Deliverable 5.2: In-depth Accident Causation Data Study Methodology Development Report

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Integrated Project, Thematic Priority 6.2 "Sustainable Surface Transport"

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PU	Public	✓
PP	Restricted to other programme participants (inc. Commission Services)	
RE	Restricted to group specified by consortium (inc. Commission Services)	
CO	Confidential only for members of the consortium (inc. Commission Services)	

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Table of Contents

Executive Summary

A recent analysis conducted by the European Transport Safety Council (ETSC 2001) identified that no single accident database could meet all of the needs and that there were major gaps including in-depth accident and injury causation.

The 5.2 Work Package (WP) of the SafetyNet Integrated Project will use an existing accident investigation network to develop an in-depth accident causation database.

The independent in-depth accident causation database will have major applications in the areas of new technology development and active safety systems as well as the more traditional area of infrastructure and road safety. Specialist teams will investigate the causes of accidents in six countries to give a survey of those Member States. Since it will prove hard to collect data from a random selection of cases, given the circumstances which the different teams work under, there will be an aim for randomness within the framework given, i.e. the selection of cases will be kept random to the best of the teams abilities.

There has been a general consensus that critical events should be used as the strategy for this project. A categorization of variables has been made and the variables are divided into six different groups;

- general variables
- critical events
- related contributing factors for the; road user, vehicle, infrastructure and organisation.

There have been several tasks to perform to be able to create the SafetyNet Accident Database. Many tables and forms needed to be created and linked together. Due to some common variables collected both in the fatal and in-depth databases, particularly regarding “general variables”, the opportunity to integrate WP 5.1 and WP 5.2 databases was suggested and acted on.
A pilot phase will be conducted in late Autumn 2005 prior to a detailed review of this process by the partners. After this procedure, the full data collection will commence, scheduled for Spring 2006.

1 Introduction to the task

At present, there are some 50,000 fatally injured road users each year throughout the 25 EU Member States. A core element of the EC road safety strategy includes a reduction of fatalities by 50% by the year 2010. Central to this strategy is the requirement for good quality in-depth accident data. Such data are seen as a fundamental pre-requisite for the formulation and monitoring of road safety policy in the EU. Data are needed to assess the performance of road and vehicle safety stakeholders and are needed to support the development of further actions. A recent analysis conducted by the European Transport Safety Council (ETSC, 2001) identified that no single accident database could meet all of the needs and that there were major gaps including in-depth accident and injury causation. Specific policy questions at EU level involve the role of infrastructure in accident causation, the monitoring of progress towards the 2010 targets and the improvement of vehicle active and passive safety performance in accident and injury causation. The 5.2 Work Package (WP) of the SafetyNet Integrated Project will use an existing accident investigation network to capture data to be recorded in an in-depth accident causation database.

1.1 The current situation with this type of data collection

It is stated in the publication “Transport Accident and Incident Investigation in the European Union” produced by the European Transport Safety Council (ETSC, 2001), that there is a lack of systematically collected data regarding representative samples from in-depth accident investigation which could be integrated into new safety policies. Even for professionals the reasoning around causation of road crashes is poorly understood and not very well defined (Mackay, 2000).

Clarke et al (2002) has presented a report titled “In-depth accident causation study of young drivers”. In that report it is stated that the phenomenon of causality of real road accident can be difficult to study, and that one possible way of studying them is investigating the accidents when they have taken place, rather than studying the behaviour of the driver in “controlled environments”. Additionally, they state that “one such well known approach involves the use of multidisciplinary accident investigation teams (MDAI) that travel to the site of accidents soon after they occur to collect data”. Clarke et al (2002) also raises the fact that a lot of studies have used in-depth techniques applied to secondary data sources such as police reports, interviews and questionnaires. They refer to Fell (1976) who was one of the first to say that an “accident causal schema could be constructed from such sources. He thought that in-depth work using police reports, although with some limitations, could be of use to be able to improve the ‘state of the art’ in understanding accident causation.

By looking at what is generally available in current accident causation analysis it can be concluded that there is a need for new methodologies within the area (J.

Sandin & M. Ljung, 2004). J. Sandin & M. Ljung, 2004, continue by pointing out that factors such as road and weather conditions and drug abuse are often used to describe accident causes, but when it comes to developing guidelines for active safety systems, they are not detailed enough. Therefore, it is important to obtain answers to the questions how and why accidents occur, to be able to develop active safety systems to prevent the same.

1.2 Project objectives of WP5.2

The purpose of the independent in-depth accident causation data will be to put together a crash investigation process that identifies the main risk factors leading to a crash. The independent in-depth accident causation database will have major applications in the areas of new technology development and active safety systems as well as the more traditional area of infrastructure and road safety. It will be a new accident investigation activity and the in-depth data will have significant applications for policy making and road safety practitioners, particularly for those working with infrastructure safety. It will also be most effective within a structure able to sustain the dialogue with a range of users.

The database will contribute a major advance of the knowledge of accident causation factors at EU level. Independent groups with no interest in commercial attributes of the study outcomes will conduct the accident investigation. The following table illustrates the distribution of cases per partner:

Table 1. Cases to be collected by each partner.

	In-depth Accident causation cases, 2 years data collection
Chalmers	70
DITS	250
MUH	100
TNO	126
VALT	200
VSRC	250
Total	**996**

1.3 Project teams

The data collection areas for the accidents will be from the countries with the largest fatality populations in Europe (Italy, France and Germany) as well as northern (Sweden, Finland) and middle European (UK, Netherlands) countries (see Figure 1). Independent groups with no interest in commercial aspects of the study outcomes will conduct all data gathering and accident investigation activities. These are the teams; VSRC (Vehicle Safety Research Centre), TNO (Netherlands Organisation for Applied Scientific Research), Chalmers (Chalmers University of Technology), MUH (Medical University of Hannover), VALT (Finnish Motor Insurers' Centre), DITS (Department 'Idraulica Transporti Strade' University of Rome).

Project Teams
VSRC (Loughborough, UK, co-ordinators)
TNO (Delft, NL)
Chalmers (Gothenburg, SWE)
MUH (Hannover, GER)
VALT (Helsinki, FIN)
DITS (Rome, IT)

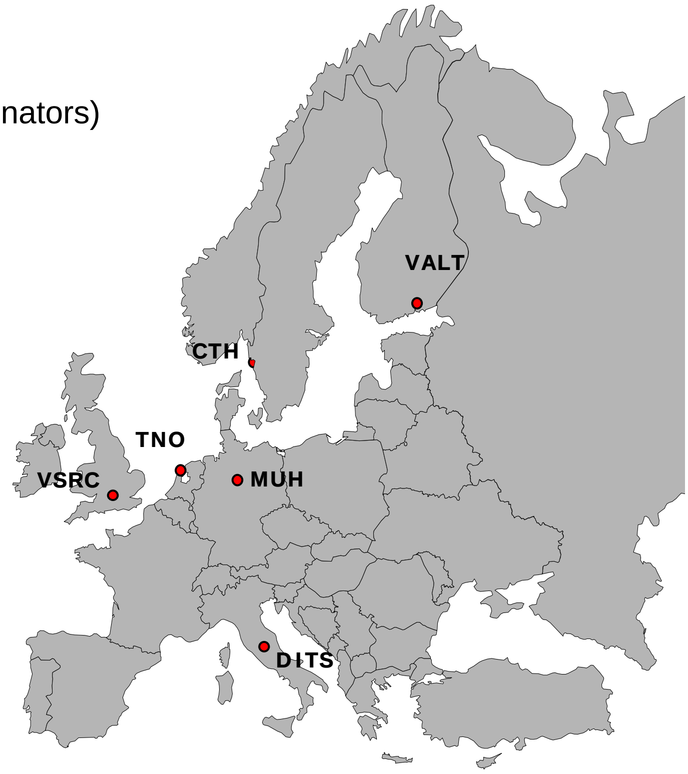

Figure 1. Locations of teams involved

1.4 Scheduling of project

The main sub-tasks to be conducted within Task 5.2 are detailed in this section. The status of activities is indicated in brackets:

5.2.0 Co-ordination activities and general project management (completed)

5.2.1 Needs of data users, including workshop (completed)
The data which needs to be collected and included has been considered and evaluated.

5.2.2 Protocols, forms and database (completed)
The development of the database structure and building the same has taken place.

5.2.3 Infrastructure and team training (completed)
Implementation of local infrastructures with links to police and other national authorities have been established. A training course for data gathering and case analysis has also been completed.

5.2.4 Pilot phase (active)
A small number of accidents will be investigated in all aspects.

5.2.5 Review (not yet commenced)
Cases collected in the pilot phase will be examined.

5.2.6 Crash investigations (not yet commenced)
Over a 24-month period, data gathering will take place by each respective partner.

5.2.7 Data analysis and final report (not yet commenced)
Upon complete data collection, data analysis and reporting will take place in accordance with the designated plan of action developed inline with EC priorities.

Meetings held

July 2004	Brussels	Kick off meeting
October 2004	Brussels	Technical meeting
February 2005	Lyon	Technical meeting
March 2005	Brussels	Technical meeting
June 2005	Mykonos	Technical meeting
October 2005	Gothenburg	Technical meeting and training

Meetings planned

February 2006	Delft	Technical meeting
June 2006	Hannover	Technical meeting
October 2006	Helsinki	Technical meeting

2 Development of methodology

2.1 User needs

One important point is that the aim of the project is to develop a methodology, which will be used to capture data. The data that will be produced are important, however, the most important part of the project is the development of the methodology, which, after development, can be used by other researchers to capture accident causation data.

A workshop called "Establishing Requirements for a New European In-Depth Accident Causation Database" was held in October 2004. This aimed to provide the future users of accident data the opportunity to feed into the process of identifying general and specific research and policy questions that future accident databases will be expected to address. It was noted in the workshop that it is most important from the outset of the development process that explanations for domains and justification for their inclusion be clearly defined. This will overcome preconceptions or misunderstandings and will help to ensure that all stakeholders are comfortable with terminologies used. During the course of the project the issue of reaching partner consensus on which data to collect and why it should be collected has been one major part of the work for all parties involved. Discussions have taken place during WP meetings and through e-mail correspondance in between meetings. The partners' joint opinion, based on the information available to this date, is that the needs of the users will be met by using the variables and definitions (glossaries) included so far in the project.

Another event that was used to understand user needs was the "National Experts Conference" where SafetyNet WP5 was represented. At this event, by presenting information on the aims and objectives of the database, it was asked for feedback on the proposed variables to be contained. Written comments were received from CIDAUT (Centro De Investigacion y Desarollo en Automacion), Spain. These comments were taken into account by the WP5 partners during the development of the proposed methods.

2.2 Variable development and protocols

All the different partners within the Work Package have had a chance to inform the rest of the group within the Work Package on the methods that each partner will use to collect data. From the partners' presentations of their field data it has emerged that there is a strong emphasis on interviewing crash participants to gather data on causal factors in accidents. It has also emerged that the variables collected within each group varies to some extent, and discussions within the group has resulted in the list of variables as it looks at this point (see Appendix B).

There has been a general consensus that critical events should be used as the strategy for this project. The critical events categorize the dysfunctional consequences of behaviour, i.e. the critical events represent the different ways in which the dysfunctional behaviour is observable in the dimensions of time, place and energy. For instance, the general critical event called timing is split into three different specific critical events of which premature action is one. Two examples, for the general critical event “Timing” with the specific critical event “Premature action”, would be: 1) Performing an overtake before there is good visibility. 2) Starting/stopping too early at traffic lights.

A categorization of variables has been made and the variables are divided into different groups; general variables, critical event, road user, vehicle, infrastructure and organisation related contributing factors. (See also Appendix B).

Since there are still three years left of the project, there is the opportunity, to refine the data collection protocol and variable levels as more knowledge is obtained about the type of information that will be examined, e.g. during the data collection phase. Before the start of this process, it is difficult to envisage exactly what level of variable detail that is needed.

To make data analysis easier for comparison amongst groups and for encouraging qualitative data entry, help sheets have been produced. These will consist of glossaries of definitions, of the variables, available within the database and they will be provided to make it easier for the persons performing the case analysis. This list/glossary will be presented on a separate document in the database, and there will be a hyperlink within the database from the input forms to the help sheet. The definitions/explanations are available in Appendix C.

Regarding paper based help sheets for the database, it has been proposed that these should be integrated as far as possible into the database, with the availability to print these off to compile a paper manual for the user if required. This is to ease access of the help sheets whilst using the database. It is expected that regular changes will be made to the help sheets and the variables, at least for the first 12 months of data collection.

2.3 SNACS (SafetyNet Accident Causation System)

The method used for the causation case analyses which will be conducted in WP5.2, will be SNACS (SafetyNet Accident Causation System) which is based on the existing method called DREAM (Driving Reliability and Error Analysis Method). DREAM, in turn, is an adaptation for the area of vehicle traffic of the model called CREAM (Cognitive Reliability and Error Analysis Method) developed by Erik Hollnagel, and described in “Cognitive Reliability and Error Analysis Method – CREAM” (Hollnagel, 1998). The DREAM method has a Human-Technology-Organisation perspective, which implies that accidents happen when the dynamic interaction between people, technologies and organisations fails in one way or another, and that there are a variety of interacting causes creating the accident (Ljung, 2002). The latter part particularly stresses one of the most important issues of the WP5.2 project; to be able to survey the causes of the accidents. The practical use of SNACS is briefly described in Appendix A and a more extensive description of the method and the practical aspects of how to use it will be available in a manual, which is currently being produced.

2.4 Different aspects of accident investigation

The infrastructure, procedure and sampling for each respective partner involved are to a varying extent described below.

SHORT REPORT ON PROGRESS/PLANS TO DATE FOR WP5.2 - TNO

Sampling area – (description of the area, where do you get the data from, how representative do you expect that to be of your country, etc):

The TNO sampling area will be the police area Zuid-Holland. The area Zuid-Holland (or so-called province Zuid-Holland). This province is split up into 4 police regions: Rotterdam-Rijnmond, Haaglanden, Hollands Midden and Zuid-Holland Zuid (see Figure 2).

		Region
(Year 2000)	The Netherlands	Zuid-Holland
Population (x1000)	15864	3398 (21%)
Area (ha) (x1000)	4153	345 (8%)
Traffic network (ha) (x1000)	113 (2.7%)	13 (3.7%)
Vehicles (x1000)	7930	1590 (20%)
Covered area (ha) (x1000)	480 (12%)	72 (21%)
Uncovered area (ha) (x1000)	3672 (88%)	273 (79%)

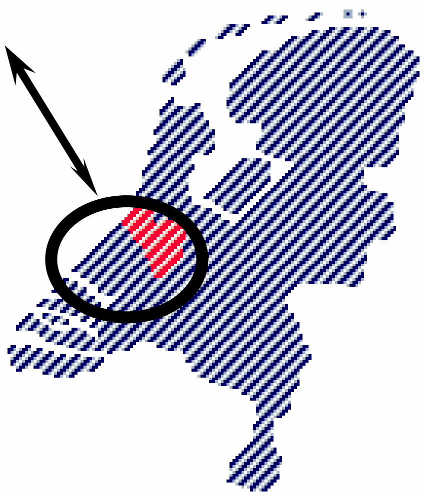

Figure 2. TNO general information on sampling area.

Accident investigation procedure - (how do you get hold of the data, links with local infrastructure/police for data collection preparation, etc):

TNO has established a very good network with the Traffic Accident Police of the whole Zuid-Holland province. TNO will be informed by police officers and we will check frequently their accident registration dossiers by visiting their offices or by having a telephone contact.

Medical data can also be acquired (if needed). However a victim's permission is required (by law) to access his/her medical file. TNO has also very good contacts with almost all hospitals of the province. The data collection is done by a TNO employee, who visits the hospital after having informed the secretary of the department at which the victim was hospitalized/treated.

Accident investigation team members (description of different areas of competences which will be represented in your team, etc)

The team will consist of the following members:
D. Margaritis: (Project co-ordinator, accident reconstruction, quality control, data analysis, medical data, data collection)
C. Klootwijk: (accident reconstruction, quality control, database issues, data collection)
Y. Vries: (accident reconstruction, data analysis, database issues)
F. v/d Wolf (accident reconstruction, quality control, medical data, data collection, data entry)
R. van Passen: (accident reconstruction, quality control, data collection, data entry)
3 x part time employees (data collection, data entry, quality control)

Date: 21 July 2005
Report prepared by: D. Margaritis

SHORT REPORT ON PROGRESS/PLANS TO DATE FOR WP5.2 - CHALMERS

Sampling area – (description of the area, where do you get the data from, how representative do you expect that to be of your country, etc):

Chalmers will be sampling from within the area called 'Västra Götalands län', which is an area with a population of 1.5 million people (17% of the total population) and the area makes out 6% of the total area of Sweden.
The investigation area is limited to approximately a 30 minutes drive from Gothenburg City Centre and statistics for the investigation area, concerning different accident types, are representative for the nation.

