PROJECT

PENDANT

Pan-European Co-ordinated Accident and Injury Database

**Funding:** European (5th RTD Framework Programme)

**Duration:** Jan 2003 - Dec 2005

**Status:** Complete with results

**Background & policy context:**

In the 25 Member States of the European Union, each year there are more than 50,000 people killed and 1.6 million injured, which represents an unacceptably high burden on Europe’s society and economy. The impact of road accident casualties is a major public health problem for Europe.

The prevention of injuries by improved vehicle safety has been a central pillar in the overall casualty reduction strategy. The introduction of the front and side impact directives in 1996 accompanied by the EuroNCAP Consumer information system was based on a systematic analysis of existing accident data that was used as the basis for the development of new test methods, which were the basis of subsequent test procedures. These policy initiatives have been the main driving factor in improving the levels of protection of cars and they demonstrated the value of sufficiently detailed accident data to support test procedure development. Nevertheless the accident data utilised has been gathered within special studies on a national basis and there was no uniform data available to describe the wider European accident population.

The FP4 EU funded project STAIRS developed a standardised protocol to be used to gather in-depth accident data relating to the injuries of car occupants and pedestrians. It also generated guidelines on the statistical approaches required to develop a database that could be used to generalise to the EU. A conclusion of STAIRS was that the EC’s FP5 programme could be used to implement the STAIRS protocols on a limited basis. This would include validation of the main recommendations and an assessment of its usefulness and determination of its limitations.

This set the scene for the development of a major element of work which became a key part of the PENDANT project, which was implemented to resolve some of the key issues not addressed within STAIRS including methods to calculate collision severity, protocols to record the details of injuries sustained and the development of estimation methods to predict casualty reductions from new technologies.

**Objectives:**

The PENDANT project was established to develop a new level of crash-injury data on a European basis in a consistent manner that had not been done before.

The overall objective was to establish a European level data infrastructure, which could be used to gather and analyse accident information at a greater level of detail than previously seen.

The specific objectives of the project were:

- to specify core and add-on data elements covering both active and passive safety;
- to create a new approach to estimate casualty reductions applicable to both primary and secondary safety countermeasures;
- to define harmonised procedures for assessing injury severity using threat to life measures;
- to create a new in-depth crash injury database which, when analysed, will give results that can be used to form generalised conclusions about European crash population (data has been collected in 8 countries to a uniform procedure and concerns injured car occupants or pedestrians);
- to use hospital based data, linked or not with police and vehicle data, as a source of information on...
traffic safety;

- to carry out analyses of both the in-depth database and hospital based data systems, to give feedback on effectiveness of existing countermeasures and priorities for future safety improvements.

As part of these objectives there was also the need to develop harmonised methods to evaluate collision severity in a way that could be implemented in a uniform manner by several investigating teams.

The incorporation of hospital register data and police level data enabled the group to demonstrate to what extent it is possible to analyse in a common way hospital data of road injuries to complement police data information coming from the countries involved, despite all their differences. The objective was to analyse the databases and identify priorities for future European regulatory and other actions.

**Methodology:**

In order to pursue its objectives, the PENDANT project was organised in the following groups of activities.

1) Development of accident investigation tools and procedures.

The objectives of these activities were: the harmonisation of accident reconstruction and collision severity estimation methods; the harmonisation of injury severity assessment techniques; the development and harmonisation of methods to predict casualty reductions from new technologies/regulation using in-depth accident data.

These objectives were pursued through the following tasks.

- **Task 1.1: Accident reconstruction and collision severity assessment guidelines.** Firstly, Reconstruction techniques were revised considering the currently used manual and computer methods as well as the involved parameters for which a description was provided. The output of these activities was a set of guidelines for giving an overview how to deal with car accidents. Secondly, a public domain database which includes main information about public domain crash tests (vehicle(s), speed(s), acceleration characteristics of the vehicles/occupants, injury criteria, etc...) was established in order to gather data that could be used as a reference that will help the accident investigator to determine the parameters of real-life accidents more accurately. Finally, an overview of the state of the art in recording information about the crash phase, including current capabilities and main obstacles to further implementation was developed.

- **Task 1.2: Traffic Users Injury Output Scales.** The objective of these activities were: to assess and quantify current available injury scales; to assess the suitability of available injury scales for the PENDANT project; to develop an implementation plan for incorporating injury coding and injury scaling methods into the PENDANT work programme.

