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STAYING ON TRACK: NEXT STEPS IN IMPROVING PASSENGER AND FREIGHT RAIL SAFETY

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

JUNE 19, 2013

Printed for the use of the Committee on Commerce, Science, and Transportation

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ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

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STAYING ON TRACK: NEXT STEPS IN IMPROVING PASSENGER AND FREIGHT RAIL SAFETY

WEDNESDAY, JUNE 19, 2013

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice, at 10:04 a.m. in room SR–253, Russell Senate Office Building, Hon. Richard Blumenthal, presiding.

OPENING STATEMENT OF HON. RICHARD BLUMENTHAL, U.S. SENATOR FROM CONNECTICUT

Senator BLUMENTHAL. Good morning, everyone. I am calling to order this hearing of the Commerce, Science, and Transportation Committee, which has the very important and profoundly significant task of hearing testimony from some really excellent witnesses on the issue of rail safety.

And I want to begin by thanking Chairman Rockefeller for the opportunity to have this hearing, which is important not only to the Northeast and to the Midwest, Missouri, but really to the entire country. And I know Chairman Rockefeller has demonstrated his commitment to improving rail safety over many, many years. And I am humbled and honored to have this opportunity.

And I also want to thank Senator Lautenberg for his tireless and relentless effort on this subject. And his loss is a personal loss to me, because he was a mentor and model, but also a loss to the country as a leader in transportation safety and reliability.

And I want to thank the staff of this committee for its excellent work in putting together this hearing, in calling the really very, very well-qualified witnesses that we have, and also in preparing for it.

Let me begin by saying that anybody who questions the need for this hearing has only to read today's headlines. The derailment yesterday of a Long Island railroad train, carrying about 1,000 passengers leaving Penn Station, which essentially paralyzed rail traffic in much of the Northeast Corridor for a substantial period of time, inconveniencing many, many people, and delaying freight and travel.

During the month of May, in a span of less than 2 weeks, our nation witnessed major railroad tragedy, the first of them in Bridgeport, Connecticut, where an eastbound train derailed and then was struck by a westbound train seconds later.

Days later, this same commuter line saw one of its own, a dedicated Metro-North worker, killed by a passing train while he was inspecting track in that vicinity.

And on May 25, just about a week later, two freight trains collided in Missouri.

Only a few days after that event, a railroad grade crossing accident and explosion occurred in White Marsh, Maryland.

We know that rail safety is improving, but these incidents certainly challenge the public's trust and confidence in the system, and the credibility of claims that rail safety is in fact improving.

I think that in many instances, pictures speak louder than words. In fact, as the saying goes, a picture is worth 1,000 words. And we are going to see two pictures in the course of this hearing. One of them is of a shunt system that Chairman Hersman will be presenting in the course of her testimony. This very rudimentary appearing piece of equipment could have saved the life of that Metro-North worker who was killed in West Haven.

The cost? About $200. And thankfully, the NTSB has now recommended, in an urgent recommendation, that Metro-North use this equipment systemwide. But for Robert Luden, it is too late.

And for American railroads, it is too late for adoption and implementation of many of these, literally, life-saving technologies, which are simple, feasible, inexpensive, and cost-effective.

So this hearing is about new technology that may help save lives and dollars. But it is also about existing systems that can and should be implemented.

The other picture, which we are going to see, is of the inspection report that was released in the wake of the collision in Bridgeport, Connecticut. This came to my office just yesterday, but it is the inspection report that was done on May 15, just 2 days before the May 17 derailment and collision.

What it shows, again, as the NTSB has pointed out in its preliminary statement, is that the defect that very likely was responsible for the derailment was found by an inspector at track 4, catenary 734. And the finding was that there were hanging ties and pumping load at that point.

The NTSB has not reached any final conclusions, but I am willing to say at this point that this deficiency very substantially contributed, if it did not actually cause, that derailment. It was found 2 days before.

Whether it should have been corrected, in my view, is indisputable. It should have been. Whether it is the only cause or the probable cause remains open for debate.

But what is astonishing about this report is not only that finding, but all the other defects found on that day at different points on that same track. Any of them could have caused a similar derailment and collision.

So the state of our railroads, literally, is in question. And that is the reason we are here today.

A couple points before I go to Senator Blunt, the Ranking Member.

Clearly, there is a need for infrastructure investment. It may be extremely costly. We have not decided how to pay for it. I have pro-

posed a national rail trust fund, and I will continue to support the creation of a national infrastructure bank.

But the issues for today concern the very simple and cost-effective options out there right now. And one of them actually concerns the technology that exists for better inspection, the Sperry Rail, which produces a better form of inspection, based in the state of Connecticut.

