

## Modelling Driver Reaction in Crash Situations

Amir Sobhani, PhD Student, Department of Civil Engineering, Monash University,  
Australia

William Young, Professor, Department of Civil Engineering, Monash University,  
Australia

Majid Sarvi, Senior Lecturer, Department of Civil Engineering, Monash  
University, Australia

Sareh Bahrololoom, Postgraduate Research Student, School of Business, La Trobe  
University, Australia

### *Abstract*

Traffic crashes have been the concern of safety researchers for many years. The human, road, environment and vehicle are the main dimensions affecting the safety level on roads. Human behaviour provides a control mechanism connecting each of these dimensions and hence plays an important role in maintaining road safety. This paper focuses on behaviour during severe conflicts. It reviews studies of human behaviour during conflicts from a number of different viewpoints. Then the need for developing a modelling framework to incorporate human behaviour before crash into a model of vehicle crashes is highlighted. The dependent variable in this model is the probability of reacting in a crash situation. Probability theory is used to derive the mathematical form of the model. The probability equation is derived as a function of the number of conflicts, the number of crashes and the probability of reacting in a particular manner given a crash has occurred. A multinomial logistic regression model is fitted to calculate the probability of human behaviour in crash situations. The independent variables of the calibrated multinomial logistic regression model are the speed limit at the scene of the crash and the interaction of weather condition and type of vehicle interaction as measured by the “definition for classifying accidents” (DCA) code used in Victoria, Australia. The final model can be incorporated in a simulation model to replicate conflict scenarios and investigate the crash causations.

**Keywords:** *Driver reaction, Crash, Conflict, Micro-simulation, Human Behaviour*