



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

60228B
Log R-88-77

Date: November 30, 1988

In reply refer to: R-88-77

To railroads
with one or more tunnels
1,000 feet or longer
used by passenger trains
(See attached list)

On May 12, 1988, National Railroad Passenger Corporation (Amtrak) passenger train No. 19, the Crescent, a daily through-train operating between New York, New York, and New Orleans, Louisiana, departed Union Station, Washington, D.C., at 6:40 p.m. The train consisted of 2 diesel-electric locomotive units and 16 cars. It carried 402 passengers, including a group of 97 students and their 27 adult chaperones from an elementary school in Pensacola, Florida.

The train entered the 1st Street Tunnel, a 4,108-foot-long, twin-tube, two-track tunnel built under Capitol Hill in 1906. The tubes are separated by a wall, with archways in the wall about each 100 feet. The tunnel is located under 1st Street between Massachusetts and New Jersey Avenues. There are no entrances or exits to the tunnel except through the north and south portals. When the train entered the tunnel, passengers observed that the first coach in the consist began to fill with exhaust fumes (smoke) from the diesel units. ^{1/} At 6:44 p.m., the train brakes were applied when a passenger chaperone who was an experienced railroad employee, erroneously believing an emergency existed, pulled the emergency brake valve on the first coach. As a result, the train stopped in the tunnel 500 feet north of the southern portal. The traincrew assumed that a train brake airhose line had separated, and they first inspected the exterior of the train to determine the cause of the undesired emergency brake application. Meanwhile, the first three coaches of the train, in which the school group was traveling, continued to fill with smoke from the locomotive's diesel engines. The Safety Board investigation revealed that the Amtrak car attendant had accomplished the proper procedure and had turned the car ventilation blowers off, but the procedure did not prevent smoke from entering the car.

At 6:48 p.m., a locomotive crewmember shut down one of the diesel units due to an overheat alarm. At 6:52 p.m., the crew shut down the second unit, at the request of the conductor, to prevent further smoke accumulation in the tunnel and cars. Shortly afterward, the engineer was advised that a yard engine had been called to pull the train back into the station. At 7:05 p.m., a yard engine from Union Station was coupled to the rear car of the train, and railroad personnel reseated the tripped emergency brake valve on the first coach.

^{1/} Due to the lack of ventilation in the tunnel, the accumulation of smoke in some cars is not unusual, even with the individual car ventilators turned off.

An Amtrak crewmember, who received a request for medical treatment from a passenger, called for emergency medical assistance to meet the train when it returned to the station platform. District of Columbia emergency response personnel responded to the call. At 7:25 p.m., the train returned to Union Station and all passengers from the first three cars, including the school group, were evacuated from the train. As a precaution, 86 passengers, mostly occupants of the first three passenger coaches and members of the student group, were treated and released by local hospitals for minor respiratory irritation aggravated by mild smoke inhalation. Except for one passenger who remained overnight for medical observation, local physicians found no dysfunctions during their examinations.

In response to another request for medical treatment through the District of Columbia's emergency response system, police and emergency ambulance service, and later the fire department, responded to the station. Responding personnel found that no one at Union Station, including Amtrak police, was aware of the reported medical emergency or where they were supposed to go. Fortunately, the responding personnel located the train. The Safety Board is concerned that there was an elapsed time of over 40 minutes between the stopping of the train in the tunnel and the evacuation of the train and passengers from the tunnel. The Safety Board believes that the timely evacuation of passengers from the tunnel should be given high priority in an emergency response plan.

Amtrak's existing procedure for a train disabled in the 1st Street Tunnel is to return the train to the station by dispatching a switch engine to pull the train back to the station. Before a train is returned, it must be inspected to determine that all the cars are on the rail and that all air hoses are connected. When there are 16 cars and 2 locomotive units, with a large number of cables and hoses between the cars, these procedures can take considerable time, since both sides of the train must be inspected. In this incident, the situation was further complicated by inadequate illumination in the tunnel. Moreover, efforts by the crew to determine what had caused the train brakes to apply was delayed for several reasons:

- o The passenger who pulled the emergency cord did not report this fact to the crew.
- o Ordinarily, air pressure for brakes would be continually pumped into the system and the leak could be found easily. However, it was necessary to shut down the diesel engines to reduce the fumes in the tunnel, and the air pressure was no longer available.
- o Due to deficient training or inexperience, the Amtrak car attendant, who was in the first car, did not recognize the sound of air escaping from the emergency brake valve in the car as the sound of a tripped emergency valve. Therefore, she took no action to advise the other crewmembers.

