

*Sgt# R-6716*



## National Transportation Safety Board

Washington, D.C. 20594

### Safety Recommendation

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**Date:** August 28, 1997

**In Reply Refer To:** R-97-39 through -42

Mr. M. B. Oglesby, Jr., President  
Association of American Railroads  
50 F Street, NW  
Washington, DC 20001

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About 5:39 p.m. on February 16, 1996, Maryland Rail Commuter (MARC) train 286 collided with National Railroad Passenger Corporation (Amtrak) passenger train 29 near Silver Spring, Maryland. En route from Brunswick, Maryland, to Union Station in Washington, DC, MARC train 286 was traveling under CSX Transportation Inc. (CSXT) operation and control on CSXT tracks. MARC train 286 passed an APPROACH signal before making a station stop at Kensington, Maryland; proceeded as if the signal had been CLEAR; and, then, could not stop for the STOP signal at Georgetown Junction, where it collided with Amtrak train 29. All 3 CSXT operating crewmembers and 8 of the 20 passengers on MARC train 286 were killed in the derailment and subsequent fire. Eleven passengers on MARC train 286 and 15 of the 182 crewmembers and passengers on Amtrak train 29 were injured.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of this accident was the apparent failure of the engineer and the traincrew because of multiple distractions to operate MARC train 286 according to signal indications and the failure of the Federal Railroad Administration (FRA), the Federal Transit Administration (FTA), the Maryland Mass Transit Administration (MTA), and the CSXT to ensure that a comprehensive human factors analysis for the Brunswick Line signal modifications was conducted to identify potential sources of human error and to provide a redundant safety system that could compensate for human error.

Contributing to the accident was the lack of comprehensive safety oversight on the CSXT/MARC system to ensure the safety of the commuting public. Contributing to the severity of the accident and the loss of life was the lack of appropriate regulations to ensure adequate emergency egress features on the railroad passenger cars.

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<sup>1</sup>For more detailed information, read Railroad Accident Report--*Collision and Derailment of Maryland Rail Commuter MARC Train 286 and National Railroad Passenger Corporation Amtrak Train 29, near Silver Spring, Maryland, on February 16, 1996* (NTSB/RAR-97/02).

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The Safety Board has long advocated a positive train separation (PTS) control system and since 1970<sup>2</sup> has issued safety recommendations concerning train collision prevention. A PTS control system can prevent trains from colliding by automatically interceding in the operation of a train when an engineer does not comply with the requirements of the signal indication.

Following its investigation of a head-on collision on the Burlington Northern Railroad near Ledger, Montana,<sup>3</sup> the Safety Board issued in July 1993 the following safety recommendation to the Association of American Railroads (AAR):

In conjunction with the Federal Railroad Administration and the Railway Progress Institute [RPI], establish a firm timetable that includes at a minimum, dates for final development of required advanced train control system hardware, dates for an implementation of a fully developed advanced train control system, and a commitment to a date for having the advanced train control system ready for installation on the general railroad system. (R-93-13)

The Safety Board additionally issued a similar recommendation to the FRA and to the RPI, respectively, in Safety Recommendations R-93-12 and -15.

The Safety Board classified Safety Recommendation R-93-12 "Open--Acceptable Response" after the FRA took the measure to seek the "final system definition, migration path, and timetable" for a PTS control system by December 1994. The Safety Board also classified Safety Recommendations R-93-13 and -15, respectively, to the AAR and the RPI "Open-Acceptable Response" based on their responses. Because of the AAR and the RPI participation and support in current test projects of the Union Pacific/Burlington Northern Santa Fe Railroad in the Pacific Northwest and of Amtrak tests in Michigan, the Safety Board reclassifies R-93-13 and -15, respectively, as "Closed--Superseded" and "Closed--Acceptable Alternate Action." Neither the AAR nor the RPI is in a position either to establish timetables or to implement a PTS control system for the railroad industry. The FRA and the railroad industry share the responsibility for the development and implementation of a PTS control system.

