National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: December 21, 2006

In reply refer to: R-06-28

Mr. Philip A. Pagano
Executive Director
Northeast Illinois Regional Commuter Railroad Corporation (Metra)
547 West Jackson Boulevard
Chicago, Illinois 60661-5717

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. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses the need to conduct a risk assessment of all crossovers on your system and determine those that pose an unacceptable level of risk due to the speed differential between maximum allowable track speed immediately before the crossover and maximum allowable speed through the crossover. The recommendation is derived from the Safety Board's investigation of the September 17, 2005, derailment of Northeast Illinois Regional Commuter Railroad Corporation (Metra) train 504 in Chicago, Illinois, and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued five safety recommendations, one of which is addressed to Metra. Information supporting this recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.[1]

On Saturday, September 17, 2005, about 8:35 a.m.,[2] eastbound (inbound) Metra train 504 derailed one locomotive and five cars at milepost (MP) 4.7 near West 47th and South Federal Street in Chicago, Illinois. The train was being operated in the push mode from a cab control car at the lead end. The train had departed Joliet, Illinois, at 7:24 a.m. en route to the LaSalle Street station in downtown Chicago. The train crew consisted of an engineer in the cab control car and a conductor, an assistant conductor, and a collector in the passenger cars.

[1] For additional information, see National Transportation Safety Board, *Derailment of Northeast Illinois Regional Commuter Railroad Corporation (Metra) Train 504, Chicago, Illinois, September 17, 2005*. Railroad Accident Brief NTSB/RAB-06/07 (Washington, DC: NTSB, 2006).

[2] All times are central daylight time.

The train derailed as it traversed a crossover from track 2 to track 1 that had a prescribed maximum operating speed of 10 mph. The train was traveling 69 mph as it entered the crossover. The second through fifth cars from the lead end of the train struck a steel girder that was part of a bridge that carried the tracks over 47th Street. Both turnouts of the crossover and one power switch machine were destroyed. Following the accident, Metra relocated the track to a new bridge adjacent to the original bridge.

Metra reported that there were 185 passengers on the train. There were 109 passengers, 4 crewmembers, and 4 others injured. Additionally, two passengers were killed. The derailment occurred during daylight hours, in sunny, clear weather with a temperature of 65° F.

The National Transportation Safety Board determined that the probable cause of the September 17, 2005, derailment of Metra train 504 in Chicago, Illinois, was the engineer's inattentiveness to signal indications and his failure to operate the train in accordance with the signal indications and the speed restriction for the crossover at Control Point (CP) 48th Street. Contributing to the accident was lack of recognition by Metra of the risk posed by the significant difference between track speed and crossover speed at the accident location and its inaction to reduce that risk through additional operational safety procedures or other means. Also contributing to the accident was the lack of a positive train control system.

The signal and train movement records indicated that the crossover had been lined for the crossover move since about 7:41 a.m. Recorder data showed the train passed the *approach diverging* signal at CP 53rd Street about 8:34:40 a.m. at a speed of 57 mph and passed the *diverging clear* signal at CP 48th Street about 8:35:16 a.m. at a speed of about 69 mph.

Track 2 leading to the crossover was designated by Metra as meeting the Federal Railroad Administration (FRA) standards for Class 4 track.[3] Metra's maximum allowable operating[4] speed between MP 7.0 and MP 3.9 was 70 mph for passenger trains and 30 mph for freight trains, except between MP 6.9 and MP 6.6, where passenger and freight train speeds were restricted to 40 mph and 20 mph, respectively. In addition, all trains operating through the crossover at CP 48th Street, MP 4.7, were limited to 10 mph. This 10-mph speed restriction was intended to provide for a safe transition of equipment through the crossover. The train derailed about 8:35:19 a.m., when it was 242 feet past the CP 48th Street signal and operating at 69 mph, as it attempted to traverse the crossover. No emergency brake application was recorded before the derailment.

The first supervisor to arrive after the accident stated to Safety Board investigators that when he asked the engineer what had happened, he responded, "I didn't see it, I didn't see it." Metra officials stated that the engineer failed to comply with the *approach diverging* and *diverging clear* signal aspects, as well as with the 10-mph speed restriction through the crossover. Following two Metra internal hearings and a formal investigation, the engineer was

[3] FRA track safety standards (49 *Code of Federal Regulations* 213.9) for Class 4 track allow 80 mph for passenger trains and 60 mph for freight trains.

[4] Metra System Timetable No. 1 was effective 3:01 a.m. on Sunday, April 3, 2005.

dismissed from Metra service on May 31, 2006, and his train engineer's license was revoked for a month (from September 21, 2005, to October 21, 2005).

After the accident, Metra placed crossover speed restriction signs in advance of crossover locations on the Rock Island District. The signs display the prescribed speed for the crossover and are intended to provide a point of reference for engineers to regulate the train's speed prior to traversing a crossover.

