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ZEDATU (Zentrale Datenbank tödlicher Unfälle in Österreich) A Central Database of Fatalities in Austria

Figure 1: Project structure

Abstract

Due to recent years accident avoidance and crashworthiness on Austrian roads were mostly developed on national statistics and on-scene investigation respectively. Identification and elimination of black spots were main targets. In fact many fatal accidents do not occur on such black spots and black-spot investigation has reached a limit. New methods are required and therefore the Austrian Road Safety Programme was introduced by the Austrian Ministry of Transport, Innovation and Technology. The primary objective is the reduction of fatalities and severe injuries. Graz University of Technology initiated the project ZEDATU (Zentrale Datenbank tödlicher Unfälle) with the goal to identify similarities in different accident configurations. A matrix was established which categorizes risk and key factors of participating parties. Based on this information countermeasures were worked out.

Introduction

Besides of national statistics there is no database available allowing a (comparable) in-depth analysis. Even if the national database was enhanced for black-spot management driver's and pedestrian's behaviour can not be analysed. In-depth accident investigation which for instance includes vehicle performance in different crash scenarios only can be studied with a more comprehensive range of data fields.

National statistics can be seen as a base level with an assessment of accident situations and examination of trends. An intermediate level identifies hazardous road locations and in-depth accident investigation will take into account causation mechanisms or injury prevention measures, too. ZEDATU was initiated to examine
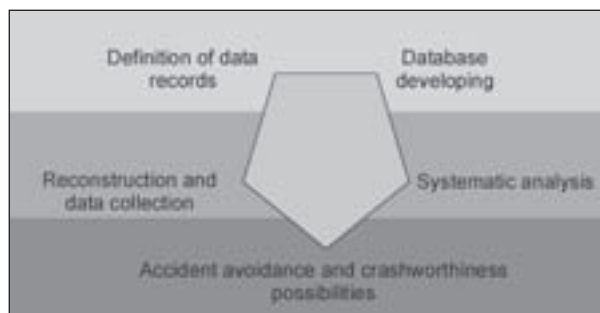
road accidents on an in-depth basis and to identify similarities in different accident configurations which have overall validity. Many accidents are single vehicle accidents which do not take place at black spots but could have similar circumstances. Risk and key factors were developed to scrutinize causation conditions.

Project Structure

The project was divided into three levels with five Work Packages (Figure 1).

Definition of data records and developing of the database

The definition of the data records was based on the STAIRS (Standardisation of Accident and Injury Registration Systems) [1] protocol and enhanced by several different European projects, namely PENDANT (Pan-European Co-ordinated Accident and Injury Databases) [2], RISER (Roadside Infrastructure for Safer European Roads) [3] and ROLLOVER (Improvement of Rollover Safety for Passenger Vehicles) [4]. In addition data fields of national statistics were implemented into the database to ensure correlation with road accidents.

Accident risk and causation factors (Figure 2) were one of the basic parts during the project. Identification of the key factors was mainly found from police and expert technical reports, pictures from scene or witness reports and accident reconstruction respectively.

