

LOG R-444

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 8, 1983

Forwarded to:

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

SAFETY RECOMMENDATION(S)

R-83-62 through -75

About 1:35 a.m., on June 23, 1982, Amtrak passenger train No. 11, the Coast Starlight, with 307 persons onboard and consisting of 10 cars operating on Southern Pacific Transportation Company track, stopped at Gibson, California, after fire and dense, heavy smoke was discovered in a sleeping car. The passengers in two sleeping cars were evacuated. As a result of the smoke and fire, 2 passengers died, 2 passengers were injured seriously, and 57 passengers and 2 train crewmembers were treated for smoke inhalation. Five persons were admitted to the hospital. Damage was estimated at \$1,190,300. ^{1/}

The evacuation of passengers from the two sleeping cars was haphazard. There was no prescribed plan, and no one person directed the evacuation. Since the conductor was the recognized highest authority on the train, he should have organized the evacuation and directed the activities associated with identifying the passengers and arranging for their safety and comfort. He could have delegated the separation of the train to which he gave inordinate attention, to a subordinate crewmember. The conductor did not give an account of his activities after the separation of the train was completed. He did not say who directed the movement of the train when the rear four cars were switched to the siding. With few exceptions, the passengers were left to themselves to evacuate the cars. In the early stages of the evacuation, more effort was made to identify which passengers had detrained, rather than to attempt to determine if passengers were still inside the cars. When the head brakeman realized that some of the bedroom doors were still closed when he first entered car 1130, he should have attempted to alert or remove the passengers. Apparently, no one attempted to attract the attention of passengers still inside the cars by at least throwing rocks at the windows or by making other attention-getting noises. Many people tried to facilitate the removal of the passengers, but their efforts were not organized. For example, while the 1131 car attendant was preoccupied with the minor task of helping people at the vestibule, she should have been assisting the handicapped passenger who was still in bedroom A.

^{1/} For more detailed information, read Railroad Accident Report—"Fire Onboard Amtrak Train No. 11, the Coast Starlight, Gibson, California, June 23, 1982" (NTSB-RAR-83-3).

Many other things could be said in retrospect about what actions should have or could have been taken. Recognizing that almost without exception, those persons engaged in rescue operations were exposed to heavy, acrid, toxic smoke and may not have been thinking clearly, the Safety Board believes that the service personnel, particularly, and the operating train crew did not conduct an effective initial response to the emergency. The Safety Board attributes this almost exclusively to inadequate training. Without proper training, most people instinctively are concerned with self-preservation or can become absorbed in a minor task which they believe is an important contribution to the effort rather than in some essential effort. With training, that person instinctively might react effectively.

The SP crewmen, the Amtrak service personnel, and the supervisors probably did not attempt to use a fire extinguisher to spray around the upper level vestibule area because they had been inadequately trained for such emergencies. If the SP and Amtrak onboard personnel had been trained in the evacuation of passengers, under conditions of fire, derailment, or flood, their responses probably would have been more effective and the outcome of the incident probably would have been different. Adequate training prepares trainees for specific tasks during an emergency, rather than allowing them to get caught up in random or uncoordinated efforts which may or may not contribute effectively to the rescue effort. In the event of an emergency, they will usually revert subconsciously to the proper emergency procedures if they have been taught effectively. This was evidenced by the 1130 car attendant's statement after the incident that the actions she took were in accordance with and the results of her flight attendant training.