In addition, Metra has revised its procedures to require an engineer to reduce immediately the train's speed by 5 mph when an *approach diverging* aspect is displayed. At the time of the accident, Metra's rules did not require any immediate action in response to an *approach diverging* signal aspect. An engineer only had to be prepared to cross over at the next signal at the prescribed speed for the turnout.

Metra had a similar accident on October 12, 2003, when another Metra commuter train, operating in the opposite direction (outbound), derailed at the same crossover.[5] The Safety Board determined that the probable cause of that accident was the engineer's loss of situational awareness because of his preoccupation with certain aspects of train operations that led to his failure to observe and comply with signal indications. As a result, the Safety Board recommended on November 16, 2005, that Metra:

R-05-13

Install a positive train control system on your commuter train routes.

Following the Metra accident on September 17, 2005, the Safety Board issued an urgent safety recommendation to Metra on December 22, 2005, asking it to:

R-05-18

Install an automatic train control system with cab signals and train control enforcement over the entire Joliet Sub District, until a positive train control system is installed.

Metra responded[6] that such an interim measure would cost nearly $125 million and take at least 9 years to accomplish and proposed an alternative: the installation of an Electronic Train Management System (ETMS). Metra stated that the ETMS could be installed in less time and at a lower cost than the automatic train control system with cab signals and train control enforcement.

[5] National Transportation Safety Board, *Derailment of Northeast Illinois Regional Commuter Railroad Train 519 in Chicago, Illinois, October 12, 2003.* Railroad Accident Report, NTSB/RAR-05/03 (Washington, DC: NTSB, 2005).

[6] Letters to the Safety Board in response to outstanding safety recommendations, dated December 14, 2005, and January 24, 2006.

The Safety Board recognizes that it will take considerable time for the ETMS to be installed, proven, and implemented to meet the FRA requirements for positive train control. However, the Safety Board is concerned that there have been two serious accidents at the same location on the Joliet Sub District. Much of this track does have an automatic train control system with cab signals, which could have been extended and could have included train enforcement protection to provide additional safety measures. While the ETMS may satisfy the intent of Safety Recommendation R-05-13, in the interim, adequate action to provide a safety redundancy on the Joliet Sub District to satisfy the intent of the urgent safety recommendation has not been taken.

Metra's installation of the crossover speed signs is a good first step; however, it is not enough. Engineers may still miss the signal instructing them to cross over at the next signal, as occurred in this accident and in the October 2003 accident. Engineers who miss the signal instructing them to cross over will have no reason to slow the train, regardless of crossover speed information on the sign. In such a case, where safety redundancy is most needed, the sign would not provide any additional safety benefit.

The Safety Board notes that the engineer of train 504 stated that he was never verbally informed that his train would be crossing over to the adjacent track at CP 48th Street. The train dispatcher confirmed that he did not notify train 504 that it would be crossing over at CP 48th Street, as he did not believe it was necessary, nor was any such notification required. However, the dispatcher stated that he had notified engineers occasionally in the past. For example, the dispatcher cited the example of a location where a train was to traverse through a crossover within the limits of a station and was to make a station stop for passengers. Some passenger cars could be occupying the crossover, and the passengers would not be able to exit from the cars that are not at the platform. No operating rule or policy requires a dispatcher to notify trains of impending movements when the movements are directed by a signal system.

The significant difference of 60 mph between maximum allowable track speed and maximum allowable crossover speed at the accident location posed a significant risk for trains directed through the crossover. If Metra had recognized adequately the level of risk at this location, it could have taken a number of actions to reduce that risk. Although Metra has made some changes to improve safety at crossovers since this accident, the Safety Board believes that Metra should conduct a risk assessment of all crossovers on its system and determine those that pose an unacceptable level of risk due to the speed differential between maximum allowable track speed immediately before the crossover and maximum allowable speed through the crossover. For those crossovers where an unacceptable level of risk is determined, the Safety Board believes that Metra should develop guidelines and procedures to effectively manage those risks, including procedures for communicating those risks with train crews.

Therefore, the National Transportation Safety Board makes the following recommendation to the Northeast Illinois Regional Commuter Railroad Corporation (Metra):

> Conduct a risk assessment of all crossovers on your system and determine those that pose an unacceptable level of risk due to the speed differential between maximum allowable track speed immediately before the crossover and maximum allowable speed through the crossover. For those crossovers where an unacceptable level of risk is determined, develop guidelines and procedures to effectively manage those risks, including procedures for communicating those risks with train crews. (R-06-28)

The Safety Board also issued safety recommendations to the Federal Railroad Administration. In your response to the recommendation in this letter, please refer to Safety Recommendation R-06-28. If you need additional information, you may call (202) 314-6177.

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

[*Original Signed*]

By: Mark V. Rosenker
Chairman