Accident investigation procedure - (how do you get hold of the data, links with local infrastructure/police for data collection preparation, etc):

Alarms are received round the clock, but the team restricts on-scene investigations to Monday through Friday during normal working hours (08.00-17.00). On the scene, the team establishes contact with rescue services and police, and then describes the accident site and context in a way as to match the course of events as much as possible. Drivers and witnesses remaining at the scene are interviewed about their experience of the accident. If the driver is no longer on the scene, an in-depth follow-up interview is made as soon as possible after the accident. For near-in time investigations the team goes to the spot a while after the accident has occurred and tries to get hold of the involved persons to be able to interview them. Retrospective investigations are made to retrieve data for those days and hours of the week when the investigation team is not operating. The information that an accident has occurred is collected from the emergency call centre, SOS Alarm, through on-line contact.

Accident investigation team members (description of different areas of competences which will be represented in your team, etc)

Until this date it has not yet been fully established which members the team will consist of. However, most likely it will consist of investigators with expertise in driver behaviour as well as vehicle and road experts.

Date: 23 August 2005
Report prepared by: R. Paulsson

SHORT REPORT ON PROGRESS/PLANS TO DATE FOR WP5.2 - VSRC

Sampling area – (description of the area, where do you get the data from, how representative do you expect that to be of your country, etc):

SafetyNet’s VSRC cases will be obtained using the pre-existing infrastructure developed for the On-the-Spot (OTS) accident research project, which investigates road traffic accidents using in-depth, prospective explorations to understand the causes of accidents and injuries. VSRC investigators are deployed within 20 minutes to the scene of 250 road crashes each year within the south Nottinghamshire region, Figure 3. The team operates strictly within the administrative regions of Nottingham City Centre, Gedling, Broxtowe and Rushcliffe. These regions are uniquely identified on the national STATS19 database enabling a statistical match to be made for accidents involving injuries using the police accident reference number which is recorded for all accidents on both databases. In addition, a procedure has been put in place and monitored to minimise any bias in the selection process which is based on random notifications from the police control room.

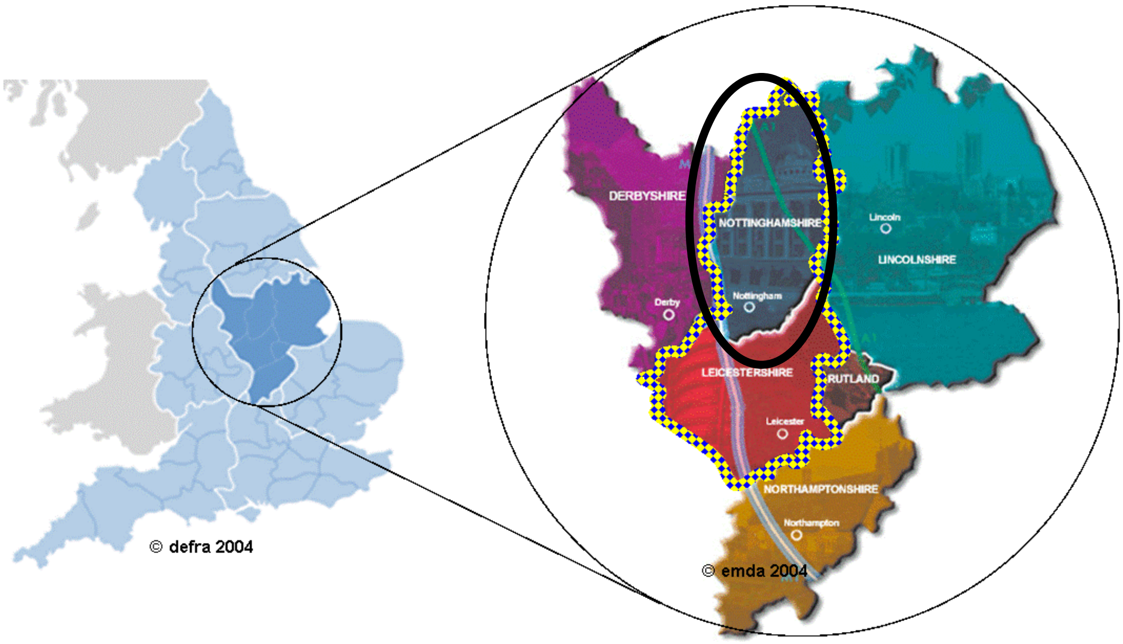

Figure 3. VSRC sampling area for 5.2

This region is representative of the UK in terms of severity of injury (see Table 2) and casualties by road user type killed and seriously injured (see Figure 4).

Table 2. 2003 Severity of traffic casualties for sampling area and UK

Accident Severity	Sampling area (%)	UK (%)
Fatal	1.2%	1.3%
Serious	14.0%	14.5%
Slight	84.8%	84.2%

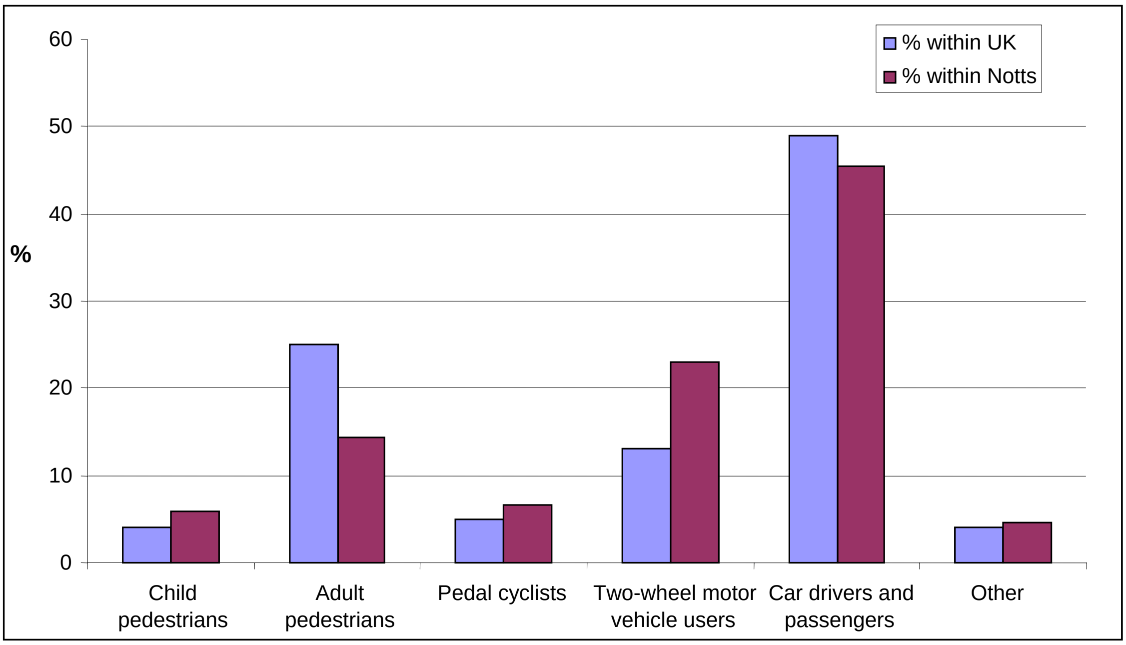

Figure 4. Proportion of casualties killed and seriously injured by road user type for sampling area and UK (mean 1993-2003)

The sampling plan is designed to meet the requirements of the project specification for good even capture of a cross section of accident types, representative of the UK situation, and capable of being linked to the national data. In this way, the project has been ensured with sampling according to a consistent and stable strategy in terms of the geographical region, accident time/day, and accident severity/type of vehicle, including non-injury accidents. All accidents that are within the sampling area that are notified to police while the teams are on duty are eligible for the sample; 8-hour shifts are rotated each week between days, evenings and nights to obtain a representative coverage of accidents by hour and day to ensure a representative distribution of accidents by hour and day throughout the year. Table 3 indicates the representativeness for the time of accidents for the sampling area compared to the UK figures.

Table 3. Time of accident for sampling area and UK (2002 data)

Time of Accident	Sampling area (%)	UK (%)
00:00 – 06:00	10.9	6.2
06:00 – 12:00	25.8	25.6
12:00 – 18:00	37.5	42.4
18:00 – 24:00	25.8	25.8

Accident investigation procedure - (how do you get hold of the data, links with local infrastructure/police for data collection preparation, etc):

From the VSRC office in Nottingham a team of three investigators, including a full-time police officer, normally arrive at the scene of an accident within around 20 minutes. Additional back-up is provided by other staff at the VSRC main office.

The local office is a dedicated project room at Nottinghamshire Police's Operational Support Division offices close to Nottingham city centre, well sited for rapid response to all regions in the sample area. The response team maintain online contact with the office in Loughborough via a fast computer system installed with multiple terminals for team use in Nottingham. A Ford Galaxy vehicle has been purchased for sole use on the project and equipped with all the investigation equipment necessary to carry out the current project requirements. The team have benefited considerably from the support and assistance provided by Nottinghamshire Police, regarding infrastructure support and technical support.

A range of investigative procedures were put into routine operation during the early months of the project at the scene of crashes and have subsequently been refined. Follow-up investigations are undertaken away from the scene of crashes including acquisition of injury information, human factors information via questionnaire, scene re-visits and liaison with local authority highway engineers. The data collected for OTS is highly detailed, wide ranging and sophisticated in structure. The forms and protocols that are used include new innovations and adaptations from earlier in-depth studies. Work is currently being undertaken to pilot more rigorous methods of interviewing drivers and eye witnesses present at the scene of accidents to improve the level and type of data collected.

Accident investigation team members (description of different areas of competences which will be represented in your team, etc)

Members of the VSRC OTS team include a complement of 4 fully trained accident investigators, 2 of whom have a forensic science background, and 2 of whom have a mechanical background, and a police officer. The team is managed by an expert in road and vehicle safety. Other researchers who specialise in psychology, human factors/ergonomics also input in to the research project. Areas of expertise include: scene examinations to obtain reconstruction evidence (including highway features), scale scene drawings, vehicle examination for defects and vehicle damage assessment, on-scene photography, reconstruction using injury information, basic maths and physics and established reconstruction software, and team safety procedures.

Interview techniques are currently employed by the VSRC OTS police officer but, as previously mentioned, more rigorous interviews with active road users and other witnesses are currently being piloted (including the potential for on scene and telephone interviewing) which will be incorporated for WP5.2.

Date: 17 August 2005
Report prepared by: C L Brace

SHORT REPORT ON PROGRESS/PLANS TO DATE FOR WP5.2 - VALT

Sampling area – (description of the area, where do you get the data from, how representative do you expect that to be of your country, etc):

Cases will be collected from all over Finland using a pre-existing infrastructure developed for investigating road and cross-country accidents according to current Finnish legislation. Figure 5 describes the number of fatal accidents investigated in years 1999 – 2003.

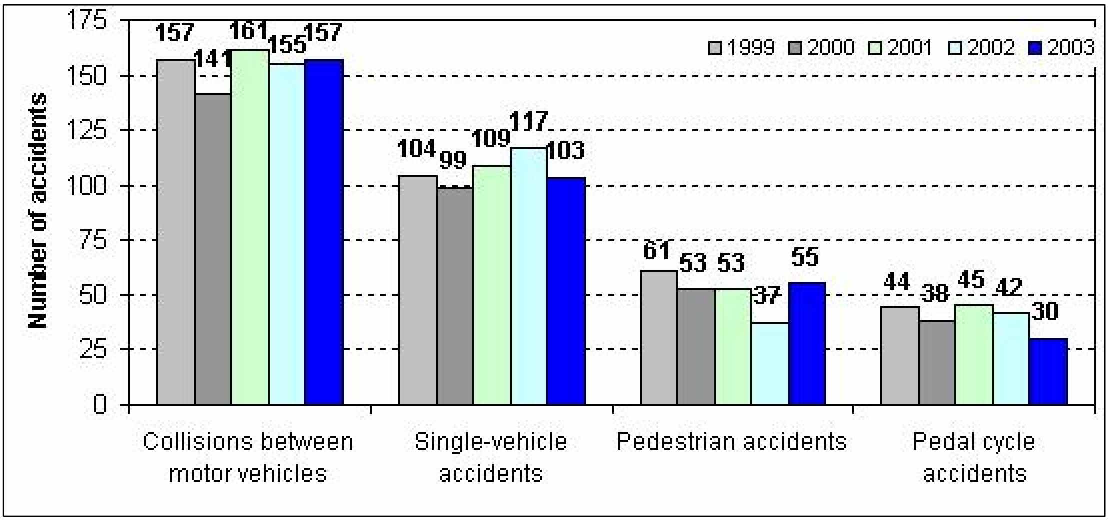

Figure 5. Number of investigated fatal accidents in Finland in 1999-2003 according to road user type (source: VALT)

Accident investigation procedure - (how do you get hold of the data, links with local infrastructure/police for data collection preparation, etc):

The data collection system is already established and in use as a standardised method under legislation.

The method works effectively when the team arrives at the scene soon after the accident. Any delay in the investigation reduces the quality of the information available, such as the marks on the road surface and in turn the reliability of the reconstruction. The investigation may also be carried out later if the call out is delayed for some reason. A reason for the delay can be, for example, a later fatality after an accident.

The information about the accident will usually be reported by the emergency centre or the local senior police officer to the investigation team. The investigation team leader makes sure that those who raise the alarm are aware that the accidents are within the scope of the investigation programme. Alerting members of the investigation team takes place according to the procedure and order agreed on by the team. Figure 6 describes the course of events of road accident investigation.

Focus of investigation at scene	Actions at scene
The accident	Alarm raised Members to the scene
What happened	Police information etc Interviews, tracks, preliminary reconstruction and discussion
Actions during the interim	**Actions during the interim**
Adding and exchanging data	Additional investigations and documents other special advisors, exchange of information and preparation
Focus in the meeting	**Actions in the meeting, analysis**
What happened Description and key event	Processing of investigation material Reconstruction, discussion Joint acceptance on description
Why it happened Immediate risks	Specification of what factors led to the key event
Which factors created risk of accident Background factors	Specification of risks: road users, vehicles, road, environment and traffic system
Why these kinds of consequences: Damage and injuries Causes Possible enabling factors	Specification of damage, causes and structural risks Specification of personal injury and influence of safety equipment
What should be done, prevention, countermeasures and recommendations	Ideas for improvement, calculations for avoidance Consideration of suggestions and their influence.
Investigation report	Completion and signing Filling in joint evaluation forms

Figure 6. Progress of road accident investigation in Finland (VALT 2002)

The investigation is performed in co-operation with the local police in the preliminary investigation or in the investigation into cause of death to an extent that is considered appropriate by the investigation team leader.

The authorities must supply investigation material that they have collected to the investigating team when it has begun its operation. The Finnish Motor Insurers'

Centre can agree with the authorities and with the state institutions on the co-operation concerning an accident investigation and the use of its findings.

Accident investigation team members (description of different areas of competences which will be represented in your team, etc)

There are 20 independent investigation teams across Finland performing the investigations.

This method of investigation has been designed for an investigation team representing multidisciplinary expertise. The basic members of the team are a traffic police officer, vehicle specialist, road safety specialist, physician and psychologist. They participate in the investigations or the analysis of the accident as necessary and, at the request of the investigation team, may include, among others, a railway or tram specialist, a bus body specialist, and special advisors who represent specialist areas in vehicle safety, commercial traffic, or traffic medicine.

The investigation team, its structure, appointment, chairmanship, powers, limits of disqualification and similar points are defined in an act of the investigation of road and cross-country traffic accidents (N:o 24/2001) and in the decree of the State Council under it (N:o 740/2001). Further instructions are given in the work procedure of investigation teams.

The team leader, vice-leader or police member will assemble the investigation team made up of members and special advisors as required, after having obtained the information about the accident to be investigated. The team leader or the vice-leader acts as the leader of the investigation team. If neither of them participates in the investigation of the case in question, the police member will act as the leader of the team.

The reports of the teams will be analysed according to the SNACS-method. SNACS analyses will be made by VALT.

Date: 23 August 2005, revised 21 September 2005
Report prepared by: Kalle Parkkari

SHORT REPORT ON PROGRESS/PLANS TO DATE FOR WP5.2 - DITS

Sampling area – (description of the area, where do you get the data from, how representative do you expect that to be of your country, etc):

The sampling are will be the Province of Ancona, it is located in the Marche Region in the central-east area of the country (see orange area in Figure 7 for Marche Region and small box for the Ancona Province).

