

“Heavy Truck Crashworthiness – Collision Accidents,” *Proceedings, 15th International Technical Conference on the Enhanced Safety of Vehicles, Melbourne, Australia, May, 1996 (with S.M. Werner, D.S. Girvan and T.P. Khatua).*

Abstract. The Society of Automotive Engineers (SAE) initiated a research program to evaluate heavy truck crashworthiness, with the goal of using that information to evaluate truck occupant protection. Phase I of this crashworthiness program entailed development of characteristic crash pulses and analysis of occupant dynamics for heavy truck accidents involving truck occupant fatalities. This paper is part of a series of reports documenting the Phase I results of the SAE heavy truck crashworthiness study. A companion study identified three major accident events in these accidents: rollover, collision with a fixed object, and collision with motor vehicle. Rear-end collision with another heavy truck was identified as a commonly occurring accident mode that was also amenable to accident reconstruction. Results indicated that the failure of fifth wheel/kingpin assembly occurs at approximately 5.5 g's for a loaded trailer. Therefore, design changes to reduce frontal cab crush must be accompanied by proportional strength increases to structures such as the fifth wheel, kingpin, and the load tie-downs. This study further develops the capability for simulating occupant dynamics in collision accidents. It is concluded that future studies in occupant protection should further investigate steering wheel geometry and stiffness, in addition to the design of ICP and suspension seat.