

Log R-426

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: November 29, 1982

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Forwarded to:

Mr. David F. Girad-di Carlo  
Chairman  
Southeastern Pennsylvania Transportation  
Authority  
130 South 9th Street  
Philadelphia, Pennsylvania 19107  
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SAFETY RECOMMENDATION(S)

R-82-110 through -112

About 9:48 a.m., e.s.t., on January 2, 1982, eastbound Southeastern Pennsylvania Transportation Authority (SEPTA) passenger train No. 114, consisting of a single rail diesel self-propelled passenger car (RDC), struck a southbound Atlantic Richfield Company (ARCO) tractor/cargo-tank semitrailer (truck) carrying gasoline at the Second Street Pike crossing at Southampton, Pennsylvania. The tractor and trailer overturned, erupted in fire, and crushed the rear of an automobile standing south of the crossing in the northbound lane of Second Street Pike. Five persons sustained minor injuries. The train operator sustained second- and third-degree burns over 80 percent of his body and died 2 weeks later as a result of his injuries. Damage was estimated at \$452,900. 1/

The conductor's statement that the whistle was sounding for the crossing and the train was slowing, indicates the operator was aware of his approach to the crossing and the Southampton Station stop. If the operator saw the automatic grade crossing signals operating originally and the automobile stopped south of the crossing, he probably believed it was safe to continue with the assurance that other traffic would not enter the track. Therefore, he most likely did not notice that the crossing signals had stopped flashing.

Single rail diesel cars have a history of failure to shunt track circuits because of their light weight. SEPTA and its predecessor, Conrail, were aware of the problem and issued Timetable General Instructions which require single rail diesel cars to approach highway grade crossing prepared to stop unless the automatic grade crossing protection is known to be working. Also, railroads have taken other measures to improve the ability of single rail diesel cars to shunt track circuits. Because the Budd rail diesel cars operated by SEPTA are equipped with disc brakes, the cars also are equipped with wheel scrubbers designed to free the wheel tread of dirt and provide a better electrical contact with the rail. However, due to the cars' light weight, train No. 114 apparently did not hold a constant shunt, most likely due to the nonuse of the track during the 2 days before the accident and the possibility of a film of dirt and rust building upon the rails from frost and dew.

1/ For more detailed information, read "Railroad/Highway Accident Report—Collision of Southeastern Pennsylvania Transportation Authority Commuter Train with a Gasoline Truck, Southampton, Pennsylvania, January 21, 1982" (NTSB-RHR-82-3).

SEPTA is maintaining the signal equipment associated with the flasher protection in accordance with standards established by the Federal Railroad Administration (FRA). However, the 1977 FRA study which examined reported highway crossing signal failures indicates that such failures do occur even with equipment being maintained according to FRA standards. In addition, the study indicates 12 failures could not be classified and involved Conrail which formerly owned the Fox Chase Line. These failures could very well have been caused by loss of shunt. If the cables had been defective, the batteries had been low, the power had been turned off, or the ballast had leaked excessively, these types of problems would have caused the flasher lights to flash red because of its fail safe feature. However, if a problem had occurred because of momentary loss of shunt by RDC, the automatic grade crossing protection may have not been activated. This condition can be eliminated by using a relay designed to respond to the loss of energizing power before it moves to its deenergized position, or an electronic device can be used to slow the operation of appropriate relays in the crossing protection circuitry.

The structural damage at the front of the train allowed the burning gasoline to enter the forward passenger compartment of the car. Fortunately, the conductor and three passengers who were in the car were all near the rear. Had there been a full passenger load in the car, the inward opening doors at the ends of the passenger compartment might have trapped the passengers in the car with more disastrous results, as occurred in the similar single RDC car/fuel truck collision on the Boston and Maine Corporation (B&M) Railroad in Everett, Massachusetts, on December 28, 1966. 2/

The newer type of rail diesel cars the SP2000 model, manufactured by the Budd Co., are now equipped with sliding doors at the sides and ends of the passenger compartments to preclude this problem. However, the older style cars should have the doors modified to facilitate exiting during an emergency.

The operator of the rail diesel car had 9 years of experience operating rail cars on SEPTA. All but the last 3 months of his experience had been on the Broad Street subway line on which there are no highway grade crossings. Although the training the operator received on the RDC and the physical characteristics of the Fox Chase Rapid Transit Line may have been adequate, the operator was relatively inexperienced in operating RDC's over highway grade crossings. This could account for his failure to notice that the grade crossing protection stop functioning, and his failure to make the required stop before operating the train over the crossing under such a condition. The circumstances of this accident should be brought to the attention of all RDC operators during their training and rules examinations.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the Southeastern Pennsylvania Transportation Authority:


Modify the automatic grade crossing protection systems to eliminate the momentary loss of shunt in order to assure that all rail cars approaching grade crossings cause the crossing warning device to operate as intended.  
(Class II, Priority Action) (R-82-110)

2/ For more detailed information, read Railroad Accident Report released February 29, 1968, Boston and Main Corporation Single Diesel Powered Passenger Car 563 Collision with Oxbow Transport Company Tank Truck at Second Street Railroad Highway Grade Crossing, Everett, Massachusetts, December 28, 1966.

Modify the inward opening passenger doors in the existing diesel rail cars to facilitate passenger evacuation in emergency situations. (Class II, Priority Action) (R-82-111)

Enhance your training and education program by bringing the circumstances of this accident to the attention of its employees in order to reduce the likelihood and severity of railroad/highway grade crossing accidents. (Class II, Priority Action) (R-82-112)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and McADAMS and EGEN, Members, concurred in these recommendations. BURSLEY, Member, did not participate.

  
By: Jim Burnett  
Chairman