



National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Log R-606A

Date: August 16, 1988
In reply refer to: R-88-46 through -48

Mr. Graham Claytor, Jr.
Chairman and President
National Railroad Passenger Corporation
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On October 12, 1987, National Railroad Passenger Corporation (Amtrak) passenger train 6, the California Zephyr, derailed in Russell, Iowa, injuring 15 crewmembers and 107 of the 230 passengers. The train was operating eastbound on the westward track, since the maintenance-of-way department had taken the eastward main track out of service. The train was traveling about 60 mph when it entered into a stub track and struck maintenance-of-way work equipment. Two locomotive units and 11 of the 14 passenger cars derailed, as well as the maintenance-of-way crane and three flat cars. ^{1/}

None of the impact forces reported in the derailment were severe. All passengers who could recall how they were injured reported that the injuries were caused by secondary impacts with interior surfaces or furnishings or with other passengers. The Safety Board noted that in this accident, as in other accidents, seatback cushions became dislodged when struck from the rear, exposing the sheet metal headrest support. Following its investigation of an accident in New York City on July 23, 1984, ^{2/} the Safety Board recommended that Amtrak:

R-85-81

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.

On November 4, 1985, Amtrak responded that it had initiated a program to satisfy the recommendation and as of that date had completed 125 cars. Although the Safety Board's then ongoing investigation of the Essex Junction, Vermont, ^{3/} accident on July 7, 1984, revealed a similar problem with the seatbacks of Heritage-class coaches, the program outlined by Amtrak for its Amfleet equipment indicated that the intent

^{1/} For further information, read Railroad Accident Report--*Collision and Derailment of Amtrak Train 6 on the Burlington Northern Railroad, Russell, Iowa, October 12, 1987* (NTSB/RAR-88/04).

^{2/} 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).

^{3/} Railroad Accident Report--*Derailment of Amtrak Passenger Train No 60, the Montrealer, on the Central Vermont Railway near Essex Junction, Vermont, July 7, 1984* (NTSB/RAR-85/14).

of Safety Recommendation R-85-81 was being met, and the recommendation was placed in a "Closed--Acceptable Action" status.

To ensure that Amtrak would follow up on the problem with the Heritage-class coaches, the Safety Board, as a result of its completed investigation of the Essex Junction accident, recommended on January 15, 1986, that Amtrak:

R-85-127

Redesign and modify the coach and seatback cushions in the Heritage-class coaches to prevent their becoming dislodged when they are impacted from behind.

Amtrak responded on September 22, 1987, that it had developed a modification to the seatback cushion, which is currently being made during the car's heavy overhaul or when cushions are renewed. Eleven cars had been completed as of the date of the response. Due to normal maintenance cycles, Amtrak expected full change-over to take 6 years.

On April 19, 1988, Amtrak informed the Safety Board that it had reviewed its installation schedule and shortened it to 4 years. Based on this projected timeframe, Safety Recommendation R-85-127 is being held in an "Open--Acceptable Action" status.

While the Safety Board is pleased that Amtrak is progressing with the modifications to the original type seatback cushions in the Amfleet cars covered in Safety Recommendation R-85-81, these same type seats had been installed not only in the Heritage-class cars covered in Safety Recommendation R-85-127 but also in Superliner coaches that were involved in this accident. The Safety Board believes that Amtrak should take steps to redesign and modify the Superliner coach seats.

Another problem that may have contributed to passengers impacting with interior surfaces was the failure of seat locking mechanisms, which causes undesired rotation of the seats, thus allowing the passengers to be ejected from their seats. As a result of an accident on April 20, 1979, at Edison, New Jersey, ^{4/} the Safety Board recommended that Amtrak:

R-79-72

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 that it had designed and developed an anti-rotating device and had tested a prototype for production.

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

As a result of its investigation of an accident at Dobbs Ferry, New York, on November 7, 1980, ^{5/} the Safety Board issued another recommendation to Amtrak for seatlocking devices:

R-81-58

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

Amtrak responded on August 3, 1981, that it was progressing with the installation of anti-rotational devices on seats on the Amfleet and Superliner cars during normal maintenance inspections and overhauls. On June 22, 1982, Amtrak responded that "... Superliners are equipped with anti-rotational locks..." In spite of these statements by Amtrak, Safety Board accident investigations continued to reveal that inadequately secured seats remained a problem. In its report of the investigation of a 1983 Amtrak derailment at Wilmington, Illinois, ^{6/} the Safety Board recommended that Amtrak:

