Development of Czech road safety impact assessment guidelines
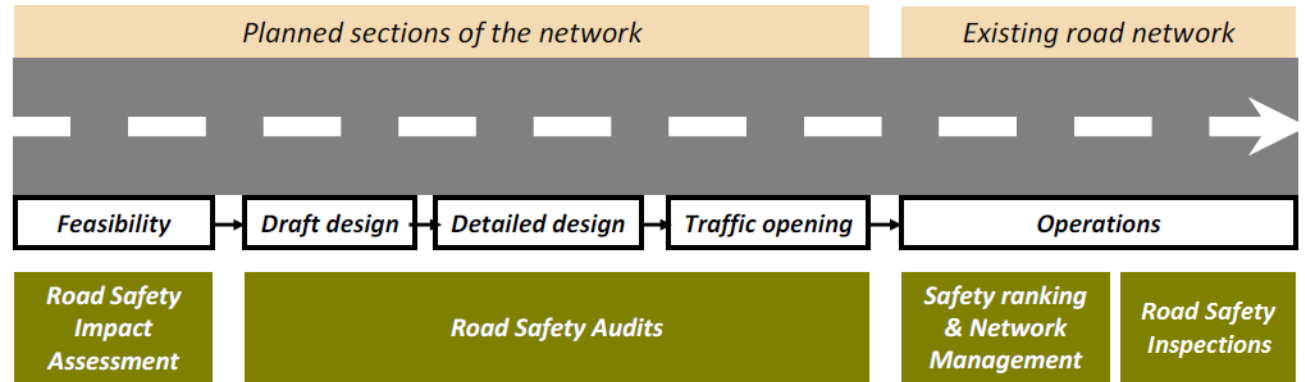
Jiří Ambros

CDV – Transport Research Centre
Czech Republic

Introduction

- EU directive 2008/96/EC on road infrastructure safety management

Planned sections of the network				Existing road network	
Feasibility	Draft design	Detailed design	Traffic opening	Operations	
Road Safety Impact Assessment	Road Safety Audits			Safety ranking & Network Management	Road Safety Inspections

www.brrc.be

- RSIA+RSA on planned roads, NSR+RSI on existing roads

Road safety impact assessment (RSIA)

- "a strategic comparative analysis of the impact of a new road or a substantial modification to the existing network on the safety performance of the road network"

- alongside with other impact assessments, such as environmental impact assessment (EIA)

- Member States to implement Directive tools by 2011

- often rather legislative documents, than practical guidelines

The Directive tools in the Czech Republic
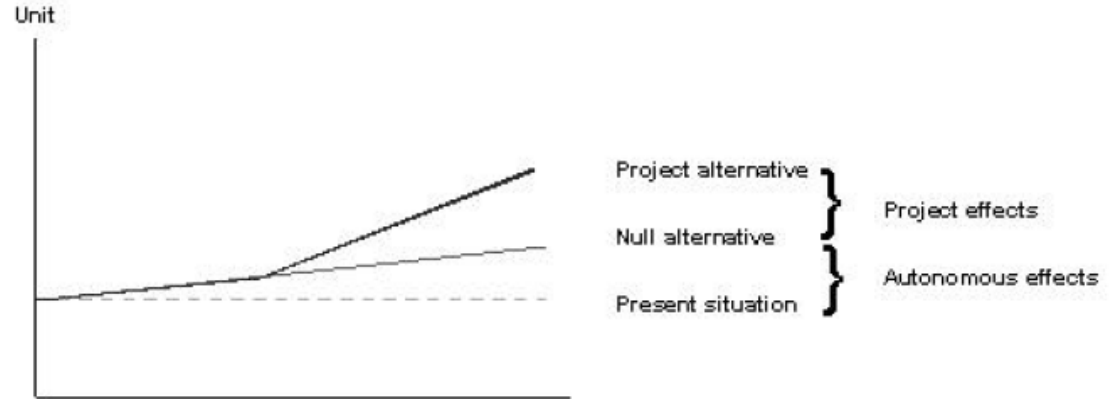
- black spots (2001), RSA (2006), RSI (2008)…
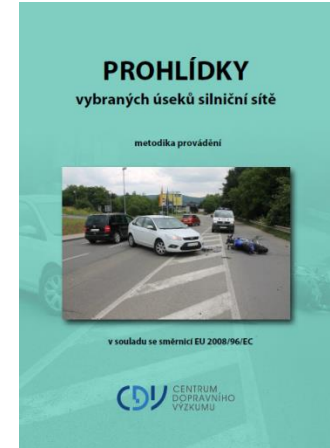
- RSIA the least used across EU, including CZ

