

Log R-0483

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: November 29, 1984

Forwarded to:

Mr. W. Graham Claytor
National Railroad Passenger
Corporation
400 North Capitol Street
Washington, D.C. 20003

SAFETY RECOMMENDATION(S)

R-84-37 through -43

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/

Calculations based on tests of train No. 301's speed recorder tape revealed that the train was being operated at 82 mph—3 mph faster than the maximum allowable speed of 79 mph—at the time of the accident. The service record of the engineer of train No. 301 indicated that he had been twice suspended for violating maximum allowable speeds while operating trains--for 30 days on May 16, 1980, while operating an Amtrak passenger train and subsequently for 7 days while operating a freight train. The disciplinary action involving the passenger train followed a radar speed check by an Illinois Commerce Commission inspector which determined that the engineer was operating at excessive speed over crossings in the town of Chatham, Illinois. The check was prompted by complaints from citizens of Chatham.

The service record of the fireman of train No. 301 indicated that he had been discharged on January 30, 1981, for responsibility in connection with the October 30, 1980, derailment of an Amtrak passenger train at Springfield, Illinois, resulting from its operation at 60 mph through a 10-mph turnout. 2/

It is significant that the ICG crewmembers have been disciplined for operating Amtrak trains at excessive speed only following accidents or when State of Illinois inspectors had detected speed violations while responding to citizen complaints. Locomotive speed tapes had not been reviewed. As a result of its investigation of the

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 Accident Report--"Derailment of Amtrak Passenger Train No. 21 on the Illinois Central Gulf Railroad at Springfield, Illinois, October 30, 1980" (NTSB-RAR-81-5).

Amtrak passenger train derailment on the ICG's Alton District track at Springfield, in which train speed was determined to be a factor, the Safety Board issued Safety Recommendation R-81-61 asking the ICG to:

Take immediate action to determine that train and engine service employees of the Alton District are fully conversant with and comply with timetable speed restrictions. . . .

The ICG replied that it performed field efficiency tests related to speed restriction compliance and that:

Rules compliance activity on a continuing basis by our supervisory personnel is more than adequate to be certain that train and engine service employees are fully conversant with and complying with timetable speed requirements. . . .

Based on ICG's response, the Safety Board placed the recommendation in a "Closed--Acceptable Action" status.

As a result of the Springfield accident, the Safety Board also issued Safety Recommendation R-81-67 asking that Amtrak:

In cooperation with the Illinois Central Gulf Railroad, develop a program of close surveillance of the operation of its trains on ICG's Alton District which includes the compliance of train crews with speed restrictions and signal aspects, as well as the monitoring of locomotive speed recorder tapes.

Amtrak replied that:

In Amtrak's agreements with the carriers, the right to control the operation has clearly been reserved by the carriers, including rule compliance and speed enforcement. Amtrak does not have the staffing required to enforce compliance with operating rules on over twenty carriers; however, Amtrak compensates the Illinois Central Gulf Railroad (ICG) for a full-time dedicated manager whose primary function is monitoring the operation of Amtrak trains on the ICG.

In 1982, Amtrak informed the Safety Board that it had begun a cooperative program with the ICG to monitor locomotive speed and event recorder tapes and enginecrew performance for Amtrak trains operating between Chicago and St. Louis to insure compliance with operating rules. Based on Amtrak's response, the Safety Board placed Safety Recommendation R-81-67 in a "Closed--Acceptable Action" status.

During its investigation of the Wilmington accident, Amtrak officials informed the Safety Board that Amtrak and the ICG were complying with the program. However, while Safety Board investigators were at Amtrak's locomotive facility in Chicago for testing of the locomotive speed recorder involved in the accident, they found that, in fact, the program was not being complied with because the speed tapes being removed from the locomotive units were not being reviewed.

The Safety Board is concerned that Amtrak's reluctance to monitor the speeds of its passenger trains may result from its desire to maintain its train schedules. The Board is aware also that the ICG and Amtrak's other contractor railroads are given bonuses for

maintaining on-time performance of trains. As a result of the Springfield accident, the Safety Board issued Safety Recommendation R-81-68 asking Amtrak to:

Make route and schedule studies to determine that Amtrak trains can be safely operated over the ICG's Alton District on the existing schedules.

