

*John F. R. C. M. C.*



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 28, 1997

**In Reply Refer To:** R-97-32 through -35

Mr. Ronald L. Freeland, Administrator  
Maryland Mass Transit Administration  
William Donald Schaefer Tower  
6 Saint Paul Street  
Baltimore, Maryland 21202-1614

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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)*.

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.

The Safety Board has investigated numerous train collisions in which the probable cause or contributing cause was the inattention of the traincrew to wayside signals. In its investigation of the head-on collision of two freight trains near Kelso, Washington,<sup>3</sup> the Safety Board attempted to determine again why one traincrew did not comply with the signal indication of an intermediate signal. The Safety Board reported its concerns about a systemic safety issue: *the adequacy of passive wayside signals to reliably capture traincrews' attention when competing sources of attention are present, and it urged the railroad industry to recognize that human vigilance has limits and that wayside signals do not ensure safe train operations.* After its investigation of the Thedford, Nebraska,<sup>4</sup> accident, the Safety Board stated that had a PTS control system been in place it could have detected that the engineer was not responding appropriately to the signal indications and could have slowed and stopped the train, thus preventing the collision.

The Safety Board concurs with the FRA emergency order 20, notice no. 1, that:

Since most train collisions on the railroad result from human factors, the most effective preventive measure is a highly effective train control system. Cab signal systems serve an important safety purpose because they provide a constant display of the governing signal indication. This provides a corrective measure should an engineer fail to note, forget, or misread a restrictive wayside signal indication. Even greater security is provided by a train control system capable of intervening should the engineer fail to observe signals and operating rules for whatever reason. ...Such systems are referred to as automatic train control or automatic train stop.

The 1987 Maryland Department of Transportation (MDOT) grant application to the FTA for the CSXT signal system modification on the Brunswick Line stated that the improvements envisioned in this program provide the foundation for the next "generation" of train control systems: advanced train control system (ATCS). However, neither the FTA nor the MTA followed up on the MDOT pursuit of this technology. In the MTA/MARC grant application to the FTA, the future installation of an ATCS, such as cab signals, was part of the justification for awarding the grant for the signal modifications being proposed. At the time of this accident, no advanced train control had been installed.

Since the collision at Georgetown Junction, MARC has undertaken a project, for which the MTA has hired a consultant and provided funding, to develop and evaluate an intermittent cab signaling system (ICSS) that features both civil speed enforcement and positive train stop technology. In addition, the supplier of track circuit equipment is estimating the cost for upgrading the equipment to continuously inductive automatic cab signals that will be compatible with the automatic train control equipment currently installed on MARC locomotives and cab control cars. The CSXT is also involved in the project because its wayside signal equipment and locomotives will be directly affected by the installation of any changes proposed to the current signal system.

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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 and Derailment of Burlington Northern Freight Train with Union Pacific Freight Train, Kelso, Washington, on November 11, 1993* (NTSB/RAR-94/02).

<sup>4</sup>Railroad Accident Report--*Collision and Derailment Involving Three Burlington Northern Freight Trains near Thedford, Nebraska, on June 8, 1994* (NTSB/RAR-95/03).

The Safety Board is encouraged by the efforts of the MTA/MARC project to develop and evaluate an ICSS; however, the ICSS should only be an interim solution until a PTS control system can be fully implemented. A PTS control system is a major step for the railroad industry to provide a redundant system where an unacceptable threat to public and employee safety exists. Pending the FRA issuance of regulations that require a PTS control system installation, railroads remain responsible for a PTS control system development and installation. Consequently, the Safety Board believes that the MTA should cooperate with the CSXT in the development and installation of a PTS control system where MARC equipment operates on CSXT tracks.

