Speed management in the Netherlands

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www.swov.nl
Where we are…
A country of flowers
Of windmills
Of canals
Of beautiful canals
Of bicycles
Of a lot of bicycles
Of more and more bicycles
…and of speedmanagement
About SWOV Institute for Road Safety Research

- Independent institute, founded in 1962
  - aims to improve road safety by ‘evidence based’ knowledge
  - research and knowledge dissemination to road safety professionals
- Four-years programme: 2003-2006, covering all road safety fields
- Financed by Dutch Ministry of Transport and others, international bodies (Europe)
- Research staff: 40

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Some facts about the Netherlands

- 16.2 million inhabitants, 10.5 million with a driver’s license (from the age of 18)
- 8.5 million registered motor vehicles
- 13 million bicycles
- 2,500 km of motorway; 130,000 km of paved roads
- Almost 200 billion travelled kilometres
- In 2004: 881 traffic fatalities and about 11,000 (registered) hospitalisations
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Fatalities per 100,000 inhabitants (2003)

[Bar chart showing fatalities per 100,000 inhabitants for various countries, with the Netherlands highlighted.]

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Fatalities in the Netherlands since 1950

Fatalities

0 500 1000 1500 2000 2500 3000 3500

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Fatalities since 1996

Target 2010: 900
Speed management: engineering
Speed management: limits
Speed management: enforcement
Country-specific problems
Speed and crashes (Elvik, et al. 2004)

- Very strong statistical relationship between speed and road safety
- When speed goes down, injuries go down; when speed goes up, injuries go up
- Causal direction between speed and road safety is clear
- Clear dose-response relationship between changes in speed and changes in road safety
- Relationship can be explained by laws of physics (stopping distance, $\frac{1}{2}mv^2$)
As background: speed limits in the Netherlands

- 1957: urban streets: 50 km/h
- 1974: rural roads: 80 km/h
  trunk roads: motorways: 100 km/h
- 1976: residential streets: ‘woonerf’
- 1983: residential streets: 30 km/h-zones
- 1988: motorways 120 km/h or 100 km/h (and a very short stretch of 80 km/h)
- 1995/1996: speed limiters for lorries (> 12 ton) and buses (>10 ton)
Opinions on speed limits (Sartre, 2003)

- Motorways: Lower 0%, Same 0%, Higher 0%, No limit 0%
- Trunk roads: Lower 0%, Same 0%, Higher 0%, No limit 0%
- Rural roads: Lower 0%, Same 0%, Higher 0%, No limit 0%
- Urban roads: Lower 0%, Same 0%, Higher 0%, No limit 0%
Exceeding speed limits (self-reported)

- Motorways: Often (25%), Very often (15%), Always (5%)
- Trunk roads: Often (15%), Very often (10%),Always (5%)
- Rural roads: Often (10%), Very often (5%), Always (2.5%)
- Urban roads: Often (5%), Very often (2.5%), Always (1%)

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Current speeding behaviour (measured)

<table>
<thead>
<tr>
<th>Type of road</th>
<th>Speed limit</th>
<th>% Exceeding limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorways</td>
<td>120 km/h</td>
<td>~ 40%</td>
</tr>
<tr>
<td></td>
<td>100 km/h</td>
<td>~ 45%</td>
</tr>
<tr>
<td>Trunk roads</td>
<td>100 km/h</td>
<td>~ 20%</td>
</tr>
<tr>
<td>Rural roads</td>
<td>80 km/h</td>
<td>~ 45%</td>
</tr>
<tr>
<td>Urban roads</td>
<td>50 km/h</td>
<td>25-70%</td>
</tr>
</tbody>
</table>
Speed management is an integral and prominent component of Dutch road safety policy in our **Sustainable Safety Vision**
Sustainable Safety vision

- Vision developed early nineties; implementation since mid nineties
- Aim: prevent crashes and minimise the chance of serious injury
- Speed management is a central element
- Type of measures:
  - Infrastructure, supported by
  - Enforcement
  - Education and publicity
  - Vehicle measures
Three Sustainable Safety principles

- **Functionality**
  - A limited number of mono-functional road categories (flow, distributor, access)

- **Homogeneity**
  - Eliminate large differences in speed, mass and direction

- **Predictability**
  - Prevent uncertainty amongst road users: recognition of road function, design consistency, predictable road course
Homogeneity and speed

