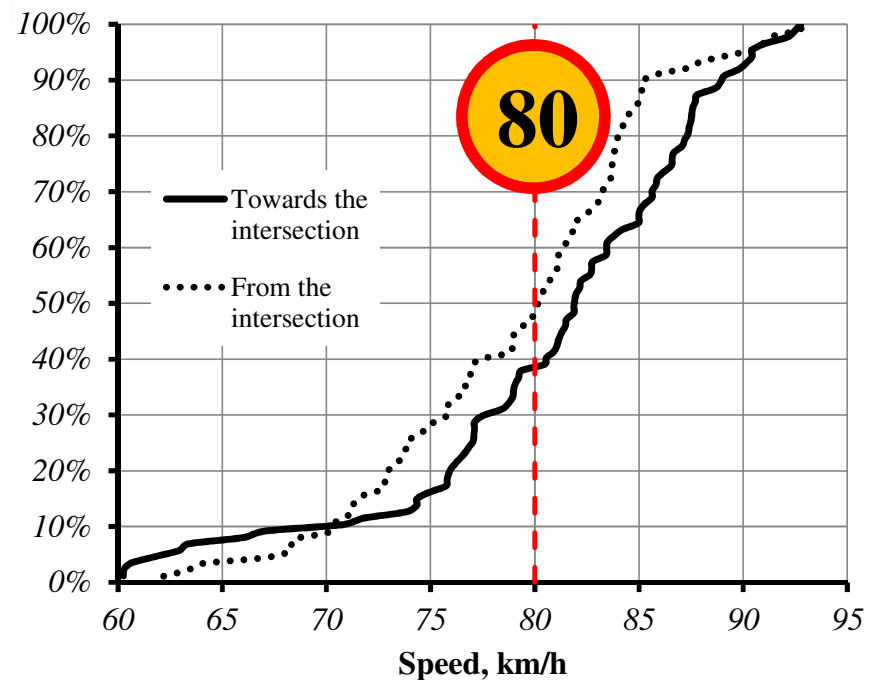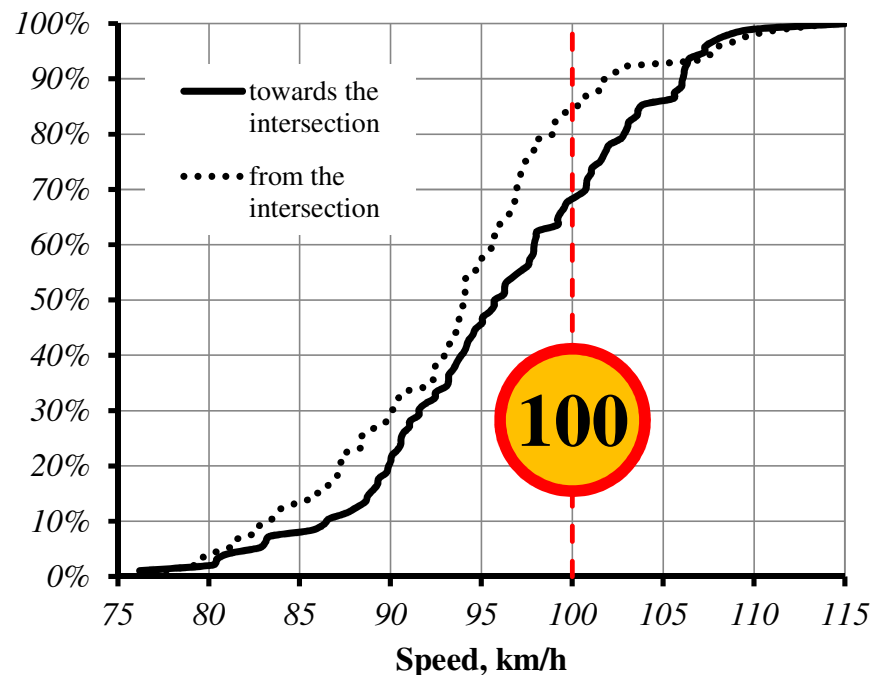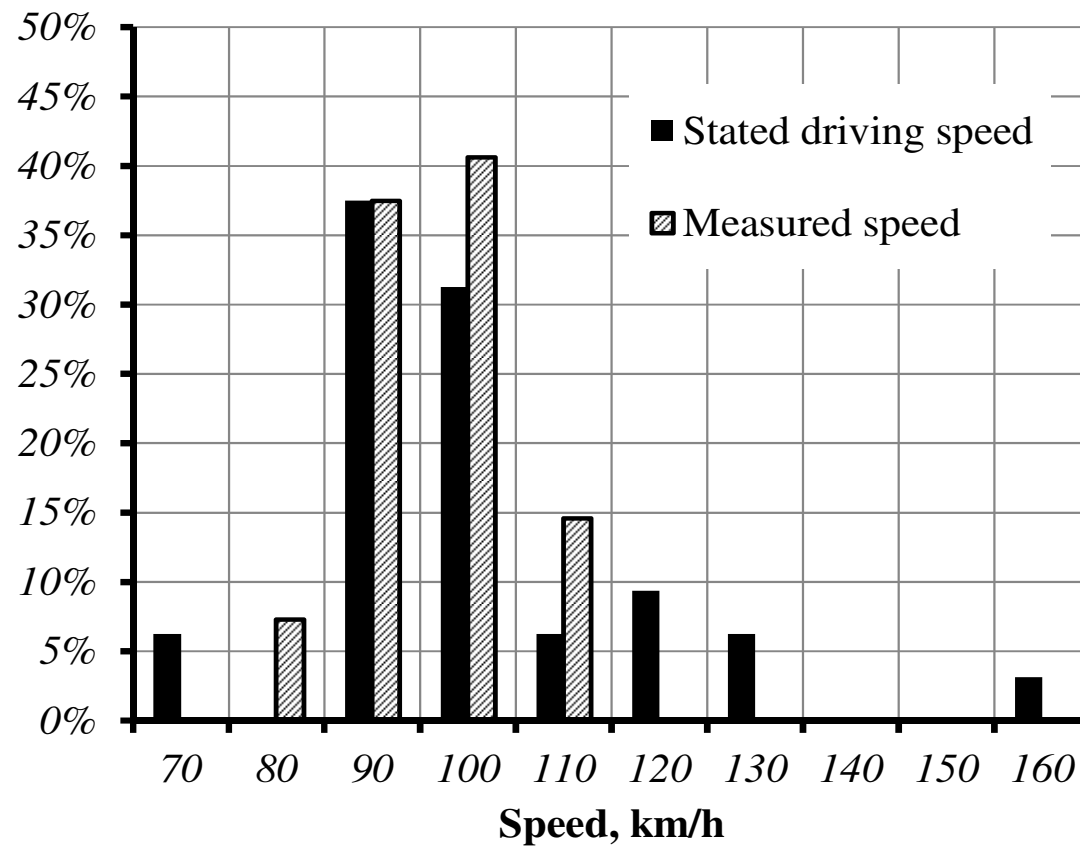
- Wider roads, higher speeds (moderate effect)
- Open environment, higeher speeds (large effect)
- Nr. lanes & separation, different per country
- Nice overlap between stated and actual speeds on 2 roads
- Just lowering the limit gives a moderate speed decrease
- Results feed into WP3/4 tool