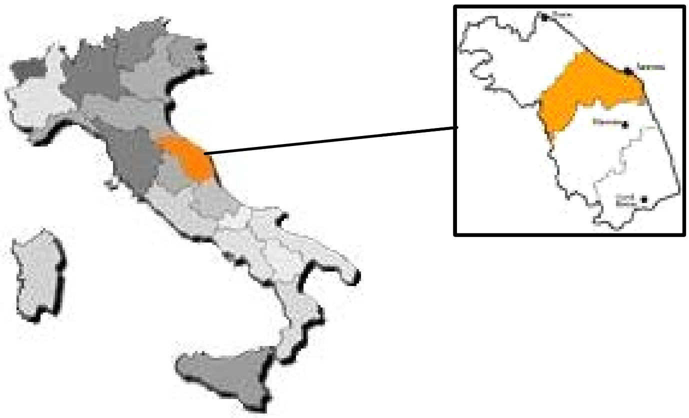

Figure 7. Marche Region and detailed of Ancona Province

To evaluate Ancona's Province representativeness of the entire country several analyses have been carried out on road accidents data; hereafter some of the results are shown. Initially, a comparison of general indicators (accident ratio, fatality ratio) at national (average values) and local level (Ancona's Province) is reported. Then results of more specific analysis carried out on accidents' classification by road type is given for both national and local data.

General indicators' results are depicted in Table 4. They show that in terms accident ratio and fatality ratio there is a (almost) full match between national average values and Ancona's Province values.

Table 4. Italy and Ancona's Province general indicators

	accident ratio[1]	**fatality ratio[2]**
Italy (average)	0.019	0.027
Ancona's Province	0.019	0.029

[1] N° fatalities / (N° fatalities + N° injured)
[2] N° fatality / N° accidents

In Figure 8 the analyses carried out on accidents' location by type of road is reported. Results show that Ancona's Province is well representative of the national values. In details, the maximum difference existing is less then 5% and refer to accidents on urban roads (Ancona's Province values are lower than national average); other minor differences (some 3%) can be depicted referring to both accidents on main roads and motorways (Ancona's Province values are bigger then national average). Finally, the same distribution of accidents on highways has been found.

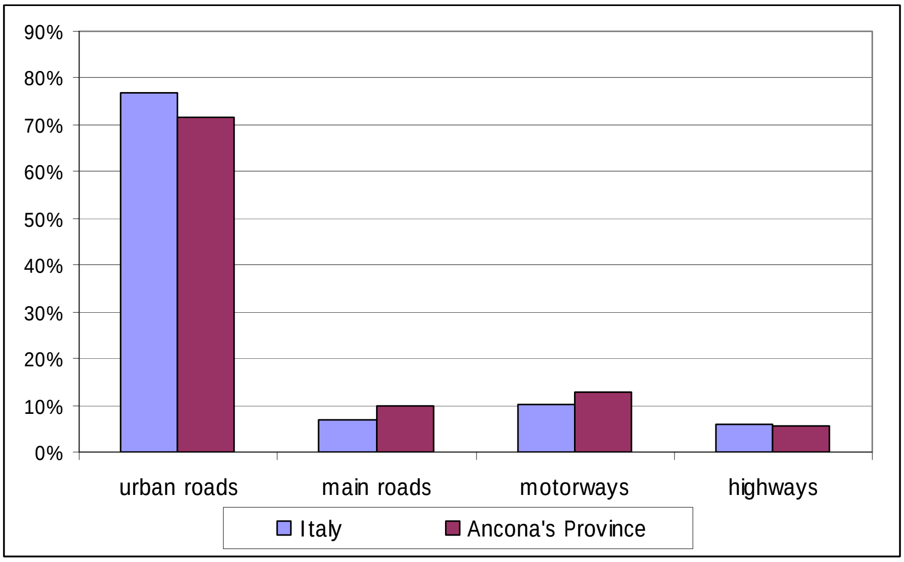

Figure 8. Comparing accidents by type of road in Italy and Ancona's Province

The total number of accidents that occurred in year 2003 in Ancona's Province is equal to 2,301 (with 61 deaths and 3,408 injured); this value ensure that the target number of accidents to be investigated (250) will be reached with no major problems within the foreseen investigation period.

The results for the area of Ancona's Province appeared representative of the national values (general and specific indicators) and the total number of accidents ensured to reach the target number of accident to be investigated. Therefore, it has been chosen as sampling area for the in-depth accident investigation.

Accident investigation procedure - (how do you get hold of the data, links with local infrastructure/police for data collection preparation, etc):

The accident investigation will be carried out in two different phases (see Figure 9):

1. On-the-scene
2. Retrospective

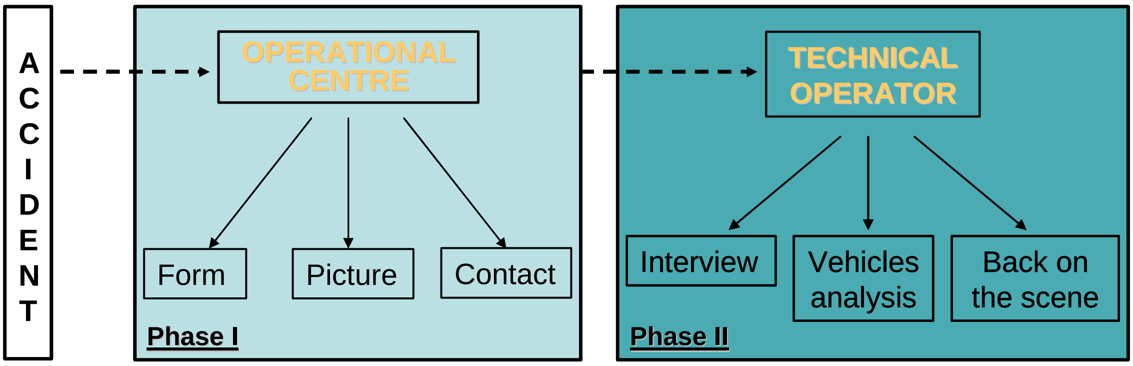

Figure 9. Accident investigation procedure

In detail, each phase is characterized by the following activities:

1. On-the-scene:
- Form: a specific form reporting all the general information (location, time, weather, description, etc) will be filled in on the accident scene;
- Pictures: several pictures will be taken in order to have a description of both the accident location (e.g. brake signs) and involved vehicles;
- Contacts: first contact will be establish with the vehicle occupants in order to carry out a detailed interview in phase 2

2. Retrospective:
- Interviews: a detailed interview will be carried out on the vehicles occupant that gave their availability during phase 1 contact establishment
- Vehicles analyses: the involved vehicles will be deeply analysed in order to highlight outside and inside deformations
- Back on the scene: a team of specialist will go back on the accident scene within a very short time period (1-2 days) in order to carry detailed analysis. This will aim at identifying all the parameters that will be used to perform the accident reconstruction**.**

This integrated approach will enable to carry out a complete in-depth analysis of the investigated road accidents.

Accident investigation team members (description of different areas of competences which will be represented in your team, etc)
Detailed skills definition of investigation team members are still on-going, however all the following macro-areas will be part of the team competences:

- *Health and Medical*: specialized technicians, members of the Marche Regional Health and Medical service, will be in charge of the on-the-scene analyses being part of the operational centre.
- *Engineering*: to ensure accidents and vehicle technical data collection and to perform analyses in order to guarantee both data and accident reconstruction representativeness

Date: 4 August 2005
Report prepared by: Pierluigi Aloia

SHORT REPORT ON PROGRESS/PLANS TO DATE FOR WP5.2 - MUH

Sampling area – (description of the area, where do you get the data from, how representative do you expect that to be of your country, etc):

As planned the sampling area will be the region of Hannover see Figure 10. The area is based on the same one used in the GIDAS (German In Depth Accident Study) methodology.

Figure 10. The region of Hannover (highlighted) in the state of Lower Saxony is the investigation area of GIDAS Hannover

With 2290 sqkm the region of Hannover is about 5% the size of Lower Saxony (47618 sqkm) and with 1.13 million inhabitants the region of Hannover has about 14% of the population of Lower Saxony (8 million inhabitants), see Table 5.

Table 5. Statistical comparison between Lower Saxony and the whole of Germany. (Statistical data taken from the ´Statistisches Bundesamt Deutschland´ for the year 2003)

	Lower Saxony	**Germany**	percentage of Germany
area in km^2	47 618	357 030	13.3 %
population	7.993 mill.	82.532 mill.	9.7 %
population density (inhabt./km^2)	168	231	n.a.
registered vehicles	5.379 mill.	54.082 mill.	10 %
people killed in traffic	774	6 163	12.6 %
Autobahn kilometres	1 354	12 044	11.2 %
kilometres of all road types	28 186	231 420	12.2 %

Accident investigation procedure - (how do you get hold of the data, links with local infrastructure/police for data collection preparation, etc):

It is the task of MUH to collect traffic accidents with information on accident causation for the German situation. For that accidents that are documented by the GIDAS team Hannover are used. A further detailed examination and research will be carried out to get access to individual information on the causation parameters

Accident investigation team members (description of different areas of competences which will be represented in your team, etc)

The team which collects the data for SafetyNet consists of 2 engineers:
Fabian Stille
Michael Jänsch

This team is supported by the GIDAS team which contributes the basic documentation. The GIDAS database is fed with data which is obtained through a team of experts which, when on duty, responds to any traffic accident with injuries in the region of Hannover. In a detailed investigation the team acquires both technical data from the accident site and medical data from the victims.

Date: 30 August 2005
Report prepared by: Dietmar Otte & Michael Jänsch

Methodology matrix for SafetyNet accident investigation

An extract from the compilation of the way in which the different partners will collect the data. (Also to be found in Appendix D together with more information about definitions of the terms used.)

Partner		Chalmers	DITS	MUH	TNO	VALT	VSRC
Cases to collect		70	250	100	126	200	250
MM		18,2	27	24	37,5	20	72,5
Days/case (140h/MM, 8h/day)		4,6	1,9	4,2	5,2	1,8	5,1
What technique does the team use for data collection?							
		%	%	%	%	%	%
"On-call" and "on scene"	OS	70	70	70	20	45	100
Nearly in time	NIT	20	0	20	30	45	0
Retrospective	RS	10	30	10	50	10	0
Which data collection techniques are possible to use under the different hours?							
Weekdays "day time" 08:00-18:00	OS	x	x	x	x	x	x
	NIT	x		x	x	x	
	RS	x	x	x	x	x	
Weekdays "night time" 18:00-08:00	OS		x	x		x	x
	NIT					x	
	RS	x		x	x	x	
Weekends "day time" 08:00-18:00	OS		x	x		x	x
	NIT					x	
	RS	x		x	x	x	
Weekends "night time" 18:00-08:00	OS		x	x		x	x
	NIT					x	
	RS	x		x	x	x	
How will the information from involved persons mainly be retrieved?							
Interviews on scene		x		x		x	x
Interviews at hospital				x			
Interviews by telephone		x	x	x	x	x[1]	x[2]
Through questionnaires					x		x

[1] Interviews by home visits or similar arrangements often used

[2] anticipated at this time – pilot underway

2.5 Sampling strategy and selection criteria

The data collection areas will be from the countries with the largest fatality populations in Europe (Italy and Germany) as well as northern (Sweden, Finland) and middle European (UK, Netherlands) countries. Specialist teams will investigate the causes of accidents in six countries to give a survey of those Member States. Data gathering is a specialist activity and care has to be taken to ensure it is done within an independent and open framework with unbiased results. Since it will prove hard to collect data from a random selection of cases, given the circumstances which the different teams work under, there will be an aim for randomness within the framework given, i.e. the selection of cases will be kept random to the best of the teams abilities. It has been decided that an open sampling plan will be kept for the time being until the database variables have been decided upon, and the experiences of other projects have been determined. The open sampling plan indicates that there will be no restriction in the selection of accidents, but all kinds of accidents will be investigated.

2.6 Database development

The database objectives and requirements were formalised early on in the database development process and are stated in the first part of this section. This is followed by some screen shots of the database.

There were several tasks to perform to be able to create the SafetyNet Accident Database. Many tables and forms needed to be created and linked together. There were mainly three different organisations who were involved in the process of creating the database, VSRC, MUH and DITS. Chalmers were involved in creating the help-sheets which contain the definitions of the causation variables, and was supportive in the process of getting the different parts together.

General information on objectives and requirements

Due to some common variables collected both in the fatal and in-depth databases, particularly regarding "general variables", the opportunity to integrate 5.1 and 5.2 databases has been suggested. Preliminary analyses highlight no major problem using a "common" database; moreover this will allow to perform a cross analysis on fatal and in-depth data concerning the general variables. It will also be beneficial from a user's point of perspective if the interface is the same, when the partners have the same persons working with input into both parts of the database. For them it will be easier and they will faster learn how to work with it.

- Forms will be filled in by all partners off-line and then sent to DITS as .xml files (Extensible Markup Language) and uploaded into the main database by means of FTP.
  ("XML is a pared-down version of SGML, designed especially for web documents. It allows designers to create their own customized tags, enabling

the definition, transmission, validation, and interpretation of data between applications and between organisations.")
- Each organisations data will be stored locally on a PC or server.
- All uploaded data will be stored on a server at DITS.
- It is most likely that the main database will be built using MySQL.

Requirements of the database

- The database should contain two parts, a separate software part for data input and one part for data storage. Since the functionality and variables can change during the data input phase, it was decided that the data input part should be a separate software which easily can be updated from the WP5 web portal. If the coding of a variable needs to be changed a new code will be added. The partners must check and change their own data in case it is needed.
- The system should allow multi-access (i.e. more than 1 partner can upload or download data at the same time).
- A consistency check should be implemented in the forms in order to ensure data consistency.
- A web portal must be developed (only accessible by WP5 partners with a protected ID and password) from where partners can download the raw data from the database in .xml, .txt or .xls format.
- There is no requirement for the database to contain data analysis tools. Instead, raw data will be downloaded by partners and then analysed off-line by partners using partners' own statistical software (e.g. SPSS).
- Aggregated results need to be made available to the public via another web portal. There needs to be discussion with WP6 regarding the integration of the aggregated results of the WP5 data collection activities with the ERSO (European Road Safety Observatory) website.
- Some of the more detailed analysis of the data collected in WP5 will be undertaken by WP7. There needs to be discussion with WP7 partners about what analysis they will conduct and what will be done by WP5 partners.

For inputting pictures into the database, there needs to be some compression of files. It would be useful to put automatic systems (e.g. batching) in place to do this, and DITS will look into the possibility of providing this capability.

Description of common interface proposal for 5.1 and 5.2

The structure of the databases for 5.1 and 5.2 will to some extent be joined together, see Figure 11, for reasons stated in section "General information on objectives and requirements". To be able to include all accident types in both parts of the database all road users need to have a VehicleID (Vehicle data). Pedestrians could, for example, have "shoe" as a vehicle.

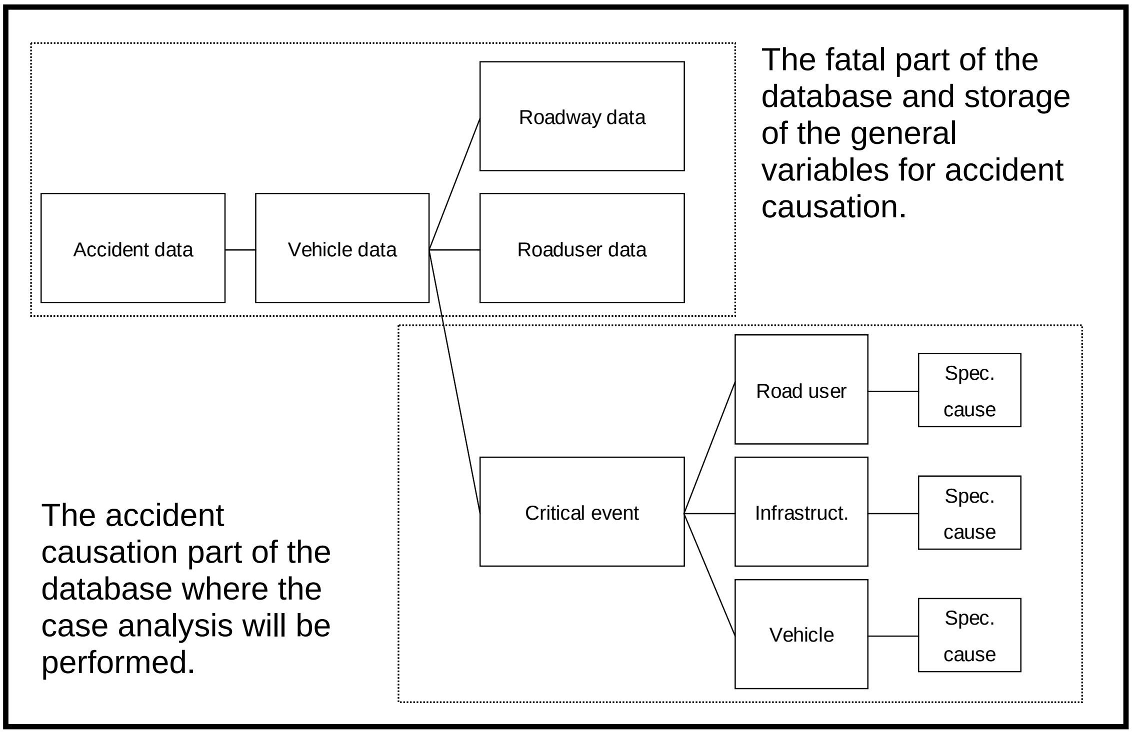

Figure 11. Database structure proposal for task 5.1 and 5.2

Input of the general variables (WP5.1) into the database

A schematic diagram summarising the basic information about the way the database should be used is shown below, Figure 12.