Another concern of mine is the amount of time it takes to do both investigations and rulemaking. Investigations by the NTSB, we are going to learn more about the amount of time it takes to complete those investigations. But in my view, 12 to 18 months is simply unacceptable as the amount of time to complete investigations. We need answers quicker, so that we can solve problems sooner.

And on rulemaking, I am concerned about delays in the FRA's rules. My understanding is that there were 17 rules that were due to be promulgated and finalized, many of them not completed yet; others delayed and, in fact, delayed in their effective dates; and compliance manuals still due.

So there is work to be done here. A lot has been done to make our rail lines safer, but we can and we should, we must, do more.

And passenger and rail freight growth is projected to continue. At the same time, this industry is really at a crossroads, because it has to earn and keep the trust of the American public.

Again, my thanks to our witnesses for being here today. I look forward to your testimony.

And I am now going to turn to Senator Blunt.

STATEMENT OF HON. ROY BLUNT, U.S. SENATOR FROM MISSOURI

Senator BLUNT. Thank you, Senator Blumenthal. And thanks for chairing this hearing today.

I know Senator Blumenthal and I and others on this subcommittee, particularly me as the new Ranking Member, looked forward to the chance to work with Senator Lautenberg who knew so much and cared so much about railroads. And we miss his understanding of these issues and his leadership on these issues.

But Senator Blumenthal's efforts to have this hearing today I particularly appreciate.

I am also particularly glad that Michelle Teel is here. She is the Multimodal Director from the Missouri Department of Transportation and will be on the second panel. We have two extraordinary panels today, and I look forward, as everybody does, to hearing from them.

As Senator Blumenthal has suggested, this is a very current issue. A day before yesterday, on the front page of the Wall Street Journal, there was a big article about conflicting pressures on the industry to do something very expensive and very new, and to maintain a system that is challenging to maintain. I mean, the rail industry is extremely capital intensive. It involves lots of investment on infrastructure that is needed to last 20, sometimes 30, years or longer.

Knowing those cost considerations, it is good to hear from the dedication of all the people who are represented on these panels

today to both supervise this and to make this important industry work.

It is an industry that is growing as we use it in more aggressive ways, both for rail and for passenger. The amount of time, resources, and money that the Federal Government and the private rail line operators have put into increasing safety is important at rail crossings, increasing awareness about the hazards of trespassing, and basically, increasing the overall safety of our actual rail infrastructure. It is a good thing to see this focused on.

If you did not know any better, you would think, if you were an outside observer, that not much was changing. But, of course, in the last few decades, an incredible amount of change has occurred in the rail industry. And it is a dramatically different industry than it was just a few years ago.

But the technological advancement, what I think has really been a nimble regulatory approach by the Federal Railroad Administration and the dedication to improving service has been impressive. But we want to hear about how it could be better, and what the Government can do to both encourage it to be better and to make it less complicated, so that you can achieve those better results.

I am very interested to hear about the status of the system today. I am specifically interested to hear about the progress being made on the implementation of positive train control, which, as almost everyone in this room knows, is supposed to be fully operable by the end of 2015. Most things I see suggest that is a very hard goal to meet.

This mandate, of course, requires possibly more than $10 billion and hours and hours of work to complete.

We had the nominated Chairman for the FCC in this very room yesterday, and I asked him about building all these towers, 22,000 towers. How does that happen in 3 years, unless the FCC figures out ways to be much more aggressive in their view of this than they are on the 2,000 or 3,000 towers that they generally maximize out in being able to permit every year?

I am also anxious to hear about the passenger and commuter rail networks, how they are managing this mandate. And so positive train control is something I hope to leave here knowing about more than I do today, and to know where we should be headed in the Senate, in the Congress, and on this committee.

And again, Mr. Blumenthal, he and I came to the Senate together. We are proud to be in this hearing together. And this is a dynamic and important industry that we need to appreciate for what it is.

So, Chairman, thank you for conducting this hearing today.

Senator BLUMENTHAL. Thank you, Senator Blunt.

Let me introduce the witnesses, and then ask each of you to begin with opening remarks.

First, Joseph Szabo, who is Administrator of the Federal Railroad Administration, he was nominated on March 22, 2009, and confirmed by the U.S. Senate on April 29, 2009. And he is the 12th administrator of the Federal Railroad Administration, and the first to come from the ranks of rail workers.

He leads a staff of over 900 professionals located in Washington, D.C., and field offices across the United States who develop and en-

force safety regulations. They also manage financial assistance programs, and oversee research and technology development programs.

Mr. Szabo is a fifth-generation railroader, who between 2006 and 2009 was Vice President of the Illinois AFL–CIO. And he also has served as Mayor of Riverdale, Illinois, and a member of the South Suburban Mayors Transportation Committee. He has held various other public service positions.