- Tool for road authorities (demonstrated this afternoon)
- Is the limit safe and credible?
- If not, how can it be improved?
- Are the suggested measures cost-effective
- Usability tested at CEDR meeting Bonn 6th October 2011
- http://www.swov.nl/enquete/Eraser/Tool.php

road ERA net

What is a 'safe' speed?
(adopted from Sweden)

Types of infrastructure and traffic	Maximum safe travel speed (km/h)
Locations with possible conflicts between cars and pedestrians	30 (20 mph)
Intersections with possible side collisions between cars	50 (30 mph)
Roads with possible frontal collisions between cars	70 (40 mph)
Roads with no possibility of side or frontal collisions (only collision with structures)	>100 (> 60 mph)

Credibility features

- Accelerators:
  - Open road environment
  - Wide road
  - Straight road stretches
  - High quality road surface

- Decelerators:
  - Dense road environment
  - Narrow roads
  - Short road stretches
  - Physical speed reducers
  - Low quality road surface

Assessment:

```
┌──────────────┐                           ┌──────────────────────┐
│ Speed limit  │ ────────────────────────▶ │ Credible speed limit │
└──────────────┘                           └──────────────────────┘
      │                                              │
      ▼                                              ▼
┌──────────────┐        ┌──────────┐
│  Safe speed  │ ─────▶ │ Priority │
└──────────────┘        └──────────┘
```

List of:
- Accelerators
- Neutral elements
- Decelerators
- Reference to ERA-NET SPACE-project

Options:
- Adapt speed limit
- Adapt road design & environment (list of features)
- Effects and costs/km

