Statement of Joseph H. Boardman,
Administrator,
Federal Railroad Administration,
U.S. Department of Transportation
before Senator Barbara Boxer,
U.S. Senate

September 23, 2008

Senator Boxer, I very much appreciate the opportunity to appear before you today, on behalf of Secretary Peters, to discuss rail safety and the recent tragic collision on September 12 in Chatsworth, California. Safety is the top priority of the Federal Railroad Administration (FRA), and the promise that technology holds to improve safety is compelling: technology can help prevent accidents, and it can help to reduce the severity of those that do occur. Recent statistics show that the industry as a whole is getting safer, but recent, highly publicized accidents show that there is still room for improvement, and we must accelerate the rate of progress. We are addressing these issues through better use of data, focusing oversight and inspection resources, and accelerating research in key areas.

FRA is also encouraged that the Senate and House may reach agreement on a bill to reauthorize the Federal rail safety program this year. Once again, we urge that Congress adopt the provisions of the Administration's rail safety bill (H.R. 1516, S. 918), including the provisions to supplement FRA's safety program with a safety risk reduction program and to grant the Secretary the authority to prescribe science-based regulations governing the hours of service of railroad operating employees, as recommended by the National Transportation Safety Board (NTSB).

FRA is assisting the NTSB in investigating the Chatsworth accident, in which a Metrolink commuter train, pulled by a conventional locomotive, collided with a Union Pacific Railroad Company freight train. As a result, 26 people lost their lives, and a significant number of passengers were injured.

The accident occurred at about 4:25 p.m., and FRA was notified at about 4:45 p.m. Personnel from FRA's Southern California District were immediately dispatched and arrived onsite at approximately 5:45 p.m. FRA's Regional Administrator traveled from the regional office in Sacramento and arrived onsite at approximately 10:30 p.m. A total of seven FRA employees were onsite on the night of the accident. In addition, FRA's National Passenger Train Accident Forensics Team was dispatched, as were research personnel from DOT's Research and Innovative

Technology Administration's (RITA) Volpe National Transportation Systems Center (Volpe Center) in Cambridge, Massachusetts. FRA and Volpe Center personnel remained onsite until released by the NTSB. Our personnel have since returned to the site on numerous occasions either as members of NTSB teams or for testing, inspection, and research purposes.

The Railroad Industry's Safety Record

In general, the safety trends on the Nation's railroads are favorable. Train accidents were down 11.7% in 2007 compared to 2006. The train accident rate of 3.30 (number of train accidents per million train-miles) in 2007 represents an all-time low.

In addition, FRA recently completed all the provisions of our National Rail Safety Action Plan, which successfully targeted the most frequent causes of train accidents, focused FRA inspection and enforcement resources, and accelerated research efforts that have the potential to mitigate the largest risks. However, not all trends are positive. Improvements in the rate of train accidents have slowed, and significant accidents continue to occur, as evidenced by the recent collision in Chatsworth. Human factors and track conditions continue to be the leading causes of train accidents.

FRA is committed to improving this record and we are focusing on ways to prevent train accidents, and—when they are not prevented—to mitigate their consequences. The Chatsworth collision has appropriately focused attention on positive train control (PTC).

Positive Train Control–Preventing Accidents

FRA is a strong supporter of PTC technology and is an active advocate for its continued development and deployment. We agree with the desire of the NTSB and the Congress to see PTC become a reality on more railroads, more quickly.

PTC is a generic term for various advanced train control technologies that can prevent train collisions through automatic train brake applications whenever a train operator, for whatever reason, fails to properly control the train. They also provide capabilities such as automatically-enforced compliance with speed restrictions and enhanced protection of maintenance-of-way workers who are within their working authority limits.

FRA's final rule enabling railroads to install PTC became effective on March 7, 2005. It was the first revision of Federal signal and train control regulations since 1984. The rule is a performance standard for PTC systems that railroads may choose to install. FRA recognizes that it may seem that it is taking a long time for railroads to implement PTC systems on their properties. The fact is, however, that a great deal has been done and is currently being done toward this end. Also, ongoing development and implementation of these systems continue to increase at a quicker pace, being made less onerous as more is learned and experience is gained. Moreover, as various benefits are realized from the implementation of PTC systems, FRA believes that continued, and perhaps more aggressive, growth in their use is highly likely. A summary of the existing projects follows:

- There are currently 13 different PTC system projects.
- They involve a total of nine different railroads and are located in 22 different States.
- Current test projects consist of a total of 2,559 route-miles and 3,107 track-miles.
- BNSF Railway Company alone has plans for implementing its Electronic Train Management System (ETMS) on 35 subdivisions.
- The Union Pacific Railroad Company is looking at its PTC system being implemented initially on four major subdivisions, with longer-term goals of expanding it systemwide.
- The Northeast Illinois Regional Rail Corporation, or Metra, is planning a PTC system on its Rock Island line.
- CSX Transportation, Inc., the Norfolk Southern Corporation railroads, the Alaska Railroad Corporation, the Ohio Central Railroad Company, and the Port Authority Trans-Hudson Corporation are all involved in the development of PTC systems on their lines.

