

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: September 20, 1978

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Forwarded to:

Honorable Richard S. Page  
Administrator  
Urban Mass Transportation Administration  
400 Seventh Street, S.W.  
Washington, D.C. 20590  
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SAFETY RECOMMENDATION(S)

R-78-52  
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About 8:03 a.m., on February 10, 1978, a trolley car and a bus owned by the Port Authority of Allegheny County collided in Pittsburgh, Pennsylvania, when the trolley car suddenly turned into the path of the oncoming bus. Four persons were killed, 37 persons were injured, and damage was estimated to be \$48,000. 1/

The operation of the track switch from one position to the other can only be done electrically by a fault in the circuit or by action initiated by a trolley operator. The trolley operator only has a capability to operate the track switch when the trolley pole of his car is on the ratenary contactor switch. He can do this by using a track switch control lever on the operating console or by applying power with the power pedal.

The trolley car operator involved in this accident testified that the switch arbitrarily operated to the curve track, contrary to his desired route, seconds before his car entered the switch. According to his testimony, he did not do anything to cause the switch to operate. However, the reported position of his car at the time the switch operated would have placed the car's trolley pole past and clear of the catenary contactor.

1/ For more detailed information on this accident, read "Railroad Accident Report--Collision of Port Authority of Allegheny County Trolley Car No. 1790 and Bus No. 2413, Pittsburgh, Pennsylvania, February 10, 1978," (NTSB-RAR-78-5).

Similarly, on February 14, 1978, another trolley car operator reported that the switch lined for the curve as his car approached it. According to his testimony, his car's trolley pole would also have been past and clear of the catenary contactor when the switch operated. He testified that he had to reverse the car and coast through the switch two times before the switch properly operated for the straight track.

The switch components and cables, the circuit components, and the car in the accident were checked for faults and none was found. Operating tests through the switch, including tests conducted using the car involved in the accident, revealed no undesired operations. Therefore, since no faults were found in the circuitry and equipment, and since the reported malfunction could not be duplicated, the Board concludes that the movement of the switch was caused by the operator.

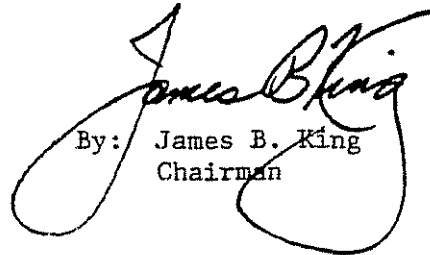
The operation of the track switch from the car is provided for by a spring-loaded, single-throw, toggle switch. This is the preferred and authorized method. However, since the track switch responds to a current load of 60 amperes or more, it will operate if the power control pedal is depressed. If this happens when the trolley pole is on the catenary contactor, the switch will position for a diverging or curve route. The toggle switch gives a more positive control and, because of an inherent timing circuit, gives the operator more flexibility in operating the track switch. Even though the operation of the track switch by use of the power control pedal is prohibited, the feature should be removed. This is especially critical since the operator must "guess" when his car's trolley pole is either on or clear of the catenary contactor switch.

Because the operation of the track switch by use of the power control pedal proved to be a crucial factor in this accident, the Safety Board recommended that the Port Authority of Allegheny County disable this feature on its fleet of PCC-type trolley cars. The Safety Board understands that other street car systems in the United States may use the same basic circuit configuration to operate electrical track switches, and, therefore, the same potential exists for an undesired operation.

Since trolley cars are still in service in several U.S. cities, and as a result of its investigation of this accident, the National Transportation Safety Board recommends that the Urban Mass Transportation Administration:

Inform operators of trolley car systems of the details of the Pittsburgh accident and, where applicable, have them disable the car feature that makes it possible to operate track switches by use of the power control pedal. (Class II, Priority Action) (R-78-52)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendation.

  
By: James B. King  
Chairman