Additional general comment:
- Look at driving speeds, enforcement and communication
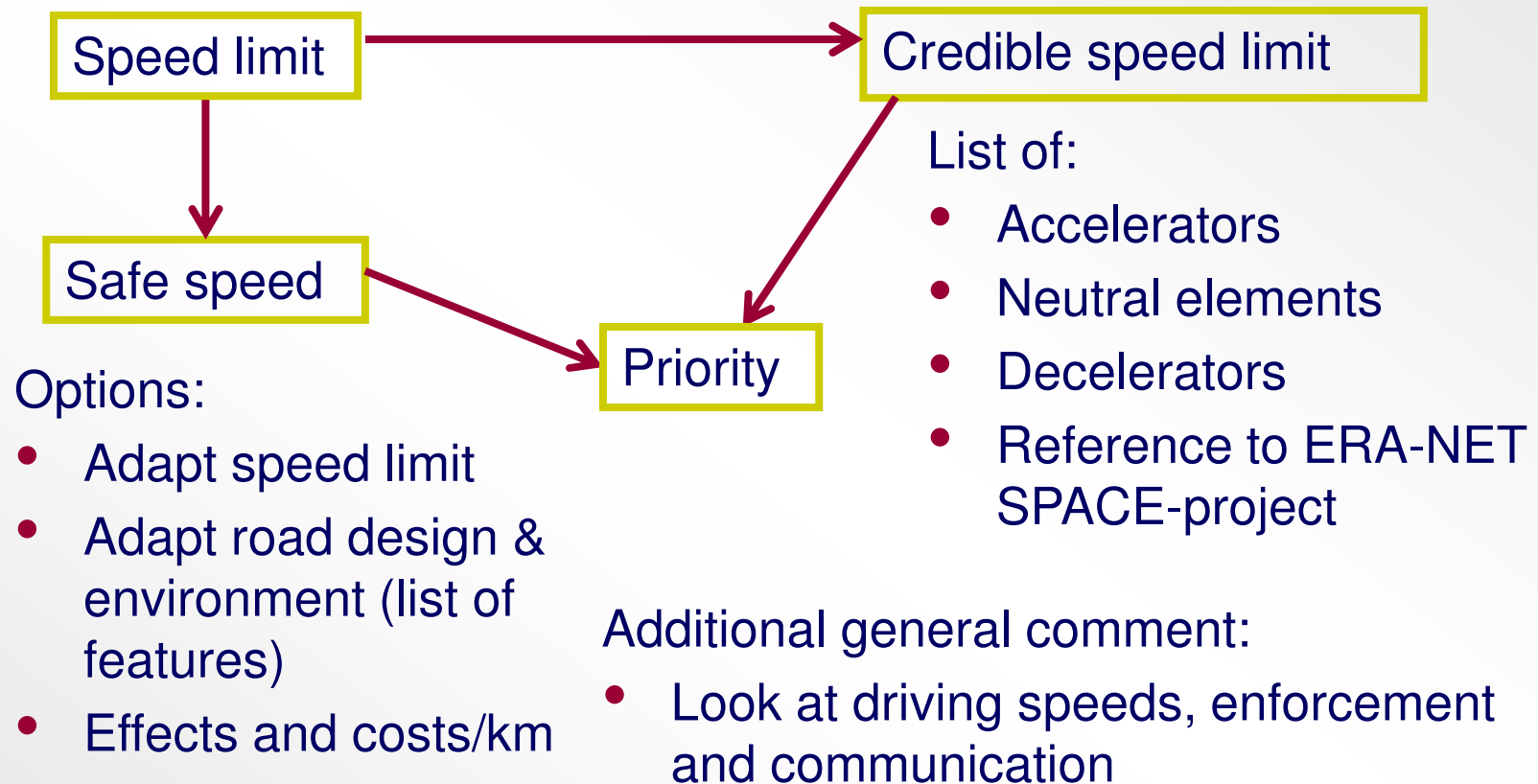
Results

The speed limit of your road= 60 km/h (40 mph)

The calculated safe speed limit=40 km/h (25 mph)

The speed limit is credible

Evaluation details

The speed limit is higher than the current safe system standards allow for.

You might decrease the speed limit to 40 km/h (25 mph).

