

“Heavy Truck Crashworthiness – 90° Rollover Accidents,” *Proceedings, 15th International Technical Conference on the Enhanced Safety of Vehicles, Melbourne, Australia, May, 1996 (with D.S. Girvan, S.M. Werner 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. Ninety-degree rollover accidents with and without subsequent collision were reconstructed in order to develop a representative crash pulse, which in turn was input into a dynamic model of the cab interior and occupant. Occupant dynamics analyses demonstrated the effectiveness of restraint use in occupant protection. Shoulder belt use was shown to be effective in limiting forward and lateral excursion of the upper body, but less effective in limiting vertical occupant excursions. Head impacts with the roof, roof header, and side roof rail were the most common and significant occupant impacts in the 90° rollover simulations.