



## Four Decades of Truck Safety Progress

Author Farrel L. Krall

*Editors Note: The reference sources utilized in this publication are immensely valuable in providing a factual history of the efforts behind advancements made in heavy truck safety throughout the last four decades. Because of the number of references and to provide ease of reading, in text citations (i.e. <sup>1</sup>) are offered indicating the number of the reference source as it is listed on the Reference List. To view and obtain copies of the references used in this article, one may visit the resource library at [www.kralltrucksafety.com](http://www.kralltrucksafety.com).*

On September 9, 1966 the U.S. Congress passed the National Traffic and Motor Vehicle Safety Act of 1966 (Safety Act). This enabling legislation served as the catalyst for U.S. truck manufacturers, via their trade association the Automobile Manufacturers Association, Inc. (AMA), to aggressively pursue the research investigation and safety enhancement of commercial vehicles operating on U.S. roadways. AMA was re-named MVMA (Motor Vehicle Manufacturers Association) in 1972 to better serve the research and regulatory needs of truck manufacturers. As further background, MVMA was dissolved in December 1992 and the current Truck Manufacturers Association (TMA) was organized several years later. Two other historical Acts that had a profound impact on truck safety were the 1956 Federal Aid Highway Act and the 1980 Motor Carrier Act (deregulation). The impact of both of these acts on truck safety and productivity are highlighted in this article.

The objective of this article is to provide an overview of a 25-year *in-search-of-truth* research program sponsored by truck manufacturers via MVMA. The Research Studies involved in this initiative were developed, implemented, and monitored by the MVMA Motor Truck Research Committee (MTRC). As a member of the MTRC from 1966 thru 1992 and serving as the chairman for seven of those twenty-five plus years, the author possesses a first-hand knowledge and factual account of the material included in this overview.

**ACCIDENT RESEARCH STUDIES:** Truck manufacturers recognized that the safety design and manufacture of trucks would become highly regulated and therefore quickly focused on the need to assess the highway accident experience of commercial vehicles. In October 1966, one month after the Safety Act was passed, AMA engaged the firm of Ernst & Ernst to gather a large body of data from official reports of accidents involving truck type vehicles. The objective was to subject this data to a preliminary search for statistically significant relationships which would be useful in the study of highway safety problems. Ernst & Ernst performed a quality analysis of 10,000 police accident reports from the ten most populous states in the U.S. Despite this exhaustive effort, the AMA Motor Truck Research Committee found the data to be grossly lacking of sufficient detail. The findings could not provide the type of information needed to make an assessment of the involvement and contributing role of trucks in highway accidents.<sup>1</sup>

Recognizing the limitations of police records as demonstrated by the findings of the Ernst & Ernst study, MVMA initiated in-depth clinical accident investigations by Calspan in western New York, HSRI (Highway Safety Research Institute) in Michigan, and UCLA in southern California. Numerous additional truck accident programs were implemented during the decade of the 70's under the sponsorship of the U.S. truck manufacturers through MVMA.<sup>2</sup>

In July 1976 the National Motor Vehicle Safety Advisory Council (NMVSAC) convened a seminar on motor vehicle safety for the purpose of exploring key issues in truck safety. The agenda, prepared by one of the council members, identified 21 hypotheses indicating over involvement of commercial vehicles in fatal crashes. To study these allegations, the MVMA MTRC engaged two independent research organizations – Calspan Corporation and Southwest Research Institute – to analyze best-available accident data regarding the safety issues alluded to in the advisory council report. These two studies concluded that information and analysis of available data fail to establish heavy trucks as grossly disproportionate contributors to the incidence of death and injury in motor vehicle transportation.

Based on these new findings, and in support of truck manufacturers continuing commitment to safety, MVMA recommended the following course of action to the advisory council: *Expressing its continuing commitment to heavy truck safety, MVMA pledges full support to the National Motor Vehicle Safety Advisory Council in its efforts to improve knowledge and understanding of the key safety issues involved. MVMA cites its considerable investment in truck safety research and analysis and underscores the industry's concern and its commitment to further study and evaluate accident causation and other safety issues. This includes the need to focus on all three elements of highway traffic safety: the vehicle, the driver and the highway itself. In this regard, MVMA suggests a coordinated heavy truck safety research and information gathering program involving government, industry, and the academic and scientific communities. Subjects to be explored include: the development of better accident involvement reporting and evaluating procedures that segregate large from small truck data; development and maintenance of in-depth large truck accident studies, including the collection of better exposure information, data on the effects of various vehicle designs; studies and analyses on methods for improving police reporting and collection techniques on large truck accident involvements; the development of more effective motor truck inspection procedures; and the development of comprehensive training, registration and licensing procedures for truck drivers.*"<sup>3</sup> In summary, the exploration of key issues in heavy truck safety and the development of better accident involvement reporting and evaluating procedures resulted. Most, if not all, of these MVMA recommendations have subsequently been implemented via the "cooperative process" discussed later in this article.

