
Ministerie van Verkeer en Waterstaat
Rijkswaterstaat
Roadside Safety Aspects in RSA's
The Dutch Approach
Workshop RISER, Budapest
Ministry of Transport, Public Works and Water Management
Road Design Departement
Warner van Hattem (The Netherlands)
1 december 2005


Road Side Safety Aspects in RSA's 2
1 december 2005
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RSA in the Netherlands

- Starts in 2002
- Training auditors
- Pilots and evaluation
- Voluntary approach

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Project Stages

- RSA in the Netherlands
- Project stages
  1. Preparatory tasks of design
  2. Preliminary design
  3. Final design (tender document)
  4. Before opening of the road
  5. After opening of the road
- Conclusion

Design Principles:

the EARLIER, the BETTER

P3 Minimise the severity of the injuries

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Preparatory Tasks of Design

P1 Prevent leaving carriageway
- Reserve sufficient space to enable an optimal road design

P2 Minimise risks
- Reserve sufficient space to enable an optimal obstacle-free zone

P3 Minimise injuries
- Define requirements for VRS
  ASI < 1,0

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Preparatory Tasks of Design

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Preliminary Design (1)

P1 Prevent leaving carriageway

- Prevent sharp curves
- Optimal cross section
  - Lane width
  - Hard shoulder
  - Recovery area
- Optimal superelevation
- Ensure sight distance

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Preliminary Design (2)

P2 Minimise risks

- Soft shoulder/ central reserve considering obstacle-free zones
  - Determine road axis
  - Determine distance between carriageways
- Low gradient side slopes
- Remove or replace obstacles
- Combine obstacles
  - Traffic signs with fly-overs
  - Cameras with lighting
- Minimise objects in behalf of motorcyclists

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Preliminary Design (2)

Preliminary Design (3)

P3 Minimise injuries

- Application of passively safe poles
- Soft shoulder/ central reserve considering VRS's
  - Soil rampart
  - Flexible VRS
  - Rigid VRS
- Application of passively safe noise barriers
- Additional construction width considering a noise barrier
- Use service roads and secondary road network for vulnerable road users

Preliminary Design (3)

Final Design, Tender Document (1)

P1 Prevent leaving carriageway

- Wide recovery area (not too wide to avoid unwanted behaviour)
- Acoustic road markings
- Rumble strips in recovery area
- Visual guidance by passively safe devices

Final Design, Tender Document (1)

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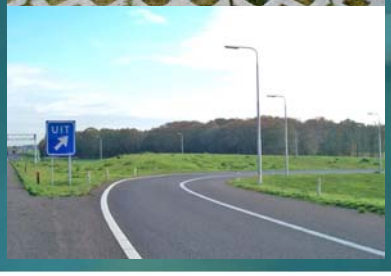
Final Design, Tender Document (2)

P2 Minimise risks

- Matted shoulder
  - Roughness
  - Green appearance
- Lighting poles (although passively safe) in inside curve of connecting roads
- Combine obstacles



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Final Design, Tender Document (3)

P3 Minimise injuries

- Application of the correct VRS
  - ASI-value
  - Availability of space

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Before Opening of the Road

P1 Prevent leaving carriageway

- Roughness and contrast of pavement
- Roughness of road marking in behalf of motorcyclists

P2 Minimise risks

- Level out altitude differences between hard and soft shoulder
- Level out soft shoulder to prevent roll-overs

P3 Minimise injuries

- Obstacles
  - Passively safe
  - Possibilities to combine
- Application of the correct VRS
- Correct installation of the VRS