The conductor said that he ordered the power to the cars shut off but that after thinking that the fans were needed to exhaust the smoke, he had the power restored. Had he been more knowledgeable of the climatic systems on the sleeping car, which could have been accomplished through training, he would have been better equipped to make such a decision. The best decision would have been to shut off the ventilating fan system immediately. Only the conductor and the Road Foreman of the Amtrak supervisors gave any indication of a concern for the continued operation of the ventilating fan system. Amtrak Service Manual A, "General Rules for Service Employees working on Board," provides only general emergency procedures for personnel, and it does not assign specific responsibilities to individuals onboard the train. The 1130 car attendant had been told in training that she should cut off the ventilation system fans, but she had had no "hands-on" training exercises to emphasize this action. Also, she had not been instructed on the operation of the fire extinguishers or the emergency window exits. Hands-on training may have impressed the 1130 car attendant and/or other persons to whom a fire extinguisher was available so that under the stressful situation they would have reacted to use the fire extinguishers effectively. The 1131 car attendant also failed to shut off the ventilation system fans in her car, and she did not persist in her effort to arouse the handicapped passenger in bedroom A. "Hands on" training is much more effective and in making a lasting impression than lectures or visual aids, and Amtrak should use more of this training technique in its training program. Had the attendants been trained in actually operating a fire extinguisher, in opening an emergency escape window, and in shutting down a ventilating fan system, they might have responded more effectively.

The 1130 car attendant could have announced to the passengers that they were to evacuate their quarters quickly and could have provided them with directions on how to evacuate safely. Simulated training involving fire in a passenger coach or sleeping car would have provided the train personnel with the necessary knowledge to evacuate passengers in an orderly manner from the affected cars. Also, a systematic check of the

bedrooms would have eliminated the problem encountered by the car attendants when they attempted to account for all the passengers. A passenger check also should have been accomplished by the SP trainmen and/or the Amtrak service or supervisory personnel.

The operating crew was operating the train in accordance with SP operating rules before the incident. The engineer used good judgment in being prepared to stop and in then stopping the train when he heard the radio conversations about the problem on the 1130 car. His decision to stop at Gibson facilitated rescue operations.

The SP operating crewmembers were not regularly assigned to passenger train service. SP personnel who worked infrequently on Amtrak passenger trains were unfamiliar with the equipment. For example, the locomotive engineer, who was not a regular passenger service employee, had difficulty shutting off, or instructing the fireman in shutting off the 480-volt a.c. alternator set (HEP). Undoubtedly, this was the result of his lack of familiarity with the equipment. The rear brakeman, who was assigned regularly to freight service, was not experienced in passenger service. Although his response to the emergency situation was exemplary, if he had been more familiar with the arrangement of the equipment, he may have been more effective in notifying and evacuating the passengers. The conductor was not currently assigned to passenger service as a conductor, but he had worked the position before on a regular basis. Most of the SP traincrew personnel were familiar with the old standard passenger equipment used in passenger service by the SP before Amtrak began operating passenger trains, but were not as familiar with the superliner equipment. Amtrak and the operating railroads over whose tracks Amtrak operate should coordinate a training program to insure that railroad operating crewmen who are qualified to operate an Amtrak passenger train are familiar with the passenger car equipment and emergency evacuation procedures.

The sleeping car attendants on train No. 11 were not assigned on a regular basis to service on the sleeping cars. The 1130 car attendant was untrained on the superliner equipment. While the attendant and the other Amtrak personnel were considered qualified for the positions they were working, there were elements of their jobs of which they had vague knowledge. Adequate training and reviews would better equip them to respond in emergency situations.

The bewilderment of the passengers once it became evident that they had to evacuate the cars could have been minimized if Amtrak had conducted at boarding time a brief passenger orientation on the car arrangement and the locations and operation of the emergency window exits and vestibule doors. Since the incident at Gibson, Amtrak has undertaken a training program for its crews designed to assist them in acquainting passengers with emergency facilities and evacuation procedures, but more work needs to be done. For example, a diagram of the superliner car, or other car, could be provided in or on the ticket envelope when the passenger purchases a ticket. The car attendants should personally go over the emergency facilities and procedures with passengers of each bedroom.

