



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: December 16, 2003

In reply refer to: H-03-29

Mr. Jeff P. Morales
Director
California Department of Transportation
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The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses the use of all-red-flash railroad hold intervals at signalized highway-rail grade crossings. The recommendation is derived from the Safety Board's investigation of the January 6, 2003, Burbank, California, highway-rail grade crossing accident¹ and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued five safety recommendations, one of which is addressed to the California Department of Transportation. Information supporting this recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

On January 6, 2003, about 9:30 a.m. Pacific standard time, eastbound Metrolink commuter train 210 struck a Ford F-550 crew cab, stake bed truck at the North Buena Vista Street grade crossing in Burbank, California. Upon impact, the truck's fuel tank was compromised, releasing fuel and resulting in a postcrash fire that consumed the stake bed, which remained at the crossing, while the truck's cab, which was not on fire, continued eastward with the train. The train derailed and came to a stop about 1,300 feet east of the crossing. The cab and second cars of the train came to rest on their sides; the remaining two cars and the locomotive remained upright. The truckdriver was fatally injured. Of the train's 59 passengers and 2 crewmembers, 32 sustained injuries; 1 passenger, who was treated and then released from a local

¹ For additional information, read National Transportation Safety Board, *Collision Between Metrolink Train 210 and Ford Crew Cab, Stake Bed Truck at Highway-Rail Grade Crossing in Burbank, California, on January 6, 2003*, Highway Accident Report NTSB/HAR-03/04 (Washington, DC: NTSB, 2003).

hospital, died 15 days later from internal injuries that were probably sustained during the accident.

The National Transportation Safety Board determined that the probable cause of this accident was the design of the traffic signals' railroad hold interval, which displayed a flashing red arrow for the eastbound North San Fernando Boulevard left turn lane, improperly implying that, after stopping, the truckdriver was permitted to make a left turn onto North Buena Vista Street. Contributing to the accident was the lack of a raised median at the crossing that would have obstructed the path used by the truckdriver to make the left turn.

The accident driver received confusing, potentially contradictory, messages from the highway-rail signal system that governed traffic movement at the North San Fernando Boulevard-North Buena Vista Street highway-rail grade crossing. The interconnected signal system, which had been installed in 2002, less than a year before the accident, did not malfunction. As it was designed to do, the approach of the Metrolink train caused the railroad signals at the crossing to alternately flash red, an indication requiring all oncoming traffic to stop until the signal aspect was extinguished. Flashing red railroad signals are intended to have no other meaning.

The approaching train also preempted the normal operation of the highway traffic signals, which, following a track clearance interval, transitioned to all-red-flash mode for all circular red and red arrow indications. The Safety Board concludes that the signal system functioned as designed and that the accident driver behaved accordingly, stopping his vehicle for the continuous red arrow that governed the left turn lane; only after that arrow changed to the all-red-flash mode did he proceed into the intersection and onto the crossing, and the collision occurred. The *Caltrans Traffic Manual* permits use of the all-red-flash mode in California when grade crossing warning equipment is within 197 feet of a signalized intersection, but it thereby presents motorists with a potentially conflicting message that, as in this case, can have fatal consequences.

The *Manual on Uniform Traffic Control Devices* (Section 8.B.05) explicitly states that "all existing turning movements toward the highway-rail grade crossing should be prohibited during the signal preemption sequences." Yet both the *Manual on Uniform Traffic Control Devices* and *Uniform Vehicle Code*, which is the primary source for standards on the meaning of vehicular signal indications, agree that the all-flash-red mode essentially has the same meaning as an octagonal STOP sign, that is, vehicles are to stop and then proceed with caution. The accident driver thus encountered railroad signals that directed him to stop and highway signals that could be interpreted more permissively. Possibly compounding the confusion was the fact that southbound traffic on North Buena Vista Street had cleared after the crossing gate on the north side of the tracks descended, and, as a result, cross traffic no longer posed a risk to the accident driver.

In fact, the more permissive meaning of the all-red-flash mode is the more common one. If motorists encounter flashing red signals at all, they are most likely to do so either late at night, which is usually a period of lower traffic volume, or when a signal malfunctions and its internal

monitoring equipment, having detected a fault, automatically places the signal in all-red-flash.² In either situation, drivers may proceed as they would at a four-way STOP intersection. Had a train arrived at this intersection while the traffic signals there were malfunctioning and consequently in the all-red-flash mode, all traffic signals would have been the same indications that they were at the time of the accident.

The Safety Board concluded that use of the all-red-flash mode for traffic signals at a railroad grade crossing has ambiguous meaning, can be confusing to motorists, and, as a result, creates unnecessary risks to life and property.

Therefore, the National Transportation Safety Board recommends that the California Department of Transportation:

Prohibit the all-red-flash option for traffic signal indications during the railroad hold interval at grade crossings. (H-03-29)

The Safety Board also issued safety recommendations to the city of Burbank, California; the National Committee on Uniform Traffic Control Devices; the National Committee on Uniform Traffic Laws and Ordinances; the Federal Highway Administration; the American Association of State Highway and Transportation Officials; the Institute of Transportation Engineers; and the Transportation Research Board. In your response to the recommendation in this letter, please refer to H-03-29. If you need additional information, you may call (202) 314-6177.

Chairman ENGLEMAN, Vice Chairman ROSENKER, and Members GOGLIA, CARMODY, and HEALING concurred in this recommendation.

Original Signed

By: Ellen G. Engleman
Chairman

² Both the *Caltrans Traffic Manual* and the *Manual on Uniform Traffic Control Devices* also allow the option of all-yellow-flash on one street and all-red-flash on the other street; they defer to “engineering judgment” in choosing between options.