It should be noted that PTC is a reality on a portion of the Northeast Corridor, including all segments where train speeds exceed 125 mph, under an FRA order. Between New Haven, Connecticut, and Boston, Massachusetts, all trains (intercity passenger, commuter and freight) run equipped with the Advanced Civil Speed Enforcement System (ACSES), which is integrated into the automatic cab signal and automatic train control system. Amtrak continues to develop the capabilities of that system, but its fundamental elements provide for full PTC functionalities. Amtrak's Incremental Train Control System (ITCS) currently supports operations up to 95 mph, and Norfolk Southern freight trains on the line are also equipped for

PTC. Additional details are available on the "Positive Train Control Project Chart," which I would like to submit for the record.

FRA is also sponsoring multiple research projects to validate or improve PTC core technologies related to communication and navigation, adaptive braking, interoperability, risk assessment, and simulations.

On the other hand, some of the main reasons that progress has not been faster are as follows:

- Limited availability of needed radio spectrum.
- The absence of interoperability (e.g., locomotives equipped with one type of PTC that works on one line cannot use their PTC on certain other lines equipped with a different type of PTC).
- The concern that systems may not be reliable and, thus, could exacerbate congestion.
- Complex braking algorithms that need refinement.

The Department has actively supported deployment of PTC through research and demonstrations, technical assistance, and issuance of performance-based regulations, and the railroads have been actively exploring the use of such systems, but much work remains to be done in developing the systems and in improving standards for interoperability. We strongly believe that the technologies that make up PTC should be deployed as they become market-ready, and we are approaching that state.

It should be noted that recent months have brought new optimism that the major freight railroads will move forward with deployment of interoperable PTC. There appears to be a convergence of major freight railroads around the basic technology that supports the BNSF Railway's ETMS, although ETMS is not yet approved for mixed operation (passenger and freight). In December 2006, FRA approved the Product Safety Plan for ETMS Configuration I as well as informational filings to test for several of the other ongoing PTC projects. (See 49 CFR Part 236, Subpart H.) The next steps for further deployment of PTC are for FRA, the railroads, and the product vendors to continue to work cooperatively toward the development of successful safety documentation supporting continuing implementation of PTC. Major technical obstacles still must be overcome, including management of radio frequency spectrum so that systems function in a timely way and support the necessary complement of onboard and wayside units.

Passenger Equipment Safety

The long-distance and commuter passenger rail environment has changed significantly in the past decade, with ridership increasing on traditional systems and new systems being brought on line. The overall safety record of intercity and commuter passenger train operations in the United States has been very good. However, there are hazards involved in rail travel, as there are in all forms of transportation. In the event of a collision or derailment, train occupants are subjected to risk of injury from loss of space to safely ride out the incident and/or secondary collisions with interior surfaces resulting from forces that develop as the train slows. In the event of a fire, passengers are subjected to the risk of smoke inhalation and/or burning. Once the train has come to a complete stop, passengers must determine the appropriate actions to take and may have to quickly locate, reach, and operate emergency exits to self-evacuate. Should emergency responder assistance be necessary for evacuation of non-ambulatory occupants or others, emergency responders must be familiar with the operating environment as well as the particular rail equipment involved.

Consequently, FRA continues to be very active in the development of Federal regulations and the support of industry standards for the safety of passenger rail equipment, including structural crashworthiness and interior occupant protection, emergency preparedness and response, and fire safety. FRA and the industry must remain vigilant to ensure that passenger railroads continue to be operated at a high level of safety, and there are several initiatives underway to promote the safety of passenger rail operations.

FRA continues to address the crashworthiness of passenger equipment as well as enhanced passenger and crew protection through our full-scale crash test program. Our main participants in this important research are the American Public Transportation Association (APTA) and Amtrak, with support from labor organizations. The overall objective of the passenger equipment safety research is to develop design strategies with improved crashworthiness over existing designs.

