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# NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20594



## Safety Recommendation

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**Date:** November 23, 1994

**In Reply Refer To:** R-94-13 through 15

Honorable Jolene M. Molitoris  
Administrator  
Federal Railroad Administration  
400 Seventh Street, S.W.  
Washington, D.C. 20590

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On November 11, 1993, about 12:24 a.m. Pacific Standard Time, a Burlington Northern (BN) freight train collided head on with a Union Pacific (UP) freight train at BN milepost 102.8 south of the Longview Junction South interlocking near Kelso, Washington.<sup>1</sup> As a result of the accident all five crewmembers from both trains were killed.

This past spring, the BN and the UP announced their intention to establish a positive train control (PTC) demonstration project on 750 miles of UP and BN track in the northwestern United States. The demonstration area will include the site of the Kelso accident. The system will contain both positive train separation (PTS) and speed control features. Some sections of track will use satellite-based communications and global positioning satellites to locate and record train positions. Other sections of track will be controlled using ground-based transponders and communications.

On July 13, 1994, the FRA released *Railroad Communications and Train Control*.<sup>2</sup> The report discusses PTC in detail. The FRA suggests using risk assessment to determine which rail

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<sup>1</sup>For more information, read Railroad Accident Report--*Head-On Collision and Derailment of Burlington Northern Freight Train 01-111-10 and Union Pacific Freight Train NPSEZ-09, Kelso, Washington, November 11, 1993* (NTSB/RAR-94/02).

<sup>2</sup>U.S. Department of Transportation, FRA. *Railroad Communications and Train Control*. Report to Congress, July 1994.

corridors could benefit the most from PTC. It has committed to monitoring and providing technical support for the PTC test bed in the northwest United States. It has also indicated that it will support Amtrak's activities on the northeast corridor to upgrade signal systems for 150-mph operation and will promote and develop PTC technologies as an element of high speed rail technologies.

The National Transportation Safety Board recognizes the efforts of the FRA, the Association of American Railroads (AAR), and the railroad industry in developing the report, and the Board supports its essence. However, the Board remains concerned about the future of PTS in the United States.

The Safety Board has long believed that PTS has advantages beyond safety that should be considered. Increase in rail line efficiency and utilization, savings in fuel use, reduced wear and tear on equipment through train pacing, and maintenance savings from eliminating pole lines and outdated signal equipment are a few of the business benefits.

The Manager for Train Control Technology for the AAR stated in his presentation on advanced train control systems to the International Association of Railway Operating Officers in 1993 that "rarely has a technology offered as broad a range of benefits to the railroad industry."

In *Railroad Communications and Train Control*, the cost of a universal PTS control system for the nation's railroads is estimated as between \$859 million and \$1.1 billion; however, safety is named as the only quantifiable benefit of PTC. The FRA alludes to the existence of business benefits from PTC but includes safety savings of only \$34.5 million per year. Clearly the benefits of a PTS control system go well beyond safety, but if safety remains the only identified benefit, PTS control systems will never be economically justified.

The safety savings of \$34.5 million per year seem vastly understated in view of the large amounts recently awarded to victims of transportation accidents in litigation suits. Any single serious passenger train accident involving fatalities and/or serious injuries would probably quickly exceed the \$34.5 million per year figure.

The FRA issued a press release with its report to Congress that stated:

To further advance positive train control, FRA, over the next 4 years, will identify high risk rail corridors on which PTC installation could be justifiable based on cost/benefit analysis. Upon a favorable finding, FRA would require installation on specific high risk corridors.

The Safety Board is concerned that without a full assessment of all of the benefits of PTS, including a more reasonable estimate of the true safety savings based on preventing litigation, there may never be a favorable finding by the FRA.

The Safety Board believes that the business benefits associated with PTS are real and need to be included in the cost benefit analysis. If safety is the only criteria for justifying PTS, then the growth of PTS will be very slow. Lack of understanding of the business benefits of PTS may be used as an excuse to label PTS control systems as too costly. The Federal Government and the railroad industry must know the true benefits of PTS control systems before they can make the proper decision regarding its application.

The Safety Board believes that the FRA and the AAR should identify and evaluate all of the potential benefits of PTS and include them in any cost benefit analysis conducted on PTS control systems. The Safety Board concludes that all potential benefits of PTS need to be identified and included in any cost benefit analysis of PTS control systems.