In its initial response to this recommendation, Amtrak replied that it,

. . . has never encouraged a carrier to violate speed restrictions. In every case, on-time performance is secondary to rule and speed compliance. All passenger train schedules contain 5% to 10% recovery time for contingencies, and therefore, it is not necessary to exceed speed restrictions to operate on time even when modest delays are encountered en route.

Safety Recommendation R-81-68 ultimately was placed in a "Closed—Acceptable Action" status after Amtrak's Operations Audit department conducted 10 performance checks over this line and determined that, indeed, the trains could be operated safely over the Alton District on the existing schedules.

The fact remains that, for whatever reason, the enginecrews of Amtrak locomotives do violate speed restrictions. There is no incentive for the contractor railroads to monitor and enforce speed restrictions if, by doing so, the receipt of Amtrak's on-time performance bonuses may be jeopardized. Moreover, since the operating contract provides that the contractor railroad is not liable for the costs of an accident, another incentive for safe operation is negated. Since Amtrak is government-subsidized, the costs of train accidents, as well as the performance bonuses, are borne by the public at large. Amtrak should establish a nationwide program of aggressive monitoring of locomotive speed recorder tapes to detect noncompliance with speed restrictions and should take action to eliminate this unsafe practice by traincrews on its contractor railroads.

ICG's Joliet District includes two separate, parallel main lines between South Joliet and Mazonia, Illinois, a distance of about 25 miles, which are to the north and south, respectively, of Wilmington. The easterly of these two lines is the single-track "old main line" which passes through Wilmington and is used by six Amtrak passenger trains daily, three in each direction. A local freight train and an occasional through freight train also use this line. None of the Amtrak passenger trains stops to pick up or discharge passengers between South Joliet and Mazonia. The parallel line, known as the Pequot Cut-off, is used exclusively by ICG for the operation of its through freight trains. Between Mazonia and Coal City, a distance of 5 miles, the cut-off line is single track, but between Coal City and South Joliet, the ICG track is paired with an adjacent Atchison, Topeka and Santa Fe Railway (ATSF) single-track main line to permit double-track operation by the two railroads. ATSF operates Amtrak passenger trains and its freight trains over this paired operation. The Pequot Cut-off line runs west of Wilmington and the "old main line." Interstate Highway 55 runs parallel to and between the two railroad lines.

According to data furnished by the Illinois Commerce Commission, there are 22 intersections of public streets and highways on the "old main line" between South Joliet and Mazonia; 1 is grade separated, 2 are grade crossings with train-activated automatic flashing light signals and shortarm gates, 9 are grade crossings with flashing light signals and warning bells but no gates, 1 is a grade crossing protected by train-activated "wig-wag" signals; and 9 are grade crossings passively protected by crossbuck warning signs. The Pequot Cut-off intersects 15 public roads and streets; 3 are grade separated, 6 are

grade crossings with flashing light signals and shortarm gates, 2 are grade crossings with flashing light signals and warning bells, and 4 are grade crossings with only crossbuck warning signs. There is no record of a train on the Pequot Cut-off having had a grade crossing collision. However, in 1975 an Amtrak train on the "old main line" collided with a truck at a grade crossing in Elwood, 5 miles north of Wilmington. 3/

The availability of another route with fewer grade crossings raises the question of whether Amtrak adequately considered safety in the selection of this route. The route of Amtrak train No. 301 and other Amtrak passenger trains between Joliet and Mazonia is over track with 22 intersections of public roads, only 1 of which is grade separated. A parallel track, known as the Pequot Cut-off, available to Amtrak has only 15 intersections of public roads, 3 of which are grade separated. None of the passenger trains stops between Joliet and Mazonia to pick up or discharge passengers. Since the ICG cut-off track is paired with an adjacent ATSF single-track main line over which the ATSF operates Amtrak trains, the ICG and Amtrak could reroute their trains and have the benefit of a more efficient double-track operation by the two railroads along with the added safety of trains encountering only 12 public roads at grade. Based on these facts and the circumstances of the Wilmington accident, and because the use of the available parallel track would reduce the risk of train encounters with highway vehicles, the Safety Board believes Amtrak should, if at all possible, reroute its passenger trains over this parallel track.