How to carry out RSIA?

- definition and comparison of alternatives

- "null" vs "project"

- quantification of their safety impact

- using ~~accident rates~~ … **accident prediction models and accident modification factors**

Unit

Project alternative } Project effects

Null alternative }

Present situation } Autonomous effects

Definitions

Accident prediction model (safety performance function)

- accident frequency as a combination of risk factors, e.g.

$$= 0.00001 \cdot \boldsymbol{AADT}^{1.2} \cdot \boldsymbol{length}^{0,8} \cdot \exp(0.002 \cdot \boldsymbol{curvature}) \dots$$

- describes safety performance in <u>default</u> conditions

Accident modification factor

- safety performance <u>after modification</u> (e.g. 0.8 = −20%)

State-of-the-art examples (1/3)

Department
for Transport

UK (COBALT)

- simple accident prediction model $A = \boldsymbol{a} \cdot (flow)^{\boldsymbol{b}}$

- parameters for 15 section types and 96 intersections types

Junction Type	Speed Limit (mph)	Coefficient 'a'	Power 'b'	Arms	Highest Link (S/D)	Formula Type	Junction Description
1	>40	0.195	0.460	3	S	C	Priority
2	20/30/40	0.195	0.460	3	S	C	Priority
3	>40	0.195	0.460	3	D	C	Priority
4	20/30/40	0.195	0.460	3	D	C	Priority
5	>40	0.361	0.440	4	S	I	Priority

State-of-the-art examples (2/3)

Sweden (EVA)

models with traffic volumes (cars, cyclists, pedestrians…)

$$A_{car} = \boldsymbol{a} \cdot \left(I_p + I_s\right)^{\boldsymbol{b}} \cdot \left(\frac{I_s}{I_p + I_s}\right)^{\boldsymbol{c}}$$

$$A_{cyc} = \boldsymbol{a} \cdot \left(I_{car}\right)^{\boldsymbol{b}} \cdot \left(I_{cyc}\right)^{\boldsymbol{c}}$$

$\boldsymbol{a}$, $\boldsymbol{b}$, $\boldsymbol{c}$ given for section and intersection characteristics

State-of-the-art examples (3/3)

Finland (TARVA)

- effect of all road improvements evaluated

- model $A = \boldsymbol{a} \cdot mileage$, with $\boldsymbol{a}$ values for road types, intersection types, minor traffic…