A key step in defining new areas to enhance safety is active accident field investigations. A group of specially trained investigators conduct forensic reviews of both the structural crashworthiness performance of equipment as well as interior occupant protection. The purpose of such investigations is to relate the causal mechanisms of injuries and fatalities to specific features of the train involved in the accident or derailment. FRA had such a team present at the Chatsworth accident. Information gathered from this event will be used to refine, as needed, planned

changes in the structural performance of future Metrolink trainsets—changes that include Crash Energy Management (CEM) technology and interior layouts with improved energy-absorbing seat and workstation table designs.

Computer models have been developed to simulate a variety of passenger rail car crash scenarios. These models, combined with the results of crash tests and field investigations of passenger train accidents, are being used to develop strategies for increasing occupant protection. The role of these tests is to measure and compare the crashworthiness performance of existing passenger equipment and evaluate the improvements achieved by modified designs.

In March 2006, with the support of RITA's Volpe Center, FRA successfully conducted a full-scale impact test involving CEM technology; a technology that FRA has been advancing for many years. The test was conducted at FRA's Transportation Technology Center in Pueblo, Colorado. In this test, a passenger train that had been specially equipped with crush zones helped absorb the force of a crash to better protect the spaces in the train occupied by passengers and train crewmembers. Other devices tested included newly-designed couplers, which are built to retract and absorb energy in a collision to help keep trains upright and on the tracks. Also tested were new passenger seats with special padding and new tables with crushable edges, designed to help prevent and mitigate passenger injuries. Use of this integrated CEM technology is expected to save lives by more than doubling the speed at which all passengers are expected to survive a train crash.

A series of full-scale tests of conventional passenger equipment were completed in the last year to assess the performance of multi-level equipment (similar to that operated in California) when impacting a rigid barrier, as well as the performance of single-level equipment when subjected to loading conditions typical of grade crossing collisions. Information gained from the dynamic impact test of the multi-level equipment will be used to help reconstruct the collision environment from the Chatsworth accident. Overall, the tests support the promulgation of improved end-frame requirements for both static and dynamic loading.

The data and information generated from the passenger equipment safety research program are used in the development of specifications and regulations, including the specification for Amtrak's high-speed trainset, FRA's passenger equipment safety standards issued in 1999, the APTA Manual of Standards and Recommended Practices (first issued in 1999 and revised in 2003), FRA's locomotive crashworthiness regulations issued in 2006, and the specification for Metrolink's

CEM equipment procurement. Additionally, earlier this year, FRA issued a final rule on passenger train emergency systems, which addresses requirements for emergency communication, emergency egress, and rescue access systems, and FRA intends to issue a final rule on enhanced end-frame requirements for cab cars and multiple-unit (MU) locomotives by early next year.

FRA has also been working with the industry on requirements for emergency lighting, emergency signage, and low-location emergency exit path marking systems, as well as requirements for removable panels in interior vestibule doors for emergency use. Research efforts are also underway to evaluate the feasibility of wireless emergency communication systems and removable panels in passenger car end-frame structures.

Advances in Locomotive Crashworthiness

A total of 10 full-scale locomotive crash tests have been conducted to date to test crashworthiness performance in specific types of accidents that could result in fatalities during regular operations. Each test was designed to engage a particular set of structural elements for determining a base-line level of performance, and each test was first simulated using computer modeling prior to the actual test. The model predictions closely matched the actual test results. At least in part as a result of the modeling and testing, the Association of American Railroads (AAR) has adopted a revised standard, S-580 (December 2004), which incorporates improvements in locomotive design. FRA also adopted revised crashworthiness requirements in 2006, which incorporated the AAR's revised S-580 standard. This rule will become effective on January 1, 2009, and locomotive manufacturers are already developing new locomotive front-end designs to be fully-compliant with its requirements. The rule also includes new requirements for improved fuel tank safety. Currently, FRA research is developing additional requirements to prevent locomotive override in rear-end collisions and is examining the feasibility of additional protection for the locomotive crew through improved emergency egress and the use of airbags and seat belts.

Conclusion

Thank you for allowing me to provide this brief update on some of the current initiatives for improving safety in the railroad industry and on the complex, technical areas of PTC, and railroad equipment safety. I look forward to your comments and questions on these important subjects.