R-84-40

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 recommendation was reiterated to Amtrak when similar problems were encountered as a result of the Safety Board's investigation of an Amtrak derailment at Woodlawn, Texas, ^{7/} on November 12, 1983. On March 13, 1985, in response to Safety Recommendation R-84-40, Amtrak reported that as its coaches were overhauled, the locking devices intended to prevent seat rotation would be modified to include a positive locking feature that would prevent undesired rotation. Additionally, Amtrak reported that it was replacing complete car sets of seatframes with a design equipped with a step latch with a positive locking device that prevents the seat from falling away from the coach wall, as well as undesired seat rotation. Amtrak further reported that it would equip all newly constructed coaches with the improved seatframes. As for unsecured equipment in food service cars, Amtrak advised that it would enhance securement of microwave and convection ovens by adding an extra steel bar across the top of the ovens to prevent displacement under extreme shock. The modification was being implemented as food service cars undergo overhaul and 120-day maintenance programs. Based on this information and the Board's investigation of the Amtrak derailment at Kittrell, North Carolina, ^{8/} on March 5, 1984, which suggested that there had been some efforts to

^{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-81/04).

^{6/} 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).

^{7/} 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).

^{8/} Railroad Accident Report--*Derailment of Amtrak Train No. 81, The Silver Star, on the Seaboard System Railroad, Kittrell, North Carolina, March 5, 1984* (NTSB/RAR-85/03).

improve seatbacks and seatframes to prevent failures, Safety Recommendations R-79-72 and R-81-58 were ultimately placed in a "Closed--Acceptable Action" status. However, inasmuch as Amtrak at the time did not plan to retrofit the overhead luggage racks in its existing cars with retention devices, Safety Recommendation R-84-40 was ultimately placed in a "Closed--Unacceptable Action/Superseded" status, and a new recommendation, as discussed later, was issued in the Essex Junction report specifically addressing luggage retention devices.

In response to questions asked during the Safety Board's deposition proceedings following the Russell accident, Amtrak stated that the seatlocks developed in early 1981 and installed on 21 Amfleet cars and 34 of the original Metroliner cars were determined to be unsatisfactory. Another supplier developed a positive seatlocking device that was specified on Amfleet II cars delivered through 1983. In addition, seats with the new seatlocking device were purchased from the same supplier to replace deteriorated seats in the Amfleet I cars. These additions began in late 1984 during the 6-year overhaul program. On March 4, 1988, Amtrak tested a similar positive seatlocking mechanism for installation on the remainder of its passenger car fleet. According to Amtrak as of April 1, 1988, no Superliner cars had been equipped with a positive seatlocking device and only 40 percent of the fleet had been so equipped since late 1984. The Safety Board believes that Amtrak should expedite the installation of positive seatlocking devices to achieve its anticipated completion date of September 30, 1989.

In addition to the problems of seatback cushions and seat locking devices, the Safety Board is concerned about two other problems that could have caused passenger injuries in this accident. The first problem is luggage being ejected from the overhead luggage racks. While no passengers reported being struck by luggage, four passengers did see luggage ejected from the racks. Although no injuries can be attributed to ejected luggage in this accident, such injuries could occur in the future. Luggage was ejected in this accident, just as the Safety Board has reported in numerous Amtrak accidents over many years.

The Safety Board has expressed concern to the Federal Railroad Administration (FRA) regarding the inadequacy of effective luggage retention devices in railroad passenger cars. As a result of its investigation of the collision of an Amtrak passenger train with a delivery truck at Wilmington, Illinois, on July 28, 1983, the Safety Board recommended that the FRA:

R-84-46

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 recommendation was reiterated to the FRA following the Safety Board's investigation of the rear-end collision between a Boston and Maine Corporation commuter train and a Consolidated Rail Corporation freight train near Brighton, Massachusetts, on May 7, 1986, ^{9/} and following the Board's investigation of the

^{9/} Railroad Accident Report--Rear-End Collision Between Boston and Maine Corporation Commuter Train No. 5324 and Consolidated Train TV-14, near Brighton, Massachusetts, May 7, 1986 (NTSB/RAR-87/02)

rear-end collision of Amtrak passenger train 94 and a Conrail freight train at Chase, Maryland, on January 4, 1987. ^{10/}

Following the Safety Board's investigation of the accident at Essex Junction in which overhead luggage falling from the racks was documented as a common cause of injuries, the Safety Board addressed the following recommendation to Amtrak, in part because it appeared the FRA was reluctant to take any action on this issue as evidenced by its unresponsiveness to Safety Recommendation R-84-46:

R-85-128

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

On September 22, 1987, Amtrak informed the Safety Board that "... test luggage restraints have been installed on three car sets. Luggage restraints have been approved by Federal agencies. . . . We estimate installation will take 6 years to complete." The Board noted during a visit to an Amtrak facility in October 1986 that the test restraint devices had some sharp protruding edges that could become an additional source of injuries, particularly if a car overturned.