The 1980 "Need to Know" Paper<sup>4</sup>, Section IV MVMA Heavy Truck Accident Research provides a detailed summary of ten significant mass-data accident studies sponsored by MVMA from 1966 thru 1979. This paper concluded that current information regarding heavy truck accidents is far from definitive...and that a continuation of the fragmented piecemeal approach to studying individual issues in isolation is not the most productive and efficient way to bring about improved truck safety. MVMA testimony at a NHTSA public hearing (1979) provides additional commentary on the urgent need for collecting more definitive accident data.<sup>5</sup>

To rectify the accident data deficiencies noted in the above 1976 and 1980 reports, MVMA spearheaded the development of a comprehensive national accident study that was implemented in 1980 by the University of Michigan Transportation Research Institute (UMTRI). This accident study known as Trucks Involved in Fatal Accidents (TIFA) which was initially funded solely by MVMA was later co-funded by the USDOT, the American Trucking Association, and the Western Highway Institute. MVMA funding was discontinued mid-year 1993 following the dissolution of MVMA in December 1992. During the 1980 to 1993 time period MVMA furnished over 75% of the \$3,500,000 TIFA budget. Reference<sup>6</sup> Section 1.0 Truck Accident Data Analysis and Section 4.0 Conclusions provides a comprehensive analysis of the TIFA data from 1980 through 1991. It is pertinent to note that during this 11-year period the occupant fatality rate for heavy trucks declined 60 percent despite the fact that vehicle miles traveled (VMT) increased approximately 50 percent and the number of licensed truck fleets increased 135 percent during this same time period. The annual number of truck occupant fatalities steadily declined from over 1400 in 1979 to under 600 in 1992 with a slight increase experienced since 1992.<sup>8</sup> slides 48, 49, and 50 Recently published NHTSA Traffic Safety Facts 2004 reveals that the combined fatality rate of 2.15 and injury rate of 38.00 involvements per 100 million vehicle miles traveled (VMT) is the lowest in recorded history. For a more recent perspective, the 2004 combined rate of 40.15 is 22 percent lower than for year 2000.

**MVMA TRUCK SAFETY RESEARCH PROGRAMS:** In fulfillment of its 1976 commitment to the NMVSAC as noted above, MVMA continued to actively pursue the research and study of truck safety issues. The reference sources utilized in this article provide a look into the research projects and programs that have attributed to the progress in truck safety.

Reference<sup>7</sup> provides a bibliography identifying approximately 150 motor truck related research projects sponsored, totally or in part, by MVMA from the late 1960s until the organization was dissolved in December 1992. The following are examples of the type of safety research studies sponsored by MVMA: Accident and Exposure Studies (as summarized above), Braking, Handling and Stability, Crashworthiness/Restraint Systems, Driver Environment / Anthropometrics, Fuel System Integrity, Splash and Spray, Truck Ride Quality/Driver Fatigue, Tire Wheel Systems, and Vehicle Underride/Conspicuity.

Reference<sup>6</sup> Section 3.0 Key Truck Research Program Areas provides a detailed summary of in-depth cooperative research program endeavors spearheaded by MVMA to address several of the aforementioned pertinent safety issues. Reference<sup>6</sup> Section 2.0 An Effective “Cooperative Process”, Involving Public and Private Sector Organizations provides information on many of the successful initiatives that were jointly conducted by MVMA, the USDOT, and the trucking community at large. One of these initiatives that warrants mention is the 1972 Williamsburg Conference on Highway Safety Research<sup>10</sup>. This SAE-sponsored forum, which was convened as a technical conference to develop a plan of needed highway safety research, included a breakout session on truck safety. The list of priority truck safety research needs that were identified during this conference has been successfully completed as a result of subsequent joint government/industry sponsored programs. Reference<sup>8</sup> Part III – A Pro-active Safety Initiative by U.S Truck Manufacturers <sup>slides 26 through 52</sup> provides a detailed overview of the results of MVMA sponsored research and the manner in which the research was employed to promote an effective cooperative working relationship with the USDOT and the trucking safety community in general

MVMA testimony<sup>9</sup> at a NHTSA Public Hearing (1979) presented information on how the association’s research is used as a basis for providing industry input to the USDOT (NHTSA and BMCS – Bureau of Motor Carrier Safety) safety rulemaking process. Specific emerging safety issues referenced in MVMA’s testimony addressed truck Drivers’ Environment and its relationship to Safety, Truck Ride Quality, Overall Cab Comfort, Underride Accidents and the Role of Truck Conspicuity, Step Handhold and Deck Requirements, Engine Fumes and Exhaust Systems (toxic gases), and Driver Space. Reference<sup>8, slides 9 through 18</sup> Part II Vehicle Regulation & Rulemaking Process, provides additional information on the USDOT rulemaking process and pertinent history, including a listing of safety regulations applicable to heavy trucks.

