

THE PRISM PROJECT – IDENTIFYING THE NEED FOR EUROPEAN SMART RESTRAINTS

Lisa Bingley, Richard Morris, Gabrielle Cross (MIRA Ltd.)

ABSTRACT

The objectives of PRISM are to facilitate the efficient and effective development of "smart restraint systems" to suit European conditions. It recognises that some such technologies are already under development to improve occupant safety during crashes. This project shall greatly assist the development of efficient smart restraint systems, thereby reducing societal costs.

It shall also improve the competitiveness of the European motor industry by providing clear guidelines on the functionality and evaluation requirements for such systems. This shall be achieved by using new real world data, bespoke computer models of high-risk scenarios, and a thorough evaluation of their scenarios using a variety of techniques.

PRISM is a European Research project funded under the 5th Framework.

The project partners are: MIRA (coordinators), CIDAUT, Daimler Chrysler, DalphiMetal, TNO, TRL, TRW, TUG & VSRC. The start date of the project was 1/12/02 and shall be completed by 31/7/05. The website address is <http://www.prismproject.com>.

KEYWORDS

Restraints, Occupants, Postures, Kinematics, Measurements

The project consists of 5 Work Packages, which are briefly summarised below;

Work Package 1 - Data Collection (Work Package Leader TUG)

This Work Package included the assessment of existing accident data formats and a review of aspects relevant to smart restraint systems. Field studies were undertaken to identify real world occupant postures, both to determine statistical trends and worst-case scenarios. Further studies were undertaken on pre-impact occupant kinematics, to determine effects of braking, "bracing" etc. Together, these aspects allow a better understanding of real world occupant start positions. This information is vital in the development of smart restraints.

WP1 is now complete, the following reports and database from WP1 are available on the website;

- R4A "Investigate Occupant Position By Photographic Studies" by MIRA Ltd.
- R4B "Driver Dynamic Response Study" By TRL.
- R4C "Occupant Behaviour During Pre-Impact Braking - Car Passengers" by MIRA Ltd.

Real world occupant postures were determined via a Photo study. This was completed in 3 different country's filming of over 5000 cars to give resulting images such as Fig.1 showing out of position rear occupants.



Fig. 1 – Side Camera Images



Fig.2 – Driver Simulation

These images were analysed and the observed data was entered into a custom made database, designed for ease of data entry and for clear parameter option selection.

The objectives of finding pre impact behaviours were to try and understand real world effects on the occupant posture at the point of impact. This was split into 2 areas; Driver responses undertaken by TRL on a driver simulator (Fig 2) and Passenger responses undertaken by MIRA in a vehicle on a proving ground.

Work Package 2 Identification of Crash Scenarios (Work Package Leader MIRA Ltd)

This Work Package is analysing all data from WP1 to identify and justify a series of injury causing impact scenarios, which may benefit from smart restraints. An agreed selection process is being used bringing experience and knowledge from a wide range of backgrounds.

The deliverables from this WP are;

- Accident Analysis and Methodology Report II.
- Impact Scenarios and Methodologies Selected for Further Study.

Work Package 3 - Evaluation of Scenarios (Work Package Leader TRL)

This Work Package shall undertake the studies defined in WP2, identifying sensitivities and other significant aspects of those scenarios. Appropriate computer models such as vehicle, restraint and occupants are being generated. The likely benefits of smart restraints in each scenario shall be determined and the predicted population benefits shall also be estimated.

The deliverables from this WP are;

- Report describing Input Parameters used in the Scenario Evaluation models.
- Report on the Parametric Study for each Scenario selected together with issues and sensitivities Identified.
- Report on potential Population benefits from implementing Smart Restraint Systems.

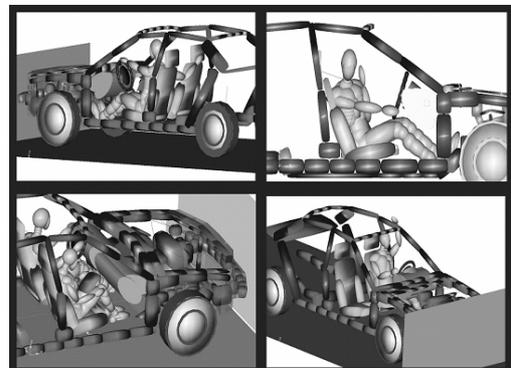


Fig 3 shows a selection of example scenario models

Fig. 3 - Scenario Models

Work Package 4 - Recommendations (Work Package Leader MIRA Ltd)

This Work Package shall compare the critical scenarios identified with existing legislation and standards. Particular emphasis on suitability of test dummy set-up shall also be considered. Guidelines shall be generated for defining functional requirements of smart restraint systems and for evaluating those smart restraint systems.

The deliverables from this WP are;

- Report on Recommended Functional Requirements for Smart Restraint Systems.
- Modelling and Testing Recommendations for Evaluation of Smart Restraint Systems.

Work Package 5 - Project Management (Work Package Leader MIRA Ltd)

This work package covers strategic project control such as work package delivery, financial organisation, and liaison with external organisations (including the Commission).

The PRISM project will endeavour to augment previous occupant studies to determine real world impact postures. The potential hazards of these postures will be shown to be mitigated by the application of appropriate smart restraint technologies. This will be illustrated by using computer-modelling techniques.

The PRISM consortium will produce recommendations for smart restraint system performance and evaluation techniques as part of a strategy for future restraint systems suitable for Europe. Look out at forthcoming conferences for further presentations by consortium partners.