

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: November 29, 1984

Forwarded to:

Honorable John Riley
Federal Railroad Administration
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

R-84-46

About 9:48 a.m., c.d.t., on July 28, 1983, Amtrak train No. 301, operating on the Illinois Central Gulf Railroad (ICG), collided with a Marquette Motor Service Terminals, Inc., delivery truck at the New River Road railroad/highway grade crossing about 1 mile north of Wilmington, Illinois. The locomotive unit and all three cars of the train were derailed, and the truck and its lading were destroyed. Two train crewmembers, the truckdriver, and 18 train passengers were injured. Total damage was estimated to be \$584,000. 1/

The cars of the train remained coupled during the derailment sequence, and the train remained generally in line with the track. The two rearmost cars tipped over on their left sides as they were diverted down the grade embankment into the ditch east of the track. As the cars tipped, heavy pieces of luggage from the open overhead racks on the right sides of these cars fell onto passengers seated on the left side. The locking mechanisms of many seats failed, allowing the seats to rotate as much as 90 degrees and causing the seat occupants to be ejected. In many locations seat cushions which had not been secured properly also fell on passengers seated on the left side. The conductor was one of the persons ejected from a seat. One passenger was pinned under a seatframe and was extricated by the flagman using emergency tools from one of the cars. Equipment was dislodged in the food service car.

The Safety Board has had occasion to point out deficiencies in the crashworthiness of Amtrak cars. As a result of its investigation of an accident in Collinsville, Oklahoma, on April 5, 1971, 2/ the Safety Board issued Safety Recommendation R-72-27, which recommended that Amtrak,

... correct ... injury-causing features ... as passenger cars are reconditioned, and in the future, apply system safety principles to the acquisition, design, construction, and renovation of passenger cars.

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

2/ Railroad/Highway Accident Report--"Atchison, Topeka and Santa Fe Passenger Train No. 212 Collision with Stillwater Milling Company Motortruck at 116th Street North Grade Crossing, near Collinsville, Oklahoma, April 5, 1971" (NTSB-RHR-72-1).

As a result of its investigation of an accident in Salem, Illinois, on June 10, 1971, ^{3/} the Safety Board issued Safety Recommendation R-72-34, which recommended that Amtrak,

... correct ... injury-causing features ... as passenger cars are renovated or rebuilt. Purchase specifications for future passenger cars should be established ... to insure that interiors are designed to minimize impact-type injuries. . . .

Both recommendations later were classified as "Closed—Acceptable Action" after Amtrak informed the Board that it was requiring improved safety features for new type passenger cars being manufactured and was making improvements to reduce injury-causing interior features of existing cars.

As a result of its investigation of an accident in Melvern, Kansas, on July 5, 1974, ^{3/} the Safety Board issued Safety Recommendation R-75-5, which recommended that Amtrak,

... require the installation of the latest practical crashworthiness features when rolling stock is renovated or when new cars and locomotives are purchased.

Amtrak informed the Safety Board on July 21, 1976, that new equipment it would be ordering in the next several years "will be provided with the latest crashworthiness features." However, an analysis of the injuries sustained by persons involved in the Wilmington accident and riding in these new cars indicates that, despite Amtrak's attention to this problem, some of the sources of injuries present in previous Amtrak accidents have not been eliminated or controlled and continue to pose a threat to passengers and employees. Based on the issuance of the more comprehensive Safety Recommendation R-84-40 in this report, Safety Recommendation R-75-5 has been placed in a "Closed-Superseded" status.

An example of an injury-producing mechanism which persists is the rotation of seats in an accident. Many of the seats in the coaches involved in the Wilmington accident were found rotated after the accident, even though the seats had been fitted with modified seat-locking devices. The installation of these devices resulted from Safety Recommendation R-79-72 which the Safety Board issued following its investigation of an accident in Edison, New Jersey, on April 20, 1979. ^{4/} The Board recommended that Amtrak,

... require that the seats of all Amfleet equipment are maintained in proper condition to insure that the seats are locked securely in place.

Amtrak responded on April 15, 1980, that it had developed an anti-rotating device that "will insure that the seats on Amfleet equipment are locked securely in place" and that installation of the devices would begin shortly. Following its investigation of an accident

^{3/} 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).

^{3/} Railroad Accident Report—"Derailment of an Amtrak Train on the Tracks of the Atchison, Topeka and Santa Fe Railway Company at Melvern, Kansas, July 5, 1974" (NTSB-RAR-75-1).