And we welcome you, Mr. Szabo, to the hearing and particularly for your long expertise and your experience in this area.

Chairman Deborah Hersman of the National Transportation Safety Board is recognized as one of the most passionate and visionary safety leaders for all modes of transportation. Among her initiatives include the actions and attention focused on distracted driving, child passenger safety, and helping accident victims and their family.

She has been a Board Member on the scene for 19 major transportation accidents. And she has chaired dozens of NTSB hearings, forums, events, and she regularly testifies before Congress. Her leadership has made the NTSB a better organization, and we are proud to welcome her today.

Susan Fleming, who is Director of Physical Infrastructure Issues in the Government Accountability Office is with us as well, the third witness. She has been a member of the GAO staff for some time. The GAO, as you know, is headed by the Comptroller General of the United States, who is appointed for a 15-year term by the President of the United States from a slate of candidates whom the Congress proposes. And the United States General Accounting Office is an independent, nonpartisan agency that works for the Congress. It is often called the congressional watchdog.

And we welcome you, Ms. Fleming, today. Thank you for being here.

So let us begin with Mr. Szabo.

STATEMENT OF HON. JOSEPH C. SZABO, ADMINISTRATOR, FEDERAL RAILROAD ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION

Mr. SZABO. Thank you, Chairman Blumenthal, Ranking Member Blunt, and members of the Committee. I appreciate this opportunity to testify.

Rail is an extremely safe mode of transportation, but I personally know firsthand the impact that train accidents can have on families and communities. I have been the mayor of a railroad town that has had its share of accidents and hazardous spills. I have been a railroader who was lucky enough to survive a close call and not fall victim to a fatality.

As a conductor, I have experienced firsthand my share of grade crossing fatalities. And over the course of my railroad career, I have had five good friends killed on duty.

The members of my FRA staff, like me, live and breathe railroad safety. As unprecedented private and public investments position rail for its growing role in moving both people and freight, FRA has sharpened its focus on enhanced safety.

2012 was the safest year in railroading history. Since the Rail Safety Improvement Act was passed in 2008, railroad accidents have declined for 5 straight years, part of a 43 percent drop over the past decade.

And this has not occurred by mistake. It reflects our comprehensive approach to railroad safety. We have used good data to increase audits and spot inspections in strategic locations. We have taken steps to ensure the competency of locomotive engineers and conductors. We have issued requirements to have emergency notification systems at every highway rail grade crossing. We have updated our track and passenger equipment safety standards to ensure the safe introduction of high-speed rail service at speeds of up to 220 mph, embracing a performance-based safety approach that will allow proven high-speed train set designs to be used in the United States.

But we must always do better. Our goal always is for continuous safety improvement.

So as we work with the industry to install positive train control, we have placed an increased emphasis on analyzing human factors. This includes advancing risk reduction programs like the confidential close call reporting system, and system safety programs for passenger operations. Our most mature confidential close call reporting system pilot project so far has yielded remarkable results, a 70 percent reduction in accidents.

Looking ahead, the President's 2014 FRA budget request includes funding to expand close call reporting nationally, furthering our understanding of root causes behind accidents, which will help railroads establish prevention measures in advance of an accident.

The key here is, we want to know what is going on before an accident occurs. With our two core authorizations set to expire, our budget also proposes a new 5-year, $40 billion rail authorization, including a national high performance rail system program to fund essential development projects for both passenger and freight rail.

And there is a fundamental link between a higher performing rail network and higher levels of safety, achieving both a state-of-good-repair and advancing new safety technologies.

Consider our investment in 110 mph service in the Midwest, which will upgrade more than 200 grade crossings with what we are calling smart technology that will detect any intrusion into that grade crossing protected area in advance of an accident occurring.

Our investments in North Carolina, which, in addition to improving speeds and reliability, will close some 50 grade crossings and construct strategically placed overpasses and underpasses, enhancing safety for trains, pedestrians, and vehicles.

Under our budget proposal, projects would be eligible to compete for funding through a national high performance rail program. And to fund these efforts, we propose establishing a new rail account within the transportation trust fund, putting rail on par with other transportation modes that benefit from sustained funding sources. And we can provide the predictability in funding that will empower states, local governments, and the private sector to invest in a rail network that is unquestionably safe.

Rail is an extremely safe mode of transportation. But like you, I am not satisfied. With your support, we can lay a deeper founda-

tion for continuous safety improvements. We can increase the use of advanced technology, capture and analyze data from programs like close calls, and close dangerous grade crossings.

Together, we can ensure that rail remains safe, reliable, and efficient. Thank you.

