

## ASSESSING THE FIELD RELEVANCE OF TESTING PROTOCOLS AND INJURY RISK FUNCTIONS EMPLOYED IN NEW CAR ASSESSMENT PROGRAMS

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### ABSTRACT

Over the past two decades the popularity of consumer crash test programs, commonly referred to as New Car Assessment Programs (NCAP), has grown across the world. They are popular among government regulators as they afford a means of promoting safety innovations and levels of vehicle performance well beyond those dictated by national standards. They also fulfill the demand for information regarding the safety ranking of vehicles among consumers contemplating the purchase of a new vehicle.

There is no question that consumer crash test programs greatly influence vehicle design changes as well as accelerate the fitment of new safety features. The extent to which these changes can be expected to reduce serious and potentially fatal injuries will be influenced by how well the testing protocols and associated rating schemes correctly reflect the nature of the residual safety problem they seek to address.

Drawing on data contained primarily in the US National Automotive Sampling System (NASS), the field relevance of current and proposed testing and rating protocols addressing frontal crash test protection is examined. Emphasis is placed on examining how accurately injury rates computed from the dummy responses measured in consumer crash tests correspond to actual injury rates observed in the field. Additional data from Canadian field investigations and US databases such as National Motor Vehicle Crash Causation Survey (NMVCCS) are examined to see how well frontal airbag firing times, crush pulse durations and other determinants of injury are replicated in consumer testing protocols. This portion of the analysis draws heavily on data obtained from Event Data Recorders (EDR) in both field collisions and staged tests of the same vehicle model.

Vehicle rankings and overall frontal crash test ratings were found to be particularly sensitive to the choice of injury risk functions employed in the test. This was particularly true in the case of injury risk functions used to assess neck injury potential. Neck injury risk derived from Nij was found to show the least agreement with the field. Agreement between field chest injury rates and those derived from crash tests was improved considerably when chest injury risk functions for “older” occupants were employed. The paper concludes with a discussion of how different current testing protocols could be improved to enhance their field relevance.