The Safety Board, however, believes that the AAR can assist the railroad industry with the development of PTS control systems through a continuing review of nonrailroad technology and assess its adaptability to railroad communication-based control systems. In addition, the Safety Board believes that the AAR can assist the railroad industry with the development of PTS control systems by acting as a clearinghouse for information on the status and results of pilot projects and by disseminating that information to the railroad industry and the Federal and participating State transportation organizations. Finally, the Safety Board believes that the AAR can assist the railroad industry with the installation and operation of PTS control systems by maintaining industry standards to ensure interoperability of equipment and an open architecture for train control systems.

The Safety Board stopping distance tests after the accident indicated that had the MARC train 286 engineer not used the reverser, thereby retaining dynamic braking until impact, MARC train 286 would have impacted Amtrak train 29 at a speed of about 34 mph as opposed to the actual impact speed of about 38 mph. The additional deceleration of MARC train 286 would have resulted in an additional 0.3

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<sup>2</sup>Railroad Accident Report--*Head-on Collision between Penn Central Trains N-48 and N-49 at Darien, Connecticut, August 20, 1969* (NTSB/RAR-70/03)

<sup>3</sup>Railroad Accident Report--*Head-on Collision between Burlington Northern Freight Trains 602 and 603 near Ledger, Montana, on August 29, 1991* (NTSB/RAR-93/01)

seconds of elapsed time before impact, which in turn would have resulted in Amtrak train 29 moving approximately 14 feet farther into the crossover before impact. Thus, with MARC train 286 operating at the speed of 66 mph and going into emergency braking 1,407 feet before impact, a collision was inevitable regardless of the reverser use by the MARC train 286 engineer.

Despite the CSXT instructions that the reverser only has limited utility and its intentions that the reverser be used only under specific conditions, the use of the reverser having a retarding effect is implied in the instructions. The MARC train 286 engineer may have drawn from that implication and used the reverser about 1,000 feet into his emergency braking sequence out of desperation when he realized emergency braking would not prevent the impending collision. Nevertheless, because the reverser use eliminated the additional braking provided by the locomotive dynamic brakes, the Safety Board concludes that the MARC train 286 engineer's use of the reverser during the emergency brake application resulted in a marginally increased stopping distance for MARC train 286. Therefore, the Safety Board believes that the AAR should inform its membership of the circumstances of this accident and caution them not to use the reverser during emergency brake applications for those trains on which the use of reverser will eliminate the dynamic braking, thus increasing stopping distance.

Therefore, the National Transportation Safety Board recommends that the Association of American Railroads:

Assist the railroad industry with the development of positive train separation control systems through a continuing review of nonrailroad technology and assess its adaptability to railroad communication-based control systems. (R-97-39)

Assist the railroad industry with the development of positive train separation control systems by acting as a clearinghouse for information on the status and results of pilot projects and by disseminating that information to the railroad industry and the Federal and participating State transportation organizations. (R-97-40)

Assist the railroad industry with the installation and operation of positive train separation control systems by maintaining industry standards to ensure open architecture and an interoperability of equipment for train control systems. (R-97-41)

Inform your membership of the circumstances of this accident and caution them not to use the reverser during emergency brake applications for those trains on which the use of the reverser will eliminate the dynamic braking, thus increasing stopping distance. (R-97-42)

Also, the Safety Board issued Safety Recommendations R-97-9 through -21 to the FRA; R-97-22 through -25 to the FTA; R-97-26 through -31 to the CSXT; R-97-32 through -35 to the MTA; R-97-36 to the U.S. Department of Transportation; R-97-37 to the Federal Emergency Management Agency; R-97-38 to the Governor and the General Assembly of Maryland; R-97-43 to the Montgomery County Emergency Management Agency; R-97-44 to the Baltimore County Emergency Management Agency, the Baltimore City Emergency Management Agency, the Metropolitan Washington Council of Governments, the Jefferson County Commissioners, and the Berkeley County Commissioners; and R-97-45 to the American Short Line Railroad Association, the Brotherhood of Locomotive Engineers, the United Transportation Union, the International Brotherhood of Teamsters, and the American Public Transit Association. The Safety Board also reiterated Safety Recommendations R-87-16, R-92-10, and R-93-12 to the FRA; R-92-16 to the General Electric Company; and R-92-17 to the Electro-Motive Division of General Motors.

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 R-97-39 through -42 in your reply. If you need additional information, you may call (202) 314-6430.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:   
Jim Hall  
Chairman