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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: April 25, 1977

Forwarded to:

Honorable William M. Cox
Administrator
Federal Highway Administration
Department of Transportation
400 Seventh Street, SW
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

H-77-4, H-77-5 and
I-77-1

About 11:08 a.m., on May 11, 1976, a Transport Company of Texas tractor-semitrailer (tank) transporting 7,509 gallons of anhydrous ammonia struck and then penetrated a bridge rail on a ramp connecting I-610 with the Southwest Freeway (U.S. 59) in Houston, Texas. The tractor and trailer then struck a support column of an overpass and fell onto the Southwest Freeway, approximately 15 feet below. The anhydrous ammonia was released from the damaged tank semitrailer.^{1/}

Six persons died as a result of the crash, 78 persons were hospitalized, and approximately 100 persons were treated for injuries but were not hospitalized. Five of the deaths and all of the injuries were a result of the inhalation of the ammonia.

If the vehicle had been transporting a solid load of equal weight and the same center of gravity height, it could have negotiated the curve at a speed of 69 mph without overturning. The vehicle in this accident was loaded to only 71.8 percent of its capacity and overturned at approximately 53.6 mph. This suggests that a lateral cargo surge combined with the normal centrifugal force at that speed to supply the necessary force to overturn the vehicle.

1/ For more detailed information on this accident read 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.

The bridge barrier rail at the site was of an outdated design. Like bridge rails in use in Texas and other States, it was designed to prevent only penetration by automobiles.

Placement of the types of barriers that will redirect or contain heavier trucks will most likely require careful analysis because of the cost and, perhaps, the adverse effects they could have on smaller vehicles in collisions. Urban routes, where penetration of a barrier by a truck that is transporting hazardous materials could be disastrous, and interchanges, where a large percentage of urban accidents occur, probably would be the best locations.

Many jurisdictions restrict the transportation of hazardous materials over particular routes where hazards would be created for bridge structures or tunnels in the event of spillage or explosion. In 1970, the city of Houston designated I-610 as a hazardous materials route and restricted all vehicles transporting hazardous materials through the city to this route. Houston's attempt to improve safety was commendable, because restricted routes can be established to accommodate local hazardous conditions.

This accident demonstrated the need for a periodic reassessment of designated hazardous material routes. However, suitable guidelines for the selection or review of hazardous materials routes are not available. Since many local agencies may not have expertise for selecting or reviewing such routes, the Department of Transportation could provide a valuable contribution to safety by developing guidelines for local officials to use.

Therefore, the National Transportation Safety Board recommends that the Federal Highway Administration:

Expedite past recommendations of the Safety Board regarding the adoption of standards for bridge barrier systems that require new installations to comply with performance standards. (Class II, Priority Followup) (H-77-4)

In consultation with State and local governments, establish highway design criteria for the selection, location, and placement of traffic barrier systems that will redirect and prevent penetration when struck by heavy vehicles. The criteria for preventing vehicle penetration should consider the human exposure to injury and the effects of hazardous cargo that could result from barrier penetration. (Class II, Priority Followup) (H-77-5)

I-77-1
Develop guidelines for local and State agencies to use in designating and periodically reviewing routes for the transportation of hazardous materials as a means of reducing injury and damage from accidents involving hazardous materials in their jurisdictions. (Class II - Priority Followup) (I-77-1)

As a result of its investigation of this accident the National Transportation Safety Board reiterates the following recommendations made after previous investigations:

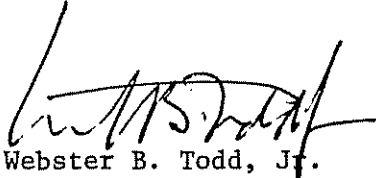
-- to the Federal Highway Administration:

"The Bureau of Motor Carrier Safety (Federal Highway Administration) in cooperation with affected industries, as represented by the Tank Truck Technical Council, conduct an investigation designed to resolve the overturn stability problems created by liquid surging of partially loaded tank-truck combinations. The ultimate objective of such a research program should be the promulgation of Federal regulations to limit the effects of surge to a specific degree. Such regulations might be based on acceptable liquid cargo outage and/or dampening requirements, consistent with safe tank-truck operations." (H-72-)

-- to the U.S. Department of Transportation:

"Initiate a research program to identify new approaches to reduce the injuries and damages caused by the dangerous behavior of pressurized, liquefied flammable gases released from breached tanks on bulk transport vehicles." (I-76-5)

TODD, Chairman BAILEY, Vice Chairman, McADAMS, HOGUE, and HALEY, Members, concurred in the above recommendations.


By: Webster B. Todd, Jr.
Chairman