Log R-515

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: May 19, 1987

In reply refer to: R-87-14 and -15

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Chairman
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About 8:36 a.m. on May 7, 1986, Boston and Maine Corporation (B&M) commuter train No. 5324 struck the rear of Conrail train TV-14 standing on Consolidated Rail Corporation's (Conrail) No. 2 main track, at Brighton, Massachusetts. The locomotive and head cars of train TV-14 had entered Conrail's Beacon Park Yard at Brighton; the last 10 cars of the train were not in the yard, but were extending through an interlocking plant and about 6 of the cars were standing on the No. 2 main track in a 2° 8' curve to the right.

Of the 550 passengers and 5 crewmembers on the commuter train, 149 passengers and 4 crewmembers were injured. The crewmembers of train TV-14 were not injured. The combined equipment damage was estimated to be $102,210. 1/

The speed recorder tape from control coach No. 1310 indicated that train No. 5324 attained a maximum speed of about 50 mph after stopping at signal 6.2E shortly before the collision. The results of the stopping tests conducted after the accident verified that a speed of about 50 mph was attainable with similar equipment and passenger loading. Although the B&M's chief mechanical officer stated that the calibration of the speed recorder from control coach No. 1310 could have been off by as much as 10 mph, the National Transportation Safety Board notes that the speed recording device from control coach No. 1310 was placed back into service on other coach equipment. That return to service indicates that the B&M mechanical department management was confident that the speed recording device was accurate. Although the engineer of train No. 5324 stated that the maximum speed he attained after stopping at signal No. 6.2E was about 20 mph (which would have been in violation of Conrail Operating Rules) his claim is not supported by the stopping distance tests. At a speed of 20 mph, the stopping distance was 185 feet, far short of the 485 feet maximum sight distance available. While the accuracy of the speed recording device may not have been exact and the maximum speed at which train No. 5324 was operated cannot be precisely established, the Safety Board believes that the speed recording device does confirm that the engineer of train No. 5324 operated his train considerably in excess of the maximum 15 mph allowed by the operating rules. Had the engineer of train No. 5324 operated his train according to the operating rules, he could have stopped his train in time to avoid the accident.

1/ For more detailed information, read Railroad Accident Report--"Rear End Collision of Boston Maine Corp. Commuter Train No. 5324 with Consolidated Rail Corp. Train TV-14, at Brighton, Massachusetts, May 7, 1986" (NTSB/RAR-87/02).

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Many passengers sustained their injuries when they struck the metal on the seats. Other passengers were injured by dislodged objects from the overhead luggage racks. Many passengers were injured when they were thrown by the impact forces and fell on or against each other. The older equipment of the type used on trains Nos. 5309 and 5324 was not designed to accommodate standing passengers. No overhead handholds are provided and the equipment is not suitable for transporting standing passengers. The overloaded condition of the train probably contributed to the numbers and severity of injuries received.

The Safety Board has been concerned about passenger injuries resulting from the inadequately designed interiors of passenger carrying cars and has addressed this issue in numerous accident investigations involving Amtrak. 2/ In its reports of these accident investigations, the Safety Board had highlighted the sources of passenger injuries including inadequately secured seats, exposed headrest frames, and unrestrained luggage falling from overhead racks. The Safety Board has issued numerous recommendations to Amtrak urging elimination of these injury-producing features. The following accident investigations illustrate the Safety Board's concern. As a result of an Amtrak collision at Wilmington, Illinois, on November 29, 1984, the Safety Board issued Safety Recommendation R-84-40 which called for Amtrak to:

> Correct the identified design deficiencies in the interior features of existing and new passenger cars, which can cause injuries in accidents, including the baggage retention capabilities of overhead luggage racks, inadequately secured seats, and inadequately secured equipment in food service cars.

The Safety Board's investigation of an Amtrak accident at Essex Junction, Vermont, on July 7, 1984, 3/ in which overhead luggage falling from the racks was again documented as a common cause of injuries, prompted the Safety Board to issue Safety Recommendation R-85-128 which called for Amtrak to:

> Develop and install effective retention devices on its overhead luggage racks to prevent the dislodging of luggage and other articles in a collision and/or derailment.

Evidence from the Amtrak accident at Chase, Maryland, on January 4, 1987, indicates that the interior features of the passenger cars were the source of numerous injuries. While Amtrak has responded favorably to many of the these recommendations,

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2/ For more detailed information, read Railroad/Highway Accident Report--"Collision of Amtrak Passenger Train No. 301 on Illinois Central Gulf Railroad with MMS Terminals, Inc., Delivery Truck, Wilmington, Illinois, July 28, 1983" (NTSB/RHR-84/02); Railroad Accident Report—"Derailment of Amtrak Train No. 21 (The Eagle) on the Missouri Pacific Railroad, Woodlawn, Texas, November 12, 1983" (NTSB/RAR-85/01); Railroad Accident Report—"Head-on Collision of National Railroad Passenger Corporation (Amtrak) Passenger Trains Nos. 151 and 168, Astoria, Queens, New York, July 23, 1984" (NTSB/RAR-85/09); and Railroad Accident Report—"Derailment of Amtrak Passenger Train No. 60, The Montrealer, on the Central Vermont Railway near Essex Junction, Vermont, on July 7, 1984" (NTSB/RAR-85/14).

