



U.S. Department
of Transportation

**Federal Railroad
Administration**

1120 Vermont Ave., N.W.
Washington, D.C. 20590

MAY | 7 2005

Mr. Robert C. VanderClute
Senior Vice President - Safety and Operations
Association of American Railroads
50 F Street, NW
Washington, DC 20001

Dear Mr. VanderClute:

So far this year, there have been three specific activation failures, two of which involved train/motor vehicle collisions, that occurred at highway-rail grade crossings equipped with active warning systems. The Federal Railroad Administration (FRA) is concerned because in each of these events motorists were not provided adequate warning.

FRA would like to take this opportunity to review with you the information gathered regarding these events (two of which resulted in fatalities), and to recommend some possible preventive courses of action. We are sending identical letters to railroad trade associations and the most directly involved rail labor organizations so that this information is disseminated to those most likely to benefit from it.

1. Manual Cut-Outs. In the State of New York, a fatal grade crossing collision occurred when a member of a train crew of a standing train inappropriately operated a manual cut-out device, resulting in the highway-rail grade crossing warning system being deactivated despite the oncoming approach of a straight through train movement on an adjacent main track. This error resulted in a very short warning for a motorist, an ensuing collision, and a fatal injury. Preliminary findings indicate that the employee who operated the manual cut-out for the warning system had not been sufficiently trained.

Railroads have the responsibility to provide their employees with clear and unambiguous guidance on the use of manual cut-out devices and to train employees to become proficient so that they do not inadvertently interfere with the normal functioning of active warning systems. Many grade crossing active warning systems of older design are equipped with manual cut-out devices that enable authorized railroad personnel to place them in a deactivated status when trains are standing on the circuit in order to avoid unnecessary activation of the warning system and resultant disruption of roadway traffic.

It is desirable that highway authorities periodically contract for upgrading of warning systems, permitting use of contemporary technology that does not employ manual cut-outs. However, as long as manual cut-outs remain in service, railroads need to ensure that all of their employees are familiar with them and have specific procedures for their use.

Recommendation

FRA therefore recommends that railroads survey their systems to ascertain all locations where manual cut-out devices are located and make sure they are properly secured against unauthorized entry, are clearly labeled, and contain clear and adequate instructions, including conspicuous and clear warnings of inappropriate use. All employees who use the device should be properly trained on its use.

FRA further recommends that where manual cut-out devices are located and where there is an elevated risk of unsafe failure (e.g., at locations of two or more adjacent main tracks equipped with such devices), the railroad should consider installation and maintenance of event recording capability. The information recorded should be sufficient to determine the status and functionality of the warning system and of the operation of the manual cut-out device(s). FRA also notes that these devices are required to be tested at least once every three months (49 CFR § 234.269).

2. Staying Clear of Fouling Circuits. Train detection circuits that are a portion of both wayside signal systems and highway-rail grade crossing active warning systems extend into switches and turnouts to at least a point of "clearance" (i.e., not fouling) in relation to the primary track. Many of these circuits are a portion of the approach circuits to an active warning system.

Recently, in the State of Florida, a fatal crossing collision occurred when a local train encroached upon a fouling circuit in close proximity to, and part of, the train detection circuit of a grade crossing equipped with a constant warning time-type active warning system, after an opposing Amtrak train had been operated past a wayside signal displaying a clear signal indication, which governed its movement through the area containing the grade crossing. The result was that the train detection circuit extending into the switch detected the local train, momentarily activated the grade crossing warning system, then "timed out" (i.e., the warning became deactivated because the equipment detected that the local train was not in motion toward the crossing). With the system in this state, the Amtrak train's rapid approach to the crossing was undetected until it reached a point that provided a very short warning time. The result was a fatal collision with a motor vehicle whose operator was inadequately warned of the approaching train. Encroachment by on-track equipment on these circuits can also result in extended periods of unwarranted activation of warning systems, resulting in degradation of the credibility of the warning system. These conditions may, in certain circumstances, be a violation of the requirements found in 49 CFR § 234.209.

FRA reminds railroads of the importance of providing their employees with clear instructions and guidance regarding the importance of clearing, and keeping clear, of portions of track where inappropriate or prolonged train occupancy can defeat the normal functioning of grade crossing active warning systems.

Recommendation

FRA therefore recommends that railroads examine their systems to ensure that all grade crossing locations, where the train detection circuitry extends into a switch leading from the primary track, are clearly marked (through signs or other markings) with the extent to which all such circuits extend. FRA further recommends that each railroad include in its program of instruction for railroad operating rules specific procedures to be used at these locations and that appropriate special instructions be issued for the divisions of the railroads where these arrangements are in place.

3. Testing and Design Errors. In the State of New York, an activation failure of a highway-rail grade crossing active warning system resulted in only about one second warning for an approaching train moving at 40 mph. This incident could have easily resulted in a collision that might have involved very serious consequences.

Investigation of the event led to the determination that a circuit design error in the involved activation circuitry caused the short warning and that it may have been in existence for a considerable period. The circumstances consisted of the following: at just after 3 a.m. (likely contributing to the fact that no collision occurred), a light locomotive consist was operated westward on main Track No. 1, across the grade crossing and through an adjacent interlocking that was comprised of universal crossovers between the two main tracks, stopping just west of the limits of the interlocking but still within the start circuit for eastward train movement. The crossover from Track No. 2 to Track No. 1 was then remotely reversed and the route was lined for a through train movement from west to east. This train movement from Track No. 2, through the crossover to Track No. 1, made at just above 40 mph, provided no more than a second or two of activation of the warning system at the grade crossing.

Investigation revealed that the specific sequence of train movements was not properly identified by the train detection circuitry, resulting in the short warning time. Testing confirmed that this condition existed only for this particular sequence of train movements. Evidently, neither the placed-in-service testing of the installation (as modified in connection with track changes), nor years of periodic testing, uncovered this design error. The design error was subsequently corrected, and FRA has verified that other similar locations on that portion of the railroad are properly configured.

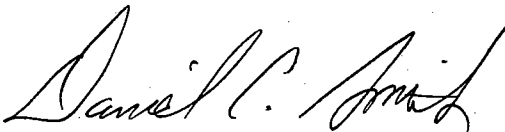
Recommendation

FRA therefore recommends that railroads look at all locations where a diverging route exists within the start circuit of an active warning system. For such locations, circuit plan review or sufficient on-site testing should be performed to determine that no similar design errors exist. FRA further notes that all new placed-in-service testing specifically should include testing necessary to determine no similar conditions are installed (see 49 CFR § 234.257).

Summary: Highway-rail grade crossing active warning systems are complex, and older installations do not benefit from more flexible technology that will eventually be substituted, as funding is available, for upgrading of circuits and control logic. FRA notes that while the possibility is very real that unknown conditions or inappropriate operating procedures will result in an accident/incident, the vast majority of warning system malfunctions (as defined in 49 CFR § 234.3), anomalies, and operating errors involving grade crossing active warning systems do not result in accidents/incidents. In this vein, FRA recommends that railroads assure that all employees are made aware of these events, as well as other grade crossing safety issues, and that the significance of full and proper warning system operation be stressed. Railroads should ensure that emphasis is placed on employees being made aware of the importance of being vigilant to observing warning system operation and of promptly reporting in the designated manner all concerns that may be observed (*see* 49 CFR § 234.101).

I appreciate your attention to these matters and hope that you will assist FRA in distributing our recommendations to all of your respective members.

Sincerely,

A handwritten signature in cursive script, appearing to read "Daniel C. Smith".

Daniel C. Smith
Associate Administrator for Safety