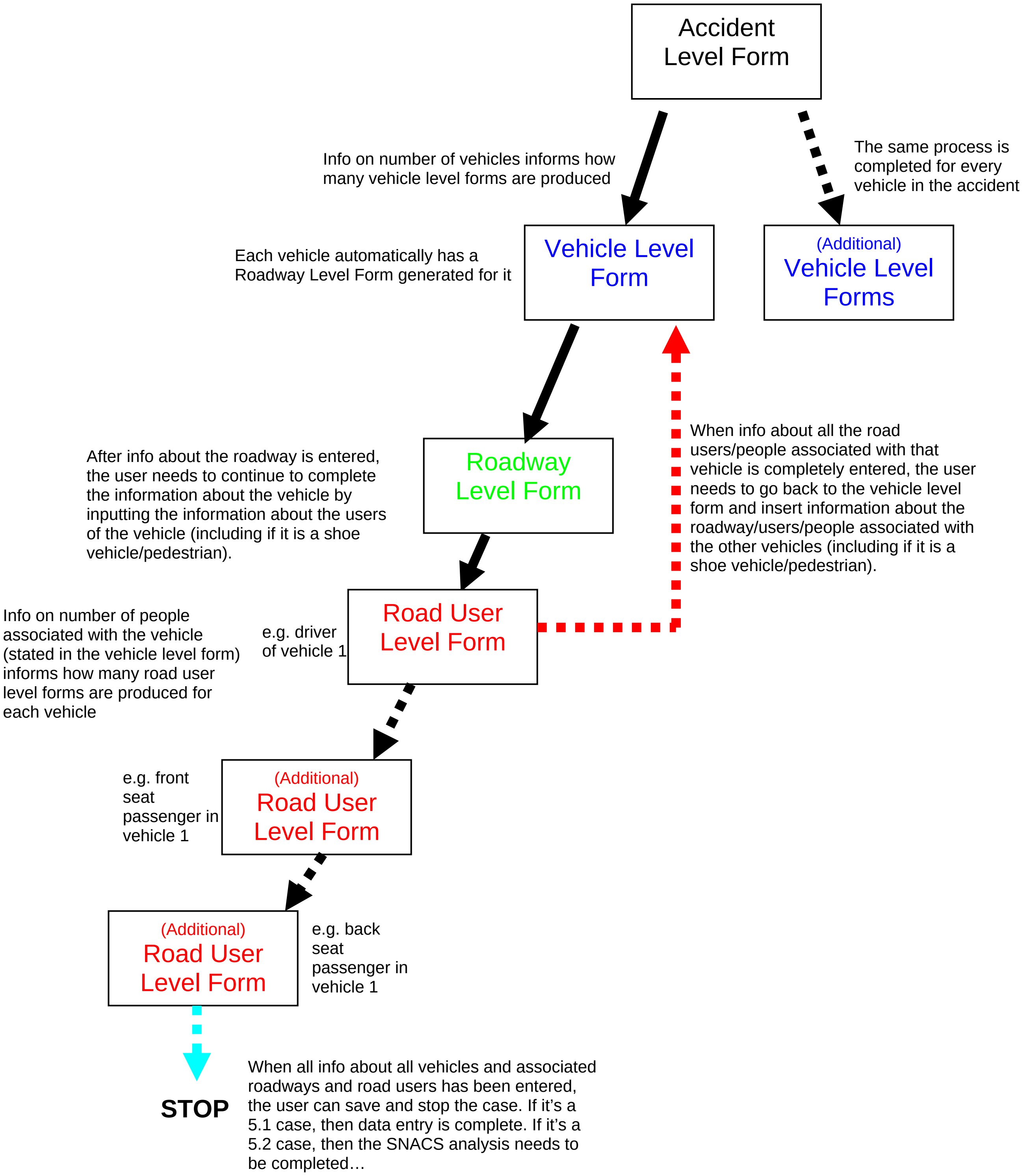

Figure 12. Schematic on basic principles of input of general variables

Input to make case analyses for WP 5.2
Illustrated below (Figure 13) is a rough sketch to show the way the case analysis should be managed with input into an MS Access interface.

The first sketch gives an “all-over-view” of how the user would be performing the analysis by choosing different options (command buttons) in the database. The options written in bold text (with the connections in between) shows the choices made by the person performing the case analysis, completing one “chain of causes” for this accident which has the general critical event “Speed”.

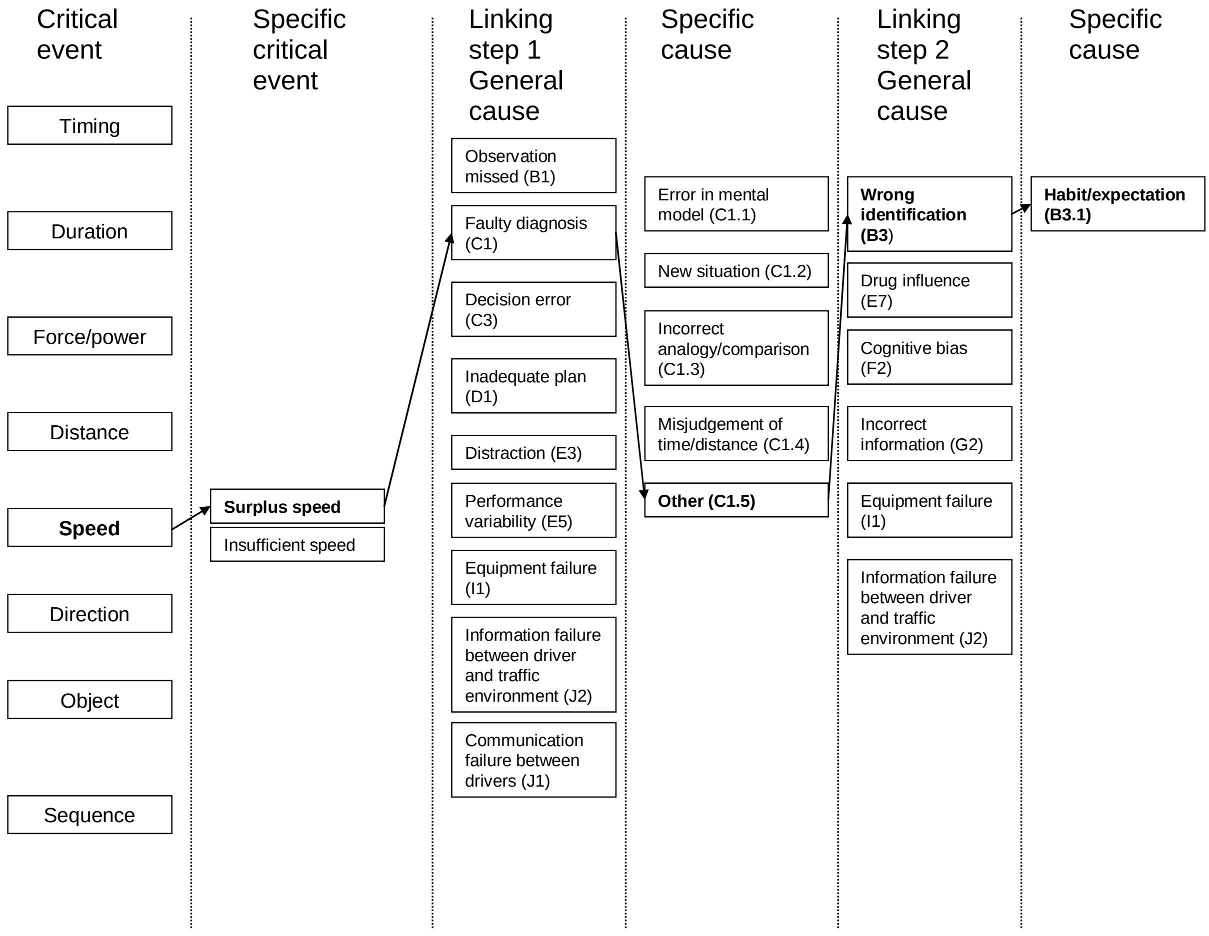

Figure 13. Example sketch of the all-over-view of the database functionality.

The linking will be built-in into the database, hence, only the options available, according to what critical event has been chosen, will be shown. So, when looking at the illustrated example; after having chosen Speed (general critical event) only “surplus speed” or “insufficient speed” (both latter ones are specific critical events) will be available. After having chosen “Surplus speed” one needs to choose one from “Observation missed (B1)”, “Faulty diagnosis (C1)”, “Decision error (C3)” etc. In this case we’ll choose “Decision error (C3)” where “Error in mental model (C1.1)”, ”New situation (C1.2)” etc, are the options. Since none of (C1.1)-(C1.4) is suitable one needs to choose “Other (C1.5)”, which in this case links us to ”Wrong identification (B3)”, ”Drug influence (E7)” or

”Cognitive bias (F2)” etc. In ”Wrong identification (B3) one finds a suitable general cause and also a suitable specific cause in ”Habit/expectation (B3.1)". Here, in finding this specific cause, the chain of causes is identified.
Note: The linking does not always stop after two steps, it might be necessary to take further steps into the analysis.

One important feature which is not specified in the sketch above is text boxes with the possibility for the person who performs/registers the case analysis to enter explanations. For instance in order to be able to describe a critical event, with regards to both the more general one which is chosen first (Speed) and the more specific one (Surplus speed), which is chosen secondly, a text box should be designated for this purpose and needs to be connected to the critical event/specific critical event (the specific critical event is a subset of the general critical event). The possibility of entering an explaining kind of text needs to be included to all the general and specific causes. Below illustration (Figure 14) shows what it might look like for a critical event/specific critical event and also for the general causes/specific causes.

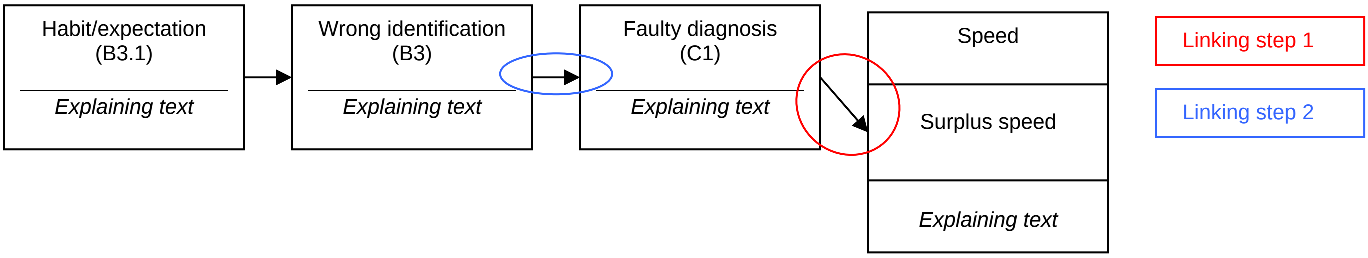

Figure 14. Illustration of the “case-analysis-tree” with one “chain of causes”.

The kind of picture illustrated above is thought to emerge, for instance under a new tab called “case analysis illustration”, as one completes the case analysis. Surplus speed should be put together with Speed to look like the above.

The user is always going through one linking chain at a time and in most cases there will be more than one chain of causes to register into the database. This implies that it needs to be possible to go back during the course of the analysis, to the critical event, for instance, and start registering yet another chain of causes.

There is an option for all specific causes, referred to as “Other” (see Figure 13 above), and this option should either link further into the chain of causes or one should be able to stop one’s analysis at this stage (depending on whether the rules for stopping have been fulfilled).

The “case analysis illustration” is put together step by step as one completes the analysis and is shown accordingly in the boxes.

Data consistency check

It was felt important to make the majority of the forms and tables contained in the database to be presented in combo boxes and text boxes (although other types of inputting responses also occur), in order to reduce input error and to improve the human-computer-interaction.

During the building of the forms, it was important that the correct data type was set for each variable (general variables, critical events, causes). For example; a variable such as “Accident date” should have the data type “date/time” and the variable “Accident day” should have the data type “text”.

Another type of consistency check which is being built into the database is the matter of not being able to register for instance four digits into a field which cannot realistically consist of more than three digits (i.e. age in years).

Screen shots

Below are some screen shots from the database. Figure 15 gives a picture of what kind of information is collected about the accident, Figure 16 illustrates the input of information regarding the vehicle involved and Figure 17 shows what the first input form for the SNACS analysis looks like.

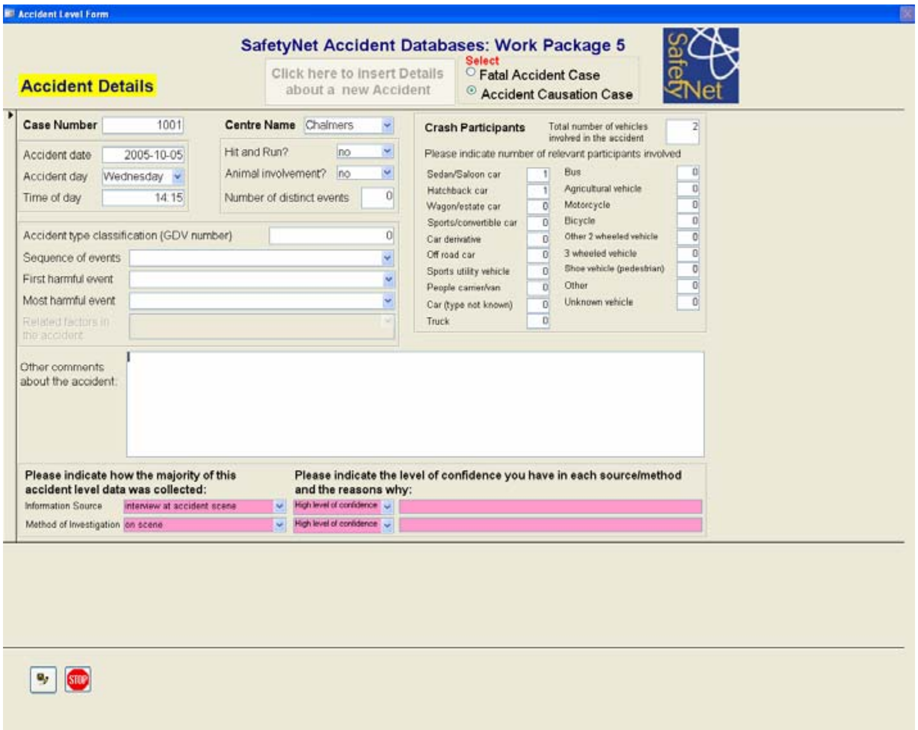

Figure 15. Accident level form

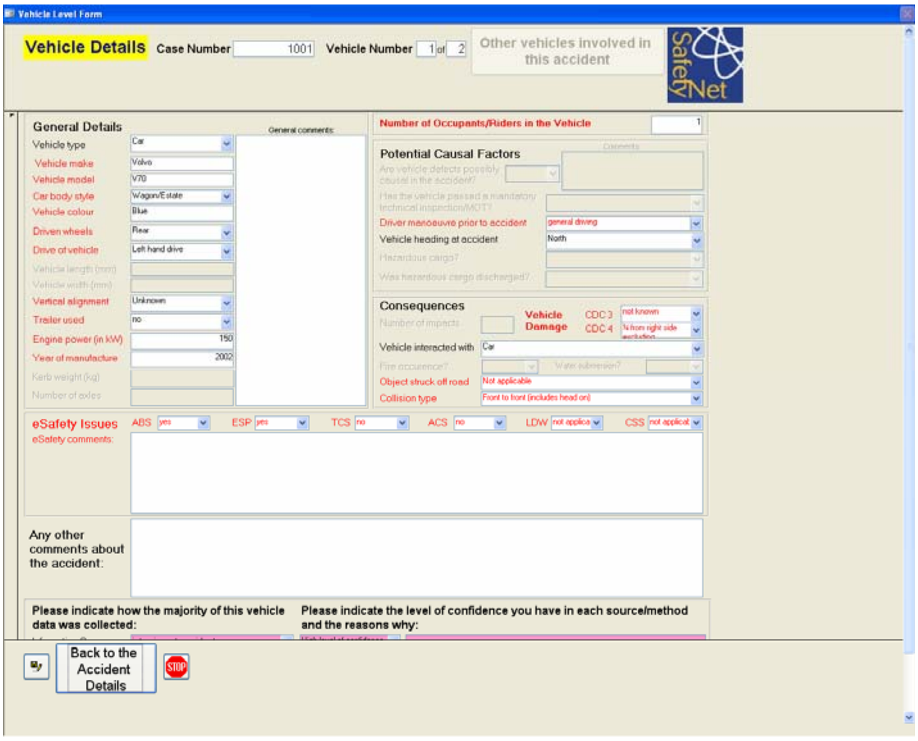

Figure 16. Vehicle level form

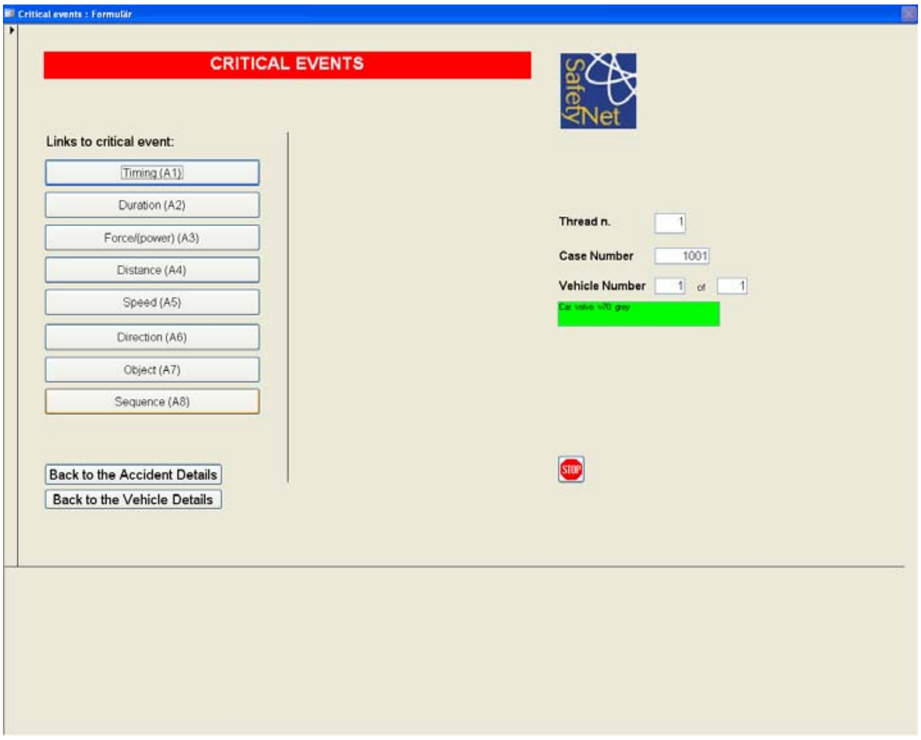

Figure 17. First form for entering SNACS analysis.

