

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

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Log R-528

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Forwarded to:

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Chairman and President  
National Railroad Passenger Corporation  
400 North Capitol Street, N.W.  
Washington, D.C. 20001

SAFETY RECOMMENDATION(S)

R-85-81 through -83

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About 10:45 a.m. on July 23, 1984, National Railroad Passenger Corporation (Amtrak) trains Nos. 151 and 168 collided head-on on Amtrak's Hell Gate Line in the Astoria section of Queens, New York, New York. Train No. 151 was being operated by train order authority westbound on the No. 2 main track between Market Interlocking and the east end of Gate Interlocking. Train No. 168 was supposed to have been stopped and held at the home signal on the No. 2 track at the west end of Gate Interlocking for the arrival of train No. 151. However, train No. 168 did not stop at the home signal but continued past Gate Interlocking. The two trains collided about 1.1 miles east of Gate Interlocking. One passenger was killed; 129 passengers, 8 Amtrak operating crewmembers, and 3 Amtrak service attendants were injured. Property damage was estimated by Amtrak to have been \$3,199,000. 1/

The postaccident tests of the signal facilities at GATE and the remote control panel at F Tower did not reveal any discrepancies in the signal system. Postaccident observations by Amtrak and Federal signal inspectors and the device applied to monitor the interlocking functions associated with signal 2E at GATE did not disclose any malfunctions. The inspection of the interlocking appurtenances at GATE by a signal maintainer about 20 minutes after the accident indicated that track blocks had been applied on the No. 2 track east and west and the No. 1 track east. The track block on the No. 2 track west was not required, but the F Tower operator apparently had applied it in error and had not removed it. The eastbound home signal 2E was at stop, non-fleeted, and the two crossovers were aligned for a straight main track movement through GATE. It should be noted, however, that signal 2E at GATE was designed so that if train No. 168 had passed it while it was displaying a proceed aspect, the signal should have changed to stop. Moreover, because of the location of the collision of trains Nos. 151 and 168, signal 2E would not have changed to proceed after train No. 168 passed even if the signal had been in the fleet mode. There was no way to determine conclusively from the positions of the control buttons or from the signal equipment at the interlocking whether signal 2E at GATE was at stop or proceed before the passage of train No. 168.

1/ For more detailed information, read Railroad Accident Report--"Head-on Collision of National Railroad Passenger Corporation (Amtrak) Passenger Trains Nos. 151 and 168 Astoria, Queens, New York, New York, July 23, 1984" (NTSB/RAR-85/09).

In contradiction to the report of the F Tower signal maintainer concerning the fleet non-fleet mode of the signals at GATE he had observed when he was about the tower, the F Tower operator said that on the day shift he normally did not fleet the signals at GATE because of the potential for track work during daylight hours. The F Tower operator testified that he performed the duties of his job on July 23 as required by the operating rules and established procedures. He responded to the train dispatcher's directions and supplied the dispatcher with the appropriate information. Also, he responded properly to the manual block rules requirements in conjunction with the operator at MARKET. His responses or performance of his duties in removing the No. 1 track from service and preparing to operate train No. 151 westbound on the No. 2 track between MARKET and GATE were appropriate. However, the operator's application of a Panel Blocking Device (PBD) on the No. 2 track west was a redundant move which had no bearing on the events that followed. The fact that initially he made an error in applying the critical PBD and had to be corrected should have impressed on his mind the correct procedure to apply a PBD on the No. 2 track east.

Crossing train No. 151 back to the No. 1 track at GATE was the only move the operator could have made without further authority from the train dispatcher. By precedent, the operator had some basis for the manner in which he planned to handle the movement of train No. 151. The practice of an operator checking with the dispatcher in such a situation had been accepted by the dispatchers. Before June 28, the operation of trains against the current of traffic usually had been made between MARKET and Harold. The operating rules do not specify exactly when the route will be aligned and the signal cleared to permit the passage of a train. Based on his testimony, the Safety Board believes that the operator was not sure of the applicable rules and procedures in this case. The Safety Board believes also that the operator should have expected new operating procedures to be developed and be required after GATE was placed into service. Since the return of train No. 151 to the No. 1 track at GATE was provided for in the operating rules, he should have made the move on his own initiative.

