U.S. Department
of Transportation

**Federal Transit
Administration**

The Administrator

1200 New Jersey Avenue, SE
Washington, D.C. 20590

OCT 14 2009

Dear Rail Transit Colleagues:

As a follow-up to my letter to you dated July 13 (enclosed), I am writing you today to urge your cooperation in completing a survey being conducted as part of a Transit Cooperative Research Program (TCRP) funded quick study.

The Federal Transit Administration has partnered with the American Public Transportation Association (APTA) to support a TCRP-funded quick study to begin to address urgent recommendation R-09-07 from the National Transportation Safety Board (NTSB) dated July 13, 2009 (enclosed), and to prepare for other industry recommendations related to the Washington Metropolitan Area Transit Authority's Fort Totten train collision in June.

You should have received a letter from APTA requesting that you forward the survey to the appropriate signal specialist in your organization for timely completion. In addition, the TCRP quick study will involve a meeting of industry signaling specialists in November to be held in Washington, DC. I encourage participation by appropriate staff from your organization.

Safety remains the primary goal of the U.S. Department of Transportation, and I thank you in advance for your cooperation and support.

Sincerely yours,

Peter M. Rogoff

Enclosures

cc: Deborah A.P. Hersman, NTSB Chairman
State Safety Oversight Agencies

U.S. Department
of Transportation
**Federal Transit
Administration**

Administrator

1200 New Jersey Ave., S.E.
Washington, DC 20590

July 13, 2009

Re: Urgent Safety Recommendation by the National Transportation Safety Board

Dear Colleague:

I write to you today to follow-up on an urgent recommendation the National Transportation Safety Board (NTSB) has made to the Federal Transit Administration (FTA) as the result of a preliminary analysis of the causes of the deadly Washington Metro Red Line heavy rail collision on June 22, 2009. As you know, nine persons died and 70 persons were injured as the result of this two-train collision.

The NTSB has determined, as a preliminary matter, that the Washington Metro train control system was susceptible to a single point failure. The system did not fail-safe and stop the train when train detection was lost. The NTSB has concluded that Washington Metro's train control lacked adequate safety redundancy that would have included timely alerts of system failures and compensation for intermittent failures or other anomalies in train detection.

The NTSB has asked that we immediately issue an advisory to all transit rail operators around the country to address the potential safety vulnerability. Specifically, we are asking that all train operators that have train control systems capable of monitoring train movements determine whether their systems have adequate safety redundancy if losses in train detection occur. If a system is susceptible to single point failure, we urge you take corrective action immediately to add redundancy by evaluating track occupancy data on a real-time basis to automatically generate alerts and speed restrictions to prevent train collisions.

We at the FTA and the U.S. Department of Transportation hold safety as our number one priority. I request that you focus immediate attention on this important safety concern. For the purposes of verification, we will be following-up shortly with requests for information on specific train control systems and what compensating systems you have been able to develop if you have determined that a single point failure could occur.

We also expect to serve as a clearinghouse to share information regarding industry best practices in addressing this issue.

Thank you very much for your immediate and priority attention to this matter. Please call me directly on (202) 366-4040 if I can be of further assistance.

Sincerely yours,

Peter M. Rogoff

cc: Mark V. Rosenker, NTSB Acting Chairman
State Safety Oversight Agencies

National Transportation Safety Board

Washington, D.C. 20594

Urgent Safety Recommendation

Date: July 13, 2009

In reply refer to: R-09-7 (Urgent)

The Honorable Peter M. Rogoff
Administrator
Federal Transit Administration
1200 New Jersey Avenue, SE
East Building
Washington, D.C. 20590

The urgent recommendation in this letter is derived from the National Transportation Safety Board's (NTSB's) ongoing investigation of the recent collision between two Washington Metropolitan Area Transit Authority (WMATA) Metrorail trains on the Red Line near the Fort Totten station in Washington, D.C. The NTSB would appreciate a response from you within 30 days addressing the actions you have taken or intend to take to implement our recommendation.

On Monday, June 22, 2009, about 4:58 p.m., eastern daylight time, southbound Metrorail train 112 was travelling in a curve when it struck the rear end of train 214 before reaching the Fort Totten station. Train 214 had stopped before entering the station to wait for another train to leave the platform. The striking train was not equipped with onboard event recorders that would have recorded train speed and other parameters. There was no communication between the train operators and the Metrorail Operations Control Center before the collision. During the collision, the lead car of train 112 telescoped and overrode the rear car of train 214 by about 50 feet. Examination of the track and wreckage indicated that the emergency brake on train 112 was applied before impact. The District of Columbia Fire and Emergency Medical Service reported 9 fatalities and transported about 52 persons to local hospitals. Although the NTSB's investigation is ongoing and no determination of probable cause has been reached, investigators have concerns regarding the safety redundancy of WMATA's train control system, which has prompted issuance of this urgent safety recommendation.