- impact coefficients for 92 measures
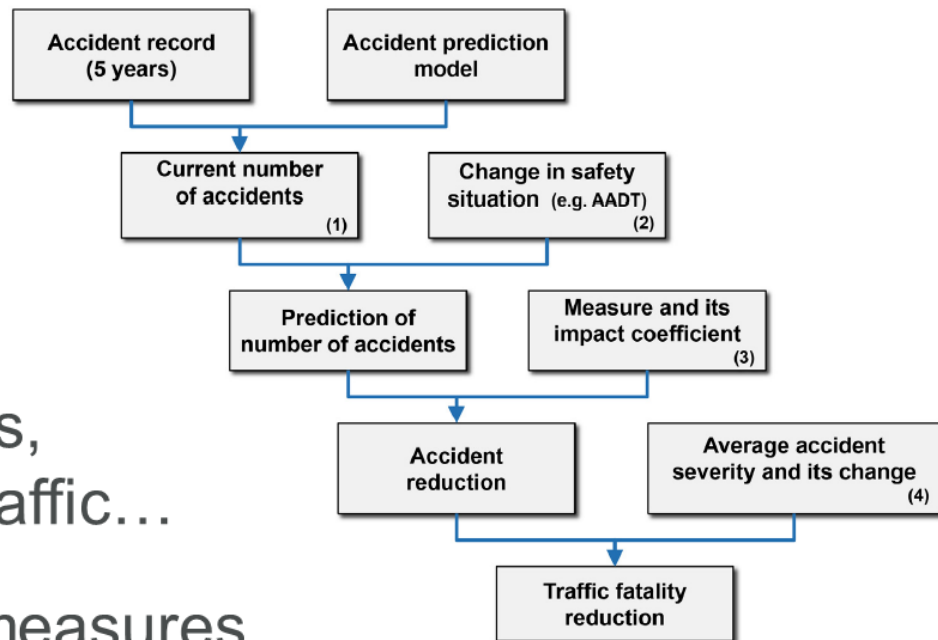
Lessons learned for Czech application

☹ Most European countries do not apply state-of-the-art RSIA (accident prediction models, accident modification factors)

☺ Models are often simple, based on traffic volumes for specific road and intersection types

Impacts often based on Norwegian "Handbook"

    o   probably similar among Nordic countries

    o   compatible in the Czech conditions **???**
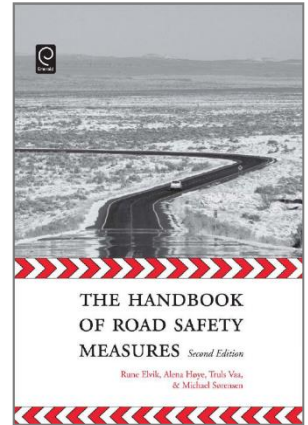
Summary

- Fostering RSIA applications in CZ by developing practical guidelines

- Incorporating the elements of state-of-the-art approach:

  - accident prediction models (simple = exposure-only)

  - accident modification factors (local or transferred ???)