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Before Opening of the Road

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After Opening of the Road

- Maintenance program 'PRIOBERM'
  - Priorities
  - Costs

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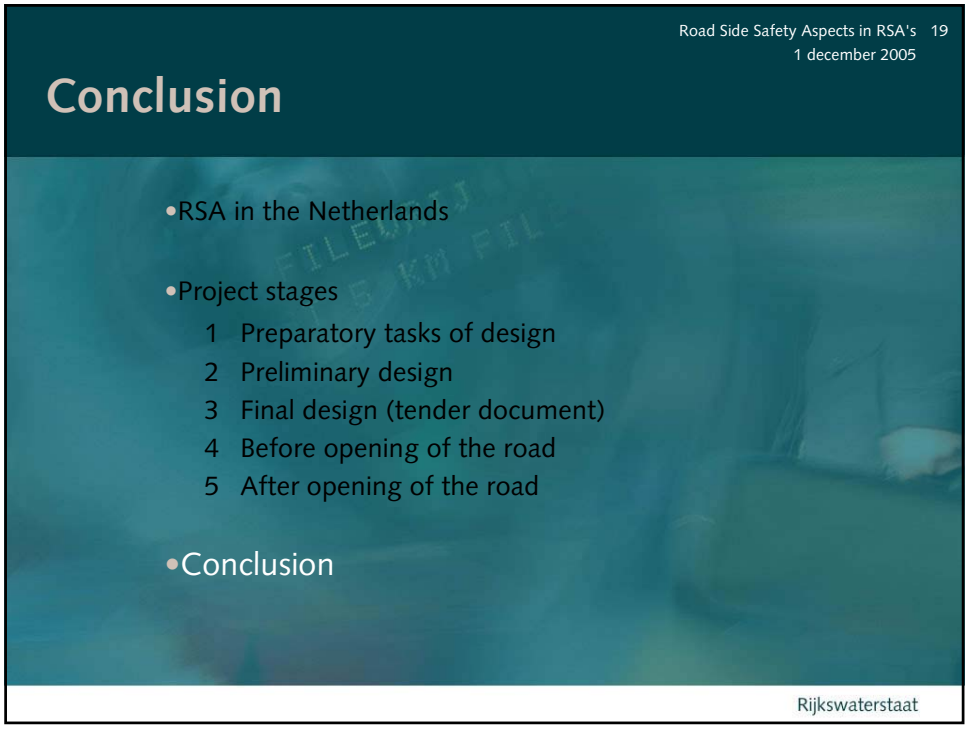
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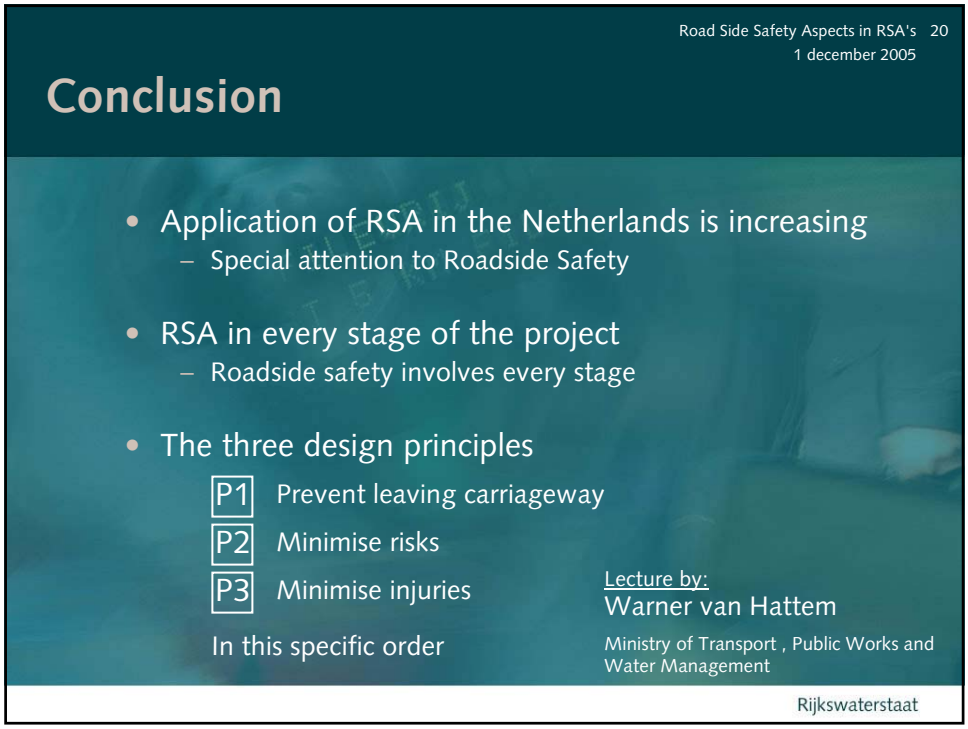
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Conclusion
• Application of RSA in the Netherlands is increasing
– Special attention to Roadside Safety
• RSA in every stage of the project
– Roadside safety involves every stage
• The three design principles
P1 Prevent leaving carriageway
P2 Minimise risks
P3 Minimise injuries
In this specific order
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