^{4/} Railroad Accident Report—"National Railroad Passenger Corp. (Amtrak) Head-end Collision of Train No. 111 and Plasser Track Machine Equipment, Edison, New Jersey, April 20, 1979" (NTSB-RAR-79-10).

in Dobbs Ferry, New York, on November 7, 1980, ^{5/} the Safety Board issued Safety Recommendation R-81-58, which recommended that Amtrak,

Install an adequate locking device on rotating seats which will prevent undesired rotation in accidents.

Amtrak responded that installation of the devices on its coaches was continuing. Based on this response, Safety Recommendation R-81-58 was placed in a "Closed—Acceptable Action" status.

One of the passengers injured in the Wilmington accident was pinned under a seatframe. As a result of the Dobbs Ferry accident, the Safety Board issued Safety Recommendation R-81-57, which recommended that Amtrak,

Establish a retrofit schedule to provide skirts at the bottom of seats to prevent leg injuries because of leg entrapment.

The recommendation was placed in a "Closed—Unacceptable Action" status after two responses from Amtrak that "locking devices on rotating seats will minimize leg injuries."

Another source of injury identified in the Wilmington accident and in previous Amtrak accidents was luggage which fell onto passengers from the overhead luggage racks, which were not equipped with luggage retention devices. On February 3, 1971, the Safety Board issued Safety Recommendation R-71-6, which recommended that the Federal Railroad Administration (FRA):

...institute immediate regulations requiring all future new and rebuilt passenger cars be equipped with secured seats and luggage retention devices.

The FRA initially responded that it would begin a study in this area, and based on an evaluation of the study, it would determine the need for regulations. The date for completion of this study was extended several times, and the Board has never received a final copy of the study.

On April 22, 1982, the FRA published in the Federal Register a notice of a general safety inquiry into rail passenger equipment. Section 14 of the Federal Railroad Safety Authorization Act of 1980 added a new subsection to section 202 of the Federal Railroad Safety Act mandating the issuance of initial rules, regulations, orders, and standards as may be necessary to ensure the safe construction, maintenance, and operation of rail passenger equipment. On June 2, 1982, the Safety Board responded to the general safety inquiry advocating the development of rail passenger equipment safety standards and listing areas for safety improvements identified in the Board's analyses of major rail passenger accidents.

On January 17, 1984, the FRA published in the Federal Register a notice of a special safety inquiry on rail passenger equipment. Section 102 of the Rail Safety and Service Improvement Act of 1982 amended section 202 of the Federal Railroad Safety Act of 1970 to require the issuance of any necessary rules relating to rail passenger equipment and a report to Congress. Although the FRA concluded in its January 1984 Report to Congress on Railroad Passenger Equipment Safety that rail passenger service has compiled an

^{5/} Railroad Accident Report—"Head-end Collision of Amtrak Passenger Train No. 74 and Conrail Train OPSE-7, Dobbs Ferry, New York, November 7, 1980" (NTSB-RAR-81-4).

excellent record, it did indicate that the interior of passenger cars merited additional study and that among the subjects to be addressed are design and securement of seats, luggage retention, and interior contouring.

In the January 17, 1984, notice regarding the special safety inquiry, the FRA stated that it would be undertaking five safety initiatives, one of which is to publish recommended guidelines on the flammability and smoke emission characteristics for materials to be used in all new and rebuilt passenger cars. ^{6/} The Safety Board believes that the FRA also should issue recommended guidelines for secure seats and luggage retention devices, once it completes its studies in this area, and the Board urges the FRA to do so. As a result of the issuance of the more comprehensive Safety Recommendation R-84-40 in this report, Safety Recommendation R-71-6 has been placed in a "Closed—Superseded" status.



A final injury-causing feature uncovered by the investigation was that equipment in the food service car was not well secured and came loose during the accident.

Equipment designers and crashworthiness experts have known for years how to protect passengers from injuries attributed to all of these causes. Safety analyses by competent passenger car designers can provide cost-effective corrections to deal with inadequately secured seats, unsecured luggage in overhead racks, and inadequately secured dining car equipment.

Therefore, the National Transportation Safety Board recommends that the Federal Railroad Administration:

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. (Class II, Priority Action) (R-84-46)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in this recommendation.

By:  Jim Burnett
Chairman 

^{6/} The other four initiatives were (1) a final rule extending coverage of FRA Track Safety Standards to include all track used for commuter service; (2) a final rule amending FRA Power Brake Standards to preserve the inspection and testing requirements for passenger car brake equipment; (3) a joint FRA-industry examination of emergency procedures; and (4) the 1984 special safety inquiry.