Project co-financed by the European Commission, Directorate-General Transport and Energy

3 Links with other projects

3.1 Links within SafetyNet

SafetyNet Work Package 4 - Independent Accident Investigation Recommendations
The main objective of this WP is to elaborate guidelines for a good practice with the aim to ensure independence in terms of data quality and also in terms of the output of these databases. Obviously, these guidelines will only concern public databases or public use of any European databases. According to the database application, the recommendations proposed will be applicable either in input, for instance with a focus on data quality or on temporal stability of the gathering method, or in output, with a particular interest in the correct use of results.

Due to the nature of this task, WP4 and WP5 have been liaising closely to benefit from the knowledge and experience available. Particular emphasis has been given to issues of independence for data collection techniques and data storage. Technical meetings have been run in parallel and with many similar partners being involved in WPs 4 and 5, this has enabled sharing of information and a close relationship during the development of both projects.

SafetyNet Work Package 6 - European Road Safety Information System
The European Commission has stressed several times in its communications the relevance of the dissemination of data and knowledge. Much information exists which is not optimally used mainly because the individuals involved do not know of its existence or the information itself is not easily accessible. The situation needs improvement, because good information supports rational decision taking. A European Road Safety Information System, demonstrating, for example, tables, graphs and impartial and research-based knowledge to the user's desks, is one of the ways to meet the objective of proper dissemination of knowledge and by so doing contributes to better road safety policies and less road casualties on European roads.

Data from WP5 will be available for presentation within this information system. It is anticipated that this will be in the form of hyperlinked tables with prepared data (similar to those used to display key data from CARE on the EC's website). Further discussion will take place between WPs 5 and 6 when the data collection phase of WP5 commences.

SafetyNet Work Package 7 – Data Analysis and Synthesis
The ultimate goal of WP7 is to perform analyses on data that will be gathered in SafetyNet WPs 1, 2, 3, and 5. It is important to obtain an agreement across the work packages involved, about the content and objectives of the analyses performed in WP7.

Therefore it has been decided that a one-day workshop will be held, involving partners from WP5 and 7, but also from WP1, 2, and 3, in order to discuss this issue. Partners involved in WP7 will provide the other WP's with propositions/examples of analyses (method, content) that could be performed, as a basis for discussion. The workshop will be conceived as a brainstorming.

For practical reasons, it has been proposed that some of the partners working in each WP will attend the workshop. For additional practical reasons, it has been decided that half of the workshop day will involve WP7-WP1, 2, and 3 discussions, while the other half will involve WP7-WP5 discussions. The workshop will take place in February 2006, exact dates to be announced shortly. Feedback on the sampling method and on the protocols will also be formulated.

3.2 Links with external projects

European Accident Causation Study (EACS)

This research project was conducted by ACEA (Association of European Car Manufacturers) from 1996 to 2001 in three phases, the first of which was supported by the European Commission (1996-1998). The objective was to make an accident causation database upon the data collected by teams in different countries (F,D,NL,I,S,FIN). A specific coding system for data collection was developed. The project was steered by the ACEA Task Force Accidentology and ACEA sub contracted to CEESAR (France) for the co-ordination of the project. At the end of the chain, CEESAR subcontracted for the data collection and coding teams. At the end of the project, the database contained 2000 accident cases.

Contact has been made between SafetyNet WP5 and the former EACS steering committee. SafetyNet WP5 has been given access to the EACS data coding book (EACS Volume 1: the database questionnaire. Version 3, September 2001) to take advantage of the previous work that has been done on making consistent data protocols coming from different institutes.

As EACS ended 3 years ago, there is no longer an EACS steering committee or any kind of group working permanently on EACS. It is difficult, therefore, to organise a formal relationship between EACS and SafetyNet WP5. However, it has been demonstrated that some of the partners who were involved in the EACS project are involved in SafetyNet. Additionally, many more former EACS partners are involved in other potential projects (e.g. TRACE[3]). It has been suggested that it would be highly beneficial to establish close relationships between the SafetyNet and TRACE projects and organise common workshops, especially but not exclusively, on the topic of data collection and identification of countermeasures. Consequently, tasks undertaken together could fit into these workshops, corresponding to join activities of the two potential EU projects.

[3] TRACE ("Traffic Accident Causation in Europe"), refers to a project bid that is currently in negotiation phase with the European Commission for commencement in early 2006.

Motorcycle Accident In-Depth Study (MAIDS)
In order to better understand the nature and causes of powered two-wheeler (PTW) accidents, the Association of European Motorcycle Manufacturers (ACEM) with the support of the European Commission and other partners conducted an extensive in-depth study of motorcycle and moped accidents during the period 1999-2000 in five sampling areas located in France, Germany, Italy, Netherlands and Spain. A total of 921 accidents were investigated in detail, resulting in approximately 2000 variables being coded for each accident. From these data, all the human, environmental and vehicle factors, which contributed to the outcome of the accident, were identified.

Collaboration between the MAIDS team and SafetyNet WP5 has been initiated. The proposed idea of a joint workshop is being developed through ACEM. Working together in such a way would be most beneficial for sharing our experiences and information about the main countermeasures identified in MAIDS. Such collaboration would enrich our mutual knowledge and develop our capacity of action towards safety improvement.

European Truck Accident Causation (ETAC) Study
ETAC, initiated by the European Commission and the International Road Transport Union (IRU), was launched in order to set up a heavy goods vehicle accident causation study to identify the real causes of accidents involving trucks and to give guidance to policy and decision makers for future actions which could contribute to the improvement of road safety. The study is resulting in a database containing road accident causation criteria, which is established in a scientific, unbiased, independent manner, and which enables the identification of truck accidents.

A meeting was held between ETAC and SafetyNet (WP5 and WP4) to define the possible synergies between the participants' activities in the field of accident causation studies, methodologies and database design. Details of the ETAC and SafetyNet projects were exchanged, specifically regarding aspects of technical detail, including sampling and quality control. There was a general discussion of the difficulties in guaranteeing independence and producing analyses that truly reflect representative causes of accidents on European roads. It was decided that the main players would build on this initial contact to continue technical discussions to their mutual benefit. It was agreed that the group would meet again in late 2005 to exchange more information.

Human Centred Design for Information Society Technologies Network of Excellence (HUMANIST NoE)
The goal of HUMANIST is to create a European Virtual Centre of Excellence on HUMAN centred design for Information Society Technologies applied to Road Transport (IVIS and ADAS), with a coherent joint program of activities, gathering research, integrating and spreading activities. Integrating activities will permit the NoE to manage and to consolidate the NoE structure by promoting the mobility of researchers, by optimising the pool of existing experimental infrastructures, by setting up electronic tools (common database, web-

conference, e-learning) for knowledge sharing. Spreading Activities will allow the NoE to spread widely the knowledge from HUMANIST, by organising debates with projects on eSafety and relevant stakeholders, by promoting harmonisation with standardisation and pre-normative bodies, by setting up training programmes, and by promoting and disseminating research results to a wide audience. HUMANIST is sponsored and supported by the European Conference of Transport Research Institutes (ECTRI) and Forum of European Road Safety Research Institutes (FERSI) networks.

Contact has recently been made between SafetyNet WP5 and HUMANIST. We were invited to make a presentation at the workshop organised by HUMANIST on "User group specific impacts of IVIS (In-vehicle information systems) and ADAS (Advanced driver assistance systems): Recent research on expectations, opinions, facts and developments". The presentation covered the work performed in SafetyNet on data collection for the analyses of accident causation and was also connected to the specific problems of ITS (Intelligent Transport Systems), and presented the current specifications of the database and offered a link to support the user needs of HUMANIST partners. This presentation formed a good starting point for a discussion to specify associations between SafetyWP5 and the HUMANIST NoE.

4 Dissemination activities to date

Table 6 demonstrates how information about SafetyNet's WP5 has been disseminated to a wide audience across Europe since May 2004. Table 7 indicates future planned dissemination activities.

Table 6. Dissemination activities for SafetyNet WP5

Date	Type	Type of Audience	Countries addressed	Size of Audience
Vienna, May 2004	Presentation to World Injury Congress: Burden of Injury Conference	Experts in road and vehicle safety	EU member states	100+ people
Hannover, September 2004	Presentation to PENDANT workshop	Experts in road and vehicle safety	EU member states	50 people
Hannover, September 2004	Presentation to ESAR Conference	Experts in road and vehicle safety	EU member states	130 people
Munich, September 2004	Presentation to SARAC Committee	Experts in road and vehicle safety	EU member states	15 people
Helsinki, October 2004	Presentation to Finnish accident investigators	Finnish experts in road and vehicle safety	Finland	250 people
Autumn 2004	Paper in Journal of Injury Control and Safety Promotion	Experts in road and vehicle safety	EU member states	>5000
Rimini, November 2004	Presentation to "2nd International Road Safety Exhibition"	Experts in road and vehicle safety	EU member states	50+ people
Rimini, November 2004	Presentation of WP 5 to "2nd International Road Safety Exhibition	Experts in road and vehicle safety	EU member states	50+ people
Brussels, December 2004	Presentation to High Level Group on Road Safety	National Representatives	Al EU Member States	60+ People
Brussels, November 2004	Presentation of WP 5 at the National Experts meeting	Experts in road and vehicle safety	EU member states	30 people
Brussels, January 2005	Presentation to ETAC project coordinators	Experts in road and vehicle safety	EU member states	11 people
Leipzig, April 2005	Presentation to Road Safety Forum	Experts in vehicle safety	EU member states	60 people
Warsaw, May 2005	Presentation to Advanced Passive Safety Network	Experts in passive safety	EU member states	30 people

Table 6. Dissemination activities for SafetyNet WP5 (continued)

Date	Type	Type of Audience	Countries addressed	Size of Audience
Mykonos, June 2005	Presentation to SafetyNet partners	Experts in road and vehicle safety	EU member states	60 people
Funchal, Sept 2005	Presentation to HUMANIST Network	Experts in active safety	EU member states	30 people

Table 7. Future dissemination activities for SafetyNet WP5

Planned Date	Type	Type of Audience	Countries addressed	Size of Audience
Prague, May 2006	SafetyNet Conference	Road Safety community	All EU countries	

5 Future plans

5.1 Pilot

For the pilot, each partner will undertake five real cases and these cases will be reviewed just after the pilot phase is over, by the partners, to check consistency of activities.

A suggestion brought forward within WP5.2 implies that during the pilot or during the start of the data collection period, there should be an expert who will visit all the partner institutions, to ensure that data is being collected and analysed appropriately and detect any difficulties in the process. Whether this will be possible and whether it is a requirement of the project will be determined upon feedback from the training and the pilot.

5.2 Review phase

The review phase will examine the pilot of each WP5 partner in terms of whether each has successfully managed to retrieve data which matches the requirements of the study. At this stage there is no required plan or procedure to follow, but there is a document being developed which will facilitate the review of the database concerning the general variables and help picking up on anomalies regarding the same. This stage in the project will also be used to assess the usability and effectiveness of the database. Any amendments that need to be made to the methodology will be made at this time.

5.3 Full data collection

Each team will have its own way of collecting data (see Appendix D). Three different modes are recognized; on-scene investigations which will make it possible for the investigating team to retrieve a lot of information, both in terms of technical data and information from persons involved in the accident. The second mode is near-in-time investigations and when performing near-in-time investigations one might still be able to retrieve some valuable data from the scene of the accident. The third mode is the retrospective one which means that the investigating team arrives at the scene a day or two later. Valuable and perishable information is likely to have disappeared and data collected by other authorities are important to retrieve. However, it is possible to complement these data with interviews performed by the investigating partner. Among these modes there are four ways of collecting data from persons involved and they are; interviews on scene, interviews by telephone, interviews at hospital and through questionnaires.

There is a sequence to follow to be able to retrieve the information which is needed:

1. Receiving/collecting information on the accident
2a. Go on-scene; do interviews, get measurements, take photos, do sketches, etc
2b. Perform a near-in time investigation (go on-scene a few hours afterwards) to; get measurements, take photos, do sketches, etc
2c. Perform a retrospective investigation – (go on-scene a day or two afterwards) to; get measurements, take photos, etc. Might also include picking up the police report, or similar, to get hold of as much data as possible.
3. Enter the general data into the database
4. Perform the case analysis
5. Perform reconstruction work (either through basic calculations or through the use of simulation software)

All data collected will be entered and stored in a database (see section 2.5 Database development). The data will be entered by the person/s doing the case analyses. Changes, most likely additions, in the variables will inevitably imply changes in the database, and the database software will be updated accordingly. When making changes in the variables that has implications for the database and in order to handle these changes re-coding and redefining of variables will be necessary. New versions of the database software will be available on the project web site.

Another important matter is the consistency in data collection. Partners need to be asking questions, either through interviews or questionnaires, which generates answers that are compatible/comparable, and, hence, are possible to save in the database. This might imply the need for some partners to revise the data collection protocol previously used.

A high level of quality control of the data is required. Therefore, implementation of systems to review procedures will take place including: evaluation of each partners' data collection and analysis activities; database validation process (consistency check for data input); case reviews (presentations on individual accident cases which are scrutinised by individual partners).

Reconstructions will be conducted to some extent from the accident data collected. A definition of the term "reconstruction", as far as this project is concerned, has been made and can be found in the matrix in Appendix D.
It has been surmised that the issue of reconstruction has not been considered in financing the research project and so it must be established how much time/resource is available for such an activity and the type of data that partners are able to collect.

In order to establish exactly which data collection topics each partner is covering, a matrix, mentioned and displayed earlier in this report (see Appendix D), has been drawn up. The matrix has been completed by the partners to state what the capabilities are regarding data collection. This activity will also make it visible where the gaps are in the current data collection provision and make recommendations for improvements in the future.

6 References

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APPENDIX A – How to use SNACS

Below is an example of how to follow the basic idea of the method SNACS.

Example: Two cars are involved in a collision in a cross-section regulated by traffic lights. An interview has been conducted with the driver, in vehicle A, who drove straight ahead against red lights when vehicle B, who had green lights, impacts the right side of vehicle A. According to driver A he was coming in to the cross-section at approximately 50 km/h when his cell phone rang. He does not state he was feeling stressed or in a hurry, neither, according to the police, was he under the influence of alcohol. The driver states that he saw the cross-section in time, but never observed the lights changing to red. He also stated he slept badly the night before the accident.

It starts with the driver going too far which is the critical event, “Prolonged distance”. From that point there are several linking possible but the most reasonable choice of variable is “Observation missed (B1)”, according to what the driver states. None of the examples of specific causes related to “Observation missed (B1)” is applicable and it is therefore needed to do another linking, and this time it involves variable “Distraction (E3)”. For this variable there is mainly one suitable example of specific cause and that is “Internal competing activity E3.3”, which is where arrow number 5 ends up.

