Road Safety and Transportation Planning – The Pilot Study of Zurich

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Presentation at the
Shaping Transportation – Conference & International PTV Vision Traffic User Group Meeting
Berlin, May 2014
The Importance of Road Safety in Zurich

Road safety is a main issue in Zurich, ...

→ Accident data analysis in the Road Safety Team
→ Framework Programme Road Safety

... but also in the entire Switzerland!

Federal Council’s programme «Via sicura»
→ Catalogue of Road Safety Measures
→ Road Safety Commissioners on federal and cantonal level and for the larger cities
→ Road Infrastructure Safety Tools
The Road Infrastructure Safety Tools

- Identifying the safest project layout
- Designing projects roadworthy
- Identifying and sanifying danger spots
- Identifying and sanifying black spots
- Monitoring road safety on network level
- Analysing road infrastructure case-related

Reference: ASTRA (2013a)
The Road Infrastructure Life Cycle and the Tools

Reference: ASTRA (2013a)
Combining Expertise on Road Safety and Transport Modelling in Zurich

Expertise and software tools:
– accident data analysis and road safety
– transport modelling and simulation

→ The Motivation:
Benefit from synergies combining road safety analysis and transport modelling

→ The Occasion:
– Dr. Wernher Brucks, Head of Road Safety, got Road Safety Commissioner for Zurich
– Workshop with PTV Group for implementation of RIA in transport modelling

→ RIA Pilot Study in collaboration City of Zurich and PTV Group
The Road Safety Impact Analysis (RIA)

Planning (reconstruction and upgrading)

Planning (new construction)

Operation

Specific single event

Project design

Implementation

RIA

Reference: ASTRA (2013a)
Road Safety Impact Assessment (RIA) and Accident Prediction Models (APM)

→ Standardized valuation method for comparing newly planned alternative schemes
→ Estimations of e.g. accident cost rates for different types of infrastructure (nodes and links)
→ Cost-benefit-analysis of new constructions or reconstructions

Accident costs in Euro per 1000 vehicle (km)
The Objective of RIA

Actual state  Layouts  Safest Layout

A  B  C

Reference: ASTRA (2013b)
The Causal Diagram of the RIA Method

- Accident prediction models (APM)
- Transportation model / Traffic data

- Expected cost of accidents per APM type
- Expected number of accidents per APM type
- Links and nodes per APM type
- Average daily traffic per link and node

- Expected number of accidents
- Expected costs of accidents
PTV‘s Background and Motivation

There’s a huge potential in the linkage between transportation planning and road safety because of the long-term decision based on the results of transport modelling.

For that reason:

→ Combining the predictive components (traffic and accidents) for long term decision support
→ Implementation of Accident Prediction Models (APM)
→ Gathering experience with the application of these APM methods
The Measure – New Motorway Segment (1)

Length: 10.6 km
Costs: 2.85 Mrd. CHF

Length: 15.7 km
Costs: 1.14 Mrd. CHF
The Measure – New Motorway Segment (2)

The Measure – New Motorway Segment (3)

The Impact of the Measure (1)
Traffic volume differences: +/- 1000 vehicles or +/- 5%
The Impact of the Measure (3)

Historical Accident Data

## Main Results

<table>
<thead>
<tr>
<th></th>
<th>RIA accident counts</th>
<th>historical accident counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>3'129</td>
<td>4'862</td>
</tr>
<tr>
<td>After</td>
<td>2'617</td>
<td>4'356</td>
</tr>
<tr>
<td>$\Delta$</td>
<td>512</td>
<td>506</td>
</tr>
<tr>
<td>$\Delta$ in [%]</td>
<td>16,4%</td>
<td>10,4%</td>
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</tbody>
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Conclusions

The RIA results complement conventional road safety expertise in an efficient way.

The results demonstrate well applicability for large scale measures.

The RIA implementation within PTV VISUM Safety links road safety analysis with transportation planning promisingly.

Three main elements are essential for a high quality RIA:

→ APM modelling
→ Transportation model / Traffic data
→ Application of the APM modelling
Outlook

RIA offers great potential for increasing road safety in general.

Assessment of small sites in urban areas asks for further investigations in combination of increasing:

→ detail level of APMs
→ detail level of transportation model
→ accuracy of traffic data

The combination of transportation models with road safety analysis enlarges return of invest in transportation modelling.
Traffic Data and Transportation Modelling – A Key Factor for RIA!

Accident data

Transportation model / Traffic data

Accident prediction models (APM)

Expected cost of accidents per APM type
Expected number of accidents per APM type
Links and nodes per APM type
Average daily traffic per link and node

Expected number of accidents

Expected costs of accidents
9:00 – 10:30 am SAFER CYCLING IN CITIES
Atze Dijkstra (SWOV) & Andre Münch (PTV Group)

11:00 – 12:30 pm PTV Visum Safety
ROAD SAFETY – NETWORK SAFETY MANAGEMENT WITH PTV VISUM SAFETY
Timo Hoffmann (PTV Group)

11:00 – 12:30 pm MODELLING CYCLISTS
Søren Frost (COWI) & Caroline Chassagne (PTV Group)

2:00 – 3:30 pm PTV Visum Safety
ROAD SAFETY – DEVELOPING AND USING A CRASH PREDICTION MODEL
Timo Hoffmann (PTV Group)

Safer roads save lives!
Thanks for Your Attention!
Abbreviations

FEDRO / ASTRA: Federal Roads Office / Bundesamt für Strassen
RIA: Road Safety Impact Assessment
RSA: Road Safety Audit
RSI: Road Safety Inspection
BSM: Black Spot Management
NSM: Network Safety Management
EUM: Einzelunfallstellen-Management / Single Accident Location Management
References

ASTRA (2013a) Infrastruktur-Sicherheitsinstrumente - Vollzugshilfe, Bundesamt für Strassen (ASTRA), Bern.

ASTRA (2013b) Infrastruktur-Sicherheitsinstrumente, Präsentation, Bundesamt für Strassen (ASTRA), Bern.

Canton of Zurich (2012) Transport Model Canton of Zurich, Canton of Zurich, Zurich.

