



U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

MAY - 5 2003

The Honorable Ellen G. Engleman
Chairman
National Transportation Safety Board
Washington, DC 20594

Dear Chairman Engleman:

This letter addresses the National Transportation Safety Board's (NTSB) Safety Recommendation H-95-37 concerning an accident involving a cargo tank carrying liquefied petroleum gas (LPG) in White Plains, New York, on July 27, 1994. The front end of the tank fractured, releasing the LPG which ignited and propelled the tank onto a frame house, engulfing it in flames. The driver was killed, 23 people were injured, and an area with a radius of approximately 400 feet was engulfed by fire. The recommendation states:

H-95-37

In cooperation with the Federal Highway Administration, study methods and develop standards to improve the crashworthiness on front heads of cargo tanks used to transport liquefied flammable gases and potentially lethal nonflammable compressed gases.

The Research and Special Programs Administration (RSPA) contracted with Pressure Sciences Incorporated to study methods of improving the crashworthiness of front heads on DOT specification MC 331 cargo tank motor vehicles. The Federal Highway Administration, now the Federal Motor Carrier Safety Administration (FMCSA), and RSPA jointly conceived and funded the study.

The contractor completed the feasibility portion of the study in 1997. FMCSA provided a report on this phase to the Board on August 19, 1997. The second phase of the study used the tools developed in the initial period to model and analyze a cargo tank motor vehicle containing pressurized propane liquid and vapor. The contractor varied the design of the cargo tank's front head to assess the importance of differing design parameters to the likelihood of failure under a range of crash conditions. The contractor also examined the potential for failure mitigation of a dual head configuration cargo tank design and evaluated the mitigating effect of crushable material between dual heads. FMCSA provided a copy of the report of this phase of the study to the Safety Board on August 11, 2000.



Most recently, Pressure Sciences conducted an investigation of several discrete designs to evaluate manufacturing costs, producibility and marketability considerations, and produced two reports titled, "Further Work to Improve Crashworthiness of Front Heads of MC-331 Cargo Tank Motor Vehicles," dated March 2001, and the "Evaluation of FHWA Study of Accident Stresses in Rollover Protection Structures," dated April 2001. (copies enclosed)

These economic and physical modeling studies were conducted to address improvement of crashworthiness on front heads of cargo tanks and how to mitigate the effects of the impact to prevent failure of the tank. Design alternatives included differing head thicknesses and configurations, addition of a secondary head at various spacings, and the addition of various energy-absorbing materials and thicknesses. The addition of an 18 inch thick layer of energy absorbing foam, covered with a 0.06 inch thick layer of sheet steel over the head of the tanker, would provide the most cost effective protection. The estimated cost per new or existing tanker would be approximately \$27, 939 and would add additional weight of 4,376 pounds, decreasing the payload of the tanker.

Based upon the findings in these analyses, we determined that it is not economically justifiable to impose the requirements of this recommendation upon industry.

In view of the technical work and efforts that have been completed, the development and dissemination of products and our completed investigation of discrete designs, we request classification of H-95-37 as "Closed-Acceptable Action." We thank you for your consideration of our request.

If you have any questions, please contact me or Ms. Patricia Klinger, Director of External Communications, at (202) 366-4831.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'S. G. Bonasso', written over a horizontal line.

Samuel G. Bonasso
Acting Administrator

Enclosures