

Lg F H 589C



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: NOV 14 1996

In Reply Refer To: H-96-46 and -47

Mr. Kirk Brown, Secretary
Illinois Department of Transportation
2300 S. Dirksen Parkway
Springfield, Illinois 62764

On October 25, 1995, at 7:10 a.m., the Northeast Illinois Regional Commuter Railroad Corporation (d/b/a Metropolitan Rail) express commuter train 624 struck the rear left side of a stopped Transportation Joint Agreement School District 47/155 school bus at a railroad/highway grade crossing in Fox River Grove, Illinois.¹ After the school bus crossed the railroad tracks and stopped for a red traffic signal, its rear extended about 3 feet into the path of the train. Of the 35 school bus passengers, 7, 24, and 4 passengers sustained fatal, serious to minor, and no injuries, respectively; the busdriver received minor injuries. The 120 passengers and 3 crewmembers aboard the commuter train were uninjured.

Investigation of this accident revealed that serious failures had occurred both with respect to the design and marking of the railroad/highway crossing and with regard to communication between the Illinois Department of Transportation (IDOT) and the Union Pacific Railroad Company (UP).

Illinois State law prohibits driving onto a railroad grade crossing unless there is sufficient space on the other side of the grade crossing to accommodate the vehicle without obstructing rail traffic. After a 1989 road widening was completed at the U.S. Route 14 (US 14) and Algonquin Road intersection, the distances from the northern rail and crossing gate to the stop line were 35 and 20 feet, respectively. The IDOT design for the road widening failed to allow for space in the queuing area sufficient to accommodate vehicles such as dump trucks, tractor-semitrailers, mobile homes, and school and commercial buses. The accident school busdriver could have known about the short queuing area through a school district route hazard identification system, had such a system been available. However, other motorists would not have had the advantage of using a school district hazard identification system, even had one been in place.

¹For more information, see Highway/Railroad Accident Report—*Collision of Northeast Illinois Regional Commuter Railroad Corporation (METRA) Train and Transportation Joint Agreement School District 47/155 School Bus at Railroad/Highway Grade Crossing in Fox River Grove, Illinois, on October 25, 1995* (NTSB/HAR-96/02).

Because no road signs were posted to provide information on the available space in the queuing area, these other motorists might be unable to determine whether the queuing area could adequately accommodate their vehicles. IDOT could have posted signs indicating the length of the queuing area, prohibiting motorists with vehicles in excess of that length from crossing the tracks during a red indication, and instructing those motorists to wait on the south side of the tracks for a green indication. Another traffic signal also could have been installed to coordinate with the intersection light. IDOT has installed a stop line, traffic signs, and traffic signals on the south side of the grade crossing since the collision. Therefore, the National Transportation Safety Board concludes that IDOT had not employed sufficient measures before the accident to prevent vehicles from encroaching on the railroad tracks while stopped at the north side of the grade crossing.

With respect to communication lapses, IDOT and the UP had exchanged various documents before the accident that included information about the warning times of the railroad signal system. After the accident, IDOT reviewed the documents and thought that they had been given 30 and 25 seconds of warning time, respectively, before and after October 11, 1995. During this review, the most misunderstood term was "warning time." IDOT personnel had concluded from the construction prints, numerous letters and memos, and the thumb wheel setting, that a minimum warning time of either 25 or 30 seconds was provided between the time the crossing warning devices were activated and a train reached the crossing.

In fact, the warning time provided by the railroad signal system does not always equate to the thumb wheel setting (25 seconds at the time of the accident). Postaccident testing found that the warning time may have been less than 25 seconds, although never less than 20 seconds, as required. Although IDOT acknowledged that it understood the railroad terminology for "preempt" and "interconnect," it did not understand that additional time must be built into the thumb wheel setting to ensure the minimum warning time because of delay times in the circuitry. IDOT officials, according to testimony, did not understand that the railroad was only providing a 20-second minimum warning time through the thumb wheel setting.

Before the accident, State and railroad signal technicians had discussed the signal systems, and a number of design reviews of the accident grade crossing had also been conducted. IDOT representatives had responded to the intersection on several occasions to check for short green indications. However, until the day of the accident, they had checked the operating program of the traffic signal system and not recognized that Algonquin Road did not receive a signal in time for traffic to clear the railroad tracks. IDOT did not understand the timing. According to the IDOT engineering technician who programmed the highway signal system conforming to his experiences of 20 to 30 seconds, he never used any written information on the warning time from the railroad. Therefore, the Safety Board concludes that IDOT had programmed its highway signal system without applying the minimum warning time information from the railroad.

The UP reset the thumb wheel from 30 to 25 seconds on October 11, 1995, but it did not notify IDOT of the change. The Safety Board is unable to determine whether IDOT would have reacted had they been notified. Even after the accident, IDOT considered that the 25-second

thumb wheel setting meant 25 seconds of warning time. Also, it had not modified the programming previously, even though the 25-second warning time was referenced before the change in the thumb wheel setting.

