ERA-NET ROAD
Road Infrastructure Safety Management Evaluation Tools - RISMET

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Stockholm, Sweden

Govert Schermers, SWOV, Netherlands

SEVENTH FRAMEWORK PROGRAMME

Road Infrastructure Safety Management Evaluation Tools - RISMET

This project/programme was initiated by ERA-NET ROAD, a project funded by the European Commission, 6th Framework programme

RISMET Project Consortium

Project Coordinator: SWOV

Institute for Road Safety Research

Project Partner 2: TUD

Technische Universität Dresden

Project Partner 3: LNEC

National Laboratory for Civil Engineering

Project Partner 4: TØI - Transportøkonomisk institutt Stiftelsen Norsk senter for samterdselsforskning

Project Partner 5: TRL – Transport Research Laboratory

Project Partner 6: KfV - Kuratorium für Verkehrsicherheit

Background

- Responds to general goal of Safety at the Heart of Design

  "..improvement of road safety through increased awareness and acceptance to implement joint road safety solutions"

- More specifically

  "seeks appropriate solutions and measures for rural roads throughout Europe"

Problem Statement

- Existing techniques, tools and models for evaluating road safety engineering measure inadequate
- Not suited to measure effect of (elements of) design on behaviour and safety
- Techniques have no/limited predictive ability, at local and/or network level
- Relevance of traditional techniques (accident dispersion)

Rismet objectives

- Define minimum data requirements
- Develop uniform methodology for data collection and analysis
- Assess applicability of existing evaluation tools
- Amend or develop tools for assessing efficacy of safety engineering solutions
- Evaluate the applicability of (new) tools
- Formulate good practice guidelines

Work PLan

5 Workpackages

- WP 1: Project management and dissemination
- WP 2: Data systems and requirements
- WP 3: Applicability of existing evaluation tools
- WP 4: Development of new evaluation tools
- WP 5: Guidelines and codes of practice

WP1 (SWOV)

- Project Management
  - Project management and financial administration
  - Project meetings; Project Steering Committee and Executive Board meetings
  - Reporting and service delivery
- Dissemination
  - Project Website
  - Detailed project work plan
    - Progress reports
    - Interim and final reports
  - External user group

Data systems and requirements (KfV)

- **Goal**

  To define the data and system requirements necessary to support the development of (future) evaluation tools required for effectively managing road safety in EU countries.

- **3 primary tasks resulting in deliverable (Data systems and requirements)**

WP2 (KfV) - approach

Literature review of relevant and prominent accident factors with focus on:

- Head-on and single vehicle collisions
- Rear-end collisions
- Lateral collisions

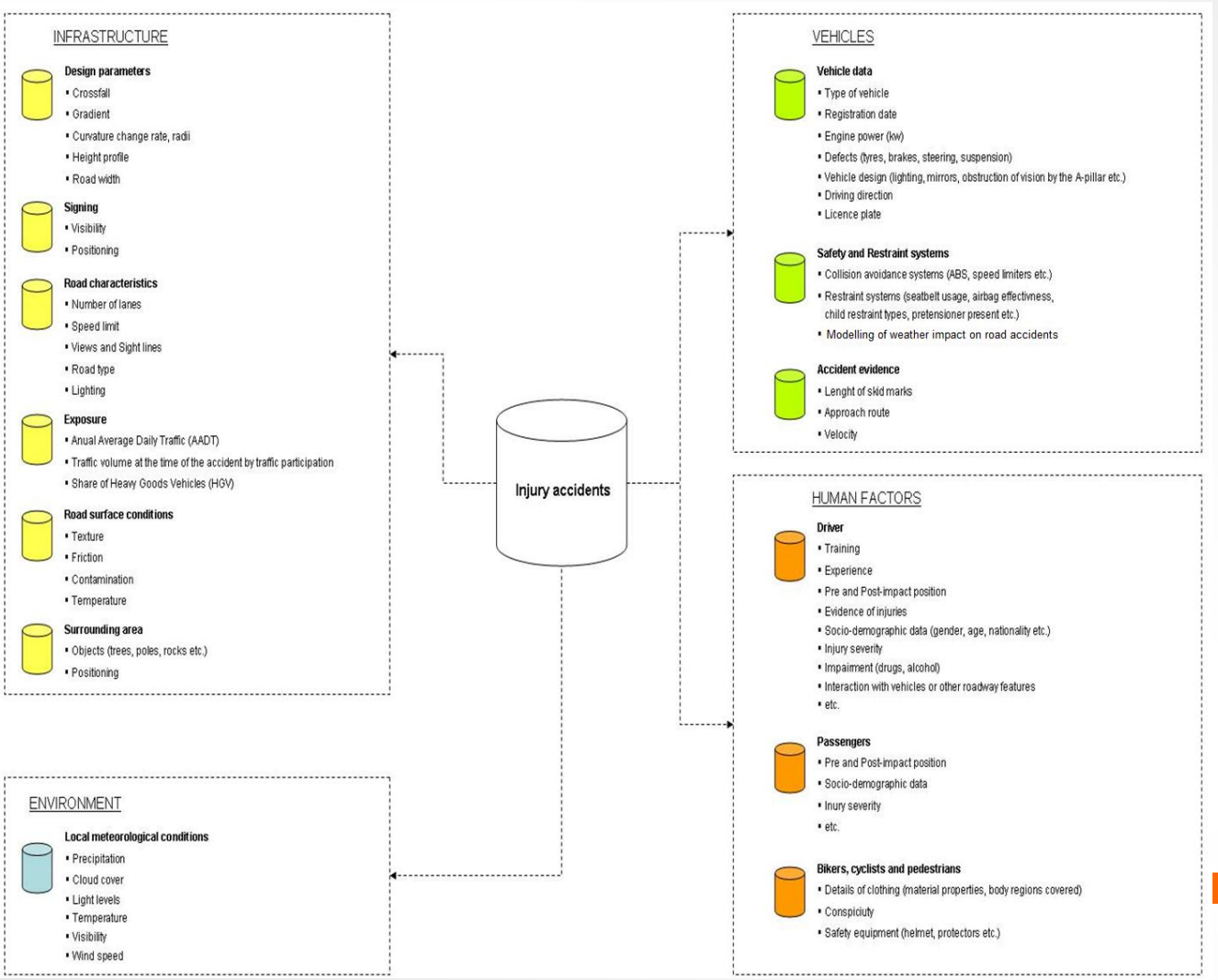
Review of state-of-the-art databases/information systems:

- Safety Analyst
- MOLASSESS
- HSIS – Highway Safety Information System
- GIDAS – Database
- Road Database of the TU Dresden
- ASB – German Road Information Bank Protocol

Inventory of availability and operational level of road safety data in 11 European countries by road safety categories

WP2 (KfV) - results

- Deliverable 2 report (Data systems and requirements)



WP 3 (TOI) - goals

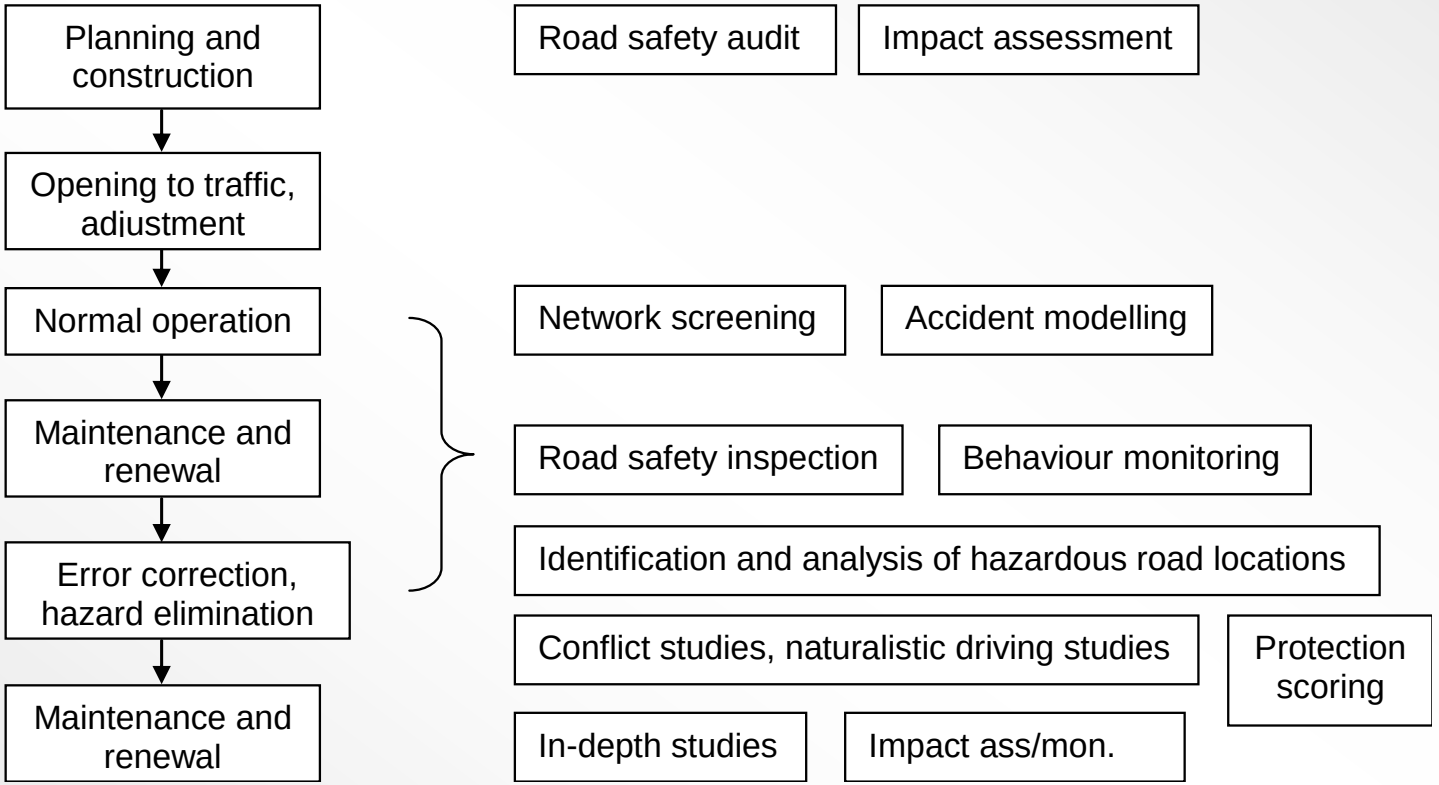
Applicability of existing tools

- Assess applicability of existing state of the art analytic tools (use/barriers)
- Outline steps to improve existing tools to become state of the art

WP 3 (TOI) - approach

- Quick scan/overview of existing tools and techniques
- Development of assessment criteria
  - Data requirement; standardised procedures; reporting; skill levels; objectivity; updating
- Survey among road authorities/practitioner
  - Type of tool, application and purpose
  - I/O requirements and capabilities
  - Model assumptions
  - Problems etc
- State of the art report (Assessment)

WP 3 (TOI) - results



WP 3 (TOI) - results

- Survey among 18 EU countries, 1 uses 10; 9 use at least 8 and 4 use at most 4
- Total scores based on weighting (use and monitoring) range from low of 15 to a high of 31 (max. 32)
- Only seven countries score higher than 70% indicating room to improve tools and promote usage
- No statistical correlation between use of tools and actual safety performance (small sample, many confounding factors)

WP 3 (TOI) - Future

1. RSA; RSI and RPS – monitor and evaluate effect by measure
