



National Transportation Safety Board

Washington, D.C. 20594

Urgent Safety Recommendation

Date: November 22, 2004

In reply refer to: R-04-09

Mr. Richard A. White
Chief Executive Officer and General Manager
Washington Metropolitan Area Transit Authority
600 Fifth Street N.W.
Washington, D.C. 20001

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. The urgent recommendation in this letter is derived from the Safety Board's investigation of the recent collision of two Washington Metropolitan Area Transit Authority (WMATA) Metrorail trains on the Red Line at the Woodley Park-Zoo/Adams Morgan (Woodley Park) station. The Safety Board would appreciate a response from you within 30 days addressing the actions you have taken or intend to take to implement our recommendation.

On Wednesday, November 3, 2004, about 12:49 p.m., eastern standard time, two Metrorail trains collided within the Woodley Park underground station. Train 703, a non-revenue train without passengers, had passed through the Woodley Park station and had ascended the grade exiting the station. Train 105 then entered the station and began embarking and disembarking passengers along the station platform. At that point, train 703 rolled back down the grade and collided with the standing train 105. There was no communication between the train 703 operator and the Metrorail operations control center or between the operators of trains 703 and 105 before the collision. About 70 passengers were on board train 105 at the time of the collision. Some of these passengers exited the train just before or during the collision; the remainder were evacuated afterward. District of Columbia Fire and Rescue reported transporting about 20 persons to local hospitals.

Train 703, a six-car train consisting of three two-car sets of 1000-series transit railcars, was being operated in manual mode by one train operator. The train was being positioned for revenue service at the Shady Grove yard later that day. Train 105 was a six-car train consisting of three two-car sets of 4000-series transit railcars being operated by one train operator. The last rail car of train 703 (the striking train) sustained extensive damage and derailed; the next car sustained damage to one end. The first car of train 105 sustained damage to the cab compartment.

The operator of train 703 told investigators that after the train began to roll back, he applied power in an attempt to stop the rollback and resume forward movement. The Safety Board tested a similar set of six 1000-series cars being operated in manual mode and found that in a rollback event on the grade exiting the Woodley Park station, the rollback could be stopped by applying forward power only if the rollback speed was 2 mph or less. If the rollback speed exceeded 2 mph, a brake application was required to stop the rollback or slow the train to 2 mph or less, at which time any application of power would result in forward movement. In all cases, the application of the train brakes could stop the train. The preliminary investigation indicates that train 703 may have attained a speed in excess of 30 mph before it struck train 105.

WMATA officials told the Safety Board that all Metrorail cars are equipped with a rollback protection feature that, when the train is being operated in the automatic mode, will automatically apply train brakes if necessary to prevent a dangerous rollback. According to WMATA, the only railcars in the fleet that have rollback protection in the *manual* mode are the 70 cars in the 2000/3000 series that have had a software upgrade as part of an ongoing rehabilitation program. The remaining 324 cars in the 2000/3000 series, as well as the cars in the 1000, 4000, and 5000 series, do not have rollback protection when being operated in manual mode.

The investigation also determined that, because of the presence of the rollback protection feature on Metrorail cars, WMATA officials did not anticipate a situation in which an uncontrolled rollback could occur. The train operators, the training instructor for train operations, and the operations control center supervisors interviewed by investigators all said they believed that the rollback protection feature would automatically prevent excessive rollback. All were apparently unaware that this feature is generally not available when a train is being operated manually. Consequently, no specific information had been provided to train operators regarding the proper management of an event similar to the one that occurred on train 703.

On November 7, 2004, WMATA issued a memorandum to train operators and Metrorail supervisors concerning the lack of a rollback protection feature on the 1000-series cars. The memorandum advised operators and supervisors that:

...there is no roll back features on the Rohr series 1000 cars when operating in a manual mode....

Therefore, each operator is advised to be aware of any and all operating conditions, related to grade positive or negative, that will affect train handling.

Any changes in operating conditions of the train shall be reported to the Operations Control Center (OCC) immediately.

On November 9, 2004, WMATA issued a memorandum supplement to the November 7 memorandum. The November 9 memorandum, also directed to train operators and rail supervisors, stated:

...This reminder covers the balance of the fleet [cars other than the Rohr cars addressed in the previous memorandum] for your clarity and for your governance.

Operators are reminded that 'roll-back' protection exists in Automatic Mode, but not in Manual. However, in Manual, your brake systems (B1 through Emergency/Mushroom) are available and are to be used in accordance with operating conditions and consistent with your training and the provisions of the MSRPH [*Metrorail Safety Rules and Procedures Handbook*].

The Safety Board is concerned that the guidance provided in these two memorandums may be too broad to prepare train operators to respond appropriately to this type of emergency. WMATA officials and train operators acknowledged that small rollbacks (1 or 2 feet) are normal. A train that has stopped on a grade routinely experiences a rollback during the brief interval between the release of the brake and the reapplication of power. In automatic mode, these small rollbacks are stopped by the normal application of power and, if the rollback continues beyond certain limits, by the rollback protection system. In manual mode, applying power to the train is an appropriate response to a small rollback. But, as noted earlier, once a train's rollback speed exceeds about 2 mph, the rollback cannot be stopped by a power application alone. In that case, either the service or emergency brakes must be used. The WMATA postaccident guidance does not describe how fast or how far a rollback may occur before it should be considered an emergency situation that requires a brake application.

The National Transportation Safety Board therefore makes the following urgent safety recommendation to the Washington Metropolitan Area Transit Authority:

Immediately revise the directions to train operators contained in your memorandums of November 7 and 9, 2004, to include specific written instructions for identifying and responding to an emergency rollback situation, and provide training to operators on the procedures to follow if such a rollback event occurs. (Urgent) (R-04-09)

In your response to the recommendation in this letter, please refer to Safety Recommendation R-04-09. If you need additional information, you may call (202) 314-6177.

Chairman ENGLEMAN CONNERS, Vice Chairman ROSENKER, and Members CARMODY, HEALING, and HERSMAN concurred in this recommendation.

[original signed]

By: Ellen Engleman Connors
Chairman