IDOT had opportunities to identify the short green indication for northbound Algonquin Road during 70-mph train operations and, as a result, could have modified the highway traffic signal system or requested more time from the railroad to ensure a sufficient interval for traffic to clear the grade crossing. However, the communication process about the interconnected signal systems was not effective between the State and the UP. Therefore, the Safety Board concludes that, had an effective communication system existed between IDOT and the UP about the interconnected signal systems, IDOT might have understood that the railroad had provided through the thumb wheel setting only a minimum of 20 seconds of warning time before the arrival of a train at the grade crossing.

In three previous Safety Board investigations, ineffective communications between highway departments and the railroads had caused or contributed to grade crossing accidents. First, in a March 1993 Fort Lauderdale accident,² highway engineers designed a work zone causing traffic to congest at the railroad/highway grade crossing. The Safety Board found that the highway engineers had not "adequately considered either the traffic congestion or the resulting obstruction of the railroad/highway grade crossing." Then, in the November 1993 Intercession City, Florida, accident³ involving a low clearance, overdimension, overweight vehicle, the Safety Board found that the Florida Department of Transportation did not ensure that the railroad had been notified of the movement of this vehicle over its grade crossing. Finally, in the May 1995 collision at a grade crossing near Sycamore, South Carolina,⁴ the Safety Board reported:

Recent interviews and previous accident investigations conducted by the Safety Board have revealed that the degree of communication and cooperation between railroads and public entities regarding grade crossing activities varies widely. Railroad and public officials tend to communicate more on activities that involve funding of active crossings or the installation and maintenance of active warning devices, or that are likely to generate public complaints. The same level of communication does not exist when it comes to other crossing maintenance activities, particularly as they relate to passive crossings. CSX Transportation (CSXT), which operates more than 20,000 miles of track, performs crossing profile maintenance to ensure track vertical and horizontal alignment and adequate drainage, while State, local, and sometimes private entities are

² Highway Accident Report--*Gasoline Tank Truck/Amtrak Train Collision and Fire in Fort Lauderdale, Florida, March 17, 1993* (NTSB/HAR-94/01).

³ Highway Accident Report--*Collision of Amtrak Train No. 88 with Rountree Transport and Rigging, Inc., Vehicle on CSX Transportation, Inc., Railroad near Intercession City, Florida, on November 30, 1993* (NTSB/HAR-95/01).

⁴ Highway Accident Report--*Highway/Rail Grade Crossing Collision near Sycamore, South Carolina, May 2, 1995* (NTSB/HAR-96/01).

responsible for maintaining the alignment of the crossing approaches. When crossing maintenance is performed, the CSXT does not always advise respective entities of these activities. By the same token, in some cases, local entities perform work to realign crossing approaches without informing the railroads. Thus, the Safety Board concludes that railroads and public entities do not routinely communicate with each other on grade crossing maintenance activities.

Misunderstandings about grade crossing systems can be manifested through differences in terminology, construction and maintenance designs and practices, and inspection and operation methods. Although many efforts have been made to address grade crossing safety, no single coordinated program has been available to ensure effective communication on all aspects of grade crossing safety between transportation modes. The Safety Board concludes that, had a coordinated program to ensure effective communication between transportation modes about all aspects of grade crossing safety been in operation, the ineffective communication between IDOT and the railroad might never have occurred.

Based on the foregoing, the National Transportation Safety Board makes the following safety recommendations to the Illinois Department of Transportation:

Review and modify the highway design for all railroad/highway grade crossings in Illinois to ensure that vehicles have adequate space and time to clear the crossing before the arrival of a train. (H-96-46)

Train Illinois Department of Transportation personnel and contractors involved in the design, inspection, and maintenance of highway signals at railroad/highway crossings to ensure that they understand the integration and working relationship of the railroad and highway signal systems. (H-96-47)

The National Transportation Safety Board is also making safety recommendations to the U.S. Secretary of Transportation, the Federal Highway Administration, the Federal Railroad Administration, the National Highway Traffic Safety Administration, the State of Illinois, the Transportation Joint Agreement School District 47/155, the National Association of State Directors of Pupil Transportation Services, the American Association of State Highway and Transportation Officials, the National Association of County Engineers, the American Public Works Association, the Institute of Transportation Engineers, the Association of American Railroads, the American Short Line Railroad Association, the American Public Transit Association, and Operation Lifesaver, Inc. (The Safety Board issued urgent action recommendations following this accident to the Federal Highway Administration, the Federal Railroad Administration, and the State Directors of Transportation.)

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 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 H-96-46 and -47. If you have any questions, you may call (202) 314-6448.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By: 
Jim Hall
Chairman