



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 16, 2008

In reply refer to: H-08-2

The Honorable Rod R. Blagojevich
Governor
207 State House
Springfield, Illinois 62706

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 State 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 safety at the West Grand Avenue highway-railroad grade crossing in Elmwood Park, Illinois. It is derived from the Safety Board's investigation of a grade crossing accident that involved a Northeast Illinois Regional Commuter Railroad (METRA) train and 18 passenger vehicles, which occurred on November 23, 2005, in Elmwood Park, and is consistent with the evidence found and the Safety Board's analyses.¹ 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 this recommendation.

About 4:41 p.m. on November 23, 2005, the day before Thanksgiving, in Elmwood Park, Illinois, a traffic queue formed within the 366-foot-wide signaled METRA highway-railroad grade crossing on eastbound West Grand Avenue.² At the same time, METRA train 107 was approaching the crossing on the westbound tracks at a speed of 70 mph, as indicated by event data recorder information. The crossing lights activated and the crossing gates lowered 54 seconds before the train arrived. The traffic queue trapped some stopped vehicles within the grade crossing.

¹ For more information, see *Commuter Train Highway-Railroad Grade Crossing Accident, Elmwood Park, Illinois, November 23, 2005*, Highway Accident Brief NTSB/HAB-08/03 (Washington, DC: NTSB, 2008), available on the National Transportation Safety Board's website at <<http://www.nts.gov/publictn/2008/HAB0803.pdf>>.

² The width of the crossing was determined by measuring the distance from the eastbound crossing gate to the farthest rail, as measured from the right lane of eastbound West Grand Avenue along a vehicle's path of travel.

As METRA train 107 approached the crossing, the engineer recognized the hazard and put the train into emergency braking. The train was unable to stop before colliding with approximately 6 of the stopped vehicles, pushing them into secondary impacts with 12 other vehicles about 4:43 p.m. Seven automobile occupants received minor-to-serious injuries, and 3 of the approximately 400 train passengers reported minor injuries. The impact destroyed 6 vehicles, and 12 vehicles had minor-to-extensive damage. The locomotive incurred minor damage and did not derail.

The National Transportation Safety Board determined that the probable cause of the Elmwood Park accident was a combination of factors that led to the development of a traffic queue on the West Grand Avenue highway-rail grade crossing and prevented queued vehicles from exiting the crossing prior to the arrival of a Northeast Illinois Regional Commuter Railroad (METRA) train: the factors were the acute angle of intersection between West Grand Avenue and the railroad tracks, which resulted in an exceptionally wide grade crossing; the unusually heavy vehicle traffic that preceded the Thanksgiving holiday; and the complex street and rail pattern and related signal interactions between Harlem Avenue and the West Grand Avenue grade crossing, which frequently desynchronized the traffic signals along West Grand Avenue during peak travel times.

An Elmwood Park Police Department video surveillance camera near the crossing recorded the sequence of events that culminated in the accident. The video showed that a traffic queue developed over the tracks while the signal light for eastbound traffic on West Grand Avenue at the intersection of 76th and West Grand Avenue was red. Even after the signal light for eastbound vehicles turned green, traffic congestion beyond the intersection kept the queued vehicles from clearing the crossing before the grade crossing signals activated and the METRA train arrived.

According to the Illinois Commerce Commission (ICC), several factors probably caused the heavy congestion on West Grand Avenue at the time of the accident. First, West Grand Avenue is a main travel route to and from Chicago, and the accident occurred on the day before the Thanksgiving holiday, one of the busiest travel days of the year. Second, the behavior of the traffic signals for several nearby streets contributed to the congestion. The railroad tracks also intersect 75th, 73rd, and Harlem Avenues just south of where these three roads intersect West Grand Avenue (see map figure below). The traffic signals and the railroad crossing signals of these three avenues are interconnected, so that an approaching train would cause the traffic signals governing northbound travel to stay green to allow traffic queues to clear the crossings. At the same time, the response of these interconnected signals to the train's approach would result in a string of red traffic signals for motorists traveling along this portion of West Grand Avenue, resulting in heavy traffic congestion. Third, although the intersection signal lights along West Grand Avenue are synchronized to ease traffic flow in the eastbound and westbound directions, synchronization is preempted at 75th, 73rd, and Harlem Avenues whenever a train approaches. It may take several cycles for the traffic signals to resynchronize. During periods of heavy train activity, as was the case prior to this accident, the traffic signals along West Grand Avenue might not have enough time to resynchronize before the arrival of the next train, contributing further to traffic congestion on West Grand Avenue. Finally, activation of the 75th, 73rd, and Harlem Avenue grade crossings impedes eastbound vehicles on West Grand Avenue from turning right, causing these vehicles to continue queuing in the right lane of West Grand

Avenue until the crossings clear. This situation effectively reduces the number of through lanes on eastbound West Grand Avenue from two to one.