Reconstruction and analysis

Accident reconstruction was performed with PC Crash. The possibilities to avoid an accident of all participating parties were determined. Figure 3 shows an accident at a junction from the first
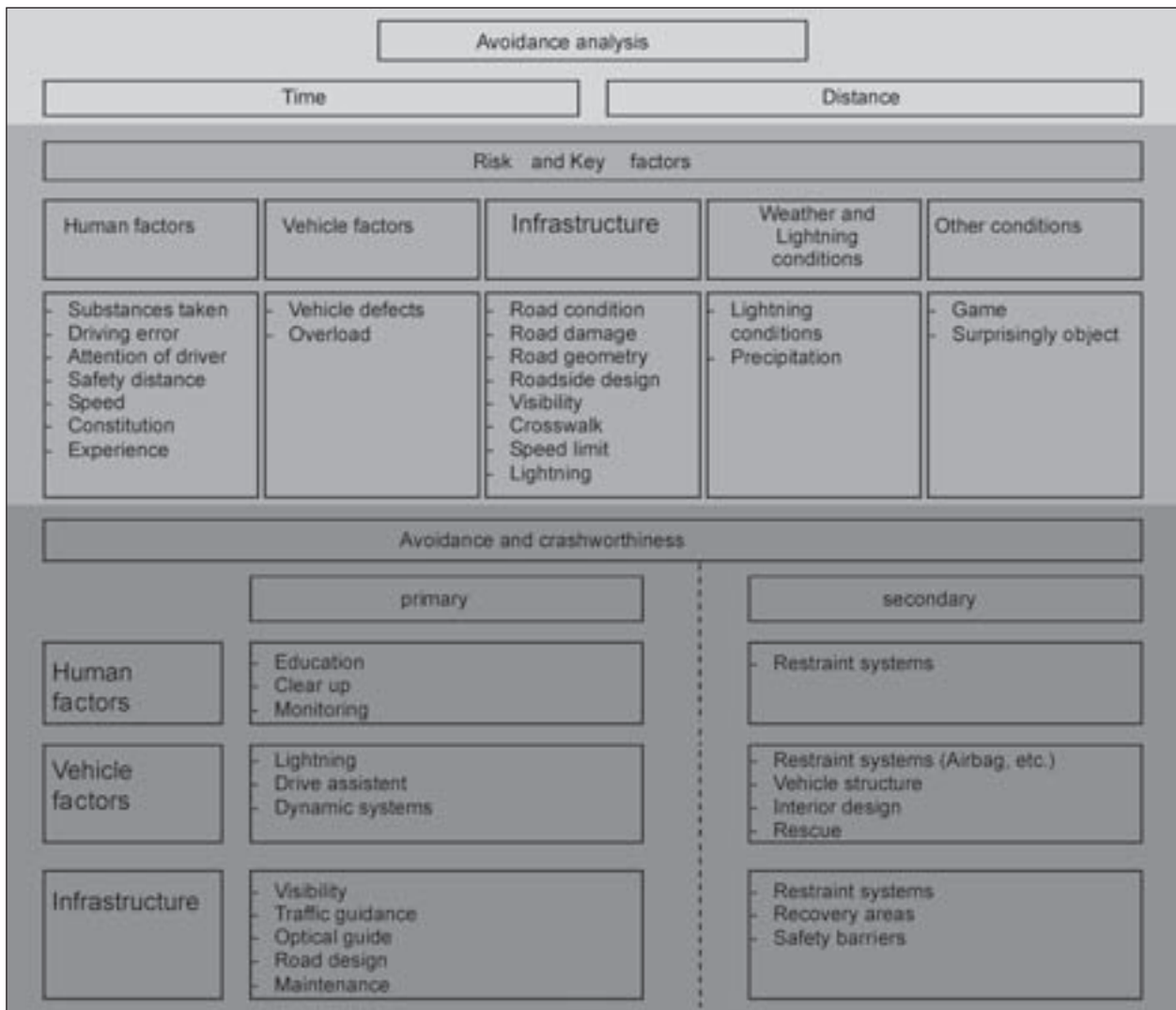
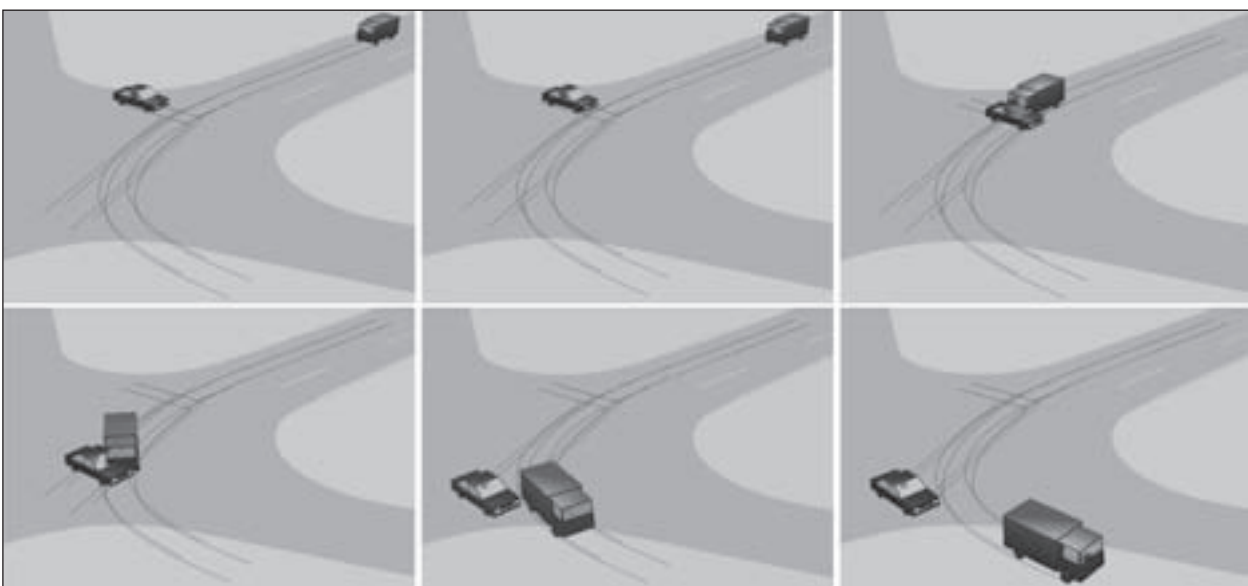**Figure 2:** Matrix for accident analysis

