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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

Mr. Howard J. Dugoff, Administrator
Research and Special Programs
Administration
400 7th Street, S.W.
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

I-79-14 through -16

The National Transportation Safety Board has investigated many accidents in which persons were killed following the release of hazardous materials from the vehicles involved in the accidents. For example, in Eagle Pass, Texas, 16 persons died following the rupture of a liquefied petroleum gas tank-semitrailer in a highway accident in 1975. In Youngstown, Florida, eight persons died following the puncture of a rail tank car carrying chlorine during an accident in 1978. In Houston, Texas, 5 persons were killed and 178 persons were injured by the release of anhydrous ammonia following the crash of a tank-semitrailer in a 1976 highway accident. The Safety Board has previously reported the causes of these accidents. ^{1/} However, the gravity of the casualties in these and other accidents following the release of hazardous materials far exceeded the initial crash losses. Improving survivability in such accidents would contribute significantly to reductions in hazardous materials transportation risks.

Using the 1976 Houston accident as a basis, the Safety Board investigated survival actions by the victims to determine what actions they took, why they were taken, and what effects these actions had on the victims' survival. These actions were then analyzed to determine the effectiveness of the U.S. Department of Transportation's (DOT) mandated safeguards in reducing casualties in hazardous

^{1/} "Highway Accident Report—Surtigas, S.A., Tank-Semitrailer Overturn, Explosion and Fire, Near Eagle Pass, Texas, April 29, 1975" (NTSB-HAR-76-4); "Railroad Accident Report--Derailment of Atlanta and Saint Andrews Bay Railway Company Freight Train, Youngstown, Florida, February 26, 1978" (NTSB-RAR-78-7); "Highway Accident Report—Transport Company of Texas Tractor-Semitrailer (Tank) Collision with Bridge Column and Sudden Dispersal of Anhydrous Ammonia Cargo, I-610 at Southwest Freeway, Houston, Texas, May 11, 1976" (NTSB-HAR-77-1).

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materials accidents. The analysis disclosed that DOT-mandated safeguards were not effective in reducing the casualties which occurred after the ammonia release. ^{2/}

DOT-mandated safeguards regarding the cargo tank, emergency communications, evacuation guidelines, and routing were involved in the Houston accident. The cargo tank safeguards did not forestall the abrupt release of the entire contents of the tank; this reduced the time for the exposed persons to determine their danger and react before they were engulfed by the released material. The "form" of the contents contributed to the sudden tank burst; additionally the quantity and form both contributed to the rapid development and the size of the affected area. The emergency communications regulations played no role in the accident, largely because the information was obscured by the sudden opaque cloud around the crash site and because the casualties occurred so quickly after the release. Had the evacuation recommendations in the National Highway Traffic Safety Administration's "Emergency Action Guide for Hazardous Materials" been followed, some of the persons who survived uninjured would have been evacuated directly into the path of the oncoming dangerous cloud. The designated hazardous materials route used contributed both to the occurrence of the crash, to the difficulties experienced by some of the victims, and to the complexity of the rescue problems.

By tracking the actions of many of the survivors in the Houston accident, the Safety Board was also able to identify several general ways to improve survival in future accidents. These findings led to a further investigation of the DOT program for the collection and use of survival action data. A primary element of the hazardous materials safety program is the accident/incident reporting system of the Materials Transportation Bureau (MTB) of the DOT's Research and Special Programs Administration (RSPA). The system however does not collect information about survival actions following the accidental release of hazardous materials. The system focuses on the collection of information about the performance of hazardous materials packaging and on trend analyses of such data to identify needed improvements. Trend analyses require sufficient accidents and, usually, extended time periods to identify needed improvements. The Safety Board concludes that the data system deficiency prevents the DOT from adequately analyzing the effectiveness of its mandated safeguards.

Some deficiencies in the DOT hazardous materials information system were recognized by the DOT's Task Force on Hazardous Materials Transportation in a September 1978 report. The task force recommendation to establish a centralized system within the Department, "carefully designed to record the significant characteristics of the Department's programs in order to assist in the Department's planning, regulatory and compliance efforts," was approved, and work to implement the recommendation is in progress. However, the Safety Board's review of the work in progress disclosed that the process for the collection and use of survival action data has not yet been singled out for attention in this project.

^{2/} For more detailed information read "Special Investigation Report--Survival in Hazardous Materials Transportation Accidents" (NTSB-HZM-79-4).

The Safety Board perceives significant value in the analysis of survival action data in the investigation of the accidents such as the one in Houston. The need for these data to provide for the adequate evaluation of the DOT programs and for identifying potential actions to improve survivability in future accidental releases has been amply demonstrated. Failure to collect such data can result in misdirection of regulatory program efforts, or an unbalanced emphasis between containment concerns and control of fatalities, injuries, and losses when releases occur. The Safety Board's experience with collection of such data shows that data sources other than carriers exist and are willing to contribute if the MTB will change its policy of requiring only carriers to submit accident/incident data.

Prompt collection and use of survival data following hazardous materials releases in which serious injuries have occurred, or in which serious injury was narrowly averted, would substantially reduce the delay in evaluating and improving DOT's hazardous materials safeguards or procedures. In a few instances, the MTB and other modal Administrations have reacted promptly to improve regulations or have issued emergency orders based on single accident occurrences. For example, action in MTB Docket HM 99, following an explosion involving some cylinders being loaded with natural gas, resulted in quick correction of this dangerous packaging practice. However, the extensive delays in implementing the tank car headshield retrofit program and the absence of improvements after the Houston and Eagle Pass accidents demonstrate the imbalance in improving the survival aspects of releases.

In addition to acquiring survival data for its internal use, DOT's dissemination of survival action data, along with maps of the hazardous materials behavior in serious releases, could permit safety program managers in other public and private emergency response activities to benefit from the lessons learned in such accidents with a minimum of delay. The task is to improve and shorten the learning process from such accidents with survival action data. These benefits merit high priority among the RSPA's safety program efforts.

For these reasons, the National Transportation Safety Board recommends that the Research and Special Programs Administration of the U.S. Department of Transportation:

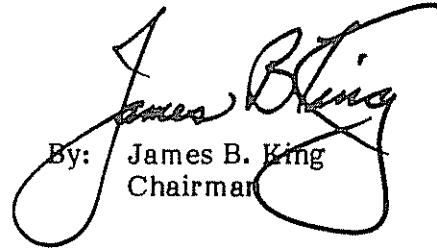
Incorporate hazardous materials incident survival action data in the new centralized hazardous materials information system which the Department of Transportation is establishing under recommendation No. 3 of the September 1978 Report of the Hazardous Materials Task Force. (Class II, Priority Action) (I-79-14)

Establish procedures to promptly utilize survival action data and to analyze the harm from an accident in evaluating the influence of regulatory safeguards upon the outcome of serious hazardous materials incidents. (Class II, Priority Action) (I-79-15)

Use survival action data collected to revise emergency guidelines, incorporating recommended actions, their purpose, and the effect

they should have in reducing losses following the release of hazardous materials. (Class II, Priority Action) (I-79-16)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

A handwritten signature in cursive script, appearing to read "James B. King". The signature is written in black ink and is positioned above the typed name and title.

By: James B. King
Chairman