[The prepared statement of Mr. Szabo follows:]

PREPARED STATEMENT OF HON. JOSEPH C. SZABO, ADMINISTRATOR, FEDERAL RAILROAD ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION

Chairman, Ranking Member, and Members of the Committee, thank you for the opportunity to appear before you today, on behalf of Secretary LaHood, to discuss the Federal Railroad Administration's (FRA) rail safety program. Rail is a particularly safe mode of transportation, and one that Americans are choosing more than ever before. In this testimony, I will detail recent accomplishments, including the status of FRA's implementation of the Rail Safety Improvement Act of 2008 (RSIA), and I will discuss current challenges. We would like to note that some railroad accidents widely reported in the press during the last few months do not reflect the positive trends in safety statistics and annual records that we have seen in safety data. In closing, I will describe FRA's preliminary reauthorization proposals, which we view as key components for improving our safety program.

FRA's mission is to enable the safe, reliable, and efficient movement of people and goods for a strong America, now and in the future. This testimony will explain how we are fulfilling that mission.

Recent Accomplishments

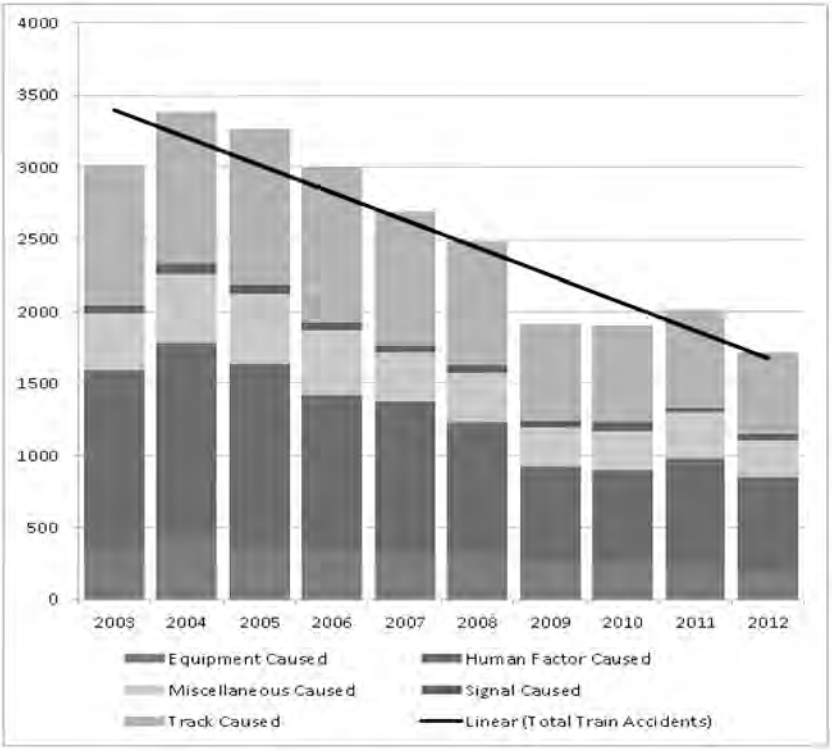
FRA's top priority is safety, and 2012 was the safest year on record, continuing our year-over-year reductions in incidents. Since 2003:

- Total train accidents have declined by 43 percent.
- Total derailments have declined by 41 percent.
- Total highway-rail grade crossing accidents have declined by 34 percent.

These safety improvements have contributed to 18-percent fewer fatalities and 14-percent fewer injuries over ten years, the annual totals falling from 865 fatalities to 706 fatalities, and 9,264 injuries to 7,993 injuries.

This achievement is even more noteworthy because Amtrak ridership reached an all-time high, rail was the fastest-growing mode of public transit, and intermodal freight traffic surged toward a new record.

Statistical Accident Reductions since 2003



FRA is committed to continuously improving safety. Although safety performance has steadily improved, we are committed to working towards that goal. Accidents in Missouri, Connecticut, and Maryland demonstrate the varied risks to rail safety. FRA approaches rail safety comprehensively. We are building on research and development, continuing to establish minimum safety requirements, conducting outreach and collaborating with stakeholders, performing compliance inspections and audits, and implementing and administering enforcement policies.

FRA's multidimensional safety strategy is intended to foster a safety culture evolution toward hazard analysis, accident prevention, and innovation, leading to a continual process of safety improvement. Positive train control (PTC) systems will be the technology backbone that promotes safety improvement through the reduction of certain human-factor-related incidents and should complement FRA's other safety efforts, such as implementation of safety Risk Reduction Programs (RRP) as well as crash energy management.

RSIA Implementation and Other FRA Safety Actions

Congress acted to address rail safety issues in 2008 through the passage of RSIA, which reauthorized FRA's safety program for five years and mandated that FRA develop approximately 40 final rules, guidance documents, model State laws, studies, and reports as well as three annual reports and hundreds of periodic accident reporting audits. RSIA also requires certain railroads to implement PTC systems by the end of 2015; provides FRA, as the Secretary's designee, with regulatory authority over the hours of service of passenger train crews; and extensively amends the hours of service laws.