- **Task 1.3: Predictive methods for estimating casualty and injury reductions.** The activities of this task firstly addressed basic questions about Electronic Stability Program (ESP) (what is an ESP, how did ESP develop, how does it work, how widespread is implementation, and how might future systems evolve). Then the influence of engineering countermeasures on improved restraint systems using a general simplified multi-body car model for the collision phase was investigated. The validation of these models was based on available crash test data of comparable Euro NCAP tests. The validated model was used to simulate a real world accident and t

**Related Projects:**

STAIRS, SafetyNet

**Parent Programmes:**

FP5-GROWTH KA2 - Sustainable Mobility and Intermodality

**Institute type:** Public institution

**Institute name:** European Commission, Directorate-General for Energy and Transport (DG TREN)

**Funding type:** Public (EU)

**Partners:**

Austria:
Technische Universität Graz, Institut f. Mechanik u. Getriebelehre (TUG)
Finland: Traffic Safety Committee of Insurance Companies (VALT); Turku University of Turku, Department of Psychology, Traffic and I/O Psychology

France: IFSTTAR; CETE du Sud Ouest; Association pour le Registre des Victimes d'Accidents de la Circulation dans le département du Rhône (ARVAC)

Germany: The Medical University of Hannover; Volkswagen A.G.

Spain: ASPB Municipal Institut of Public Health of Barcelona; Universidad Politecnica de Madrid, Institute f. automobile Research (INSIA)

Sweden: Chalmers University

The Netherlands: SWOV - the Dutch national road safety research institute; TNO Automotive - Organisation for Applied Scientific Research (TNO)

United Kingdom: Loughborough University - Vehicle Safety Research Centre (VSRC), Ergonomics and Safety Research Institute (ESRI)

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Key Results:
The main achievements of the PENDANT project were:

1) Methods to assess collision severity: a manual giving guidelines for accident reconstruction has been produced to serve as an overview of methods for crash analysts. A literature review of Crash-Data Recorders has assessed the capabilities of available systems to record information about the crash phase, including current and main obstacles for further implementation. A major output of these project activities was the development of the crash test database providing new access to EuroNCAP and other crash test data, which can be accessed at www.crashtestdb.com.

2) Traffic Users Injury Output Scales: a review of the available injury scales has identified that the Abbreviated Injury Scale is the most appropriate tool to describe the nature of injuries and measure threat to life. It also made recommendations for harmonised application to in-depth injury data and improved relevance to field data.

3) Predictive Methods for Estimating Casualty and Injury Reductions: crash modelling methods were used to predict the change in crashes and injuries from the use of new technologies. PC-CRASH was used to estimate the changes in the nature and number of crashes if cars were equipped with electronic Stability Control, while MADYMO was used to evaluate the reduction in injuries expected if cars were to be equipped with certain advanced restraint systems.

4) Accident Investigation Infrastructure: a structure that can be used to investigate accidents in 8 countries has been established using specially trained teams in the UK, France, Germany, The Netherlands, Finland, Austria, Spain, and Sweden.

5) In-depth Accident Database: the teams have collectively investigated over 1100 crashes in-depth gathering extensive information about the nature of the collision (the vehicle damage, the performance of the safety systems and the injuries sustained).

6) Accident Data Analysis: the database has been analysed resulting in a report that reviews the
accident situation and gives guidelines regarding future priorities for injury prevention.

7) Linked hospital and police data systems: existing injury register databases in France, the Netherlands, and Spain have been reviewed for their purpose, as well as the data contents and the methods of linkage. Probabilistic, deterministic and manual methods were used.

Policy implications

As a result of this project there is a co-ordinated system to inform European vehicle safety policy in a systematic and integrated manner. The results of the data analyses provide new directions to develop injury countermeasures and regulations. The data itself provide an essential tool to contribute to the technical development and assessment of new and recent regulations. The broad international coverage will ensure that new Directives have safety benefits for the full European crash population.

**STRIA Roadmaps:** Other specified
**Transport mode:** Road transport
**Transport sectors:** Passenger transport, Freight transport
**Transport policies:** Safety/Security
**Geo-spatial type:** Network corridors