National Technical University of Athens
School of Civil Engineering
Department of Transportation Planning and Engineering

Experiences and future challenges for reliable and transferable estimates of safety countermeasures in Europe

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'International Developments on Crash Modification Factors and Functions'

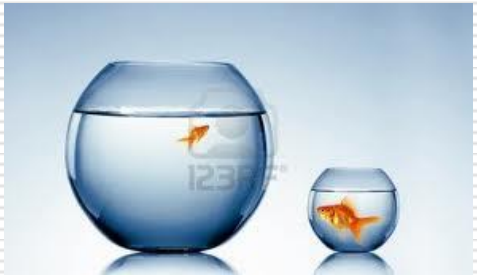
Background

If you cannot measure it,
you cannot improve it
(Lord Kelvin)

Road Safety is a typical field
with high risk of important investments
not bringing results

Background

- Economic appraisal: important tool in the hands of decision makers but also a complex issue:
  - difficulties in isolating the safety effect of a specific measure;
  - difficulties in comparing information/data among countries
    - differences in road traffic environments
    - differences in the actual investment costs among the countries
    - differences in methodologies of safety effect calculation



- Crash Modification Factors & Functions are fundamental to identifying the most effective safety countermeasures and for calculating safety benefits in economic analyses

Objectives

To analyse the current experiences and future challenges for reliable and transferable estimates of CMFs in Europe

- The need for reliable and transferable CMFs
- Current practices in Europe
- Key resources and publications
- Challenges for the European context
- Opportunities for international collaboration

The need for good and transferable CMFs

- A questionnaire survey among European road safety stakeholders was carried out on 2012 (DaCoTA project), aiming to identify the needs and priorities for safety data & tools
  - More than 500 stakeholders
  - More than 55 items (data, knowledge & tools)
  - Covering the entire policy making cycle

    Fact finding ⇨ programme development ⇨ implementation ⇨ evaluation

- The survey revealed that 'implementation of measures' and 'cost & safety impacts of measures' are of highest importance (high priority and low availability)
  - Monitoring of implemented measures across Europe
  - Good practice on measures implementation
  - Costs and safety impacts of single & combined measures
  - Common methodology for assessing safety impacts

The need for good and transferable CMFs

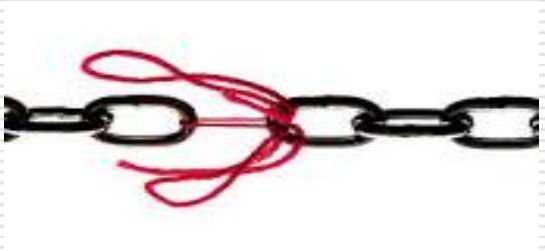
- Need to make sure that the limited funds available are used effectively.
- A CMF allows a synthesis of diverse evaluation results that in turn allows for more universal understanding and application of safety effectiveness measures.

  ex-post evaluations ⇨ meta-analyses ⇨ theorizing
- The narrower the CMF distribution, the larger is the probability that policy decisions are correct.
- A CMF could allow more rapid adoption and dissemination of new safety measures.

- CMFs are the basis for evidence based safety policies.

Current practice in Europe

- **Two recent surveys** on road safety management in Europe with similar results
  - The DaCoTA research projects
  - The ETSC / PIN survey

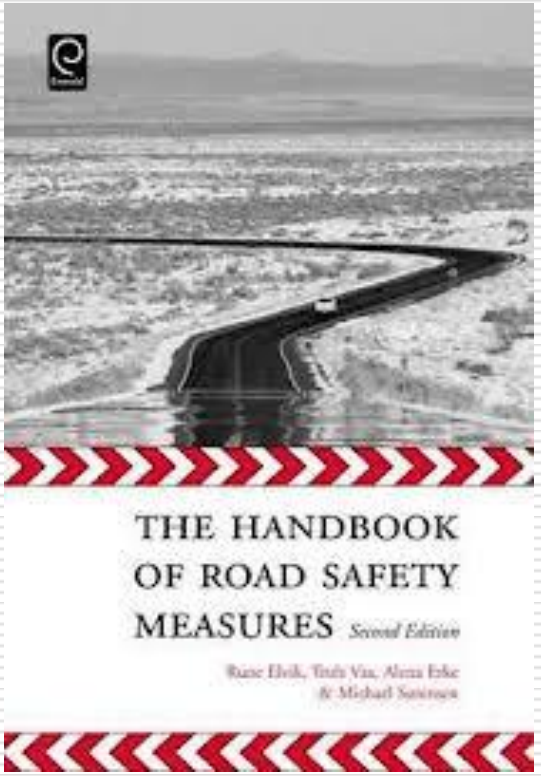


- Evaluation of safety measures appears to be **the weakest component** of road safety management systems in Europe
  - Only in few countries, evaluation of safety measures is part of the culture and a routine within the road safety programme, with a dedicated budget.
  - In most countries, evaluation is rare and adjusted to the available budget.
  - Evaluation is usually limited to infrastructure and enforcement measures.
  - Evaluation of entire road safety programmes is even more rare
  - Formal efficiency assessment techniques are not always implemented.