FRA has finalized 59 percent of RSIA-mandated rules and 69 percent of the required studies, while continuing to pursue completion of the remaining provisions of the Act. The appendix to this testimony lists the rulemakings, non-periodic reports, guidance, and model State laws that FRA has completed as of June 1, 2013, that were mandated, explicitly or implicitly, by RSIA.

FRA's regulatory program maximizes safety by developing rules based on facts, incident and accident causation analysis, comparison of alternative mitigation measures, and cost-beneficial solutions. FRA rules consider current and future industry capabilities, compliance burden and cost, and other economic and social realities. Within this context, FRA makes every effort to reach statutory milestones with its available resources. FRA often works with its Railroad Safety Advisory Committee (RSAC) to improve the quality and transparency of FRA's rule development. FRA has maintained a continuous planning effort, through the Department's regulatory review process and consultations with stakeholders, since RSIA's enactment.

To promote compliance with rules, FRA has built a safety oversight workforce that is highly motivated, well trained, and expertly skilled in numerous technical disciplines and specialties. Many inspectors and specialists come to FRA with decades of operational experience, which we build on and refine through continuous, comprehensive guidance, classroom and on-the-job training, mentoring, and developmental opportunities. New inspectors receive up to 120 hours of formal classroom training within their first year on board. They also go through 56 hours of additional formal classroom training related to accident investigation fundamentals. Historical accident and inspection data ensures optimal allocation of resources. FRA uses its Staffing Allocation Model for allocating its inspection resources among its eight regions and core disciplines and its National Inspection Plan (NIP) to facilitate inspectors' focusing their efforts on specific railroads and locations that are likely to have safety problems. NIP provides guidance to an inspector on the amount of time that he or she should spend on each railroad in his or her territory based on historical risk analysis. An inspector following NIP guidance should be more effective finding unsafe conditions that he or she can bring to the attention of railroad officials to correct.

The NIP also provides guidance to each regional office on how its inspectors, who each specialize in one of the five inspection disciplines, should divide their work by railroad and by State. The NIP produces an initial baseline plan for each of the Agency's eight regions based on an analysis of historical accident and inspection data and then allows the regional administrators to adjust the goals for their respective regions based on local knowledge and emerging issues. FRA also partners with participating State rail safety programs in enforcing the rail safety laws.

As noted, FRA has made significant progress fulfilling unprecedented mandates set forth by RSIA, including the following measures to address some of the prevalent safety issues:

- *To address track-caused accidents—*
  - FRA issued regulations on concrete ties, completed a study of track inspection practices, and issued a notice of proposed rulemaking (NPRM) on rail integrity.
  - FRA has started a research and development program with the goal of achieving reliable long life from concrete ties. The program involves freight railroads, Amtrak, manufacturers and universities.
  - In addition, on its own initiative, using its general rulemaking authority, FRA published a final rule on vehicle/track interaction safety standards. The final rule achieved unanimous approval by RSAC. The rule was based on research into vehicle/track interaction. The rule promotes the safe interaction of rail vehicles with the track over which they operate under a variety of conditions at speeds up to 220 mph. The rule also adds flexibility for safely permitting high cant deficiency train operations through curves at more conventional speeds so that both freight and passenger trains may better sustain maximum allowable speeds through curved track.
- *To enhance and improve grade crossing safety—*
  - FRA issued standards requiring railroads to establish and maintain toll-free "1–800" emergency notification systems by which the public can telephone the proper railroad about a stalled vehicle or other safety problem at a specifically identified grade crossing.
  - FRA promulgated regulations requiring 10 states to issue State-specific action plans to improve safety at highway-rail grade crossings. FRA issued model State laws on highway users' sight distance at passively signed crossings and on highway motorists' violations of grade crossing warning devices.
  - FRA published a proposed rule specifying the types of information that railroads would have to report to the Department's National Crossing Inventory. FRA also issued guidance addressing pedestrian safety at or near passenger rail stations, developed a five-year strategy to improve highway-rail grade

crossing safety, and conducts an audit every two years of Class I railroads' highway-rail grade crossing accident reports to ensure that these railroads are accurately reporting these incidents and such audits every five years of other railroads.