Positive Train Control (PTC) Project Chart
September 23, 2008

PTC Projects Nationwide Current and Proposed					
FRA Region	**State Location**	**RR**	**System Name**	**Route Miles**	**Track Miles**
1	MA, RI, CT, NJ	Amtrak	ACSES/ATC	177	376
	DE, MD	Amtrak	ACSES/ATC	27	54
	NY, NJ	PATH	CBTM	14	43
Total	7	2	2	218##	473##
2	OH	OCRS	Train Sentinel	356	356
3	SC, GA, TN	CSX	CBTM	273	273
	SC	NS	OTC	120	120
Total	3	2	2	393	393
4	MI	Amtrak	ITCS	74**	84**
	IL	UP	NAJPTC#	120	120
	IL	BNSF	ETMS I	132	132
	IL	METRA	ETMS	34	75
Total	2	4	4	358	409
5	TX, OK	BNSF	ETMS II	205	217
6	NE	UP	CBTC-VTMS	175	367
7	--	None	--	0	0
8	AK	Alaska	CAS	531	541
	WY, WA, ID	UP	CBTC-VTMS	168	198
	ND, MT	BNSF	ETMS I*	153	153
Total	6	3	3	852	892
Grand Total	**22**	**9**	**11**	**2,559**	**3,107**

Acronyms for PTC Systems in Chart

ACSES/ATC - Advanced Civil Speed Enforcement System/Automatic Train Control
CBTM - Communication Based Train Management system (including on both CSX and PATH)
OTC - Optimized Train Control system

ITCS - Incremental Train Control System
NAJPTC - North American Joint Positive Train Control system
ETMS I - Electronic Train Management System configuration I
ETMS II - Electronic Train Management System configuration II
CBTC-VTMS - Communication Based Train Control-Vital Train Management System
CAS - Collision Avoidance System

Footnotes to Chart

This system moved to the Transportation Technology Center, Inc., at Pueblo, CO, for further development.

Currently in revenue service, supporting speeds up to 150 mph. Two additional ACSES segments, engineered but not funded, are not included.

* Upon planned installation on BNSF's Hettinger Subdivision.

** Assuming that ITCS is extended another 8 miles to the Indiana State line. ITCS is currently installed on 66 route-miles (76 track-miles). ITCS track-miles include six controlled sidings, totaling 10 miles.

Recent Action to Improve Passenger Rail Safety
Federal Railroad Administration
September 13, 2008

January 2008

Passenger Train Safety to Be Improved with New Requirements for Emergency Communication, Evacuation, and Rescue Features

Commuter and intercity passenger rail equipment will be safer under a new federal rule that ensures improved emergency window exit availability, specifies additional emergency rescue features, and requires two-way communication systems. The new regulations issued by the Federal Railroad Administration (FRA) mandate that passenger rail cars be equipped with two-way communication systems that better help train crews inform and instruct passengers during emergency situations and allow passengers to report potential safety or security problems to them. Also, emergency evacuation and rescue access windows are required at all levels with passenger seating, and all new passenger rail cars must be equipped with emergency roof access locations. In addition, the rule includes minimum requirements for the inspection, testing, maintenance, and repair of these safety systems. The new rule also addresses a safety recommendation made and other concerns raised by the National Transportation Safety Board following fatal passenger train accidents including an April 2002 collision between a BNSF Railway freight train and a Metrolink passenger train in Placentia, CA and a February 1996 collision between two New Jersey Transit commuter trains in Secaucus, NJ.

November 2007

FRA Publishes Collision Hazard Analysis Guide for Passenger Rail Operators

The Federal Railroad Administration (FRA) has published a step-by-step guidebook on how to identify and analyze potential hazards along a rail corridor for use in developing effective risk reduction strategies that will improve the safety of commuter and intercity passenger rail operations. The analysis provides a foundation for ensuring that hazards such as highway-rail grade crossings, overhead and trackside structures, or bridge abutments are evaluated and addressed. The FRA publication supports the American Public Transportation Association's (APTA) ongoing Commuter Rail System Safety Program Plan initiative.

August 2007

Proposed Federal Regulations Expected to Improve Safety of Passenger Trains; Afford Passengers and Crew Better Crash Protection

Rail passengers and train crewmembers will be better protected under newly proposed federal safety standards that significantly enhance the strength of key structural components of passenger rail cars to make them more crashworthy. The proposed rule is designed to preserve more space in which both passengers and train crew members can safely survive a collision with another train, a vehicle at a highway-rail grade crossing, or other object by strengthening the car's forward structure. Specifically, existing federal standards would be upgraded for cab cars and multiple-unit (MU) locomotives that are used in the predominant method of operation by commuter and intercity passenger railroads across the country. Under the proposed rule, forward corner posts would have to withstand 300,000 pounds of force before failing, doubling the current federal requirement. In addition, forward corner and collision posts would have to satisfy new federal standards to absorb a minimum level of energy and bend a specific distance without breaking to maximize the full potential strength of these structural components. The new standards would apply to cab cars and MU locomotives ordered beginning in October 2009 and accommodate new equipment designs. With this proposed rulemaking, FRA seeks to formally codify as federal regulation, and enhance in part, industry standards issued by the American Public Transportation Association (APTA) and presently implemented by the nation's passenger rail service operators on a voluntary basis.

