

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 8, 1983

Forwarded to:

Honorable Thomas A. Till
Acting Administrator
Federal Railroad Administration
400 Seventh Street, N.W.
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

R-83-76

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 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.

According to Amtrak, the materials used for the interior trim of the sleeping cars when they were built in 1974 were the best products available at the time for fire retardancy and flammability. The waiver given to the supplier by Amtrak to allow the use of selfskinning urethane (foam polyurethane) in the chair armrests and the passenger service units because of a lack of other suitable material seemingly has created a potentially dangerous situation and one that is recognized among rail car builders for both railroads and rail rapid transit companies as needing correction. Although polyurethane is

^{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).

flame-resistant, it will melt and emit toxic gases if heated as by a smoldering fire. The toxicity of the gas cannot be measured. Since very few cigarette butts were found in the ashtrays of bedroom No. 1, since only one armrest -- which had no built-in ashtray -- was burned severely, and since the burn pattern of the armrest appears to have been caused by a heat source external to the armrests, it is unlikely that a fire originated in the armrests as a result of cigarettes in the ashtrays. Further, since polyurethane tends to stop burning when the flame is removed, there is no evidence to support the theory that the fire originated in the armrests of the chairs or that the polyurethane was instrumental in causing or spreading the fire in the 1130 car.

The neoprene carpet backing and the seat coverings were highly resistant to burning. The most highly flammable materials used in the bedrooms were the bedding and accessories associated with the berths. If a heat source had penetrated into the mattress ticking or bedding, a fire could have resulted.

On November 26, 1982, the Urban Mass Transportation Administration (UMTA) published a Notice and Request for Public Comment (NRPC) on "Recommended Fire Safety Practices for Rail Transit Materials Selection," Docket No. 92-C, Volume 47, Federal Register 53559. This document proposes standards for testing the flammability and smoke emission characteristics of materials used in the construction of rapid rail transit and light rail transit vehicles. These proposed standards were, in part, a response to Safety Board recommendation R-79-54 issued to UMTA after the train fire on the Bay Area Rapid Transit District on January 17, 1979, 2/ and safety recommendations R-81-6, and -13 issued to UMTA on January 22, 1981, after the Safety Board's public hearing on rapid rail transit. 3/ After reviewing the NRPC, the Safety Board indicated to UMTA that it generally supported the guidelines. The cooperative effort indicated by rail rapid transit companies, manufacturers of equipment, Amtrak, and the Department of Transportation is commendable and this effort should result in improved materials for use in passenger car construction and trim.

The Safety Board believes that the proposed standards are a move in the right direction to reduce fire hazards in rail passenger vehicles. The Federal Railroad Administration (FRA) was tasked by Congress to develop passenger car safety standards which should also address the flammability characteristics, smoke emission, and toxicity of materials. The Safety Board believes that, once the standards are adopted, the FRA should include the guidelines as part of the passenger car safety standards as a requirement to be followed by manufacturers of future-generation rail passenger cars.

The Safety Board has stressed the importance of training in other accidents where the evident lack of adequate and coordinated training between the railroad operating crewmembers and Amtrak onboard service personnel was apparent. As a result of its investigation of an accident near Wilmington, Delaware, on October 17, 1975, 4/ the Safety Board recommended that the FRA:

2/ Railroad Accident Report--"Bay Area Rapid Transit District Fire on Train No. 117 and Evacuation of Passengers While in the Transbay Tube, San Francisco, California, January 17, 1979" (NTSB-RAR-79-5).

3/ Safety Effectiveness Evaluation of Rail Rapid Transit Safety (NTSB-SEE-81-1).

4/ Railroad Accident Report--"Collision of Penn Central Transportation Company-Operated Passenger Trains Nos. 132, 944, and 939, near Wilmington, Delaware, October 17, 1975" (NTSB-RAR-76-7).

Require carriers to train employees in emergency procedures to be used after an accident, to establish priorities for emergency action, and to conduct accident simulations to test the effectiveness of the program, inviting civic emergency personnel participation. (R-76-29)

In response to recommendation R-76-29, the FRA replied on August 22, 1977, that it was "analyzing carrier testing and training programs submitted under [49 CFR] Part 217--Railroad Operation Rules . . . and will determine what training and testing regulations are necessary to ensure adequate training programs." The Safety Board is holding the recommendation in an "Open--Acceptable Action" status.

In its investigation of an accident at Seabrook, Maryland, 5/ the Safety Board recommended that the FRA:

Promulgate regulations establishing minimum standards for the training of traincrews in the safe operation of trains and in emergency procedures. (R-79-40)

In response to recommendation R-79-40, the FRA replied on October 15, 1979, that it did not intend to promulgate regulations in the area of training and that it could "best serve the training needs of the industry through research projects" to improve railroad employee training. The Safety Board, however, believes that research alone does not lead to improved action or adoption of standards by the railroad industry and is holding the recommendation in an "Open--Unacceptable Action" status.

Also, as a result of the Seabrook accident, the Safety Board recommended that Amtrak:

"Establish a program to train crewmembers in the proper procedures for care of passengers in derailment and emergency situations. (R-79-36)

Amtrak replied on March 21, 1979, that it would "follow up on the training of the crewmembers to deal with derailments and emergency situations and include such training in its on-going employee training program. The Safety Board is holding recommendation R-79-36 in an "Open--Acceptable Action" status.

Additionally, as a result of its special study of railroad emergency procedures, 6/the Safety Board recommended on March 5, 1980, that the FRA:

Require operating railroads to develop emergency response plans, put them into effect, and file those plans . . . with the FRA. (R-80-7)

The FRA's reply of June 9, 1980, November 14, 1980, and July 14, 1981, indicated that it proposes to develop a model emergency response plan, but that it would rely on the railroad industry and its employees voluntarily implementing such a plan. Recommendation R-80-7 is being held in an "Open--Unacceptable Action" status. The Safety Board urges the FRA to reconsider its position on this important issue. The Safety Board is pursuing an active followup program with the FRA to effectively and expeditiously close out these and other open recommendations.

5/ Railroad Accident Report--"Rear End Collision of Conrail Commuter Train No. 400 and Amtrak Passenger Train No. 60, Seabrook, Maryland, June 9, 1978" (NTSB-RAR-79-3).
6/ Special Study Report--"Railroad Emergency Procedures," January 18, 1980 (NTSB-RSS-80-1).

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.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the Federal Railroad Administration:

Expedite the development of passenger car safety standards which were mandated by Congress in October 1980 (reiterated January 14, 1983), including in the standards:

- (a) Criteria for the location and intensity of emergency lights within the cars to assure adequate visibility for escape from smoke filled cars;
- (b) Requirements for emergency evacuation plans, for training of personnel for emergencies, and for emergency systems, such as emergency exits and doors, smoke detector systems, etc., specifying the numbers, type, location, and markings;

- (c) Acceptable levels of flame spread rate, smoke emissions, and toxic fumes for interior materials; and
- (d) Requirements for the installation of a sprinkler system to which water can be supplied by emergency equipment through externally mounted standard standpipes.

(Class II, Priority Action) R-83-76)

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


By: Jim Burnett
Chairman