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**National Transportation Safety Board**  
Washington, DC 20594



**Safety Recommendation**

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**Date:** October 29, 1997

**In Reply Refer To:** H-97-39

Mr. Max E. Rumbaugh, Jr.  
Executive Vice President  
Society of Automotive Engineers  
400 Commonwealth Drive  
Warrendale, Pennsylvania 15096-0001

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About 3:25 p.m. on April 25, 1996, a 1988 Mack truck with a concrete mixer body was unable to stop as it approached a "T" intersection at the bottom of an exit ramp in Plymouth Meeting, Pennsylvania. As the truck proceeded through the intersection, it collided with and overrode a 1985 Subaru passenger car. The Subaru driver was killed; the truckdriver sustained minor injuries. The truckdriver was unrestrained; the Subaru driver was found restrained in her vehicle. The weather was clear and dry. No fire ensued, and no other vehicle occupants were involved in the accident.<sup>1</sup>

During its investigation, the National Transportation Safety Board identified as safety issues the maintenance and truck inspection practices of JDM Materials Company, Inc., (the owner of the truck) and the adequacy of Federal and State guidelines for conducting truck air brake system inspections.

Postaccident examination and testing of the accident truck operating systems revealed that the only deficiencies were in the truck's braking system, specifically, a broken drain valve on the secondary air brake air reservoir tank, an inoperative low-air-pressure warning switch, and reverse-connected air brake lines at the truck's treadle valve.

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<sup>1</sup>For more detailed information, read Highway Accident Summary Report—*Truck Loss of Braking Control on Steep Downgrade and Collision with a Vehicle near Plymouth Meeting, Pennsylvania, April 25, 1996* (NTSB/HAR-97/02/SUM).

Because the low-air-pressure warning switch was inoperative, it did not warn the truckdriver when the secondary air supply tank became depleted. The Safety Board concluded that had both low-air-pressure warning switches on the accident truck been operable, the truckdriver would have had earlier warning of the depleted air supply and may have been able to stop the truck and avoid the accident.

The air brake lines on the accident vehicle were most likely reversed during March 1994 when JDM mechanics performed the only documented maintenance on the treadle valve of the accident truck. At no time before the accident did the motor carrier's mechanics detect the reversed air lines, even though the accident truck was in service in this condition for almost 2 years before the accident.

So long as both of the truck's air systems remained intact, the operation of the truck's brakes appeared normal; however, the reversed air lines bypassed a vital backup in the air brake system. The rear axle spring brakes, which automatically activate when a loss of air occurs in the primary air system, did not activate in this accident, because the primary air system remained intact. The secondary air system, which on the accident truck was providing air to operate the rear brakes, was not equipped with a backup system. The Safety Board concluded that the motor carrier's improper installation of the treadle valve air lines on the accident truck effectively bypassed an important safety feature and resulted in reducing the truck's braking capability under certain emergency conditions.

JDM officials told the Safety Board that its mechanics use service manuals provided by component manufacturers and by Mack Truck, Inc., in performing vehicle repairs and periodic maintenance. Mack Truck publishes an air brake service manual that also contains individual component maintenance information. The brake maintenance section of the Mack Truck maintenance and lubrication manual includes brake adjustment procedures and specifications; however, the manuals in use before this accident did not contain procedures for comprehensively testing the operation of dual-circuit brake systems. Also, the Mack Truck air brake service manual did not provide any system function test procedures that would have detected reversed lines or malfunctioning low-air-pressure warning switches. The treadle valve manufacturer publishes an air brake troubleshooting guide that outlines a test procedure that would have detected reversed treadle valve air line connections and inoperative low-air-pressure warning switches. The Safety Board concluded that if JDM employees had followed the treadle valve manufacturer's installation tests and inspection procedures when performing maintenance on the treadle valve of the accident truck, they would probably have recognized the improper installation problems or inoperative brake components or both, and the accident may have been prevented.

The repair and installation problems highlighted in this accident are not unique to Mack Truck vehicles. The air brake system configuration used on the accident truck is similar to that used on other trucks with concrete mixer bodies. According to the Bureau of the Census, about 61,000 such trucks are in operation nationwide. The JDM fleet inspection found that about 1 percent of its trucks had air lines reversed and about 7 percent had inoperative low-air-pressure

warning switches. Based on these findings, the Safety Board concluded that a significant number of dual-air-brake-system-equipped trucks nationwide may have undetected air brake deficiencies similar to those found on the accident truck.

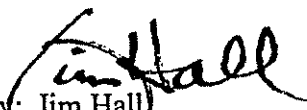
The Safety Board therefore believes that the Society of Automotive Engineers should:

In cooperation with the National Highway Traffic Safety Administration, develop specifications and requirements for the installation, in heavy trucks with a dual air brake system, of separate low-air-pressure warning devices that will independently alert drivers to a loss of air pressure in either system. (H-97-39)

Also, the Safety Board issued Safety Recommendations H-97-31 to the Federal Highway Administration; H-97-32 to the Commercial Vehicle Safety Alliance; H-97-33 to the American Trucking Associations, Inc.; H-97-34 to the National Ready Mix Concrete Association; H-97-35 to the JDM Materials Company, Inc.; H-97-36 to the Pennsylvania Department of Transportation; H-97-37 to the Truck Manufacturers Association; and H-97-38 to the National Highway Traffic Safety Administration.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation H-97-39 in your reply. If you need additional information, you may call (202) 314-6440.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

  
By: Jim Hall  
Chairman