The stopped train, 214, was a 6-car train in passenger service consisting of two 2-car sets of 3000-series transit railcars and one 2-car set of 5000-series transit railcars. The striking train, 112, was a 6-car train in passenger service consisting of three 2-car sets of 1000-series transit railcars. Each train had one operator on board.

Trains operate under the direction of WMATA's Operations Control Center and utilize an automatic train control system supplemented by wayside signals at interlockings. WMATA

procedures require trains to operate in automatic mode on the mainline during the morning and evening rush hours, unless an operator requests permission to operate manually. During off-peak hours, trains operate in manual mode. Maximum authorized speed in the accident area is 59 mph. The automatic train control system is designed to prevent collisions regardless of the mode of operation by generating speed commands for individual train movements that should not allow more than one train to occupy a track circuit.[1]

Postaccident testing showed that the track circuit at the accident site intermittently failed to detect a train stopped at the location where train 214 was stopped when the collision occurred. It appears that the train control system did not detect train 214's location after it stopped, and thus the following train (train 112) did not receive a command to slow or stop in order to maintain train separation. Investigators are continuing to examine train control system circuitry and recorded data to better understand how the train control system functioned prior to the accident.

WMATA maintenance records showed that an impedance bond for the track circuit where the accident occurred was replaced on June 17, 2009, 5 days before the accident. The impedance bond was replaced as part of a scheduled multi-year program to upgrade train control circuitry. After a postaccident review of recorded track circuit data, WMATA reported that the track circuit had been intermittently failing to detect trains after June 17. The NTSB has not uncovered any evidence to suggest that WMATA was aware of this track circuit problem prior to the accident.

The Operations Control Center computer system continuously receives real-time train location data and displays this information on a monitor in the control center. The investigation has found that there is no automatic monitoring that would identify and promptly report a situation in which a train stops being detected by the system. Recorded track circuit data showed errors in train detection for several days before the accident. WMATA has informed the NTSB that since the accident it has assigned personnel to review recorded data once a day to identify track circuit anomalies systemwide. The NTSB is concerned that a daily review, while a good first step, is not sufficient to address this safety issue. The NTSB believes that software algorithms or additional circuitry could be developed to continuously evaluate the validity of real-time track occupancy data and alert operations personnel when problems are detected. Alerts should prompt actions that include immediately stopping train movements or implementing appropriate speed restrictions to prevent collisions.

The NTSB is concerned that WMATA's train control system failed to prevent this collision. The accident has shown that the train control system is susceptible to a single point failure because it did not fail safe and stop the following train when train detection was lost. Consequently, the NTSB believes that WMATA's train control system did not have adequate

[1] Each track circuit coincides with a length of track, or track block. Mainline routes are divided into track blocks from one end of the terminal station to the other. Each block is checked for train occupancy by means of audio frequency track circuits. Tuned impedance bonds (devices) provide block separation. These devices inject coded signals into the track that detect the presence of a train in the block and automatically transmit limiting and regulated speeds to passing trains. There is generally one track circuit per block with impedance bonds located at both ends of each track circuit.

safety redundancy that would include timely alerts of system failures and compensation for intermittent failures or other anomalies in train detection.

The NTSB believes that in the interest of passenger safety the Federal Transit Administration (FTA) should notify other rail transit operators that have train control systems capable of monitoring train movements of the problems identified thus far in the June 22, 2009, WMATA accident investigation. The FTA should also verify that these rail transit train control systems have adequate safety redundancy.

Therefore, the National Transportation Safety Board makes the following urgent safety recommendation to the Federal Transit Administration:

> Advise all rail transit operators that have train control systems capable of monitoring train movements to determine whether their systems have adequate safety redundancy if losses in train detection occur. If a system is susceptible to single point failures, urge and verify that corrective action is taken to add redundancy by evaluating track occupancy data on a real-time basis to automatically generate alerts and speed restrictions to prevent train collisions. (R-09-7) (Urgent)

The NTSB also issued an urgent safety recommendation to the Washington Metropolitan Area Transit Authority.

In response to the recommendation in this letter, please refer to Safety Recommendation R-09-7 (Urgent). If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our Tumbleweed secure mailbox procedures. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Acting Chairman ROSENKER and Members HERSMAN, HIGGINS, and SUMWALT concurred in this recommendation.

[Original Signed]

By: Mark V. Rosenker
Acting Chairman