The potential of a fire and the need for more readily available escape routes were visibly emphasized in this accident. Apparently, the emergency windows in the superliner equipment were designed for escape routes in the event of a derailment and when passengers could move freely about the car. However, in a very short time, the fire had blocked the vestibule escape route from the upper level. Fortunately, the 1130 car was not the last car in the train and the two end doors were usable as escape routes. More

emergency windows would have facilitated the successful evacuation of the car. The idea of a fire in a superliner car, or in most rail equipment for that matter, of the magnitude and intensity experienced at Gibson was probably not considered when the equipment was designed, built, and furnished because of the fire resistant materials used in the car's interior and the steel superstructure of the car. The Safety Board believes that the flaws in this engineering concept would have been revealed in a safety evaluation of the car design. No safety feature should be glossed over in a design on the assumption that a particular event cannot happen. Every eventuality conceivable should be anticipated irrespective of its remote chance of occurrence. Design considerations which anticipated fire should have included more emergency escape exits and a fire detection and control system.

Additionally, several other design features should be improved in Amtrak's equipment. In the economy bedrooms with an emergency window, the upper berth in its lowered position covered the window handle from view and interfered with the ready removal of the window glass. The signs identifying the emergency windows were flush mounted on the walls in the hallways and were difficult to see. No provision had been made for passengers to descend to the ground from upper level emergency windows, which were about 12 feet above the top of the rail. The top of the rail can be another 3 to 4 feet higher than firm footing at the base of the rock ballast supporting the track structure. Emergency window exits need to be better marked in passenger cars and more emergency escape exits need to be provided to overcome the possible blocking of access to the emergency windows which may be occasioned by a locked or jammed bedroom door. Passengers related that they were unsuccessful in removing the emergency escape windows because they experienced difficulty in maintaining the necessary secure grasp on the handle affixed to the window glass assembly to remove the assembly. (This problem was corroborated by Safety Board investigators.) Amtrak should study this problem and correct it. Some means should be provided for passengers to safely descend through the windows to the ground from either the upper or lower car level. Better emergency lighting facilities located near the floor are needed to overcome the effects of smoke in the event of a fire. Also, provisions should be incorporated into new cars for an external hook-up to a water supply for a sprinkler system distributed throughout the car, thus, a fire could be more easily controlled. Such an outside hook-up would enable a fire truck's hose to be connected to the sprinkler system and pump water under pressure into the car.

The addition of means of quickly detecting a fire, such as smoke detectors, could guard against recurrence of an accident, such as Gibson. A detection system connected into the ventilation system which when actuated would automatically shut off the fans to the ventilation system would be beneficial. The smoke detecting system could be connected into the central alarm system so everyone could be alerted to a potential danger. Additionally, an alarm system that would sound in each bedroom and that could be manually or automatically actuated would notify passengers of an emergency in the sleeping cars. Such an alarm system should include an override feature so that the alarm would sound over the intercom speaker in each bedroom, irrespective of whether or not the bedroom occupant had muted the speaker by the volume control or the position of the channel selection switch. Amtrak should explore the feasibility of such a system.

One passenger in the Gibson accident experienced difficulty in opening the bedroom door which delayed her evacuation about 10 minutes. Although excitement may have contributed to the passenger's difficulty, the Safety Board has received other complaints

from passengers on other Amtrak trains citing similar problems. ^{2/} Amtrak should review the hardware associated with the bedroom doors to insure that the doors open freely and easily at all times. Amtrak has reported to Safety Board investigators that the cause of this problem has since been determined and that it is being corrected. Amtrak should perform a system safety analysis of the superliner car to determine the feasibility of incorporating changes to improve safety either in the present fleet of cars or in future generations of passenger cars.

Although the Regional Director-Passenger Services did not take exception to the "house cleaning" on train No. 11, investigators found paper trash containers filled with styrofoam cups and numerous cigarette butts. There is no evidence to suggest that the fire in the 1130 car originated in the trash container. However, because trash containers are used as receptacles for the contents of ashtrays, thereby posing a fire hazard, Amtrak should provide nonflammable trash containers.