Effectiveness: 5-10%

Cost indication: low

Alternatively, you might adapt the failing design elements of the road, which are:

- Access restriction recommended for vulnerable road users.
  Effectiveness: 0-25%
  Cost indication: medium-high

- Obstacle free zone should be > 2.5m or safety barrier.
  Effectiveness: 20-75%
  Cost indication/km: low-medium

- Shoulders should be present and well paved, or be unpaved for more than 1m.
  Effectiveness:
  Cost indication/km:

- Level junctions should have speed reducing measures (e.g. plateaus).
  Effectiveness: 30-70%
  Cost indication/km: low-high

Credibility

Decelerators

- The road is smaller than 4.5m

Credible road features

- No access restrictions
- No separation of driving directions
- Dense or semi-open road environment
- Straight stretch of road is shorter than 180m

Accelerators

- No physical speed reducers at (all) junctions

When available, speed data can be a usefull additional source of information. Be aware that speed is influenced by more factors than road design alone.
More information about measures that can be taken, can be found in this document of the SPACE-project .

Urgency
The urgency of taking action on your road is: Moderate

- CEDR, Bonn: 18 participants, 16 countries
- Introduction and presentation of ERASER and tool
- Questionnaire: 8 responses
- Agreement on usefullness of this type of tool
- Content with basis and style of the tool
- Suggestions differ, some want more detail, others less

SaCredSpeed

Legend:
- To high limit
- Credible
- To low limit
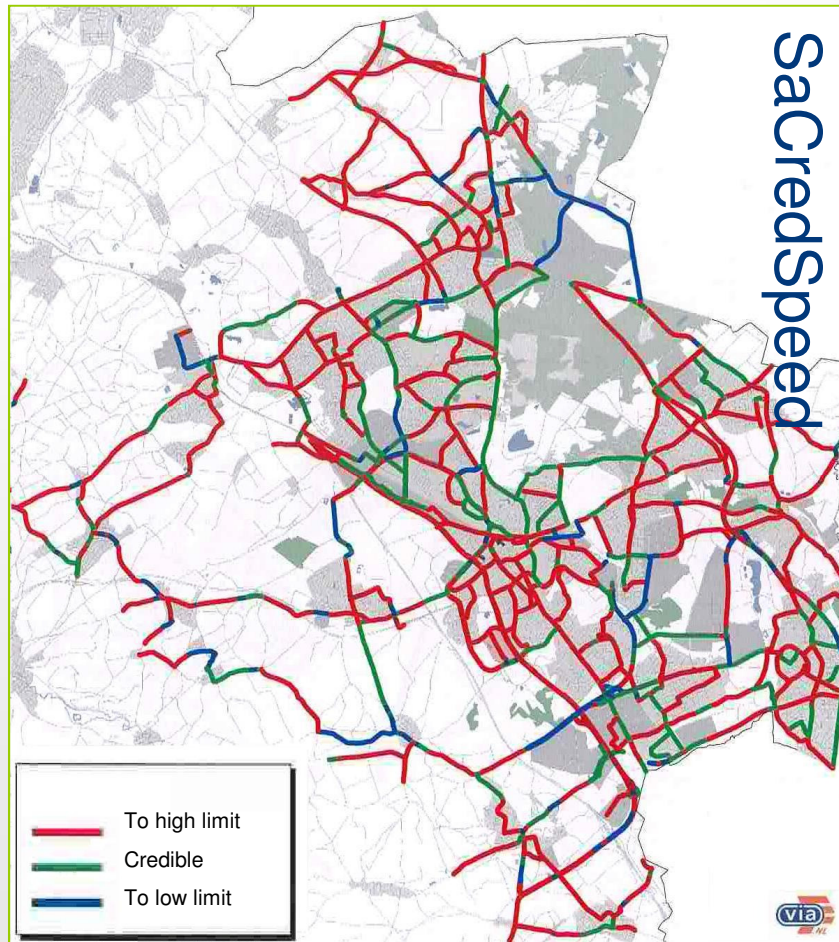
- Example of tool in NL:
  - GIS-based tool
  - Database of road network
  - Attractive user-interface

- Website: www.kfv.at/eraser
- Leaflet
- 4 factsheets
- List of relevant congresses and journals
- Presentations and articles to follow
- So far:
  - CEDR Bonn Oct 2011
  - Central and Eastern European countrioes (CEE) Budapest Oct 2011
  - Experts meeting Vienna Oct 2011

- Tool that works and is usefull!
- General European SER features:
  – Width
  – Environment
- Country specific SER features:
  – Median treatment
  – Number of lanes

Thank you for your attention
www.eranetroad.org

Rob Eenink
SWOV, Institute for Road safety Research
Rob.eenink@swov.nl