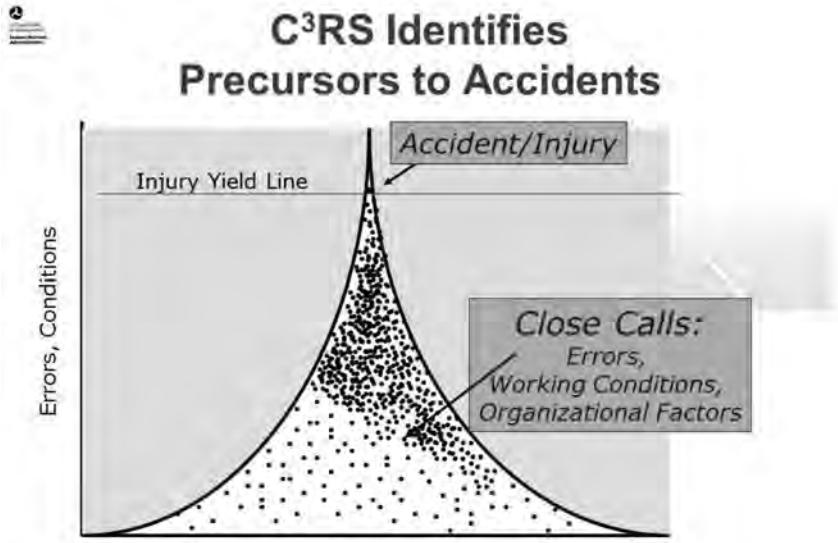
- FRA continues to research new technologies for improving grade crossing safety. One project that has significant potential is implementation of Intelligent Transportation Systems at grade crossings. FRA is also conducting human-factors research to understand the behavior of highway users when they approach grade crossings. This is expected to lead to recommendations for improved signage and warning systems. FRA also released a grade crossing information smartphone application, which is further detailed below.

- *To enhance the accountability of railroads for their own safety—*
  - FRA has issued a notice of proposed rulemaking (NPRM) that would require certain passenger railroads to develop and implement Risk Reduction Plans (RRPs), and another NPRM on requiring freight railroads to establish RRPs is in clearance in the Executive Branch. These regulations are designed to encourage railroads to develop and implement systematic risk-based approaches to ensuring continuous safety improvement.

- *To address human-factors-caused accidents and resulting casualties—*
  - FRA issued final rules to enable nationwide implementation of PTC systems as well as final rules on camp cars used as railroad employee sleeping quarters and on the hours of service of passenger train employees. The latter draws on detailed research into the causes of train operator fatigue and analysis of thousands of operator work patterns. A final rule on minimum training standards and plans is under Departmental review.
  - FRA published in the *Federal Register* detailed interim and final interpretations of the hours of service laws as amended by RSIA, and a second set of interim interpretations to be published in the *Federal Register,* addressing additional issues, is in review in the Executive Branch.
  - FRA issued a final rule requiring owners of railroad bridges to implement programs for inspection, maintenance, and management of those structures.

In addition to working on RSIA mandates, FRA has been advancing safety through other initiatives:

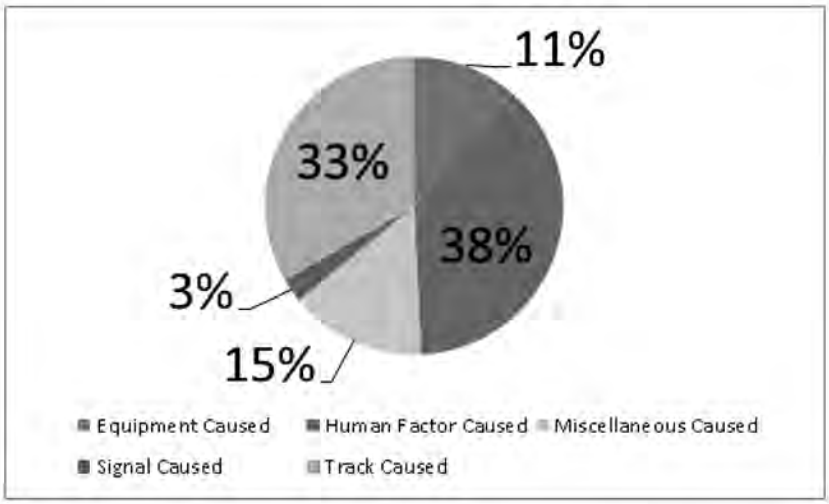
- FRA is supporting the safety of proposed passenger rail operations, including line extensions, and shared-use and high-speed operations by providing technical outreach, including training and information regarding safety regulations and system safety, to many new start commuter railroads, and FRA is currently working with several new operators.
- From funding provided for high-speed rail research and development, FRA has identified several key risk factors for corridors shared by passenger and freight operations. Research to better understand these risks and find mitigations are currently underway.
- FRA is making important strides to address human-factors issues through an industry-wide initiative to combat the dangers of electronic device distraction in the railroad workplace.
- FRA is implementing a voluntary, Confidential Close Call Reporting System program (C^3RS) for railroads and their employees to report close calls without receiving disciplinary action. The FY 2014 Budget proposes expanding the C^3RS from a limited pilot project to a nation-wide rollout. Experience at C^3RS pilot sites has contributed, we believe, to a nearly 70-percent reduction in certain accidents at one of the most mature pilot sites. Reductions in accidents come from a proactive culture of safety that uses real data far beyond that which can be pulled from accident investigations on a reactive basis. Effective safety oversight is helped by having accurate data. The magnitude of the information provided from proactive programs like C^3RS in comparison to traditional data from accidents and injuries is illustrated below:



These achievements are not cause for complacency, but a foundation to build on, as we look for more and better cost-effective ways to improve the safety of our country's rail network.

Key Challenges to Railroad Safety

By law, railroads are required to report an expansive universe of accidents, incidents, and events that occur in the course of operations. FRA also investigates certain railroad accidents, and analyzes the data it receives and collects. This information assists FRA in allocating and deploying inspection and oversight resources effectively, where they have the greatest positive impacts.



Train Accident Causes—2012

As illustrated above, 71 percent of all train accidents were the result of either human factors or the condition of railroad track in 2012. FRA has focused on the reduction of those two accident categories as our highest priority.

Human Factors

The leading cause of train accidents is human factors.

Positive Train Control Systems

RSIA provides that "the term 'positive train control system' means a system designed to prevent train-to-train collisions, over-speed derailments, incursions into established work zone limits, and the movement of a train through a switch left in the wrong position." 49 U.S.C. 20157(i)(3). FRA continues to work to support railroads in their implementation of PTC systems prior to RSIA's December 31, 2015 statutory deadline. In our August 2012 Report to Congress on PTC, FRA pointed out the technical and programmatic obstacles to meeting the statutory deadline. Some railroads have publicly acknowledged that they will not be able to complete PTC implementation by the deadline. FRA will continue to provide field engineering support and system testing oversight for PTC systems, and hopes to provide formal approval and system certification for the Southern California Regional Rail Authority's PTC system this year.

Further, FRA is working to eliminate obstacles to timely PTC system implementation by working with railroads, suppliers, and other government agencies to resolve critical path issues. In the coming years, FRA will continue to work towards the certification of the systems used by other railroads and provide additional engineering support. FRA will also work with Congress if it decides to change the statutory deadline.

Defective Track

The second-leading cause of train accidents is defective track. Track defects comprise a wide universe of conditions, some serious and some relatively innocuous or inconsequential. Some defects develop simply due to rail's exposure to the natural environment, while others are the result of the stress of routine operations. FRA's Track Safety Standards govern all aspects of track structure and geometry, and require specific inspection and maintenance actions by railroads. In addition to the recent and pending track rulemakings, which have already been discussed, FRA has embarked on an aggressive program to focus its track-related enforcement efforts on the most likely accident causes. These efforts have helped move the track-caused accident rate in the proper direction. Here, too, our research and development efforts are a critical component of our regulatory efforts and provide the basis for revisions to those regulations and best industry practices.

Most track-caused derailments occur at slow speed and are of minor consequence. FRA has safety standards for all track, including low-speed track and the types of yard and industrial track on which the majority of these incidents occur. However, more serious derailments can occur on mainline tracks that support passenger and high-tonnage freight trains at higher speeds.

To reduce the likelihood of track-caused derailments, FRA has taken action on several fronts:

- Our track inspection program includes FRA track experts who routinely accompany railroad track inspectors as they perform their duties inspecting all types of railroad track, switches and station areas.
- FRA track personnel help assure that track defects are discovered, properly documented, and repaired to monitor the condition of the track structure better.
- FRA uses a small fleet of very specialized railcars that accurately measure track geometry. These cars find track defects and send out notifications to FRA and to the individual railroad that owns the track. These cars are also used as "platforms" on which new inspection technologies can be tried and perfected. These new technologies have improved the accuracy of track defect detection. FRA geometry cars are world-class in their technology and accuracy. Research and development are underway to automate many of these inspection technologies, which will enable FRA and the industry to monitor cost-effectively the state of repair of the rail network on a regular basis.

Highway-Rail Grade Crossing and Trespasser Safety

More than 90 percent of all rail-related fatalities in recent years have been the result of either trespassing on railroad rights of way or else accidents at highway-rail grade crossings.

Highway-Rail Grade Crossings

In recent years, highway-rail grade crossing accidents have resulted in the second-largest number of rail-related deaths in the United States, 33 percent of the total. Yet grade crossing safety has shown vast improvement, as a result of substantial public investment in crossing warning devices and greater public awareness of the

risks at grade crossings. Accordingly, the number of grade crossing accident deaths has declined by 30 percent over the last decade. FRA is fully committed to reducing the number, frequency, and severity of collisions at highway-rail grade crossings.