Figure 3: Accident sequences

movement of the smaller vehicle until the rest positions.

An analysis was made in a systematic manner. Firstly all Austrian accident types were studied and finally rollover and motorcycle accidents were analyzed separately. Within each accident type human factors such as use of seat-belt, age, gender etc. were comprised. Risk and key factors were investigated and analyzed for each accident type separately.

Accident avoidance and crashworthiness possibilities

Based on the analysis results a proposal has been worked out which included countermeasures for driver, vehicle and infrastructure. These countermeasures are based on primary or secondary safety. (Remark: Education and monitoring of seat-belt usage can be categorized as primary safety. Improvement of restraint systems or vehicle structure can be categorized as secondary safety.)

Results

A short summary of analysis provided that in single vehicle accidents only 40% of occupants were using the seat-belt for sure. Investigation of car accidents only show that close to 13% of analyzed fatal accidents resulted in a rollover. Additionally, rollovers mostly occurred in single vehicle accidents. 90% of the unbelted occupants were ejected during a rollover. Dangerous objects at the road side were identified as trees, poles or embankments (cut and fill slopes).

Discussion

Gathering the accident cases it was figured out that documentation of accidents varied in quality. Particularly pictures taken from scene and vehicles were inadequate. Only about 20% had good or perfect quality. For a huge number of single vehicle accidents documentation had poor quality, especially when only the driver was involved. The reason was found in Austrian's legislation. There is no law to punish self-injuries – hence little effort is taken by the police in investigating single car accidents thoroughly. Coding AIS (Abbreviated Injury Scale) was impossible for most of the fatal injured participants when no autopsy was made.

Conclusion

Currently no detailed in-depth fatality database is available in Austria nor in other European countries. ZEDATU has detailed information regarding human, vehicle and infrastructure. Due to the accident matrix it is possible to identify risk and key factors for each accident. STAIRS as the fundamental protocol should guarantee a harmonized data collection. ZEDATU based on STAIRS and enhanced by several European projects may provide accident data in high detail.

References

[1] http://www.lboro.ac.uk/research/esri/vsrc/stairs/index.htm

[2] http://www.vsi.tugraz.at/pendant/

[3] www.mvs.chalmers.se/~thomson/RISER/index.html

[4] http://www.vsi.tugraz.at/rollover/