CRITICAL EVENT	**SPECIFIC CRITICAL EVENT**	**LINKING**
Distance (A4)	Prolonged distance (A4.1)	(B1), (C1), (C2), (C3), (D1), (E6), (I1), (J1), (J2)
	Shortened distance (A4.2)	

CATEGORIES	**GENERAL CAUSE**	**EXAMPLES OF SPECIFIC CAUSE**	**LINKING**
Observation (B)	Observation missed (B1)	Glare (B1.1)	(C1), (D1), (E3), (E4), (E6), (F1), (G3), (H5), (I1), (N2)
		Noise (B1.2)	
		Tunnel vision (B1.3)	
		Other (B1.4)	
	False observation (B2)	Other (B2.1)	(C2), (E3), (E4), (E7), (E9), (F1)
	Wrong identification(B3)	Habit/expectation (B3.1)	(E3), (F1), (G2), (H4), (J2)
		Other (B3.2)	
Temporary person related functions (E)	Distraction (E3)	Passengers (E3.1)	(I1)
		External competing activity (E3.2)	
		Internal competing activity (E3.3)	
		Other (E3.4)	
	Fatigue (E4)	Circadian rhythm (E4.1)	(M2), (M3)
		Extensive driving spell (E4.2)	
		Other (E4.3)	

APPENDIX B – Variables for SafetyNet WP5.2

General variables

VARIABLE	TYPES OF RESPONSES FOR EACH VARIABLE
Accident level	
Case number	of a standard configuration, e.g. VSRC001
Consecutive number	of a standard configuration
Centre	of a standard configuration, e.g. VSRC, CTH
Accident date	month and year only
Accident day	Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday
Time of day	Specific time using 24-hour clock, e.g. 0711, 1729
Area	Urban, rural
Crash scenario	collision with animal, rear collision, chain collision, chain or rear collision, frontal collision, lateral collision, collision with pedestrian, single vehicle accident (no obstacle), single vehicle accident (collision with obstacle), collision with park
Crash participants	Number of parties involved and kind (e.g. 2 cars, 1 bicycle, 1 pedestrian)
Hit and run	yes or no or unknown
Animal involvement	yes or no or unknown
Sequence of events	Non-collision [Overturn/rollover, Fire/explosion, Immersion, Gas inhalation, Fell/jumped from vehicle, Injured in vehicle, Thrown or falling object, Pavement surface irregularity (pothole, grooved, grates), Vehicle occupant struck or run over by own vehicle
First harmful event	Non-collision [Overturn/rollover, Fire/explosion, Immersion, Gas inhalation, Fell/jumped from vehicle, Injured in vehicle, Thrown or falling object, Pavement surface irregularity (pothole, grooved, grates), Vehicle occupant struck or run over by own vehicle
Total number of vehicles damaged	Total number of vehicles damaged (actual number)
Number of distinct events	Number of distinct events (actual number)
Roadway level	
Road classification	motorway, semi-motorway, road (rural), road (urban), main street, street (other), other, unknown
Number of lanes	Total number of driving lanes on both side of road
Speed limit	in kilometres per hour
Type of speed limit	permanent, temporary, variable (dynamic), advisory, other, unknown

VARIABLE	TYPES OF RESPONSES FOR EACH VARIABLE
Roadway surface type	Concrete; blacktop, bituminous or asphalt; brick or block; slag, gravel or stone; dirt; other; unknown
Construction/maintenance zone	None; construction zone; maintenance zone; utility zone; work zone; type unknown
Traffic signal control/device	No control; highway traffic signals; regulatory signals; school zone signs; warning signs; unknown
Traffic signal device functioning	No controls; device working properly; device not working; device not working properly; unknown
Light condition	Daylight, dusk, twilight, darkness, darkness with artificial light, other/unknown
Weather conditions	Dry; rain; hail; freezing rain; snow; wet snow; other; unknown
Strong winds	Yes; no; unknown
Fog	Yes; no; unknown
Pedestrian facility	None present but evidence of desire line; crossing facility sited after bend or junction; refuge; drop kerb; pedestrian crossing; flood lighting; footbridge present
Surface contaminants	None; mud; leaves; oil; diesel; gravel; discarded load; concealed road markings; other
Signing related to the accident	Signing present at site of accident, e.g. temporary signs, unauthorized signs, illuminated signs; variables message signs etc, *signs missing*.
Traffic calming	Yes; no; unknown
Cycle facilities	None; advanced cycle lane separated by kerbing; cycle lane on footway; cycle lane separated by road markings; cycle (toucan) crossing
Traffic way flow	Not Physically Divided (Two-Way Trafficway); Not Physically Divided (With Two-way Continuous Left-Turn Lane); Divided Highway, Median Strip (Without Traffic Barrier); Divided Highway, Median Strip (With Traffic Barrier); One-Way Trafficway; Entrance/Exit
Roadway alignment	Straight road; bend to left; bend to right; unknown
Junction	No junction; T junction; Y junction; crossroads; roundabout; merging lane
Vehicle level	
Vehicle type	Car, LGV, HGV, bus, motorcycle, pedal cycle, other/unknown
Vehicle make	Manufacturer
Vehicle model	Name

VARIABLE	TYPES OF RESPONSES FOR EACH VARIABLE
Body type/style	Sedan/saloon; hatchback; wagon/estate; sports; derivative; off road/SUV; convertible; MPV
Vehicle colour	Red, blue etc.
Engine power	in KW (kilowatts)
vehicle damage	location damage only (Column 3 of CDC)
ABS-system existent	Yes; no; unknown
trailer used	Yes; no; unknown
No. of occupants/riders	1, 2, 3, 4, 5, 6+, other/unknown
Year of manufacture of vehicle	Year that this vehicle was manufactured
Drive of vehicle	Left hand drive, right hand drive, not applicable, other/unknown
Driven wheels	front wheel drive; rear wheel drive etc.
Vertical alignment	Uphill, downhill, flat, unknown, other
Vehicle manoeuvre	Going straight; Slowing or stopping in traffic lane; Starting in traffic lane; Stopped in traffic lane; Passing or overtaking another vehicle; Leaving a parked position; Parked; Entering a parked position; Controlled manoeuvre to avoid an animal; pedestrian
Vehicle heading at accident	North, northeast, east southeast etc., unknown
Object hit/vehicle interacted with	Car; LGV (weight less than 3.5 tons); HGV (weight more than 3.5 tons); minibus; Bus/coach; Pedal cycle; Moped/scooter; Motorcycle <125cc; Motorcycle >125cc
Object struck off road	Pedestrian; Lamp post; Road sign; Tree; Wall; Building; Bridge; Animal; Other roadside furniture; Other/unknown
Collision type	No collision with motor vehicle in transport; Front-to-rear (includes rear-end); Front-to-front (includes head-on); Front-to-side, same direction; Front-to-side, opposite direction; Front-to-side, right angle (includes broadside); Front-to-side/angle – direction not specified; Sideswipe same direction; Sideswipe opposite direction; Rear to side; Rear to rear; Other (end-swipes and others); Not applicable; Unknown
Road user level	
Driver/Rider issues	
Person number	standardised configuration

VARIABLE	TYPES OF RESPONSES FOR EACH VARIABLE
Road user classification	to link the person to a particular vehicle if relevant
Seat position	ISO standard (1.1, 1.3 etc.)
Age	age in years
Gender	Male or female or unknown
Is the driver a resident of the country?	e.g. D, GB, F,…
Body region most heavily injured	e.g. head, torso, etc.
Police Injury severity	Fatal, serious, slight, n/a, unknown, other
Suspicion of alcohol involvement	yes; no; unknown
Police reported other drug involvement	yes; no; unknown
Seatbelt used	yes; no; unknown; not applicable
…additionally for Motorcycle Drivers only	
Motorcycle helmet worn	yes/no/unknown
Protective items worn:	
Reflective items worn	yes/no/unknown
…additionally for Bicyclists only	
Bicycle helmet worn	yes/no/unknown
Protective items worn:	
Reflective items worn	yes/no/unknown
Passenger issues	
Person number	Standard configuration for project
Road user classification	to link the person to a particular vehicle if relevant
Seat position	ISO standard (1.1, 1.3 etc.)
Age	age in years
Gender	Male or female or unknown
Body region most heavily injured	e.g. head, torso, etc.
police injury severity	Injury severity – cause of death etc.
Seatbelt used	yes; no; unknown; not applicable
…additionally for Motorcycle Passengers only	
Motorcycle helmet worn	yes/no/unknown
Protective items worn:	

VARIABLE	TYPES OF RESPONSES FOR EACH VARIABLE
Reflective items worn	yes/no/unknown
…additionally for Bicycle Passengers only	
Bicycle helmet worn	yes/no/unknown
Protective items worn:	
Reflective items worn	yes/no/unknown
Pedestrian issues	
Person number	Standard configuration
Age	age in years
Gender	male or female or unknown
police injury severity	Fatal, serious, slight, n/a, unknown, other
Body region most heavily injured	e.g. head, torso, etc.
Pedestrian impairment…	Yes or no with an optional box for further details if known...
Pedestrian disabilities	Body impairments, e.g. deaf, blind, requires use of wheelchair/crutches/frame/stick etc.; not known; no
Reflective items worn	yes/no/unknown
Other information	
Information retrieving	Through interview on the scene, through interview by phone, site visit
Active safety systems	1: ESP (Enhanced Stability Programme) 2: TCS (Traction Control System) 3: ACS (Active Cornering System) 4: LDW (Lane Departure Warning) 5: Collision sensing system

Critical events

CRITICAL EVENT	SPECIFIC CRITICAL EVENT	LINKING
Timing (A1)	Premature action (A1.1)	(B1), (C1), (C3), (D1), (E6), (J1), (J2)
	Late action (A1.2)	
	No action (A1.3)	
Duration (A2)	Prolonged action/movement (A2.1)	(B1), (C1), (C3), (D1), (E6), (I1), (J1), (J2)
	Shortened action/movement (A2.2)	
Force/(power) (A3)	Insufficient force (A3.1)	(B1), (C1), (D1), (E6), (I1), (J1), (J2)
	Surplus force (A3.2)	
Distance (A4)	Prolonged distance (A4.1)	(B1), (C1), (C2), (C3), (D1), (E6), (I1), (J1), (J2)
	Shortened distance (A4.2)	
Speed (A5)	Surplus speed (A5.1)	(B1), (C1), (C3), (D1), (E3), (E5), (I1), (J1), (J2)
	Insufficient speed (A5.2)	
Direction (A6)	Incorrect direction (A6.1)	(B1), (C1), (D1), (D2), (E2), (E6), (J1), (J2)
Object (A7)	Adjacent object (A7.1)	(B1), (B3), (C3), (D1), (E5), (E6), (H3), (J1), (J2)
	Similar object (A7.2)	
Sequence (A8)	Skipped action (A8.1)	(B3), (C1), (C3), (D1), (D2), (E1), (E6), (G1), (J1), (J2)
	Repeated action (A8.2)	
	Reversed action (A8.3)	
	Extraneous action (A8.4)	

Road user related contributing factors

CATEGORIES	GENERAL CAUSE	EXAMPLES OF SPECIFIC CAUSE	LINKING
Observation (B)	Observation missed (B1)	Glare (B1.1)	(C1), (D1), (E3), (E4), (E6), (F1), (G3), (H5), (I1), (N2)
		Noise (B1.2)	
		Tunnel vision (B1.3)	
		Other (B1.4)	
	False observation (B2)	Other (B2.1)	(C2), (E3), (E4), (E7), (E9), (F1)
	Wrong identification(B3)	Habit/expectation (B3.1)	(E3), (F1), (G2), (H4), (J2)
		Other (B3.2)	
Interpretation (C)	Faulty diagnosis (C1)	Error in mental model (C1.1)	(B3), (E7), (E9), (F2), (G2), (I1), (J2)
		New situation (C1.2)	
		Incorrect analogy/comparison (C1.3)	
		Misjudgement of time/distance (C1.4)	
		Other (C1.5)	
	Wrong reasoning (C2)	Incorrect analogy/comparison (C2.1)	(E6), (E7), (F2)
		Error in mental model (C2.2)	
		Other (C2.3)	
	Decision error (C3)	Shock (C3.1)	(B3), (E2), (E3), (E7), (E9), (F2), (J2), (L1), (L2)
		Other (C3.2)	
Planning (D)	Inadequate plan (D1)	Error in mental model (D1.1)	(C1), (E1), (E3), (E4), (E7), (E9), (L2), (M1), (M2)
		Overlooked side effects (D1.2)	
		Other (D1.3)	
	Priority error (D2)	Legitimate higher priority (D2.1)	(C1), (E9), (F2), (J1), (J2), (M1)
		Conflicting criterions (D2.2)	
		Other (D2.3)	
Temporary person related functions (E)	Memory failure (E1)	Learning long ago (E1.1)	(M2)
		Temporary inability (E1.2)	
		Other (E1.3)	
	Fear (E2)	Previous mistakes (E2.1)	None defined
		Insecurity (E2.2)	
		Conceivable consequences (E2.3)	
		Other (E2.4)	
	Distraction (E3)	Passengers (E3.1)	(I1)
		External competing activity (E3.2)	
		Internal competing activity (E3.3)	
		Other (E3.4)	
	Fatigue (E4)	Circadian rhythm (E4.1)	(M2), (M3)
		Extensive driving spell (E4.2)	
		Other (E4.3)	

CATEGORIES	GENERAL CAUSE	EXAMPLES OF SPECIFIC CAUSE	LINKING
	Performance variability (E5)	Illness (E5.1)	(L1), (L2), (M2)
		Other (E5.2)	
	Inattention (E6)	Temporary inability (E6.1)	(F2)
		Bored/unmotivated (E6.2)	
		Habit/expectation (E6.3)	
		Other (E6.4)	
	Under the influence of substances (E7)	Alcohol (E7.1)	None defined
		Drugs (E7.2)	
		Medication (E7.3)	
		Other (E7.4)	
	Physiological stress (E8)	Illness (E8.1)	(M2), (M3)
		Other (E8.2)	
	Psychological stress (E9)	Other (E9.1)	(L2), (M2), (M3), (N1), (N3)
Permanent person related functions (F)	Functional impairment (F1)	Other (F1.1)	None defined
	Cognitive bias (F2)	Other (F2.1)	None defined
Communication (J)	Communication failure (between drivers) (J1)	Noise/music (J1.1)	(E3), (E6), (E7), (E9), (F1), (I1), (N2)
		Temporary inability (J1.2)	
		Glare (J1.3)	
		Other (J1.4)	
Experience and training (L)	Insufficient skills (L1)	Other (L1.1)	None defined
	Insufficient knowledge (L2)	Other (L2.1)	None defined

Vehicle related contributing factors

CATEGORIES	GENERAL CAUSE	EXAMPLES OF SPECIFIC CAUSE	LINKING
Temporary HMI problems in driver environment (G)	Access limitations (G1)	Temporary inability (G1.1)	(I1), (I2)
		Other (G1.2)	
	Incorrect information (G2)	Badly presented display (G2.1)	(I1), (I2), (J2)
		Navigation problems (G2.2)	
		Other (G2.3)	
	Temporary sight obstruction (G3)	Baggage (G3.1)	None defined
		Passengers (G3.2)	
		Other (G3.3)	
Permanent HMI problems in driver environment (H)	Sound (H1)	Other (H1.1)	(O2), (O3),
	Illumination (H2)	Other (H2.1)	(O2), (O3),
	Access problems (H3)	Other (H3.1)	(K1), (O2), (O3)
	Mislabelling (H4)	Incorrect translations (misleading terms in manuals etc) (H4.1)	(K3), (O2)
		Other (H4.2)	
	Permanent sight obstruction (H5)	Other (H5.1)	(O3)
Equipment (I)	Equipment failure (I1)	Tyres (I1.1)	(K1), (K3), (O1), (O5)
		Steering (I1.2)	
		Brake system (I1.3)	
		Lighting (I1.4)	
		Other (I1.5)	
	Software fault (I2)	Deficient navigation system (I2.1)	(K3)
		Other (I2.2)	
Maintenance (K)	Maintenance failure - condition of vehicle (K1)	Tyres (K1.1)	None defined
		Steering (K1.2)	
		Brake system (K1.3)	
		Lighting (K1.4)	
		Other (K1.5)	
	Inadequate quality control - vehicle (K3)	Other (K3.1)	None defined
Vehicle design (O)	Unpredictable system function/characteristics (O1)	Load (O1.1)	None defined
		Other (O1.2)	
	Inadequate HMI (O2)	Other (O2.1)	None defined
	Inadequate ergonomics (O3)	Other (O3.1)	None defined
	Inadequate design of communication devices (O4)	Other (O4.1)	None defined
	Inadequate construction (O5)	Tyres (O5.1)	None defined
		Steering (O5.2)	
		Brake system (O5.3)	
		Lighting (O5.4)	
		Other (O5.5)	

Infrastructure related contributing factors

CATEGORIES	GENERAL CAUSE	EXAMPLES OF SPECIFIC CAUSES	LINKING
Communication (J)	Information failure (between driver and traffic environment) (J2)	Noise (J2.1)	(I1), (K4), (N1), (N2), (N3)
		Glare (J2.3)	
		Information overload (J2.3)	
		Other (J2.4)	
Condition of road (K)	Maintenance failure - condition of road (K2)	Inadequate road markings (K2.1)	None defined
		Road (surface) in poor condition (K2.2)	
		Road surface covered (K2.3)	
		Other (K2.4)	
	Inadequate quality control - road (K4)	Poor choice of road surface (K4.1)	None defined
		Inadequate planning (K4.2)	
		Other (K4.3)	
	State of road (K5)	Change of road surface friction (K5.1)	None defined
Design of traffic environment (N)	Inadequate road design (N1)	Optical guidance (N1.1)	None defined
		Vertical alignment (N1.2)	
		Horizontal alignment (N1.3)	
		Design of cross section (N1.4)	
		Other (N1.5)	
	Permanent obstruction to view (N2)	Vegetation (N2.1)	None defined
		Building/fence (N2.2)	
		Signs (N2.3)	
		Other (N2.4)	
	Inadequate information design (temporary or permanent) (N3)	Unclear route information (N3.1)	None defined
		Too many traffic signs (N3.2)	
		Inappropriate placement of traffic lights (N3.3)	
		Inappropriate placement of traffic signs (N3.4)	
		Other (N3.5)	
	Temporary obstruction to view (N4)	Weather conditions (N4.1)	None defined
		Other vehicle (N4.2)	
		Other (N4.3)	
	Inadequate roadside design (N5)	Placement of road equipment (N5.1)	None defined
		Placement of objects in roadside (N5.2)	
		Design of cross section (N5.3)	
		Other (N5.4)	
	Design of traffic flows (N6)	Other (N6.1)	None def.

