



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: September 13, 2002

In reply refer to: H-02-22

Spring Brake Manufacturers
(See Attached List)

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses spring brake design to facilitate inspection. The recommendation is derived from the Safety Board's investigation of the May 31, 2001, collision between a truck-tractor semitrailer and a school bus near Mountainburg, Arkansas,¹ and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued eight safety recommendations, one of which is addressed to spring brake manufacturers. Information supporting this recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

On May 31, 2001, about 3:28 p.m. central daylight time, a southbound Gayle Stuart Trucking, Inc., truck-tractor semitrailer exited Interstate 540 at State Highway 282 (SH-282) near Mountainburg. The driver was unable to stop at the stop sign at the bottom of the ramp. The 79,040-pound combination unit was traveling approximately 48 mph when it entered the intersection and collided with the right side of a westbound, 65-passenger, 1990 Blue Bird Corporation school bus operated by the Mountainburg, Arkansas, Public Schools. The school bus rotated approximately 300 degrees clockwise and overturned; the body, which partially separated from the chassis, came to rest on its right side on the eastbound shoulder of SH-282. The tractor semitrailer continued across the roadway, rotated about 60 degrees clockwise, overturned, and came to rest on its left side. Three school bus passengers seated across from the impact area were fatally injured; one was partially ejected. Two other passengers, one of whom was seated in the impact area, received serious injuries, and four passengers had minor injuries. The school bus driver and the truckdriver both sustained minor injuries.

¹ For additional information, read National Transportation Safety Board, *Collision Between Truck-Tractor Semitrailer and School Bus Near Mountainburg, Arkansas, on May 31, 2001*, Highway Accident Report NTSB/HAR-02/03 (Washington, DC: NTSB, 2002).

The Safety Board determined that the probable cause of the accident was the truckdriver's inability to stop the tractor semitrailer at the stop sign at the bottom of the ramp due to the reduced braking efficiency of the truck's brakes, which had been poorly maintained and inadequately inspected. Contributing to the school bus passengers' injuries during the side impact were incomplete compartmentalization and the lack of energy-absorbing material on interior surfaces.

Of six brakes on the tractor semitrailer equipped with spring brakes for emergency-parking brake application (axles 3, 4, and 5), three had broken springs. The 3L brake spring was broken in three pieces, restricting total stroke by 3/8 inch. Thus, even though the 3L brake appeared to be within adjustment at 1 7/8 inches, it was not.

The 4L brake spring was broken in two pieces, and dynamic testing of the vehicle showed that the broken spring did not prevent service brake application; the service brakes even locked during one test. When the emergency-parking brake was applied during another test, the 4L brake provided some braking force (the service brake locked on gravel but not on concrete), indicating the emergency-parking brake force was reduced due to the broken spring, but was not completely eliminated.

The 5L brake spring was also broken and blocking the pushrod, thereby limiting pushrod stroke and preventing it from reaching the minimum 1 1/2 inches necessary for the automatic adjuster to begin readjustment. During testing, the 5L brake did not provide any braking force when either the emergency-parking brake or the service brake was applied. In other words, both the emergency-parking brake and the service brake were nonfunctional.

Thus, a broken spring, in addition to reducing the braking ability of the emergency-parking brake or rendering it inoperable, can have a detrimental effect on the service brakes, as was the case in this accident. Broken springs on two of the vehicle's three brakes prevented proper brake adjustment, thereby contributing to a reduction of the tractor semitrailer's braking efficiency.

The design of brake springs makes detection of broken springs difficult because access to the closed chamber is restricted. One method of detection involves inserting an optical device called a borescope into the caging port. Another entails inserting a finger inside the caging port, but doing so can be extremely dangerous during roadside inspections; if the truck moves, the spring breaks, or the driver applies or releases the parking brake, the inspector can be injured. If the spring brake is equipped with an integrated caging bolt, then it has no port for accessing the spring. Brake springs are neither a Commercial Vehicle Safety Alliance out-of-service item nor an inspection item. However, as this accident demonstrates, broken springs can have safety consequences when they prevent proper adjustment of the service brake or decrease the braking capability of the emergency-parking brake. The Safety Board concludes that because of the spring brake design, examining the springs to determine whether they were broken was difficult on three of the truck's brakes.

Therefore, the National Transportation Safety Board recommends that spring brake manufacturers:

Develop a spring brake that allows inspectors or mechanics to view components safely to determine whether the spring is broken. (H-02-22)

The Safety Board also issued safety recommendations to the Federal Motor Carrier Safety Administration, National Highway Traffic Safety Administration, Commercial Vehicle Safety Alliance, and National Fire Protection Association and reiterated a recommendation to the U.S. Department of Transportation. In your response to the recommendation in this letter, please refer to H-02-22. If you need additional information, you may call (202) 314-6177.

Chairman BLAKEY, Vice Chairman CARMODY, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

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