- Due to the **lack of a common framework as regards CMFs** in the European context, researchers and policy makers rely on a number of key publications and resources

Key publications and resources

- The Handbook of Safety Measures (2009)
- State-of-the-art summaries of current knowledge on the effects of 128 road safety measures
  - policy instruments
  - road design, equipment, maintenance, traffic control
  - vehicle design, protective devices, inspection
  - driver training and regulations,
  - public education & information,
  - police enforcement and sanctions,
  - post-crash care

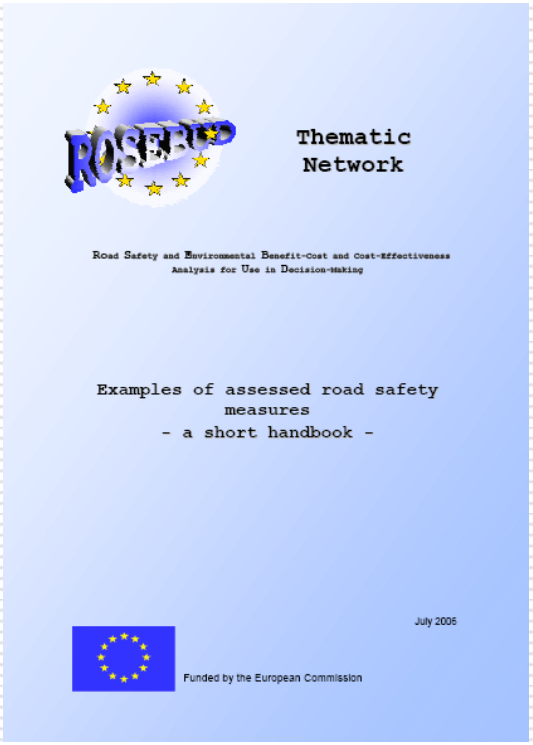


- Formal techniques of meta-analysis were used.

- A systematic framework was used to assess the validity of the studies.

Key publications and resources

- The ROSEBUD Handbook (2006)
  «Examples of assessed road safety measures»

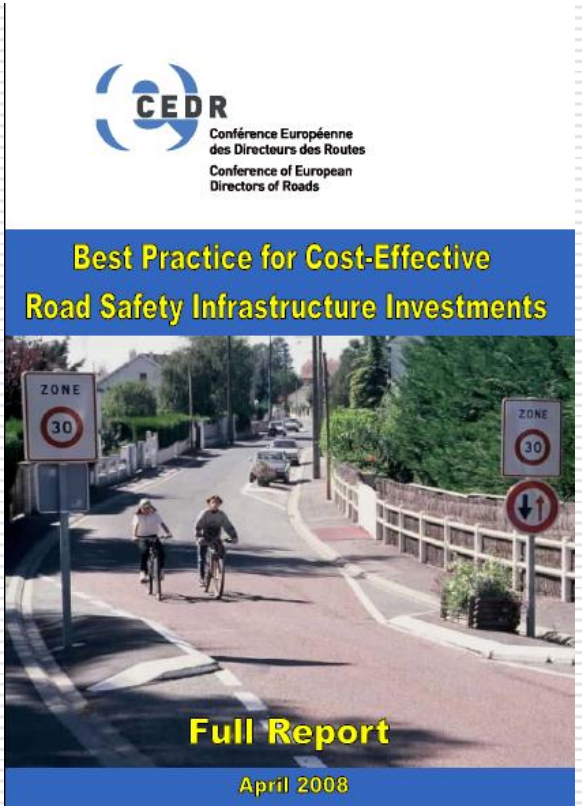


- The handbook includes information about various assessed road safety measures.
  - User related
  - Vehicle related
  - Infrastructure related

- The assessment methods used are cost effectiveness analysis (CEA) or cost-benefit analysis (CBA)
- According to the Benefit-Cost ratio, measures are ranked as poor, acceptable and excellent.

Key publications and resources

- The CEDR Report (2008)
  «Best Practice on Cost Effective
  Road Safety Infrastructure Investments»
- A review of 56 road infrastructure investments (literature and national CEDR questionnaires)
  - motorways, rural roads, urban areas
  - Simple road sections, bends, junctions
- Five most promising investments were identified:
  - Roadside treatment
  - Speed management
  - Junctions layout
  - Junction traffic control
  - Traffic calming



  - Safety effects, Other effects (mobility, environmental etc.), Investments costs, CEA/CBA results, Strengths and weaknesses, implementation barriers