Organisation related contributing factors

CATEGORIES	GENERAL CAUSE	EXAMPLES OF SPECIFIC CAUSES	LINKING
Organisation (M)	Deficient instructions/procedures (M1)	Other (M1.1)	None defined
	Overload/ Too high demands (M2)	Other (M2.1)	None defined
	Management failure (M3)	Other (M3.1)	None defined
	Inadequate training (M4)	Other (M4.1)	None defined

APPENDIX C – Glossary for critical events and causes[4]

Critical event	Definition/explanation of specific critical event	Example
Timing (A1) The regulation of time for actions to occur.	**Premature action (A1.1)** An action started too early, before a signal was given or before the required conditions had been established.	Performing an overtake before there is good visibility. Starting/stopping too early at traffic lights. Dip the lights too early when driving in the dark.
	Late action (A1.2) An action started too late.	Not changing lanes in time. Starting an overtake too late. Dip the lights too late when driving in the dark.
	No action (A1.3) An action that was not done at all (within the required point in time).	Not stopping at traffic lights. The driver does not change lane. The lights are not dipped at all.
Duration (A2) Continuance or persistence in time, of an action.	**Prolonged action/movement (A2.1)** A manoeuvre that continues beyond the point when it should have been terminated.	Staying in the left lane too long after having performed an overtake.
	Shortened action/movement (A2.2) A manoeuvre is interrupted or shortened.	Squeezing in just in front of a vehicle which one has just been overtaking. Not completing braking at stop signs.
Force / power (A3) The capacity of an action being performed.	**Insufficient force (A3.1)** Insufficient ability (e.g. strength, power,) to brake/accelerate. Insufficient engine power.	The brakes are not efficient enough. The acceleration ability is not enough to perform a safe overtake.
	Surplus force (A3.2) Too powerful braking/acceleration. Too powerful engine.	Acceleration is so strong that one easily looses control over the vehicle. The brakes were so good that the car stopped so quickly causing the car behind to collide into the rear.

[4] The definitions of the general variables are to be found in the deliverable written for Task 5.1, in the report called "Deliverable 5.1: Fatal Data Methodology Development Report".

Critical event	Definition/explanation of specific critical event	Example
Distance (A4) The amount of space between objects or places.	**Prolonged distance (A4.1)** A movement taken too far. The vehicle is too far from object, destination, intended position.	(Parking too far away from the pavement.)
	Shortened distance (A4.2) A movement not taken far enough. The vehicle is too close to object, destination, intended position.	The driver was following too close to objects in the traffic environment, e.g. a vehicle in front. Driving cross stop lines and central lines. Driving too close to the pavement when parking.
Speed (A5) Rate of motion.	**Surplus speed (A5.1)** Action/manoeuvre performed too quickly or with too much speed or ended too early.	Speeding with regards to speed limit or other road users. Skidding in a curve.
	Insufficient speed (A5.2) Action/manoeuvre performed too slowly or with too little speed.	Keeping to low speed when overtaking and having to abort the action.
Direction (A6) The way in which the vehicle is going.	**Wrong direction (A6.1)** Manoeuvre made in the wrong direction.	Turning right instead of left. Going backwards instead of forwards. Going off the road instead of following the lane.
Object (A7) An item or an actuator.	**Adjacent object (A7.1)** An object which is in physical proximity to the object that should have been used.	The driver hits the brake-pedal instead of the accelerator. The driver pushes buttons belonging to the climate control instead of the radio.
	Similar object (A7.2) An object which is similar in appearance to the object that should have been used.	Activating headlights instead of windscreen wipers.
Sequence (A8) The order in or when/how the event takes place/happens.	**Skipped action (A8.1)** One or more actions of a series of actions were skipped.	Changing lanes without checking rearview mirrors or looking in the dead angle/blind spot.
	Repeated action (A8.2) The previous action is repeated.	Looking out for vehicles behind several times before changing lanes.
	Reversed action (A8.3) The order of two neighbouring actions is reversed.	Changing lane and then indicating direction. Turning and then indicating direction.

Critical event	Definition/explanation of specific critical event	Example
	Extraneous action (A8.4) An extraneous or irrelevant action is carried out.	Braking when not necessary.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Observation (B)	**Observation missed (B1)** A signal or an event that should have been the start of an action (sequence) is missed.	**Glare (B1.1)** Being faced with bright lights which make it difficult to see.	Low sun shining right at the vehicle/person.
		Noise (B1.2) Being surrounded by loud noise which prevents perception of other acoustic signals	High volume on the stereo keeps one from hearing other road users honk the horn.
		Tunnel vision (B1.3) Being limited in the peripheral vision.	When experiencing fear or high speed, the peripheral vision diminishes from 180 degrees to as much as 20-30 degrees.
		Other (B1.4)	
	False observation (B2) An event or some information is incorrectly recognised or mistaken for something else.	**Other (B2.1)**	
	Wrong identification (B3) The identification of an event or some information is incorrect.	**Habit/expectation (B3.1)** Being used to a certain environment makes it difficult to discover changes.	Signs which have been changed are not observed. A sign indicating that what has been a primary road for ten years, is hard to notice for people who have been driving on that road for many years.
		Other (B3.2)	
Interpretation (C)	**Faulty diagnosis (C1)** The diagnosis of the situation is incomplete or incorrect.	**Error in mental model (C1.1)** The individual's ideas on a place or turn of events does not correspond to reality.	The driver believes making a left turn is allowed, but actually, going left is prohibited.
		New situation (C1.2) The individual ends up in a completely new situation and has no frame of reference for making a judgement call.	Driving on a road in the country and all of a sudden a sheep appears on the road.
		Incorrect analogy/comparison (C1.3) The driver's understanding is based on a comparison or an analogy which has no correspondence in the real world.	In an intersection: Car A has right of way and when car B slows down when coming into the intersection, car A believes car B has stopped to let car A pass, since that is her/his experience when comparing to other such situations.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Interpretation (C)			Only car B has just slowed down to pass a bump in the road and has not taken any notice of car A's right of way.
		Misjudgement of time/distance (C1.4) The driver's estimation of distance or time is not correct.	Initiates a left turn before opposite traffic have passed.
		Other (C1.5)	
	Wrong reasoning (C2) Concluding something based on incorrect assumptions.	**Incorrect analogy/comparison (C2.1)** The driver's understanding is based on a comparison or an analogy which, in reality, has no correspondence.	In an intersection: Car A has right of way and when car B slows down when coming into the intersection, car A believes car B has stopped to let car A pass, since that is her/his experience when comparing to other such situations. Only car B has just slowed down to pass a bump in the road and has not taken any notice of car A's right of way.
		Error in mental model (C2.2) The individual's ideas on a place or turn of events do not correspond to reality.	The driver believes making a left turn is allowed, but going left is actually prohibited.
		Other (C2.3)	
	Decision error (C3) Coming to an incorrect decision due to inability of making the right choice among many decisions, or inability of making any choice at all.	**Shock (C3.1)** The driver is in a state of shock.	The driver is in a state of shock because of the situation.
		Other (C3.2)	
Planning (D)	**Inadequate plan (D1)** The plan is not complete, or the plan is wrong, i.e. it does not contain all the details needed when it is carried out.	**Error in mental model (D1.1)** The individual's ideas on a place or turn of events do not correspond to reality.	The driver believes making a left turn is allowed, but going left is actually prohibited.
		Overlooked side effects (D1.2) The driver does not realise that his/her action will have side effects which will have a negative influence on the situation.	The driver sees that the traffic light is turning red, and brakes very hard which surprises the vehicle coming from behind.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Planning (D)		**Other (D1.3)**	
	Priority error (D2) Not making the correct priorities which results in an ineffective plan.	**Legitimate higher priority (D2.1)** One action is legitimately prioritized compared to another.	Altering lane in a less appropriate way in order to let an ambulance pass.
		Conflicting criterions (D2.2) The driver needs to solve two contradictory tasks at the same time.	Listening to traffic information on the radio while at the same time talking on the mobile phone.
		Other (D2.3)	
Temporary person related functions (E)	**Memory failure (E1)** An item or a piece of information cannot be recalled when needed.	**Learning long ago (E1.1)** It has been several years since the learning/training took place.	Encounter a traffic situation which one has not been in for many years.
		Temporary inability (E1.2) At that point in time, the individual cannot manage to perform a task which they normally have no problem doing.	An item or some information cannot be recalled when needed, i.e. due to bad short-term memory.
		Other (E1.3)	
	Fear (E2) Being afraid of something.	**Previous mistakes (E2.1)** One has previously made mistakes in similar situations and fears to repeat them.	Anxious about a particular manoeuvre due to previous bad experience/accident.
		Insecurity (E2.2) The driver doubts his/her own ability of handling the situation.	
		Conceivable consequences (E2.3) One becomes scared when realizing which consequences the current situation might have.	Truck driving in the opposite direction enters the wrong side of the central line, some distance away.
		Other (E2.4)	
	Distraction (E3) The performance of a task is suspended because the person's attention was caught by something else or the attention has shifted.	**Passengers (E3.1)** Another person in the vehicle diverts the driver's attention.	Conversations with co-passengers, children fighting etc.
		External competing activity (E3.2) An object or a sequence of events outside the vehicle diverts the driver's attention.	An animal appearing by the side of the road.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Temporary person related functions (E)		**Internal competing activity (E3.3)** An object or a sequence of events inside the vehicle diverts the driver's attention.	The mobile phone ringing, the navigation system alerting or the road user is thinking of something in particular.
		Other (E3.4)	
	Fatigue (E4) Being mentally or physically tired/exhausted.	**Circadian rhythm (E4.1)** Driving at a time which is normally not within the "waking hours" and that results in reduced output capacity.	Driving at night to avoid heavy traffic results in fatigue. Effects of jet lag, air travel between different time zones, results in fatigue.
		Extensive driving spell (E4.2) Not taking breaks or pausing when driving long distances, and that leads to diminished driving ability.	Truck drivers changing trucks with each other and driving more than the allowed period of time during 24 h.
		Other (E4.3)	
	Performance variability (E5) Reduced or increased precision of actions.	**Illness (E5.1)** The individual is struck with a condition of illness which has a detrimental effect on driving ability.	Have a heart attack, suffer from dizziness, feeling nauseous, etc
		Other (E5.2)	
	Inattention (E6) Low vigilance due to loss of focus.	**Temporary inability (E6.1)** At that point in time, the individual cannot manage to perform a task which they normally have no problem doing.	The driver of a car starts coughing a lot and is not able to pay attention to driving.
		Bored/unmotivated (E6.2) The individual lacks motivation to carry out his/her task in the best way possible.	Driving the same distance to work every day. The driving task is tedious, e.g. the road is very long and straight, resulting in boredom.
		Habit/expectation (E6.3) Being used to a certain environment makes it difficult to discover changes.	Signs which have been changed are not observed. A sign indicating that what has been a primary road for ten years, is hard to notice for people who have been driving on that road for many years.
		Other (E6.4)	
	Under the influence of substances (E7) Being affected by different sorts of substances.	**Alcohol (E7.1)** The road user is under the influence of alcohol.	A vehicle goes off the road because the driver was under the influence of alcohol.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Temporary person related functions (E)		**Drugs (E7.2)** The road user is under the influence of non-prescribed drugs.	A vehicle is going off the road because the driver was under the influence of heroin.
		Medication (E7.3) The road user is under the influence of prescribed drugs.	A vehicle is going off the road because the driver had been under the influence of strong sedatives.
		Other (E7.4)	
	Physiological stress (E8) Different physical factors putting a strain on the driver.	**Illness (E8.1)** The individual is struck with a condition of illness which negatively affects the ability to drive.	Have a heart attack, suffer from dizziness, feeling nauseous, etc.
		Other (E8.2)	
	Psychological stress (E9) Different mental factors putting a strain on the driver.	**Other (E9.1)**	
Permanent person related functions (F)	**Functional impairment (F1)** Reduced ability in one or more human functions.	**Other (F1.1)**	
	Cognitive bias (F2) Taking in and processing information a little bit askew, including very basic statistical and memory errors that are common to all human beings and drastically skew the reliability.	**Other (F2.1)**	
Communication (J)	**Communication failure (between drivers) (J1)** A message or a transmission of information failed to come through to the receiver (another road user)**.**	**Noise/music (J1.1)** Being surrounded by loud noise or music which prevents perception of other acoustic signals.	High volume on the stereo keeps one from hearing other road users, for instance, honk the horn.
		Temporary inability (J1.2) At that point in time, the individual cannot manage to perform a task which they normally have no problem doing.	The driver has a temporary blackout and has forgotten how to handle either the situation, the car or both of them.
		Glare (J1.3) Being faced with bright lights which makes it difficult to see.	Low sun shining right at the vehicle/person.
		Other (J1.4)	

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Experience and training (L)	**Insufficient skills (L1)** Lack of practical experience to handle the situation, i.e.; a task, an activity, piece of equipment etc.	**Other (L1.1)**	
	Insufficient knowledge (L2) Lack of knowledge due to lack of awareness, confusion etc.	**Other (L2.1)**	
Temporary HMI (Human Machine Interaction) problems in driver environment (G)	**Access limitations (G1)** Problems for the user to reach items/actuators in the driver environment.	**Temporary inability (G1.1)** The individual cannot, at that moment, handle something which normally is not a problem.	The driver has a temporary blackout and has forgotten how to handle either the situation, the car or both of them.
		Other (G1.2)	
	Incorrect information (G2) Information in the driver's environment is being ambiguously, incompletely or incorrectly formulated/presented.	**Badly presented display (G2.1)** The display does not show the information in the intended/correct way or the information is poorly presented and is difficult to see.	The interface of a GPS-display is not optimized and the driver has a hard time interpreting the information given.
		Navigation problems (G2.2) Difficult to navigate within the information systems.	The menu in the navigation system is difficult to understand, and the driver needs to pay a lot of attention to it.
		Other (G2.3)	
	Temporary sight obstruction (G3) The view is temporarily obstructed by an object.	**Baggage (G3.1)** Some kind of object is placed in such a way that it obstructs the driver's view.	Too much luggage in the car and the driver's field of vision is completely or partially blocked when looking in the rear-view mirror.
		Passengers (G3.2) One or more passengers are placed in such a way that they block the view the driver normally has.	A very tall person is seated in position 2:2 (in the middle of the back seat) which makes it difficult for the driver to see, in the rear-view mirror, what is going on behind the car.
		Other (G3.3)	
Permanent HMI problems in driver environment (H)	**Sound (H1)** Noise levels are permanently too high or signal levels are permanently too low.	**Other (H1.1)**	