In view of the issuance of the July 9, 1984, memorandum by the Division Operator to clarify moves in the accident area, apparently other operators had expressed confusion concerning jurisdictional control of tracks between Harold and GATE, GATE and MARKET, and Harold and MARKET. The GATE remote control unit and the responsibility for operating Gate Interlocking was new to all the operators at F Tower. However, only the 7 a.m. to 3 p.m. operator represented to Safety Board investigators that he was uncomfortable with the operation and having responsibility for Gate Interlocking. The available evidence indicates that the F Tower operator responded to the operating rules and procedures as he was required under the operating circumstances, even though he had appeared to be uncertain about the applicable manual block rules.

In its report involving a head-on collision at Bristol, Pennsylvania, on March 29, 1982, 2/ the Safety Board addressed the problem of employees who were able to pass an operating rules examination with a qualifying grade, but who appeared to lack an understanding of the application of the rules. As a result of its investigation, the Safety Board recommended on September 21, 1982, that Amtrak:

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2/ Railroad Accident Report--"Head-on Collision of Amtrak Trains Extra 769 East and No. 195, Bristol, Pennsylvania, March 29, 1982" (NTSB-RAR-82-05).

Review Amtrak's current method of conducting operating rules examinations and review classes to determine if it is adequate to permit employees to demonstrate that they not only know the wording of the rules, but that they understand how the rules are to be applied under actual conditions. If these objectives are not being achieved, restructure the operating rules classes to accomplish this goal. (R-82-95)

On March 31, 1985, Amtrak responded that it was reviewing its methods of instruction and the content and frequency of operating rules classes. Amtrak also indicated that it was providing a comprehensive training program for all train and engine personnel which included the application of operating rules to actual situations. The Safety Board has classified Safety Recommendation R-82-95 as "Closed--Acceptable Action."

The Safety Board is concerned that there still appears to be a lack of understanding of the application of operating rules by some employees even though they obtained a high or, in this case, a perfect score on the operating rules test and believes that the problem should be studied industry wide. In its report of a rear-end collision between two Conrail trains near Saltsburg, Pennsylvania, on February 26, 1984, <sup>3/</sup> the Safety Board again discussed the fact that crewmembers, who had received satisfactory passing grades on their operating rules examination, did not understand the rules fully on their application. The Board found similar deficiencies in the training of a train dispatcher in its report of the investigation of a head-on collision at Motley, Minnesota. <sup>4/</sup> The Safety Board believes that rules classes and examinations must be structured so that employees will understand the rules and how to apply them rather than simply parroting them. In the interim until industry wide action is taken, the Safety Board urges Amtrak to seek further improvements in its system of rules instruction to require class attendees to demonstrate their knowledge of applying the proper operating rule.

The postaccident change in operating rules by Amtrak to inform the crew of a train that its rights are restricted is an appropriate backup safety measure and was a procedure railroads used for many years in the form of a 31 train order. However, the use of manually delivered train orders may increase the exposure of personnel who are involved in delivering the information to hazards attendant on crossing multiple tracks. At some of the interlocking towers where informational orders may have to be delivered, F Tower for example, the operator must cross a number of tracks and electrified third rails to effect delivery of the order. The process also may result in delay of other traffic. The procedure initiated by Amtrak should give added assurance against a train's moving beyond a designated point whether it has a proceed signal aspect or not. Of course the crew of the train with its rights restricted will have to know that the train order has been fulfilled before they can proceed. We hope Amtrak is addressing the problem of giving train crews such notice in multiple track areas and in areas where there are tunnels. The informational train order could be given to the restricted train via radio so as to avoid the hazard to personnel. Such a procedure would increase the need for a "clear" radio channel.