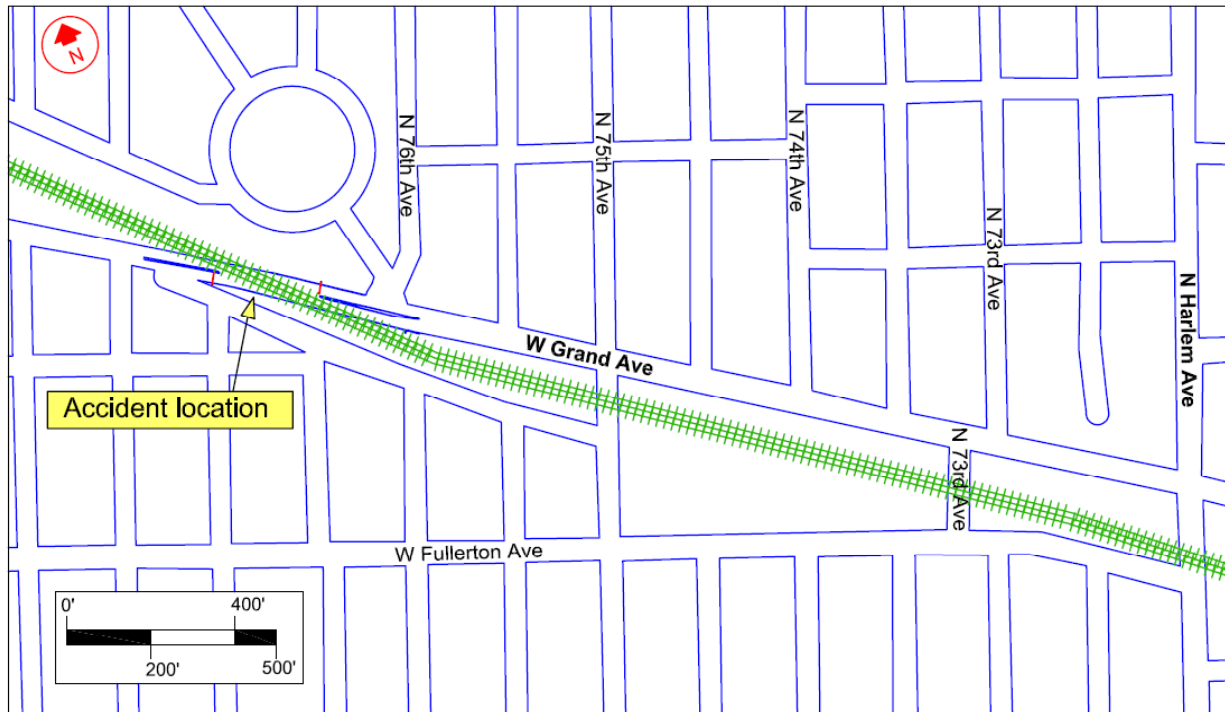


Figure. Location of the Elmwood Park grade crossing accident.

The 366-foot-wide West Grand Avenue grade crossing is the widest in the State of Illinois. This width is due to the acute 10° angle at which the four divided lanes of West Grand Avenue intersect the three rail tracks at the crossing. Because of the angle of this intersection, vehicles must cross 179 feet of rail, measured from the outer rails along a vehicle's path of travel, to get from one side of the crossing to the other. By contrast, about 0.5 mile east, the three rail tracks intersect the four lanes of Harlem Avenue at a 70° angle; at this grade crossing, vehicles traverse 35 feet of rail to get from one side to the other.

At the time of the accident, the maximum track speed was 70 mph for passenger trains and 30 mph for freight trains. Passenger trains used this crossing 82 times per day (Monday through Friday), and freight trains used it 25 times per day (Monday through Friday). The average daily vehicle traffic at this section of West Grand Avenue was 20,900 vehicles.

