Evaluation of traffic safety using microsimulation (ASTRA2003/005)

Evaluation de la sécurité du trafic par microsimulation

Funding: National (Switzerland)
Duration: Jun 2004 - Jul 2007
Status: Complete with results

Background & policy context:
Currently, road safety analyses and audits are 'reactive', in the sense where they are mainly relying on the detection of blackspots based on accidents statements. The project is the fruit of a reflection leaving the idea that traffic microsimulators could be advantageously used in purposes of 'anticipative' road safety, if it was able to offer safety indicators in addition to performance ones.

Objectives:
The project evaluates the possibility of integrating the verification of traffic safety within a traffic flow model of a road section or a simple network. Using microsimulation to evaluate risk parameters and to ensure that any modification, for example placing new equipment or changing the routing strategy, does not affect the global safety level in a negative way.

Methodology:
First, an extensive literature search will be conducted to determine the various security indicators that have already been proposed. Each of these indicators will be a detailed analysis in order to judge their relevance and determine their applicability in the context of microsimulation. Based primarily on the results of first part and based on data from the microsimulation, the development of a relevant indicator will be realized. This will be done by determining the importance and influence of each of these data on the level of security that exists in the relationship between two vehicles. A detailed study of behavior patterns used by microsimulation will be necessary. The limits of the indicator should also be clearly determined. Once the method of calculation of this indicator is established an interface with the simulation software AIMSUN (developed by the Polytechnic University of Catalonia) will be programmed to automatically obtain this indicator. The development of this interface has been executed, the assessment of the safety level of a section of the motorway bypassing the city of Lausanne will be performed based on an existing and already calibrated model. A comparison will be made with the accident data to determine the level of correlation between the areas designated as particularly dangerous by the microsimulation and those which are dangerous in reality. After this validation phase, the security indicator will be applied to several scenarios of telematics application. Finally, a series of conclusions will be drawn and proposals for use in the safety analysis will be proposed.

Parent Programmes:
ARAMIS - ARAMIS information system

Institute type: Public institution
Institute name: Swiss Government: State Secretariat for Education and Research
Funding type: Public (national/regional/local)

Partners:
Switzerland
Key Results:

The use of microsimulation tools is now a reality in the design office in Switzerland mainly to assess the capacity of roads. The module developed by this study will piggyback on existing software and demonstrate the possibility of expanding the scope of use of the security problems.

Policy implications

A case study on a motorway section gives encouraging results, demonstrating the potentialities of microsimulation for road safety evaluation. So zones presenting dangerousness more important than the rest of the network can be localised, according to traffic conditions. Added to classic performance indicators, the unsafety density allows a global analysis, supplying a precious help during road network management and conception.

Documents:
- Final report in German (Final report)

STRIA Roadmaps: Network and traffic management systems, Infrastructure
Transport mode: Road transport
Transport sectors: Passenger transport, Freight transport
Transport policies: Safety/Security
Geo-spatial type: Other