The crowded radio channel used by Amtrak in the New York area results in frequent problems by interruptions of transmissions. The problem on July 23 was exacerbated by

<sup>3/</sup> Railroad Accident Report--"Rear-end Collision between Conrail Trains OIPI-6 and ENPI-6X, near Saltsburg, Pennsylvania February 26, 1984" (NTSB/RAR-85/02).

<sup>4/</sup> Railroad Accident Report--"Head-on Collision of Burlington Northern Railroad Freight Trains Extra 6760 West and Extra 7907 East, Near Motley, Minnesota, June 14, 1984" (NTSB/RAR/-85/06).

the limited power of the portable transceivers in the New York area. The distress calls from train No. 151 were interfered with by "business as usual" transmissions conducted on numerous transceivers, and clearing the channel for emergency calls was difficult. Amtrak should renew action to obtain its own channel to improve operational safety in the New York area and to facilitate emergency response.

While the use of monitoring instruments at interlocking locations does not necessarily improve the immediate safety of an operation, it does provide a positive check on signal aspects, switch positions, PBDs, and the sequence in which operations are performed and on the moves made. Operations can be improved if these records are analyzed to develop improved techniques.

The vestibules of the head cars were badly crushed and the survival of anyone caught in the vestibules during a crash situation would be problematical. The single fatality, a passenger who died as a result of internal injuries received in the collision, was removed from the vestibule of one of the head cars. Most of the injuries received by other passengers were minor and consisted primarily of cuts and bruises on faces, arms, bodies, and legs. Neck and back injuries were common complaints.

The passengers' seats for the most part remained in place, but some rotated on their pedestals. Passengers suffered head and facial injuries when they struck the seatbacks in front of them and dislodged the seatback cushions. When the seatback cushions were displaced, the piece of sheet metal that serves as part of the headrest support was exposed and became a further hazard. Many passengers were thrown into the aisles and struck each other or the chair arms or sides of the partially rotated seats.

Some passengers complained of being struck by loose baggage dislodged from the overhead luggage racks. Amtrak has made several attempts to improve the baggage containment/retention capabilities of the overhead racks, such as installing a vertical lip on the inboard edge of the rack and lateral ridges on the bottoms of the racks. As a result of its investigation of a train collision at Wilmington, Illinois, on July 28, 1983, 5/ the Safety Board recommended that Amtrak:

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 racks, inadequately secured seats, and inadequately secured equipment in food service cars. (R-84-40)

The Safety Board reiterated Safety Recommendation R-84-40 to Amtrak following its investigation of a derailment at Woodlawn, Texas, on November 12, 1983. 6/ On March 13, 1985, Amtrak responded that a web-type retention device was being used in its new prototype single level sleeping cars. Other types of retention devices are being evaluated for Amtrak's prototype coaches which are planned for future construction.

5/ Railroad/Highway Accident Report--"Collision of Amtrak Passenger Train No. 301 on Illinois Central Gulf Railroad with Marquette Motor Service Terminals Inc., Delivery Track, Wilmington, Illinois, July 28, 1983" (NTSB/RHR-84/02).

6/ 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).

Amtrak said it is not planning a retrofit program for equipment in service. However, since the same type of safety hazard manifested itself again in the July 23 accident, the Safety Board urges Amtrak to reconsider its decision about a retrofit program for passenger equipment in service at this time. The present methods for restraining baggage are not adequate and more work needs to be done in this respect on equipment currently in use. The Safety Board continues to hold recommendation R-84-40 in an "Open--Unacceptable Action" status.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the National Railroad Passenger Corporation (Amtrak):

Modify the coach seats used in Amfleet equipment so that seatback cushions cannot become dislodged when struck and expose surfaces which can cause injuries in accidents. (Class II, Priority Action) (R-85-81)

Apply for an exclusive radio channel for the National Railroad Passenger Corporation's operational use in the New York area. (Class II, Priority Action) (R-85-82)

Develop an operating rules verification procedure that will require employees to demonstrate that they understand the meaning of the rules and can properly derive and apply the correct rules for use in emergency circumstances. (Class II, Priority Action) (R-85-83)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.

By: *Patricia A. Goldman*  
Jim Burnett  
Chairman *for*