- **Current task: to develop tools for core road network and key measures**

Intermediate results

(sections, intersections, interchanges)
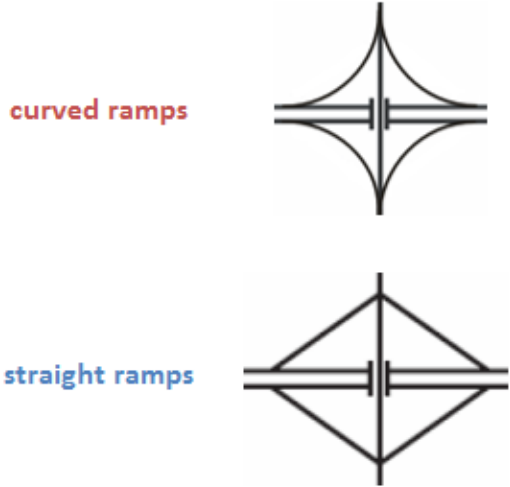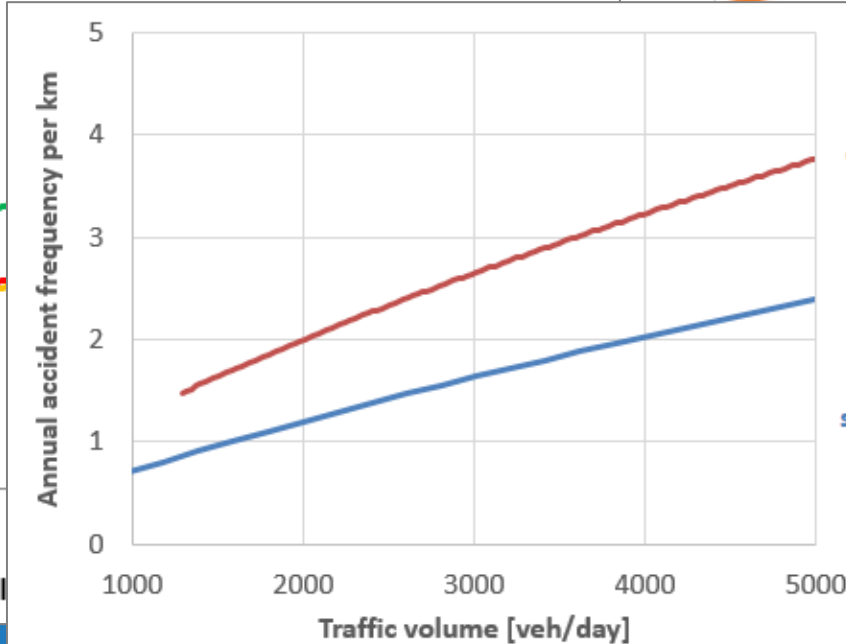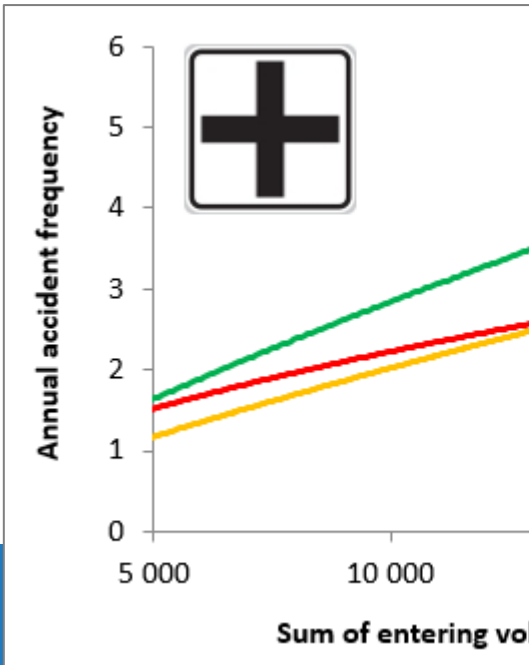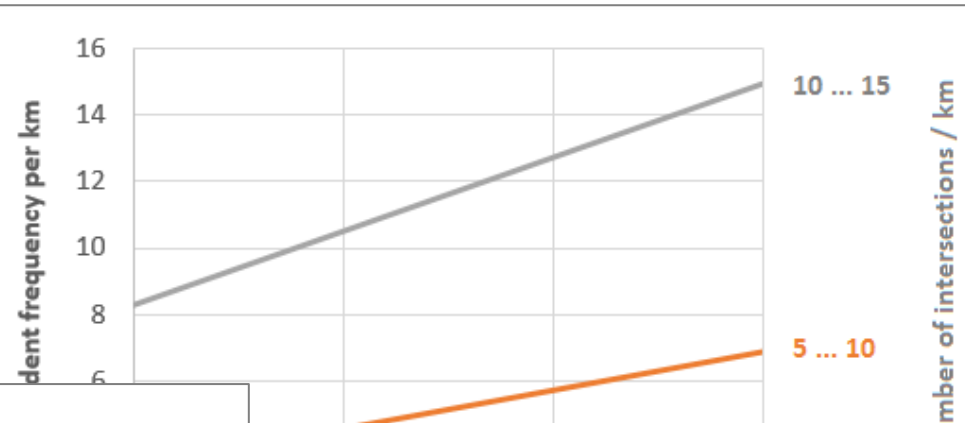
Thank you for your attention

Jiří Ambros
jiri.ambros@cdv.cz

CDV – Transport Research Centre
Líšeňská 33a, 636 00 Brno, Czech Republic

www.cdv.cz/en/