Accident records provided by the Federal Railroad Administration (FRA) and the Illinois Department of Transportation (IDOT) indicated that 45 accidents occurred at this grade crossing between 1956 and November 2005, resulting in a total of 7 fatalities and 27 injuries. Prior to November 23, 2005, the last accident at this location occurred on November 24, 2004—the day before Thanksgiving 2004—and resulted in two injuries.

Before the November 2005 accident, the Village of Elmwood Park, in conjunction with IDOT and the ICC, had undertaken several initiatives to improve the safety of the grade crossing.

These projects included installing a fiber optic network on West Grand Avenue in 2002 to improve the coordination of the traffic signals at the 76th, 75th, and 73rd Avenue intersections and traffic flow along West Grand Avenue;³ initiating “Operation Lifesaver” public education efforts in 2002; and erecting “Long Crossing Do Not Stop On Tracks” signs above the travel lanes of West Grand Avenue in both travel directions in 2003. Elmwood Park representatives stated that they believed these improvements had alleviated some of the traffic congestion around the crossing. Evidence from the FRA’s Web-Based Accident Prediction System (WBAPS)⁴ supports this belief. Based on highway-rail grade crossing collision data gathered for 1998–2002, WBAPS predicted that the West Grand Avenue crossing would incur about 0.47 collision per year. This WBAPS value was the highest for any public grade crossing in the State of Illinois for the period. The 2002–2006 WBAPS value for the crossing was 0.28 collision per year, a decrease from the previous period’s accident prediction value but still the third highest for a public grade crossing in the State.

Despite the safety improvements made by local authorities between 2002 and 2005, congested traffic conditions continued to cause safety problems in the vicinity of the West Grand Avenue grade crossing. After the accident, on November 28 and 29, 2005, Safety Board investigators spent a total of 6 hours observing the flow of traffic across the West Grand Avenue grade crossing during morning and evening rush hours, and they observed two occasions when a vehicle became trapped within the area between the crossing gates and the tracks when the gates were down and crossing signals were active. On March 22, 2007, a METRA safety official told Safety Board investigators that a school bus loaded with students that was traveling westbound on West Grand Avenue had become trapped in the area between the railroad tracks and the crossing gates 8 days earlier.⁵ A METRA employee, who happened to be inspecting signals at the crossing, radioed the oncoming train to warn it about the bus. (Because there was enough room between the crossing gate and the tracks to accommodate the school bus safely while the train passed, a collision would not have occurred.)

Safety Board investigators met with representatives from the Village of Elmwood Park, the ICC, and IDOT on November 25, 2005, to discuss the possibility of interconnecting the 76th Avenue traffic signals with the West Grand Avenue grade crossing signals. State and local representatives stated that the traffic density on West Grand Avenue exceeded the design capacity of the road, resulting in backups of 0.5 mile or more. Interconnection of the grade crossing signals with the 76th Avenue traffic signals would require interconnection with the nearby grade crossing and traffic signals on 75th Avenue. The State and local authorities at the meeting estimated that if the West Grand Avenue grade crossing signals were interconnected with the traffic signals at 75th and 76th Avenues, the signal warning time for the West Grand Avenue grade crossing would be about 2 minutes 40 seconds. This interval would require motorists to wait behind the lowered gates for nearly 3 minutes before a train arrived and would

³ This initiative did not include interconnecting the 76th Avenue traffic signals with the grade crossing signals for West Grand Avenue.

⁴ WBAPS ranks each crossing based on its 5-year accident history, as well as basic data on each crossing’s physical and operating characteristics. According to the FRA, WBAPS is a tool to help State officials decide where best to direct scarce highway-rail grade crossing resources.

⁵ Per telephone conversation with the METRA safety chief, March 22, 2007. A photo of the trapped school bus was published in *Elm Leaves*, Volume 37(1), page 3.

result in the crossing being closed for more than 4 hours per day for train passage. The meeting representatives stated that this would lead to increased traffic congestion, which would likely cause more motorists to ignore the grade crossing signals, and thereby result in more grade crossing accidents. They stated that the only effective way to prevent these types of accidents is to provide a separation of West Grand Avenue from the rail grade crossing.