The Safety Board also 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, 4/ 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.

As a result of its investigation of an accident in Salem, Illinois, on June 10, 1971, 5/ 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.

3/ For more information, read Railroad/Highway Accident Report--"Collision of a Crown-Trigg Construction Company Truck with an Amtrak Passenger Train at Elwood, Illinois, November 19, 1975" (NTSB-RHR-76-2).

4/ 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).

5/ 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).

As a result of its investigation of an accident in Melvern, Kansas, on July 5, 1974, 6/ 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. 7/ 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 in Dobbs Ferry, New York, on November 7, 1980, 8/ 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,

6/ 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).

7/ 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).

8/ 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).

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 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.^{9/} 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

^{9/} 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.

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. The Board believes that Amtrak should equip its passenger coaches with luggage retention devices even if not required to do so by Federal regulation. 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.

Although it was not a factor in the severity of the injuries, the Safety Board notes that the underfloor batteries which provide emergency power were damaged, rendering them inoperative. As a result, it was necessary to manually open the power-operated sliding end doors of the cars. Because of the attitude of the cars, this action was extremely difficult. Had the accident occurred in darkness, evacuation of both the injured and uninjured would have been much more difficult. Following its investigation of an accident in Emerson, Iowa, on June 15, 1982 ¹⁰/ the Safety Board issued Safety Recommendation R-83-25, which recommended that Amtrak,

Evaluate and modify, as necessary, emergency lighting systems in passenger-carrying cars to better protect the functioning of emergency lights in emergency situations.

Amtrak replied that,

the emergency lighting systems on Amtrak equipment are designed to provide a minimum of two hours of acceptable illumination when the primary power source is interrupted. . . Protection is provided by battery power and the circuits are well protected; however, submergence in water will cause any emergency lighting system to become inoperative in a short period of time.

The Safety Board responded by urging Amtrak to reconsider the full intent of the recommendation, stating that "passenger-carrying cars should contain self-powered emergency lights, independent of the train's power sources, that will function in emergency situations even in the event it becomes submerged in water." The Board currently is awaiting a further response from Amtrak on this recommendation, which is being held in an "Open--Unacceptable Action" status. The circumstances of the Wilmington accident show that the batteries are not well protected. Amtrak in evaluating the emergency lighting systems should specifically concern itself with relocating the emergency power system batteries to an area of the car where they might be less susceptible to damage in an accident.

Although Amtrak's F-40PH diesel-electric locomotive units are, for the most part, used over railroads with a maximum allowable speed of 79 mph or less, the overspeed devices on these units are set to function at 104 mph. As a result, there is no overspeed protection under that speed. Amtrak should modify its locomotive overspeed protection so that it limits operation to speeds only nominally in excess of those allowed.

¹⁰ Railroad Accident Report—"Derailment of Amtrak Train No. 5 (The San Francisco Zephyr) on the Burlington Northern Railroad, Emerson, Iowa, June 15, 1982" (NTSB/RAR-83/02).

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

Review the possible contribution of the on-time incentive program in encouraging contractor railroad operating practices which may cause a degradation of safety, and modify the program as appropriate. (Class II, Priority Action) (R-84-37)

Regularly review locomotive speed recorder tapes as they are removed from locomotives to detect noncompliance with speed restrictions, and require the contractor railroads to take action to eliminate speeding by traincrews. (Class II, Priority Action) (R-84-38)

Reroute passenger trains between Joliet and Mazonia, Illinois, onto track where there are fewer railroad/highway grade crossings. (Class II, Priority Action) (R-84-39)

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. (Class II, Priority Action) (R-84-40)

Modify the overspeed devices on Amtrak diesel-electric locomotive units so that the devices limit operation to speeds only nominally in excess of maximum allowable operating speeds. (Class II, Priority Action) (R-84-41)

Relocate the battery used in the emergency power system to an area of the car where it is less susceptible to damage in an accident. (Class II, Priority Action) (R-84-42)

Improve the cooperative program with the Illinois Central Gulf Railroad for monitoring enginecrew performance and enginecrew compliance with operating rules. (Class II, Priority Action) (R-84-43)

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

By: Jim Burnett
Chairman

Patricia A. Goldman
for