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

Develop and install a central alarm system in sleeping cars to alert passengers occupying sleeping spaces of an emergency. The alarm system should be actuated automatically by strategically located smoke detectors and should simultaneously deactivate the air circulating system. (Class II, Priority Action) (R-83-62)

Study the feasibility of providing an override feature for the intercom system of each bedroom so that an emergency alarm would be received in each bedroom irrespective of the setting of the volume control and channel selection switch. (Class II, Priority Action) (R-83-63)

Provide an emergency escape window exit in each sleeping compartment as well as in all passenger car hallways. (Class II, Priority Action) (R-83-64)

Relocate the handles on the emergency escape window exits in superliner sleeping cars from the top to the bottom of the window giving priority to economy bedrooms where the handle cannot be seen or effectively operated with the upper berth lowered. (Class II, Priority Action) (R-83-65)

Install in each sleeping compartment and all passenger car hallways effective, low mounted emergency lights which will provide a lighted escape path in the event of heavy smoke when an emergency evacuation is required. (Class II, Priority Action) (R-83-66)

Evaluate the effectiveness of the handle design on Amtrak equipment emergency escape window exits to determine that the required operational forces to remove the windows and stripping are within human performance capabilities for the range of potential users and redesign if necessary. (Class II, Priority Action) (R-83-67)

^{2/} An article written by Jim Faber in the Seattle, Washington, "ENETAI" issued October 22, 1982.

Improve the visibility of markings of emergency escape window exits on superliner cars and, in addition, conspicuously mark the outside of the superliner passenger cars to identify the emergency escape window exits and to provide adequate instructions for their removal. (Class II, Priority Action) (R-83-68)

Discontinue the use of paper trash bags in all passenger trains and install fire proof trash containers. (Class II, Priority Action) (R-83-69)

Conspicuously mark superliner sleeping and passenger car vestibule doors and end doors inside and out to indicate the location and method of operation of the door latch and any safety latch. (Class II, Priority Action) (R-83-70)

Revise applicable sections of Service Manual A to prescribe specific emergency duties and responsibilities for all Amtrak on-board service personnel, relevant to all identifiable potential train accidents, with emphasis on on-board fires and on procedures for notification, evacuation, and post-accident disaster handling of passengers. (Class II, Priority Action) (R-83-71)

Include both Amtrak supervisory personnel and onboard service personnel in refresher training programs covering the changes in Amtrak emergency procedures. Arrange with all railroads, over which Amtrak trains are operated, emergency training for traincrew employees qualified for assignment to passenger service. (Class II, Priority Action) (R-83-72)

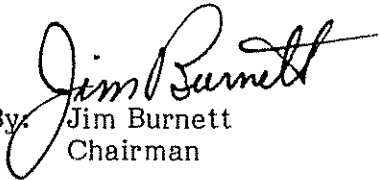
Extend the training program for on-board service personnel to require them to demonstrate their ability to operate emergency exits and emergency equipment and to perform assigned emergency responsibilities outlined in the Service Manual A in simulated exercises. (Class II, Priority Action) (R-83-73)

Conduct a one time survey of all passenger cars to identify materials that do not meet current flammability standards or that produce toxic fumes and undertake a systematic program to replace them with materials that meet current flammability, smoke emission, and toxicity standards. (Class II, Priority Action) (R-83-74)

Develop a passenger briefing card or placard with information on the location and operation of emergency exits, fire extinguishers, and first aid kits, and install them in prominent places in the passenger cars and in every bedroom in sleeper cars. In addition, require that the car attendants explain the emergency procedures to the passengers in each bedroom so that they will have an understanding of the car arrangement and the emergency facilities available. (Class II, Priority Action) (R-83-75)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . .to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations." (P.L. 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations. Therefore, we would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, McADAMS, BURSLEY, and ENGEN, Members, concurred in these recommendations.


By. Jim Burnett
Chairman