**HEAVY TRUCK CRASHWORTHINESS SUCCESS STORY:** As discussed earlier in this article, the issue of Truck Crashworthiness has received considerable longstanding attention by truck manufactures, USDOT, and numerous other organizations. Reference<sup>11</sup> provides a chronology (1966-2000) of research and development activities focused at developing a better real-world understanding of truck accidents and vehicle design improvements to mitigate truck occupant deaths and injuries in crashes. As shown in this reference and as part of a five-year cooperative research project, in 1998 nine new SAE Recommended Practices for evaluating truck crashworthiness performance were published by SAE. Reference<sup>12</sup> provides a comprehensive overview and analysis of Truck Crashworthiness developments in the United States. This paper was presented as part of an SAE Heavy Vehicle Rollover TOPTEC in July 2000.

A September 1996 report by the USDOT Federal Highway Administration (FHWA)<sup>13</sup> provides a comprehensive analysis of truck highway safety in North America (US, Canada and Mexico) and Europe (Germany, France, Sweden, the United Kingdom, Belgium and the Netherlands). The objectives of this Scanning Tour of North America and Europe were to scan current practices, innovations, policies, rules/compliance and to identify options and issues in highway/commercial vehicle interaction technology.

This report summarizes the findings, perceptions, and assessments of the 13-member scanning-tour group who toured the nine countries (the author of this article was selected to represent the U.S trucking industry as a representative of the Society of Automotive Engineers - SAE). The group was charged with evaluating and developing recommendations on technical, regulatory, and policy issues surrounding highway freight transportation and the interaction between heavy vehicles and highway systems with special emphasis on highway safety.

In summary, the author's objective of this article is to provide a substantiated and factual overview and reference guide of the historical contributions that have impacted truck safety. During his 45-year career in the trucking industry, truck safety has improved and continues to progress dramatically. Truck manufacturers have played a key leadership role in instituting this cooperative non-adversarial process of improvement. The author has dedicated most of his career to the pioneering study, research, implementation, and advocacy of truck safety improvements. A research library of the resources cited in this article may be found on his web site: [www.kralltrucksafety.com](http://www.kralltrucksafety.com).



## Reference List

Entire list may be accessed at the Resource Library at [www.kralltrucksafety.com](http://www.kralltrucksafety.com)

- 1.) **Ernst & Ernst Truck Accident Study**; Report of Procedures and Findings, August 1968 (Prepared for Automobile Manufacturers Association, Inc.)
- 2.) Truck Manufacturers Pioneering Development of Accident Data Programs (Oral Presentation by Farrel L. Krall at the SAE Truck and Bus Meeting October 14, 1996) *edited 01/2006*
- 3.) **Key Issues in Heavy Truck Safety**; statement of Motor Truck Manufacturers Division, Motor Vehicle Manufacturers Association of the United States, Inc. submitted at the *Motor Vehicle Safety Seminar* sponsored by the National Motor Vehicle Safety Advisory Council July 12, 1976 (presented by Peter Griskivich MVMA and Farrel L. Krall International Harvester Company)
- 4.) **Heavy Truck Safety...The Need to Know**; MVMA Paper co-authored by Gary W. Rossow MVMA and presented to the American Association for Automotive Medicine October 8, 1980 by co-author Farrel L. Krall International Harvester Company
- 5.) **Statement of Peter Griskivich, Vice President Motor Vehicle Manufacturers Association of the U. S. Inc.** at the National Highway Traffic Safety Administration Public Meeting on Heavy Truck Safety, Washington, D.C. – September 10, 1979
- 6.) **The Decade of Declining Heavy Truck Fatalities...A Tribute to the Cooperative Process SAE Paper 933058 November 1993**; Farrel L. Krall author
- 7.) **MVMA Sponsored Motor Truck Research (A Bibliography) Motor Truck Manufacturers Division – Motor Vehicle Manufacturers Association December 1992**
- 8.) **Legislative Impact on the Design and Operational Safety of Large Trucks in the United States**, International Truck & Bus Safety Research & Policy Symposium...Center for Transportation Research The University of Tennessee Knoxville, TN April 3-5, 2002...Farrel L. Krall author
- 9.) **Statement of Paul F. Allmandinger, Vice President, Engineering Division, Motor Vehicle Manufacturers Association of the U.S. Inc.** at the National Highway Traffic Safety Administration Public Meeting on Heavy Truck Safety Washington, D.C. – September 10, 1979
- 10.) **The Williamsburg Conference on Highway Safety Research...a technical conference to develop a plan of needed safety research** (sponsored by the SAE Vehicle Research Institute November 29-30, December 1, 1972; Session VII Truck, Bus and Multipurpose Vehicle Safety chaired by Farrel L. Krall)
- 11.) **Truck Occupant Crash Protection – 1966-2000 Chronology of Investigation, Analysis, and Research Development** (compiled by Farrel L. Krall as a reference for this article 01/2006)
- 12.) **Truck Crashworthiness in the United States “A Historical Perspective”...** SAE Heavy Vehicle Rollover TOPTec July 12-13, 2000...Farrel L. Krall author
- 13.) **FHWA Study Tour for Highway/Commercial Vehicle Interaction** U.S. Department of Transportation Federal Highway Administration September 1996 Publication No. FHWA-PL-96-027 HPI-10/11-96(1M)E, Farrel L. Krall, Contributing Author as member of the FHWA Study Group