

Log H-591B



## NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20594

### Safety Recommendation

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**Date:** May 24, 1993

**In Reply Refer To:** H-93-14 and -15

Mr. William Dawson  
Acting Superintendent of Public Instruction  
California State Department of Education  
721 Capitol Mall  
Sacramento, California 95814

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At 3:24 p.m. on July 31, 1991, a 1989 72-passenger school bus operated by Mayflower Contract Services, Inc., was traveling eastbound on undivided, two-lane Tramway Road from the Palm Springs (California) Aerial Tramway parking lot. On board the bus were 45 girl scouts and 8 adult advisors. During the descent, the bus increased speed, left the road, plunged down an embankment, and collided with several large boulders. The busdriver and 6 passengers were killed; 47 passengers were injured.<sup>1</sup>

National Transportation Safety Board tests indicated that speeds between 13.3 (closed throttle) and 19.3 (full throttle) mph were necessary before the accident bus transmission would downshift from third to second gear. Since analysis determined that the accident bus was traveling above this speed range when it negotiated the curve at the guardrail/culvert, the transmission could not be forced to downshift into second, thereby negating transmission use for regaining speed control. Measurements and computations indicated that the bus was traveling 64 mph where the tire yaw marks began at the curve. Tests revealed that the transmission would normally upshift from third to fourth between 24.0 and 37.6 mph and would automatically upshift from third to fourth at 50.5 mph to protect against engine overspeed. If the busdriver had selected and kept the selector lever in third gear,

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<sup>1</sup>For more detailed information, read Highway Accident Report--Mayflower Contract Services, Inc., Tour Bus Plunge from Tramway Road and Overturn Crash near Palm Springs, California, on July 31, 1991 (NTSB/HAR-93/01).

the bus would have automatically upshifted from third to fourth before the yaw marks began. However, any automatic upshift from third to fourth occurred after the busdriver had lost speed control. Because of the vehicle's degraded braking capacity, he could not decrease speed to effect a downshift.

The Safety Board concludes that although the Allison automatic transmission feature that permits automatic upshifts did not cause or contribute to this accident, an upshift occurrence may be the first warning that the transmission can no longer help maintain speed control and immediate action must be taken to reduce speed to effect a downshift back into the desired gear range. Therefore, the Safety Board believes that the California Department of Education (DOE) should expand the school and tour busdriver training curriculum to include automatic transmission upshift characteristics and proper transmission operation in mountainous terrain.

To determine knowledge or skill level, the most reliable method is to test and evaluate performance. California had no specific performance criteria for judging proficiency in mountain driving techniques. This lack of performance criteria precluded an evaluation of the quality of mountain driving training that the accident busdriver had received.

California requires no mountain certification or behind-the-wheel training for a driver's license to operate a school or tour bus. However, Mayflower had provided about an hour of behind-the-wheel mountain driving training to the accident busdriver and thus exceeded the California minimum training requirements. The Safety Board found no evidence that the busdriver had driven in mountainous terrain since his behind-the-wheel mountain driving training in April 1990. It is possible that when assigned the accident trip, any acquired skill or knowledge had been lost through disuse.

The busdriver's instructor stated that during the mountain training he told busdrivers to use the same gear ascending and descending a grade. The busdriver should have also known the *California Commercial Driver Handbook* instruction about selecting a gear one range lower than that needed to ascend the same grade. Tests indicated that with the gear selector in drive the transmission downshifted into second gear range while ascending most of Tramway Road and at the top downshifted into first gear range. The accident busdriver must have been aware of these downshifts when ascending Tramway Road. Following the instructor or the handbook, the busdriver would have selected second gear range or first gear range, respectively, to descend Tramway Road.

However, the evidence indicates that the busdriver selected third and possibly fourth gear range before speed control was lost. Whether third or fourth gear range was selected, the busdriver

either disregarded his instructions or was unaware of the significance of the transmission downshifts he should have observed while ascending Tramway Road. The Safety Board concludes that although the busdriver met all requirements for a California Class B license and had received training to operate in the mountains, he did not use proper techniques for driving in mountainous terrain. Although the California DOE has revised its position to require mountain training, the Safety Board believes it should also develop a specific curriculum for the initial and the recurrent training of school and tour busdrivers in mountain driving techniques and require those busdrivers to complete this training before driving in mountainous terrain.

Therefore, the Safety Board recommends that the California Department of Education:

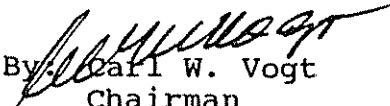
Expand the school and tour busdriver training curriculum to include automatic transmission upshift characteristics and proper transmission operation in mountainous terrain. (Class II, Priority Action) (H-93-14)

Develop a specific curriculum for the initial and the recurrent training of school and tour busdrivers in mountain driving techniques and require those busdrivers to complete this training before driving in mountainous terrain. (Class II, Priority Action) (H-93-15)

Also, the Safety Board issued Safety Recommendations H-93-10 and -11 to the Federal Highway Administration, H-93-12 and -13 to the State of California, H-93-16 and -17 to the California Highway Patrol, H-93-18 to the Mount San Jacinto Winter Park Authority, H-93-19 to the National Committee on Uniform Traffic Laws and Ordinances, H-93-20 to the American Association of State Highway and Transportation Officials, H-93-21 and -22 to the National Association of State Directors of Pupil Transportation Services, H-93-23 to the General Motors Corporation Allison Transmission Division, and H-93-24 through -26 to the Mayflower Contract Services, Inc.

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 recommendations in this letter. Please refer to Safety Recommendations H-93-14 and -15 in your reply. If you need additional information, you may call (202) 382-6850.

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HART, and HAMMERSCHMIDT concurred in these recommendations.

  
By Carl W. Vogt  
Chairman