While the train was disabled in the tunnel, another train entered the adjacent track from the south, which may have contributed to the increased smoke accumulation in the tunnel. The Safety Board is concerned that Amtrak may have allowed a second train into the tunnel without fully assessing the possible consequences of the train movement. This decisionmaking procedure should be addressed in an emergency response plan.

The 1st Street Tunnel has served rail traffic through Washington for 82 years. However, several inadequacies in the tunnel design hampered or delayed a timely response in several important ways:

- o Ventilation was inadequate because there are no blowers in the tunnel. Two blowers are in service in the subway area under Union Station to prevent fumes from entering the station. These blowers exhaust diesel fumes accumulating in the subway into the tunnel. When the train was stopped, the flow of air through the tunnel was impeded. Witnesses reported that within 2 minutes after stopping in the tunnel, additional smoke accumulated in the first three passenger coaches while the diesel units were running to supply electrical power to the disabled train.
- o Lighting was inadequate for meeting the needs of emergency operations. When the engines were shut down, the train's primary power source was lost. The lead cars became dark due to smoke and the reduced intensity of the battery-powered emergency lighting. The traincrew's inspection of the train and removal of the train from the tunnel probably would have been more timely had there been increased lighting in the tunnel.
- o Communications in the tunnel depend on an operable locomotive radio. However, while communications from the conductor could be heard by the control tower in Union Station, it was necessary for a crewmember to use the locomotive radio to relay instructions from the tower to the conductor. Amtrak currently is reviewing the existing communications system.

The District of Columbia government suggested in a June 17, 1988, letter to the Safety Board regarding this incident that designated locations be assigned where emergency response personnel could contact Amtrak personnel when responding to emergencies at the station. While the police and fire departments regularly respond to routine problems at the station, it is apparent from the response to this incident that additional coordination is needed for more serious mishaps. With the renovation of Union Station currently in progress, Amtrak and the District of Columbia need to develop a mutual plan for use in future emergencies onboard trains, and in particular, trains that are inside the 1st Street Tunnel.

Amtrak recognizes that specific improvements in its emergency response procedures for tunnels are needed and is working to develop procedures for responding to disabled trains in tunnels. Additionally, Amtrak plans to work with the Federal Railroad Administration and the District of Columbia to develop emergency plans for handling Union Station emergency notification and coordination, including training and drills. However, the Safety Board is concerned that these worthwhile joint efforts may not be receiving sufficient emphasis and believes the Union Station emergency response plans should be expedited.

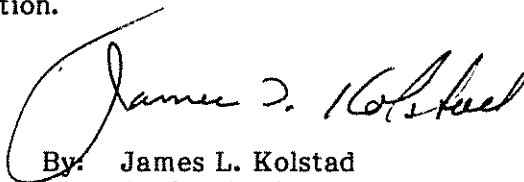
As a result of its investigation of this incident, the National Transportation Safety Board recommends that railroads with one or more tunnels 1,000 feet or longer used by passenger trains:

Undertake a system review of existing tunnels used in passenger operations to determine needed changes in ventilation, lighting, communications, and other safety features, and establish priorities for corrective action. (Class III, Longer Term Action) (R-88-77)

Also, the Safety Board issued Safety Recommendations R-88-74 and -75 to the National Railroad Passenger Corporation and Safety Recommendation R-88-76 to the District of Columbia.

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" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation R-88-77 in your reply

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in this recommendation.

A handwritten signature in cursive script that reads "James L. Kolstad". The signature is written in dark ink and is positioned above the typed name and title.

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