On April 19, 1988, Amtrak responded to the Safety Board that:

Amtrak has modified the design of its luggage retention devices to eliminate the sharp edges. . . . Our investigations revealed that luggage moved longitudinally during derailments, then piled up and spilled into the car body. . . . By having the vertical stops on 81-inch centers and a raised side rail, the luggage will be successfully restrained. . . . With regard to the approval of this modification, there is no formal review process for such modifications. Arrangements were made for representatives of both the NTSB and FRA to review and attend a field test of the new system.

Amtrak's schedule shows that 22 cars of a scheduled 991 cars have had the modified luggage retention device installed as of the date of the response and that completion will vary from 1989 to 1991 depending on the car type.

Although the test restraint devices appear to prevent the longitudinal movement of luggage and Amtrak has eliminated some of the sharp protruding edges, the full effectiveness of the devices has not been evaluated in a testing situation for an overturned car. Despite these concerns, the Safety Board continues to believe that once an adequate device has been evaluated and determined suitable, installation should be accomplished as expeditiously as possible in view of the fact that passenger injuries continue to occur as a result of luggage falling from the overhead luggage racks. Moreover, the Board is concerned with the FRA's most recent response to Safety Recommendation R-84-46, dated March 16, 1988, in that the FRA has endorsed Amtrak's current retrofit program, even though adequate testing and evaluation of the devices has not been done. The Board has urged the FRA to look into all possible solutions to the luggage retention problem and develop guidelines

^{10/} Railroad Accident Report--Rear-End Collision of Amtrak Train 94, the Colonial, and Consolidated Rail Corporation Freight Train ENS-121 on the Northeast Corridor near Chase, Maryland, January 4, 1987 (NTSB/RAR-88/01).

that would apply to any carrier involved in passenger rail service. Safety Recommendations R-84-46 and R-85-128 are currently held in an "Open--Unacceptable Action" status.

A second problem affecting passenger safety was televisions, coffeemakers, and microwave ovens in the lounge car that were not equipped with restraints. It was noted in this accident that the televisions in the lounge car were broken from their mounts and lying on the floor. While it could not be determined if the televisions caused any injuries, it is a very real possibility. Unsecured coffeemakers were also found on the floor and unsecured ovens were found in their mounts, but loose. As the Safety Board noted in previous investigations, Amtrak is making progress in securing equipment in food service cars. The Safety Board urges Amtrak to expedite the program, and to include in that program all equipment that is either unsecured or inadequately secured.

Therefore, the National Transportation Safety Board reiterates Safety Recommendation R-85-128 and also recommends that the National Railroad Passenger Corporation (Amtrak):

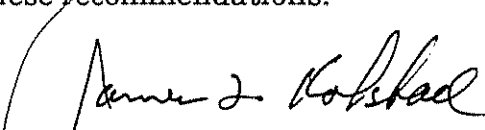
Redesign and modify the coach seats and seatback cushions in the Superliner-class coaches to prevent their becoming dislodged when they are impacted from behind. (Class II, Priority Action) (R-88-46)

Develop and install effective retention devices for televisions sets in all passenger cars to prevent them from becoming dislodged in an accident. (Class II, Priority Action) (R-88-47)

Develop and install effective retention devices for coffeemakers in all passenger cars to prevent them from becoming dislodged in an accident. (Class II, Priority Action) (R-88-48)

Also as a result of its investigation, the Safety Board issued Safety Recommendations R-88-40 through -45 to the Burlington Northern Railroad Company, R-88-49 to the American Short Line Railroad Association and to the Association of American Railroads, and R-88-50 to the Union Pacific System; Missouri-Kansas-Texas Railroad System; St. Louis Southwestern Railway Company; Southern Pacific Transportation Company; Atchison, Topeka, and Santa Fe Railway Company; Chicago and North Western Transportation Company; Davenport, Rock Island and North Western Railway Company; Lake Superior and Ishpeming Railroad Company; Minnesota Transfer Railway Company; and Soo Line Railroad Company.

BURNETT, Chairman, KOLSTAD, Vice Chairman, and LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.


By: James L. Kolstad
Acting Chairman