Since the accident, METRA and the State of Illinois have taken additional steps toward reducing the potential for grade crossing accidents at the West Grand Avenue crossing. On November 28, 2005, METRA restricted track speed in the vicinity of West Grand Avenue⁶ to 30 mph. METRA stated that the restriction would remain in effect until substantial safety improvements were made at the crossing. Until a more permanent solution is realized, the following interim improvements for this grade crossing have been fully implemented:

- December 2005: Installed a changeable message (warning) sign for eastbound West Grand Avenue in advance of the crossing.
- February 2006: Removed all eastbound “No Right Turn” blank-out signs from both the 75th and 73rd Avenue traffic signals.
- April 2006: Modified traffic signal timings and sequences for the 76th, 75th, and 73rd Avenue intersections located east of the crossing to improve traffic flow for eastbound West Grand Avenue.
- May 2006: Installed low-mount “Do Not Stop On Tracks” signs and amber warning flashers on both sides of the crossing.
- By March 2007: Installed crosshatch pavement marking within the crossing area.
- By March 2007: Removed an eastbound transit bus stop that had been located between the grade crossing and the intersection of 76th and West Grand Avenues.
- Ongoing: Trimmed tall vegetation from the landscaped area near the southeast quadrant of the crossing to improve the sight distance for train engineers approaching the crossing.
- Ongoing: Increased Illinois Operation Lifesaver public education efforts in the Elmwood Park area.

In March 2007, IDOT completed a feasibility study, which was initiated at your direction, as the Governor of Illinois, to identify engineering options for improving the West Grand Avenue crossing. Three options were selected as being most feasible, each of which would result in a grade separation between the METRA rails and West Grand Avenue.⁷ According to IDOT, a preliminary engineering and environmental study is needed to identify the preferred option, but funding was not allocated for this purpose for the 2007 or 2008 fiscal years.

Improvements to the West Grand Avenue grade crossing to date may have contributed to further reduction of the crossing’s WBAPS predicted collision value, which was 0.25 in May 2008, and the Safety Board commends METRA, the Village of Elmwood Park, the ICC, and

⁶ The speed restriction covers the area from mile marker 10.4 to 10.6.

⁷ The three options selected were (1) to raise West Grand Avenue over the METRA rails, (2) to lower West Grand Avenue under the METRA rails, or (3) to simultaneously lower West Grand Avenue and raise the METRA rails.

IDOT for implementing the numerous interim safety measures cited earlier. However, the crossing's irregular width and design, combined with the heavy rail and traffic volumes on West Grand Avenue and complex traffic pattern surrounding it, virtually guarantee that vehicles, including school buses, will continue to become trapped within the lowered crossing gates. The Safety Board concludes that although improvements to the West Grand Avenue grade crossing have had a positive impact on safety, a host of underlying factors make this crossing inherently unsafe, including the acute angle of intersection between West Grand Avenue and the railroad tracks, which results in an exceptionally wide grade crossing; the heavy vehicle and rail traffic that regularly uses the grade crossing; and the complex street and rail pattern and related signal interactions between Harlem Avenue and the West Grand Avenue grade crossing, which frequently desynchronize the traffic signals along West Grand Avenue during peak travel times. Not only does this crossing generate safety concerns, but also it places an economic burden on commuters and the Village of Elmwood Park in the form of long traffic queues and slower rail service.

The feasibility study completed in March 2007 indicated that a grade separation is the best option for improving safety and alleviating congestion along West Grand Avenue, and representatives from the Village of Elmwood Park, the ICC, and IDOT supported this action during their 2005 postaccident meeting with the Safety Board. The Village of Elmwood Park and the Northeastern Council of Mayors have also expressed to IDOT their preference for a grade separation. A grade separation is the only way to eliminate conflicts between the travel modes, ease the traffic flow along West Grand Avenue, and allow METRA trains to operate at their maximum permitted speed. The Safety Board had been encouraged by the parties' impetus to achieve a grade separation; however, it is now concerned that the lack of additional funding to proceed beyond the feasibility study signals a possible waning of resolve.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Governor of Illinois:

Require the Illinois Commerce Commission and the Illinois Department of Transportation to construct a grade separation in place of the West Grand Avenue grade crossing, and provide the necessary resources to effect this change.
(H-08-2)

In response to the recommendation in this letter, please refer to Safety Recommendation H-08-2. 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. 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).

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

[Original Signed]

By: Mark V. Rosenker
Chairman