The Safety Board also believes that the FRA, the BN, and the UP should identify and evaluate all potential safety and business benefits of the PTC system currently proposed for the northwest region of the United States. The value of these benefits should be considered in the overall assessment of the system.

PTS control systems require specific information about the train speed and location to perform their functions. The control system also requires a data link communications platform to share the information with traffic control centers to ensure safe operation and to avoid conflicts with other trains in the vicinity. Once this information is made available to the PTS control system, it may be possible to use the information for other safety functions. For example, once a train's speed, direction, and exact location are known, it may be possible to provide information to motor vehicles waiting at grade crossings. Information could be displayed on an electronic display installed at the crossing. The display could be used to advise the motorists of such things as the presence of two trains converging at a double track crossing.

During the Rail Safety Summit sponsored by the Department of Transportation on September 30, 1994, panelists mentioned the possibility of using a PTS control system to send train movement information directly to individual vehicles. This possibility was also mentioned in the FRA's report to Congress. The ability to communicate information to individual vehicles could be incorporated in the Department of Transportation's Intelligent Transportation System (ITS) program (formally The Intelligent Vehicle Highway System). The Safety Board concludes that PTS data and information may be useful in enhancing grade crossing safety.

The Safety Board believes that the FRA should identify possible uses for PTS data and information and conduct a study to identify ways in which this information can be used to enhance grade crossing safety. A feasibility study on how this information can be used to enhance grade crossing safety would complement the FRA's current activities on PTS and the ITS program.

The Safety Board continues to be extremely interested in PTS control system development and technology. The Board is pleased that the FRA has issued *Railroad Communications and*

*Train Control.* The Safety Board wants the FRA to continue serious involvement in PTS to ensure that railroads begin installing it on their main lines.

The need for PTS goes beyond the economic benefits of accident avoidance. It is impossible to fully assess the impact of fatalities, serious injury, property damage, environmental damage, or damages awarded through litigation on railroad employees, railroad passengers, or members of the general public. As railroad traffic increases, the risk of major accidents involving passenger trains and freight trains also increases. Public sentiment demands that the railroads be safe. The risk of injuring or killing train crewmembers and passengers or members of the general public, as well as the risk of environmental damage caused by hazardous material spills, is unacceptable. Using PTS control systems is one way that the railroads can act to prevent a great number of human performance or human error accidents.

Therefore, the National Transportation Safety Board recommends that the Federal Railroad Association:

As part of your monitoring and oversight activities on the Burlington Northern and Union Pacific Railroad's train control demonstration project, identify and evaluate all potential safety and business benefits of the positive train control system currently proposed for the northwest region of the United States. Consider the value of these benefits in your overall assessment of the system. (Class II, Priority Action) (R-94-13)

In conjunction with the Association of American Railroads, identify and evaluate all of the potential benefits of positive train separation and include them in any cost benefit analysis conducted on positive train separation control systems. (Class II, Priority Action) (R-94-14)

Identify possible uses for positive train separation control systems data and information and conduct a study to identify ways in which this information can be used to enhance grade crossing safety. (Class II, Priority Action) (R-94-15)

In addition, the Safety Board reiterates the following safety recommendations to the Federal Railroad Administration:

Promulgate Federal standards to require the installation and operation of a train control system on main line tracks that will provide for positive separation of all trains. (R-87-16)

In conjunction with the Association of American Railroads and the Railway Progress Institute, establish a firm timetable that includes at a minimum, dates for final development of required advanced train control system hardware, dates for a implementation of a fully developed advanced train control system, and a

commitment to a date for having the advanced train control system ready for installation on the general railroad system. (R-93-12)

Also, the Safety Board issued Safety Recommendations R-94-16 to the Association of American Railroads, R-94-17 to the Burlington Northern Railroad, and R-94-18 to the Union Pacific Railroad.

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 recommendations in this letter. Please refer to Safety Recommendations R-94-13 through -15 in your reply. If you need additional information, you may call (202) 382-6840.

Chairman HALL and Members LAUBER and HAMMERSCHMIDT concurred in these recommendations.

  
By Jim Hall  
Chairman