3/ For more detailed information, read Railroad Accident Report--"Derailment of Amtrak Passenger Train No. 60, The Montrealer, on the Central Vermont Railroad near Essex Junction, Vermont , July 7, 1984" (NTSB/RAR-85/14).

and is looking at ways to eliminate these injury-producing features, 4/ the Safety Board believes that any carrier involved in passenger rail service, should make a concerted effort to improve the interior designs of its passenger cars and to prevent these types of injuries. As was demonstrated in this accident, a large number of the injured were standees who were thrown into each other or struck by falling luggage. The Safety Board believes that the MBTA should provide equipment which has adequately designed interiors, including overhead grab bars and seat handholds, to prevent the types of injuries that resulted in this accident.

The Safety Board also over the years has called on the Federal Railroad Administration (FRA) to take action in this area. As early as 1970, the Safety Board recommended that the FRA "institute immediate regulations requiring all future new and rebuilt passenger cars be equipped with secured seats and luggage retention devices." Although a study was initiated, no further action was taken. As recently as 1984, the FRA indicated in its Report to Congress on Railroad Passenger Equipment Safety that the interior of passenger cars merited additional study and that among the subjects to be addressed were the design and securement of seats, luggage retention, and interior contouring. The previously cited Amtrak collision at Wilmington, Illinois, on July 28, 1983, prompted the Safety Board to issue Safety Recommendation R-84-46 to the FRA which called for the FRA to:

> Expedite the studies on the interior design of passenger cars, described in the January 1984 Report to Congress, and publish recommended guidelines for securing seats and for luggage retention devices.

The Safety Board's investigation of an Amtrak train derailment at Kittrell, North Carolina, on March 5, 1984, again demonstrated further need for luggage retention devices and Safety Recommendation R-84-46 was reiterated to the FRA on March 20, 1985. On June 3, 1985, the FRA responded to the Safety Board's recommendation and indicated that it planned to take no further action. In a letter dated August 19, 1985, the Safety Board expressed disappointment at FRA's decision in view of the overwhelming documentation that injuries have occurred and continue to occur as a result of the features of the passenger car interiors, particularly unrestrained luggage from the overhead racks. The Safety Board cited another Amtrak accident in Astoria, Queens, New York, on July 23, 1984, which again revealed that these sources of injuries continue to pose a threat to passengers. The Safety Board urged the FRA to reconsider its decision and to take action to implement the Safety Board's recommendation. No further response from the FRA has been received and the recommendation is being held in an "Open--Unacceptable Action" status.

4/ In its March 13, 1985, response to Safety Recommendation R-84-40, Amtrak outlined steps to improve securement of seats and food service equipment in existing and new cars, and although it had designed a web-type luggage retention device to be installed on new cars, it had no plans to retrofit existing cars. Consequently, since the full intent of Safety Recommendation R-84-40 was not being met, it was placed in a "Closed--Unacceptable Action" status and a new recommendation, R-85-128, was issued to address specifically luggage retention devices. Subsequent to the Essex Junction, Vermont, accident, Amtrak indicated that it was investigating luggage restraint devices on new and existing cars; therefore, R-85-128 is being held in an "Open--Acceptable Action" status. Amtrak has advised the Safety Board that it is testing a new luggage retention system in some of its passenger cars in Northeast Corridor service.

As a result of the collision, the car interiors in train No. 5324 received relatively light damage. The operating compartment of control coach No. 1300 was not crushed. Some of the impact energy was probably absorbed by the cars in train TV-14, thus reducing the damage and impact reaction to the equipment and passengers of train No. 5324.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the Massachusetts Bay Transportation Authority:

> Require that on-board speed recording instruments used on equipment in commuter service be maintained to perform their intended function. (Class II, Priority Action) (R-87-14)
>
> Provide equipment for commuter service which has adequately designed interiors, including overhead grab bars and seat handholds, to prevent injury from exposed metal headrest frames and unrestrained luggage. (Class II, Priority Action) (R-87-15)

Also, as a result of its investigation, the Safety Board reiterates Safety Recomendation R-84-46 to the Federal Railroad Administration.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, Member, concurred in these recommendations. NALL, Member, did not participate.

By: Jim Burnett
Chairman