2. Network screening –adopt Safety Analyst approach
3. Road accident modelling - test models empirically, incorporate RUB variables
4. BSM – employ Empirical Bayes approach for identification and the matched-pair approach for the analysis of contributing factors
5. RSIA – HSM reflects state of the art. Current practice to adopt this.
6. Monitoring of RUB – target max. five types of behaviour affecting safety (incl. speeding, not wearing seat belts and drinking and driving.
7. Conflict studies, naturalistic driver behaviour studies and in-depth studies of accidents are optional tools in the safety management toolbox; none are essential.

WP4 (LNEC) Goals

Development of evaluation tools

- To determine the most appropriate Bayesian modeling approach (Poisson; Poisson-Gamma and Poisson Log-Normal) and assessment methodology for intersections in EU countries
- To establish means to incorporate driver behaviour into APMs
- To test cross-country applications of APM
- To recommend approaches for future application and development

Results WP4 - Model form for junctions

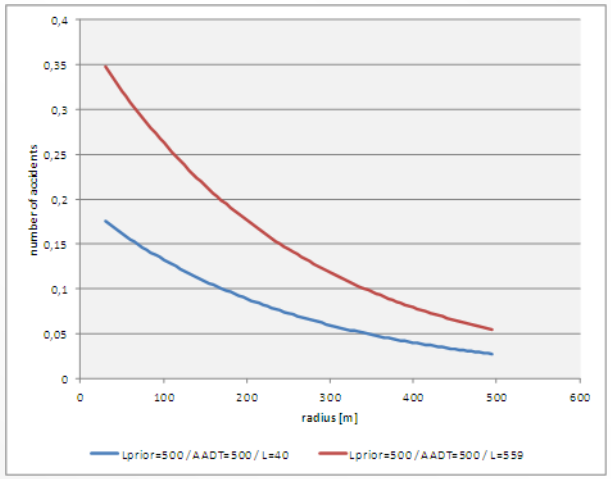
- Data from 4 countries independently and collectively modeled (NO; AT;P and NL)
- 1250 rural junctions (3 and 4 legs; roundabout, signal; priority control) using 5 year accident and traffic data
- 3 models fitted to each country's data, model fit checked and overall model choice scores compared
- Poisson-Gamma regression model most suited for accident modeling at junctions

