

NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

ISSUED: May 18, 1981

 Forwarded to:

 Mr. A. S. Boyd
 President and Chief Executive Officer
 National Railroad Passenger Corporation
 400 North Capital Street, N. W.
 Washington, D.C. 20001

SAFETY RECOMMENDATION(S)
R-81-57 through -60

About 4:12 p.m., on November 7, 1980, Conrail freight train OPSE-7 struck the head end of Amtrak train No. 74 while it was standing on track No. 2 at Dobbs Ferry, New York. The lead locomotive unit of train OPSE-7 overrode and destroyed the operating cab of the power car of train No. 74. Of the estimated 234 persons aboard the trains, 75 passengers and 9 crewmembers were injured. Damage to the equipment was estimated at \$915,000. 1/

When the trains collided, passenger train No. 74 was stopped and freight train No. OPSE-7 had slowed between 8 and 10 mph. The lead freight locomotive unit overrode the passenger train power car. The operating cab was crushed; the engineer's console, the fireman's seat, and all intervening structure were pushed about 112 inches from the front end of the unit rearward into the electrical locker. In addition to crushing the operating cab, train No. 74 was pushed rearward 112 feet. The engineer and fireman were injured when they jumped from the operating cab to the ground before the collision.

Many of the passengers, who had no warning before the collision and were not aware of the impending collision, were thrown forward into seatbacks at impact. Many seats rotated when struck from behind because of inadequate locking devices. The largest number of injuries to passengers were to the legs when they became caught under the seats ahead. The next largest number was facial lacerations, bruises, and broken and knocked out teeth. One female passenger was seriously injured and required emergency surgery.

When a fire started outside of the second car, the conductor and a trainman removed a fire extinguisher from the power car to extinguish the fire. There was some panic when word of the fire spread through the cars and passengers began to smell the smoke. However, this was of a short duration and when the passengers realized the fire was not spreading, they calmed down.

1/ For further information, read: Railroad Accident Report—"Head-End Collision of Amtrak Passenger Train No. 74 and Conrail Freight Train OPSE-7, Dobbs Ferry, New York, November 7, 1980" (NTSB-RAR-81-4).

Passengers experienced extreme difficulty when they attempted to evacuate the cars. Many passengers tried to push the emergency windows outward; however, because the windows were designed to be taken out by pulling inward, they would not open. Other passengers could not determine how to open the trapdoor over the steps, so many passengers jumped from the car to the ground.

R-70-10
The Safety Board identified fixtures within passenger cars as injury-producing in its investigation of an accident at Glendale, Maryland, on June 28, 1969, 2/ and recommended to the FRA that it initiate studies to determine the relationship between rail passenger car design and passenger injury and, where practical, take action to improve the design of future high-speed and rapid transit passenger cars. Amtrak has placed many cars in service since that report was issued. The Safety Board has investigated other accidents 3/ in which passenger injuries have been caused by the fixtures within the car. No Federal regulations exist for even minimum standards for interior design of passenger cars. Amtrak's newest cars still have some of the same injury-producing equipment that was cited in past Safety Board investigations.

A 1978 crashworthiness study 4/ conducted by the FRA identified seat rotation as being a cause of passenger injuries and concluded that it is necessary to "prevent double seats from swiveling by providing a positive lock to improve occupant containment." The problem of leg entrapment was also identified as a significant cause of passenger injuries in the FRA study. The report concluded that there was a need to "prevent leg entrapment under seats by adding a back skirt to reduce high frequency of leg injury in collisions."

Since the sill section and floor plate of train No. 74 were 21.9 inches lower than the sill and floor of the freight locomotive unit of OPSE-7, the operating cab of the power car was not survivable in this accident. Penetration of the power car at this height above the floor plate insured failure of the cab's forward structure.

Although the I-beam forward posts of the power car were intended to be collision posts, they failed to provide any protection since they were torn loose and pushed rearward even in this relatively low-speed collision. In the test mockup that was performed on the collision posts before they were installed in the power car, the collision posts were welded to an I-beam before the test loading was applied. The actual installation of these collision posts differed from the testing because they were welded

2/ Railroad Accident Report—"Penn Central Company Train Second 115 (Silver Star) Derailment at Glendale, Maryland, June 28, 1969" (RAR-70-1).

3/ Railroad Accident Report—"Richmond, Fredericksburg & Potomac Railroad Company Train No. 10/76 Derailment with Three Fatalities and Numerous Personal Injuries, Franconia, Virginia, January 27, 1970" (NTSB-RAR-71-1); Railroad Accident Report—"Derailment of Amtrak Train No. 1 While Operating on the Illinois Central Railroad Near Salem, Illinois, June 10, 1971" (NTSB-RAR-72-5); Railroad Accident Report—"Collision of Illinois Central Gulf Railroad Commuter Trains, Chicago, Illinois, October 30, 1972" (NTSB-RAR-73-5); Railroad Accident Report—"Derailment of an Amtrak Train on the Tracks of the Atchison, Topeka & Santa Fe Railroad Company, at Melvern, Kansas, July 5, 1974" (NTSB-RAR-75-1); and Railroad Accident Report—"Collision of Two Penn Central Commuter trains at Botanical Garden Station, New York City, January 2, 1975" (NTSB-RAR-74-8).

4/ "Rail Safety/Equipment Crashworthiness," FRA/ORD 77/73.

only to the much thinner floor plate. In this accident, the collision posts were either torn loose from the floor plate or from the floor plate metal. It is evident that modern passenger equipment, such as that used on train No. 74, will always sustain extensive damage in a collision with conventional locomotives because of the incompatibility of the rigid frames, its frame being approximately 21 inches lower than standard railroad equipment. Apparently, this matchup was not considered when the turboliner equipment was adapted for use on American railroads.

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

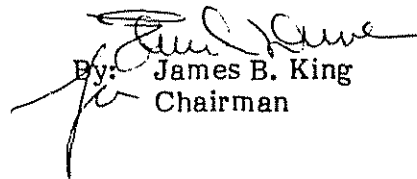
Establish a retrofit schedule to provide skirts at the bottom of seats to prevent leg injuries because of leg entrapment. (Class II, Priority Action) (R-81-57)

Install an adequate locking device on rotating seats which will prevent undesired rotation in accidents. (Class II, Priority Action) (R-81-58)

Revise turbotrains to improve cab crashworthiness in a collision. (Class II, Priority Action) (R-81-59)

Promptly provide for passengers identification of emergency exits which includes instructions for proper use. (Class II, Priority Action) (R-81-60)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and BURSLEY, Members, concurred in these recommendations. GOLDMAN, Member, did not participate.


By: James B. King
Chairman