The confusion between the CSXT and the Montgomery County Fire and Rescue Services (MCFRS) at the accident site and the untimely notifications between the CSXT and MARC of the collision resulted because neither the CSXT nor MARC had a formal emergency management plan available that contained procedures for dispatchers and traincrews to notify emergency responders of train movements near an accident site. When the AU dispatcher authorized the engineer of CSXT train Q401 to move his locomotive closer to assist in evacuating passengers, the MCFRS incident commander was not advised that the train would be approaching the accident site. The movement of trains toward an accident area should have been addressed by the CSXT and MCFRS dispatchers. The Safety Board concluded that the confusion during the initial emergency response resulted because the CSXT and MARC lacked a formal *emergency management plan to follow*. The implementation of an emergency management plan that addressed communications and training would have eliminated the confusion between the CSXT and MARC. Therefore, the Safety Board believes that the MTA/MARC should develop an emergency plan that will provide a detailed description of emergency response procedures as well as a protocol to coordinate activities with the emergency response organizations and other transportation entities when an accident occurs.

The CSXT traincrews of MARC passenger trains had minimal guidance, compared with the Amtrak manual of on-train instructions for conductors and assistant conductors, to properly perform passenger train functions. Since the CSXT operation in 1985 of the MARC passenger service, the CSXT had not maintained a comprehensive passenger program that would provide guidance to traincrews for passenger train functions. The CSXT produced *Passenger Service Bulletins* as needed, but it offered little guidance on responding to passenger train emergencies. The CSXT passenger traincrews reported that they had not received any emergency training in passenger train operations and in passenger responsibility in emergencies. The Safety Board concluded that the CSXT personnel operating MARC passenger trains are not adequately trained to understand and therefore execute their responsibilities for passengers in emergencies. The CSXT and MARC have been working since 1993 to complete the *Passenger Conductor's Manual*, which was unfinished at the time of the accident. A review of this unfinished manual shows that it is much less comprehensive than the Amtrak manual of on-train instructions for conductors and assistant conductors. The Safety Board believes that MARC and the CSXT should develop and implement, in cooperation, a complete training agenda for all CSXT passenger traincrews that provides experience in the correct use of emergency equipment, in emergency communications procedures, and in passenger evacuation and assistance in an emergency and also includes the distribution of a comprehensive employee guidance manual.

Since the accident MARC has informed the Safety Board that it, in cooperation with Amtrak and the CSXT, has developed video materials for training emergency responders and the Amtrak and CSXT

traincrews who operate MARC commuter trains.<sup>5</sup> However, such passive training may not be as effective as training that requires traincrews to actively participate and practice what is being demonstrated. To achieve the protocols and procedures described in any emergency management plan, emergency drills should be performed in conjunction with local emergency management agencies and with the railroad to reinforce training, to test communications, and to determine whether procedural changes are needed. Therefore, the Safety Board believes that the MTA/MARC and the CSXT, in cooperation with the emergency management agencies of Baltimore County, of the city of Baltimore, of the Metropolitan Washington Council of Governments, and of Jefferson and Berkeley Counties in West Virginia, should conduct periodic disaster drills to assess their emergency management plans, to reinforce and evaluate their emergency training, and to test the communications with the organizations.

Therefore, the National Transportation Safety Board recommends that the Maryland Mass Transit Administration:

Cooperate with the CSX Transportation Inc. in the development and installation of a positive train separation control system where Maryland Rail Commuter equipment operates on CSX Transportation Inc. tracks. (R-97-32)

Develop an emergency plan that will provide a detailed description of emergency response procedures as well as a protocol to coordinate activities with the emergency response organizations and other transportation entities when an accident occurs. (R-97-33)

Develop and implement, in cooperation with CSX Transportation Inc., a complete training agenda for all CSX Transportation Inc. passenger traincrews that provides experience in the correct use of emergency equipment, in emergency communications procedures, and in passenger evacuation and assistance in an emergency and also includes the distribution of a comprehensive employee guidance manual. (R-97-34)

Conduct, in cooperation with the CSX Transportation Inc., the Baltimore County Emergency Management Agency, the City of Baltimore Emergency Management Agency, the Metropolitan Washington Council of Governments, the Jefferson County Commissioners, and the Berkeley County Commissioners, periodic disaster drills to assess their emergency management plans, to reinforce and evaluate their emergency training, and to test the communication with the organizations. (R-97-35)

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-97-36 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-97-39 through -42 to the Association of American Railroads; 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-

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<sup>5</sup>Before the accident, Amtrak was providing training for MARC traincrews on the Penn Line and hands-on as well as audio-visual training for emergency responders in areas near the Penn Line.

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-97-32 through -35 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:   
Chairman