Recent Action to Improve Passenger Rail Safety
Federal Railroad Administration
September 13, 2008

June 2006
New FRA Study Re-Affirms Safety of Push-Pull Passenger Rail Operations

A comprehensive federal study of accident data found that push-pull passenger rail service has an excellent safety record and that a train being pushed has virtually no greater likelihood of derailing after a highway-rail grade crossing collision than one with a locomotive in the lead. The study re-affirms the conclusions of a previous report issued in July 2005 by the Federal Railroad Administration (FRA) that reviewed the safety of push-pull operations. The new analysis of grade crossing accidents found that from 1996 to 2005, only three push trains derailed out of 218 collisions and two pull trains derailed out of 290 collisions. This difference in the rate of derailment between push and pull modes is a statistically insignificant 0.69 percentage points. The report also determined that 27 fatalities occurred in push trains and 22 happened in pull trains during this same period.

May 2006
New U.S. Department of Transportation 'Rollover Rig' Research and Rescue Training Simulator to Enhance Passenger Rail Safety

A new rescue training simulator that can rotate a full-sized commuter rail car up to 180 degrees to teach emergency responders how to save passengers from rollover train accidents was unveiled by the Federal Railroad Administration (FRA) at a demonstration in the Washington, D.C. area. The device, known as the Passenger Rail Vehicle Emergency Evacuation Simulator, or "Rollover Rig," can be used to simulate various passenger train derailment scenarios so first responders are able to safely practice effective passenger rail rescue techniques. In addition, it provides researchers the ability to test new passenger rail evacuation strategies and safety components such as emergency lighting, doors, and windows. The FRA developed the Emergency Evacuation Simulator at a cost of $450,000. The commuter rail car was donated by New Jersey Transit. The Washington Metropolitan Area Transit Authority has agreed to house, operate, and maintain the simulator at its emergency response training facility located in Landover, Md. ENSCO, Inc. of Falls Church, Va., designed and built the equipment.

March 2006
DOT Unveils New Crash Energy Management System to Improve Passenger Rail Safety

The federal government is testing new safety devices for commuter trains that are designed to better protect passengers during crashes. The test, conducted earlier in the day at the Department's rail testing facility in Pueblo, CO, was designed to determine if the safety devices that are part of the Crash-Energy Management system will make the more than 414 million annual commuter train riders safer. The crash test of a locomotive and passenger train equipped with special test dummies was the first ever to use the newly designed Crash-Energy Management system. The system includes crush zones that absorb the force of a crash to better protect the parts of trains where passengers sit and operators' spaces. The crush zones have stronger end frames that act as bumpers to distribute crash forces throughout an entire train so passengers feel less of the impact. Other devices tested include newly designed couplers, which join two cars together and are built to retract and absorb energy to keep trains upright on the tracks during a crash. New passenger seats and chairs designed with special padding and crushable edges also were tested. If the new safety system works as designed, they will more than double the speed at which all passengers can survive a train crash, from just 15 miles per hour to at least 36 miles per hour. Los Angeles' MetroLink commuter train system has already ordered new passenger rail cars that incorporate the technology.

Recent Action to Improve Passenger Rail Safety
Federal Railroad Administration
September 13, 2008

July 2005

DOT to Study Safer Seats, Tables for Commuter Trains

The U.S. Department of Transportation's (DOT) Research and Innovative Technology Administration (RITA) launched a new project to make seats and tables on commuter trains safer. Working with the Federal Railroad Administration (FRA), RITA's Volpe National Transportation Systems Center has awarded two contracts worth $850,000 to a Massachusetts-based technology firm, TIAX to develop a safer passenger seat and worktable that will reduce injuries and improve the ability of passengers to safely exit a train following a collision. To make passenger trains safer, TIAX will design a worktable that will absorb energy upon impact and reduce the risk of head, chest, abdomen and leg injuries. The table also will be designed to allow passengers to evacuate more easily following a collision. In addition, improved three-person seats will be developed to reduce the risk of head, chest, and leg injuries by safely compartmentalizing passengers and ensuring that the seat remains attached to the floor upon impact.

Source:
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