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Permanent HMI problems in driver environment (H)	**Illumination (H2)** Permanently being exposed to too much light, e.g. causing reflexes, glare, or not having enough light e.g. causing reduced colour, contrast.	**Other (H2.1)**	
	Access problems (H3) An item or an actuator is in one way or another out of reach to the user.	**Other (H3.1)**	
	Mislabelling (H4) The labelling or identification of an item (e.g. device, dial, button) is incorrect or ambiguous.	**Incorrect translations (misleading terms in manuals etc) (H4.1)** Translation of hand books and/or vehicle information is poor.	Ambiguous terms used in the manual.
		Other (H4.2)	
	Permanent sight obstruction (H5) The sight is permanently obstructed due to the vehicle design.	**Other (H5.1)**	
Equipment (I)	**Equipment failure (I1)** Some piece of equipment fails/stops working or the performance of a system does not behave as expected/intended.	**Tyres (I1.1)** One or many tyres is punctured, fast or slowly, and does not perform as expected.	A tyre explodes.
		Steering (I1.2) The steering system fails in, one way or another, and does not perform as expected.	The steering column breaks.
		Brake system (I1.3) The brake system fails, in one way or another, and does not perform as expected.	A brake-disc is overheated.
		Lighting (I1.4) The lighting fails, in one way or another, and does not perform as expected.	The left front headlight is not working.
		Other (I1.5)	
	Software fault (I2) The software is performing slower than expected or not at all.	**Deficient navigation system (I2.1)** Information is not available due to software problems or other such problems.	The performance of the system slows down. This can be critical for command and control, in particular.
		Other (I2.2)	

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Maintenance (K)	**Maintenance failure (K1)** The vehicle, or parts of the equipment, is out of order due to inadequate or incorrect maintenance.	**Tyres (K1.1)** One or many tyres have been inadequately maintained or checked and does not perform as expected.	A tyre explodes because it has been worn out.
		Steering (K1.2) The steering system has been inadequately maintained or checked and does not perform as expected.	The level of servo oil is to low.
		Brake system (K1.3) The brake system has been inadequately maintained or checked and does not perform as expected.	The brake-blocks have not been replaced for a long time.
		Lighting (K1.4) The lighting has been inadequately maintained or checked and does not perform as expected.	A non-functioning brake light has not been replaced.
		Other (K1.5)	
	Inadequate quality control (K3) The vehicle, or parts of the equipment, have not been subject to adequate quality control by the responsible party, e.g. the user.	**Other (K3.1)**	
Vehicle design (O)	**Unpredictable system functions/characteristics (O1)** The characteristics of the vehicle become unpredictable under some circumstances.	**Load (O1.1)** A certain amount of load makes the vehicle behave unpredictably.	If one is driving with a lot of baggage in the trunk and enters a curve with too much speed, the car might become under steered and go off the road.
		Other (O1.2)	
	Inadequate HMI (O2) The interaction between user and an in-vehicle system is inadequately designed.	**Other (O2.1)**	
	Inadequate ergonomics (O3) The driver seat, for instance, is inadequately designed from an ergonomic point of view.	**Other (O3.1)**	

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Vehicle design (O)	**Inadequate design of communication devices (O4)** The vehicle's light signals (indicators, brake light, head lights, reverse lights) are unable to communicate in situations when necessary.	**Other (O4.1)**	
	Inadequate construction (O5) The vehicle has been insufficiently built or the construction has been insufficiently considered.	**Tyres (O5.1)** The tyres have been inadequately constructed and does not perform as expected.	The design of tyres makes the vehicle aquaplaning.
		Steering (O5.2) The steering system has been inadequately constructed and does not perform as expected.	The driver looses control of the vehicle because turning the steering wheel has no effect
		Brake system (O5.3) The brake system has been inadequately constructed and does not perform as expected.	The brakes are all rusty because of exposure to water and yield almost no braking power.
		Lighting (O5.4) The lighting has been inadequately constructed and does not perform as expected.	The front headlights produce insufficient light.
		Other (O5.5)	
Communication (J)	**Information failure (between driver and traffic environment) (J2)** A message or a transmission of information failed to come through to the receiver (the road user).	**Noise (J2.1)** Being surrounded by loud noise which prevents perception of other acoustic signals.	High volume on the stereo keeps one from hearing other road users signalling by using the horn.
		Glare (J2.3) Being faced with bright lights which makes it difficult to see.	Low sun shining right at the vehicle/person.
		Information overload (J2.3) Too much information is being conveyed to the road user.	Too many signs, both commercial and non-commercial, by the road, which makes it difficult to select which pieces on information it is the most important to pay attention to.
		Other (J2.4)	
Condition of road (K)	**Maintenance failure (K2)** The road or parts of the road is in a poor state due to inadequate or incorrect maintenance.	**Inadequate road markings (K2.1)** Markings in the road surface are hardly visible or non existing.	Painted arrows in the road surface indicating which way the lanes are going, have been worn out.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Condition of road (K)		**Road (surface) in poor condition (K2.2)**	The road is full of holes or the road surface needs re-paving since too many cars have been going on studded tyres.
		Road surface covered (K2.3) The condition of the road is sub standard.	The road surface is covered with snow, oil etc.
		Other (K2.4)	
	Inadequate quality control (K4) The road or parts of the road has not been subject to adequate quality control by the responsible party, e.g. the road administration.	**Poor choice of road surface (K4.1)** The surface chosen when the road was being built is not up to standard.	The asphalt on the road is of poor quality and the road surface is decomposited.
		Inadequate planning (K4.2) Inadequate routines for maintenance of roads which are supposed to keep a safe and functional level of standard.	The road surface has in time decomposited.
		Other (K4.3)	
	State of road (K5) The current road-holding characteristics.	**Change of road surface friction (K5.1)** The friction in the road surface is changed due to different factors.	After the snowplough has been ploughing there is often a little bit of snow left which reduces the road friction. Rain falling after having had a long period of drought makes the road slippery when oil and dirt comes up and forms a thin layer at the top of the surface.
Design of traffic environment (N)	**Inadequate road design (N1)** The planning and construction of the road is insufficient.	**Optical guidance (N1.1)** The visual guidance, in most cases painted marks, in the road.	No central line to tell which way the road is turning in the distance ahead.
		Vertical alignment (N1.2) The road is built in a very hilly environment.	Too many hills which makes it difficult to see the distance ahead.
		Horizontal alignment (N1.3) The road is built in a very winding environment.	Too many curves which makes it difficult to look and plan ahead.
		Design of cross section (N1.4) The cross section is not well-considered enough.	The camber is inadequately designed in a curve
		Other (N1.5)	
	Permanent obstruction to view (N2) Objects in traffic	**Vegetation (N2.1)** The view is completely or partly blocked by	High hedges and bushes which reduce the visibility.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Design of traffic environment (N)	environment cause permanently reduced visibility.	vegetation.	
		Building/fence (N2.2) The view is completely or partly blocked by buildings or fences.	A high fence in a residential area which reduces the view when going round a corner.
		Signs (N2.3) The view is completely or partly blocked by one or more signs.	A commercial sign by the side of the road blocking the view in an intersection.
		Other (N2.4)	
	Inadequate information design (temporary or permanent) (N3) The design of the traffic control or traffic guidance is not adequate.	**Unclear route information (N3.1)** The design of the route information makes it difficult for the driver to scan the situation.	Several possible routes are stated on one sign post and if one is new to the place and needs to read carefully to know which way to take, a lot of attention needs to be paid to that sign post which makes it hard to concentrate on the driving and the surrounding traffic.
		Too many traffic signs (N3.2) Several traffic signs placed within a close range.	A large number of traffic signs within close proximity make it difficult to know which one to follow.
		Inappropriate placement of traffic lights (N3.3) The traffic lights placed in a way which makes it hard to follow them.	Standing first in line at a traffic light and not being able to see the lights because they are located almost right above ones vehicle.
		Inappropriate placement of traffic signs (N3.4) The traffic signs are placed in a way which makes it hard to read/follow them.	A traffic sign is placed too close to a cross section and the driver is forced to take quick action which might surprise the fellow road users.
		Other (N3.5)	
	Temporary obstruction to view (N4) Objects in traffic the environment causing temporarily reduced visibility.	**Weather conditions (N4.1)** The view is completely or partly blocked because of the weather conditions.	A lot of snow or rain is falling, or it might be very foggy, and each of these conditions makes it hard for the road user to see what is happening in the distance.

Categories	Definition/explanation of general cause	Definition/explanation of specific cause	Example
Design of traffic environment (N)		**Other vehicle (N4.2)** The view is completely or partly blocked by another vehicle.	Another vehicle passes by and blocks the view.
		Other (N4.3)	
	Inadequate roadside design (N5) The planning and construction of the roadside is insufficient.	**Placement of road equipment (N5.1)** Objects placed in the proximity of the road, e.g. energy absorbing structures.	An energy absorbing terminal is located too close to the driving lane.
		Placement of objects in roadside (N5.2) Objects placed in a less appropriate way, in the proximity of the road.	An avenue of trees which have been planted alongside a road.
		Design of cross section (N5.3) The cross section has not been planned well enough.	
		Other (N5.4)	
	Design of traffic flows (N6) The arrangement of, e.g. lanes, is a source of confusion.	**Other (N6.1)**	
Organisation (M)	**Deficient instructions/procedures (M1)** Instructions or descriptions of procedures are either incomplete, ambiguous, unsuitable or incorrect.	**Other (M1.1)**	
	Overload/ Too high demands (M2) The road user is subjected to too much pressure or stress.	**Other (M2.1)**	
	Management failure (M3) The planning and/or the management of work or working conditions is inadequate.	**Other (M3.1)**	
	Inadequate training (M4) The user has not been trained well enough.	**Other (M4.1)**	

APPENDIX D - Matrix for 5.2

Definition of terms for SafetyNet accident investigations

Term	Definition
On-Scene	The accident investigation team goes to the accident scene while the participants in the crash are still in place.
Nearly in Time	The accident investigation team goes to the accident scene the same day that the accident have occured but can not make it "on scene".
Retrospective	The accident investigation team goes to the accident scene some days after the accident.
Photography	To take specific photographs at an accident scene according to conventional standards (e.g. taking pictures of standard aspects of vehicle damage etc., using standard approaches to taking photos at night/with specific lenses etc.)
Scale scene drawings	To prepare a scale drawing of the scene according to conventional standards
Scene examinations to obtain reconstruction evidence	Used to obtain reconstruction evidence (e.g. understanding tyre marks, debris patterns etc) – true breaking, overload, where the glass is thrown to
Reconstruction using basic maths and physics	Reconstruction using basic maths and physics (not requiring software) – this data can be plugged into 'Reconstruction using simulation and other software'
Reconstruction using established reconstruction software	e.g. PC-Crash
Reconstruction using injury information	Injury data is used to better understand the movements/position of the road user at point of impact, e.g. driver, pedestrian injuries in relation to contact on the vehicle
Highway features	e.g. looking for "through effects", signage conflicts, etc
Interviews with active road users	Interviews (on-scene/hospital/telephone/questionnaire) with active road users, e.g. driver, pedestrian involved in accident
Interviews with other witnesses	Interviews (on-scene/hospital/telephone/questionnaire) for other witnesses, e.g. passengers, passers by
Vehicle damage assessment	To understand impact configurations, delta V, light filaments on/off, pedestrian interactions, etc
Vehicle examination for defects	e.g. simple on-scene procedures for tyres, lights, etc.
Team safety procedures	Standard procedures and training used to educate members of your team regarding the personal risks of accident investigation

Methodology matrix for SafetyNet accident investigation

Partner		Chalmers	DITS	MUH	TNO	VALT	VSRC
Cases to collect		70	250	100	126	200	250
MM		18,2	27	24	37,5	20	72,5
Days/case (140h/MM, 8h/day)		4,6	1,9	4,2	5,2	1,8	5,1
What technique does the team use for data collection?							
		%	%	%	%	%	%
"On-call" and "on scene"	OS	70	70	70	20	45	100
Nearly in time	NIT	20	0	20	30	45	0
Retrospective	RS	10	30	10	50	10	0
Which data collection techniques are possible to use under the different hours?							
Weekdays "day time" 08:00-18:00	OS	x	x	x	x	x	x
	NIT	x		x	x	x	
	RS	x	x	x	x	x	
Weekdays "night time" 18:00-08:00	OS		x	x		x	x
	NIT					x	
	RS	x		x	x	x	
Weekends "day time" 08:00-18:00	OS		x	x		x	x
	NIT					x	
	RS	x		x	x	x	
Weekends "night time" 18:00-08:00	OS		x	x		x	x
	NIT					x	
	RS	x		x	x	x	
How will the information from involved persons mainly be retrieved?							
Interviews on scene		x		x		x	x
Interviews at hospital				x			
Interviews by telephone		x	x	x	x	x[1]	x[2]
Through questionnaires					x		x

[1] Interviews by home visits or similar arrangements often used

[2] anticipated at this time – pilot underway

Detailed methodology matrix for SafetyNet accident investigation

Does your team use this method of investigation (see definitions above) for each accident case, on a routine basis?

Partner		VALT	VALT Comments	TNO	TNO Comments	MUH	MUH Comments	VSRC	VSRC Comments	CTH	CTH Comments	DITS	DITS Comments
Photography	*y/n*	y	Should be routine, but not obtained to scale from every accident	y		Y		y		y		y	
Scale scene drawings	*y/n*	y	As above, additional info from scene not obtained from every accident (if team is not on the scene), especially in northern Finland it may take many hours to get to the scene when snowing…	y	In most of the cases made by the police (Autocad drawings)	Y		y		y		y	
Scene examinations to obtain reconstruction evidence	*y/n*	y	See below	y	Not always, if we are some days late (with a bad weather) it is not useful anymore	Y		y		y		y	
Reconstruction using basic maths and physics	*y/n*	y	Basic calculations using basic maths and physics can be made if there is sufficient evidence from braking/skidding and collisions.	y		Y		y		y		n	

APPENDIX D

Partner		VALT	VALT Comments	TNO	TNO Comments	MUH	MUH Comments	VSRC	VSRC Comments	CTH	CTH Comments	DITS	DITS Comments
To what extent can the above level of reconstruction be performed on SafetyNet cases according to budgeted finances.	%	20-40	All accidents are not reconstructed, though several copies of PC-Crash are in use in teams.	60		100	If GIDAS cases	20	It is anticipated that, where the opportunity presents itself and where appropriate, approximately 50 cases could be reconstructed.	20		–	
Reconstruction using simulation and other software	*y/n*	n	Depends on how detailed reconstruction is made.	y		Y		n		y		y	
To what extent can the above level of reconstruction be performed on SafetyNet cases according to budgeted finances.	%	10-30	See below.	60		100	If GIDAS cases	0	This activity is not anticipated at the moment. There may be potential later in the project for VSRC to conduct a small proportion of reconstructions on their cases using simulation and other software.	0-10		25-35	
Highway features	*y/n*	y		n	Not allowed to visit highways without the escort of police officers	Y		y		y		y	
Interviews with active road users	*y/n*	y		y		Y		y		y		y	
Interviews with other witnesses	*y/n*	y		y		N		y		y		y	As option.

Partner		VALT	VALT Comments	TNO	TNO Comments	MUH	MUH Comments	VSRC	VSRC Comments	CTH	CTH Comments	DITS	DITS Comments
Vehicle damage assessment	*y/n*	y		y		Y		y		y		y	
Vehicle examination for defects	*y/n*	y		y		N		y		y		y	
Team safety procedures	*y/n*	n		y		Y	Wearing protective shoes and reflective jackets. Securing accident site with our vehicle with blue lights.	y		y		y	
Do you collect accident data on all:		If **No**, what types of road users, vehicles and roads do you exclude?											
<u>types of road users</u> (e.g. car drivers, HGV drivers, pedestrians etc.)?	*y/n*	y		y	All	Y		y	We have no exclusions	y		y	
ages and models of <u>vehicles</u> (e.g.all vehicles involved in an accident irrespective of age, all types of vehicle.)?	*y/n*	y		y		Y		y	We have no exclusions	y		y	

APPENDIX D

Partner		VALT	VALT Comments	TNO	TNO Comments	MUH	MUH Comments	VSRC	VSRC Comments	CTH	CTH Comments	DITS	DITS Comments
types of roads (e.g. privately owned roads, government owned roads, country roads etc.)?	*y/n*	y		y		Y	We exclude privately owned roads with no public access. However privately owned roads with public access are included e.g. supermarket parking lots.	y	We do not collect data from privately owned roads	y		y	
What areas do you think is most important for the training session in WP5.2 for your team members.													
			VALT: Understanding SNACS-methodology and interactions between variables.		x Use of the database x Correct interpretation of variables (same definitions for all teams) x Harmonized method of data collection (environment and vehicles)		Most important is training on the obtaining of Accident causation data and using the database. We already have fixed procedures for the general accident data and injury data.		Any training is useful training – there is nothing that's specifically obvious		The SNACS analysis and database procedures		All.

APPENDIX D

Other Comments													
			SafetyNet investigations will be based on VALT-Method with required additional SNACS-analysis and variables. Method described in detail in publication "VALT-Method 2003". Cases investigated are fatal accidents. Some additional cases without fatality may be selected.										