When motorised and vulnerable road users resp. non-motorised traffic mix, speed must be low:

- Extension of 30 km/h zones in built-up areas
- Introduction of 60 km/h zones in rural areas
- Speed reduction measures at junctions
  - Speed humps and raised intersections
  - Round-abouts
Speed humps and raised intersections
Round-abouts
Effects of infrastructural measures

- **Categorisation of roads (~ 100%)**

- **30 km/h zones**
  - Currently approx. 50% implemented (30,000 km)
  - Injury accident reduction: 22% (SWOV, 1993)

- **60 km/h zones**
  - Currently approx. 50% implemented (12,500 km)
  - Injury accident reduction: 25% (Waterboard, 2004)
  - Largest accident reduction at junctions

- **Round-abouts**
  - Fatal and serious accident reduction: 63% (SWOV, 1995)
Categorisation of roads

~100%
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Speed enforcement

- Change of law -1992
  - ‘Minor’ offences settled administratively
  - Massive introduction of speed/safety camera’s
  - Fines sent to license plate holder

- Regional targeted enforcement projects -1999
  - Extra police officers: 28 in each of 25 police regions
  - Information and communication officer
  - Financed by revenues from fines
  - Targets in terms of efforts (e.g. 950 hours per week)
  - Five priorities (speeding, alcohol, seatbelts, red lights, helmets)
### Number of fines for speeding: 1995-2004

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Fines (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>1.0</td>
</tr>
<tr>
<td>1996</td>
<td>1.5</td>
</tr>
<tr>
<td>1997</td>
<td>2.0</td>
</tr>
<tr>
<td>1998</td>
<td>3.0</td>
</tr>
<tr>
<td>1999</td>
<td>4.0</td>
</tr>
<tr>
<td>2000</td>
<td>5.0</td>
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<td>2001</td>
<td>6.0</td>
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<td>2002</td>
<td>7.0</td>
</tr>
<tr>
<td>2003</td>
<td>8.0</td>
</tr>
<tr>
<td>2004</td>
<td>8.5</td>
</tr>
</tbody>
</table>
Regional project: effect on speed violations (SWOV, 2004)

- Enforced roads vs. similar non-enforced roads; speed limit 80
- Development of the number of speed violations (>87km/h)
Regional project: effect on road safety

- Enforced roads vs. all other rural roads in same region
- Number of fatal and serious injuries resulting from motor vehicle accidents

Saving: $1 - \frac{122}{1090/1986} = 1 - 0.79 = 21\%$

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<tbody>
<tr>
<td>Enforcement</td>
<td>281</td>
<td>122</td>
</tr>
<tr>
<td>No enforcement</td>
<td>1,986</td>
<td>1,090</td>
</tr>
</tbody>
</table>
Success elements

- Intensity of the enforcement
- The duration of the project
- Publicity
  - at the spot
  - in general (mass media!)
- Credibility: dangerous roads!
- Mobile camera’s: unpredictability
- Certainty of paying the fine
Recent developments on enforcement

- Increasing number of “automated section controls” (on motorways and major rural roads)
  - Efficiency: high
  - Effectivity: first indications are very positive (<1% violators), reduction of crashes
  - Public acceptance: rather high

- Increasing number of unobtrusive video cars
  - Aiming to catch the ‘excessive speeder’ and other excessive violators
  - Efficiency and effectiveness: some doubts
  - Public acceptance: very high
Summing up:

- Speed and speeding are important factors in road safety and road safety policies in the Netherlands.
- Sustainable safety: avoid encounters with high impact speeds and mass differences.
- Legal and infrastructural measures are the basis supported by enforcement.
- Public acceptance and understanding of speed limits and speed enforcement is important.
- Successful approach, but still a long way to go.
### Future developments (SWOV, 2004)?

- **Enhance the credibility of speed limits**
  - Speed limits more in accordance with road design, road function and road environment
  - Ideally, a system of dynamic, flexible speed limits – the role of Intelligent Speed Adaptation (ISA)
  - More communication on the backgrounds of speed limits

- **Enhance the credibility of speed enforcement**
  - Focus on objective or subjective ‘logical’ spots
  - Wider use of automated section control
  - Communicate to road users the need for enforcement and its effects
Speed cameras: a cry for “REVENGE”
Thank you for your attention