Results WP4 - behaviour

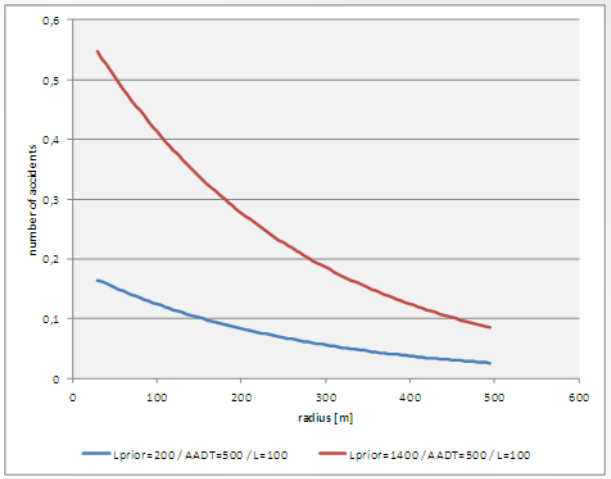
- Speed prediction models developed describing relationship between crashes, speed behaviour and alignment
- Applying SPM to 5930km German rural roads, curves and curved sequences detected and accidents mapped
- APMs describing single curves; curved sequences and sequence elements developed

Results WP4 (TUD)

- Length of single curve



Length of prior sequence



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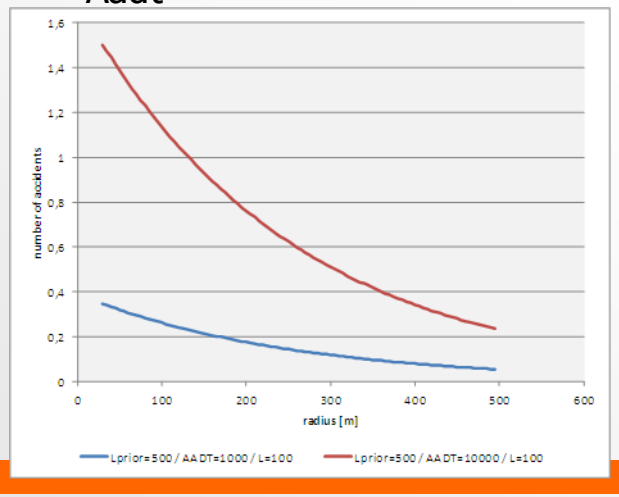

- Methodology suited for managing safety on existing roads

Results WP4 (LNEC)

- Tools for evaluating design consistency
  - Detection of tangent and curve elements; estimates of speed profiles calculated
  - Classification of horizontal curves
  - APM for roads with/without shoulders
- Benchmarking using DE/P/NL data
  - Differences in data and quality
  - Data sets small (km and accidents)
  - TUD method better for existing roads, LNEC better for new/redesign
- Calibration studies required

WP5 (SWOV)

Data requirements for road network inventory studies and road safety evaluation – Guidelines and specifications

(based on inputs WP 2 and 3)

- Background,
- Purpose of guidelines
- Overview of current data collection and evaluation tools
- Framework for database (overview of databases, proposed dataset, data collection)
- Data specifications (roadway segments; alignment; intersections)

WP5 (SWOV)

Guideline for development and application of road infrastructure safety management evaluation tools

- Intro. and purpose of guidelines
- Theory and fundamentals of road safety
- Overview evaluation tools
- Guideline chapters on application and development:
  - RSA and RSI
  - Network screening/NSM
  - Accident modelling
  - Road protection scoring
  - BSM
  - Impact assessment
  - Monitoring RUB, conflict studies and In depths

Outputs and further reading

- Website (http://rismet.swov.nl)
- Detailed Work plan (D1)
- Data Systems and requirements (D2)
- Data requirements guideline and specification (D3)
- Assessment and applicability of evaluation tools (D4;D5)
- Accident Prediction Models for Rural Junctions on Four European Countries (D6.1)

Outputs, further reading

- Applying speed prediction models to define road sections and to develop APMs: A German case study and a Portuguese exploratory study (D6.2)
- Cross-country applicability of evaluation methods. A pilot study in Portugal and Germany (D6.3)
- Guidelines for development and application of evaluation tools (D7)

Thank you for your attention

www.eranetroad.org

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