Key publications and resources

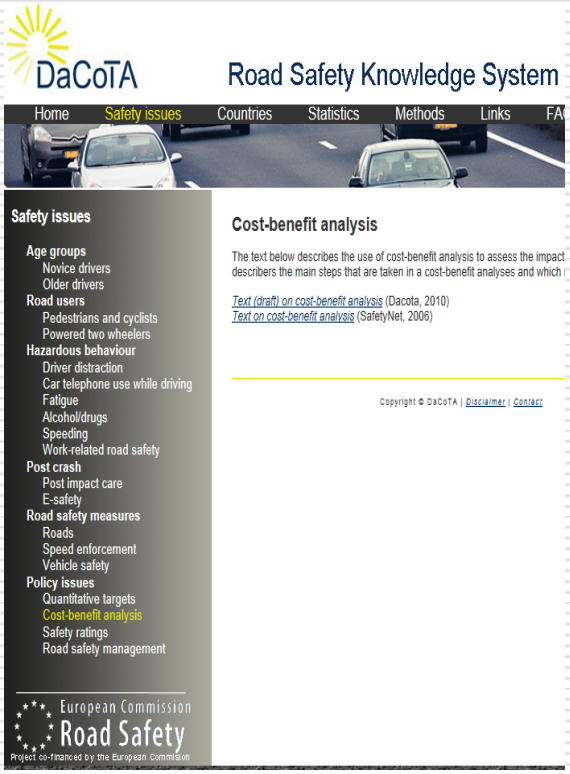
- The SUPREME Handbooks (2007)
  "Best practices in road safety"

- Handbook of measures at country level
- Handbook of measures at European level
  - Best practice (B/C ratio available)
  - Good practice (sound theoretical basis)
  - Promising practice (new measures)

- Nine thematic areas
  - Education, campaigns, driver training
  - Rehabilitation and diagnostics
  - Vehicles
  - Infrastructure
  - Enforcement
  - Statistics and in-depth analysis
  - Institutional organisation
  - Post-accident care

Key publications and resources

- The European Road Safety Observatory



- ERSO helps policy makers & researchers to find their way into the European road safety world.
  - Knowledge & webtexts on safety issues
  - Data (fatalities, exposure, SPI, attitudes & behaviours, in-depth data)
  - Basic Fact Sheets, country profiles, forecasts & benchmarking

- CMFs and economic appraisal in the ERSO
  - Inventory of measures implemented in Europe
  - Webtext on Cost-Benefit Analysis
  - Links to key resources and publications

Summary of current practice in Europe

- Existing efforts on analysing the impacts of road safety measures in Europe provide a wealth of information:
  - Description and qualitative assessment of measures
  - Quantitative assessment (CMFs, CBA)
  - Directions and needs for further research

- In the European context, CMFs are neither as specific nor as detailed

Challenges for the European context

- **Technical challenges**
- Lack of uniformity in the performance of related research and the reporting of research results.
- Lack of common values for monetary assessment (e.g. VoSL)
- Lack of CMFs for assessing the impacts of combined measures
- Lack of CMFs for assessing road safety programmes

- While most countries use CMFs from other countries, the process of transferring is imperfect - research findings not well documented.
- Properly planned, conducted and documented (including circumstances under which the CMF was developed) research will improve transferability of CMFs.
- At the moment relatively few studies meet these standards.

Challenges for the European context

- **Challenges for transferability**
- Lack of a uniform understanding of the value, importance and usage of CMFs in road safety decision making.
- Need to assess the particularities of setting, context, and implementation features of a specific measure.
- The safety effects of even the most promising road safety measures cannot be guaranteed.

- Manuals and handbooks have been developed, aiming to gather, harmonize and improve the existing knowledge on CMFs (e.g. Highway Safety Manual)
- These are often used by European countries, by adopting the CMF values.
- Due to the important gaps in the knowledge concerning the transferability of CMFs, several counties have developed their own methods and values.

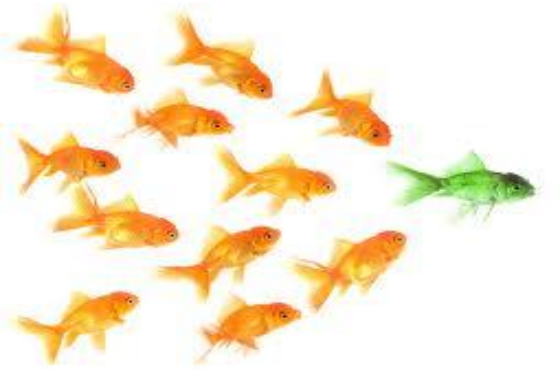
Opportunities for international collaboration

- The most important gaps and uncertainties in the efficiency assessment process concern the adoption of appropriate values for CMFs

- Advancement of thinking about what research produces a good CMF.
- CMF evaluation should become a required procedure for all road safety investments
- Any following investments should be linked with the CMF results of the previous investments.
- Standard and uniform CMF evaluation procedure as established through continuous international cooperation in the field is the first step towards transferability of CMF experiences.

Opportunities for international collaboration

- Increasing the accessibility of this information, through the dissemination of efficiency assessment results.
- Communicating the value of certain countermeasures across international boundaries and seeking their rapid adoption will help to maximize research investments.
- International dialogue and leadership to advance a broader global effort
- Cooperation among selected researchers offers an opportunity to expand international dialog.



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