Our multi-faceted approach to addressing highway-rail crossing safety is referred to as the "Three Es": Engineering, Enforcement, and Education. Engineering activities include numerous rulemakings (Locomotive Auxiliary Lights; Rail Car Reflectorization; Inspection, Testing and Maintenance Procedures for Grade Crossing Signal Systems; Use of Locomotive Horns at Public Crossings; and Telephonic Emergency Notification Systems) and advancing the state of technologies that improve safety for drivers, rail employees, and passengers. FRA has long partnered with Operation Lifesaver, Inc., and State and local law enforcement authorities to facilitate grade crossing collision investigation courses and encourage consistent enforcement of highway traffic laws governing motorist behavior at crossings.

With funding from the Federal Highway Administration (FHWA), states have installed and upgraded crossing warning devices, especially at high-risk crossings. Currently, $220 million is authorized annually for states to use to improve highway-rail grade crossings, and more than $4 billion has been spent on crossings since 1974. Determinations about which projects receive funding are made by State departments of transportation or public utility commissions, and must be based on objective analysis of the relative safety risks associated with each public highway-rail crossing. In addition, under the grant program pursuant to the Intermodal Surface Transportation Efficiency Act, section 1103(c), highway-rail grade crossings along designated high-speed rail corridors were eligible to receive Federal funding for a number of grade crossing hazard elimination activities. FRA and FHWA jointly managed this program. This funding was continued in subsequent surface transportation bills through SAFETEA–LU, and in FY 2012, $15 million was available for grants under the program. Applications were received from 12 states for $25.5 million.

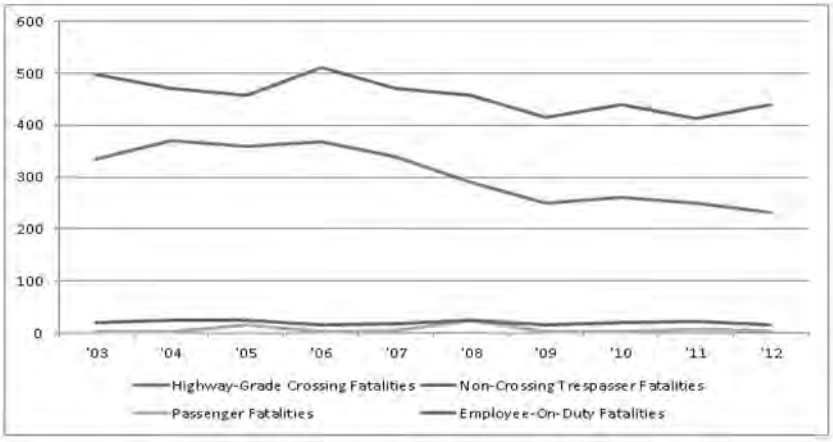
Because fully one-half of all train-highway vehicle collisions occur at crossings that are equipped with active warning devices reported to be functioning as intended, FRA believes that rigorous enforcement of State laws with stiff sanctions for motorist violations of grade crossing signal and traffic laws is an effective strategy to reduce violations and collisions at crossings. In September 2011, FRA provided model State legislation on highway-rail grade crossing violations by motorists. FRA reviewed and evaluated existing State laws and drafted a model law that can be used by states seeking to strengthen their traffic laws.

New Technological Applications

Just this week, FRA announced the launch of a new smartphone application, available in the Apple App store, designed to help reduce the number of highway-rail grade crossing accidents. The Grade Crossing Locator Application allows people to access information about highway-rail grade crossings in their area, helping them to make better decisions around the more than 200,000 highway-rail grade crossings in the United States.

The Grade Crossing Locator Application will enable people not only to locate highway-rail grade crossings in their area, but also to find out what type of traffic control devices are present, the physical characteristics of the crossing, and how many trains pass through daily. FRA is using technology to innovate and connect with Americans about grade-crossing safety because we believe more information leads to smarter choices, driving down the number of accidents and saving lives.

Crossing and Trespassing Fatalities since 2003



Trespassing

The number of trespassing fatalities has decreased by 12 percent since 2003 (there were 498 fatalities in 2003 and 439 fatalities in 2012), but crossing fatalities have decreased more quickly. Extremely difficult to address, trespassing is the most significant cause of death attributable to railroad operations in the United States. Approximately 60 percent of all rail-related fatalities occur to individuals that are not authorized to be on railroad rights-of-way.

FRA, through its research and development program, also developed a five-year strategy addressing trespassing and conducted a trespasser demographic study to better target trespass prevention efforts. The study will be released shortly. In addition, FRA sponsored a targeted, trespass prevention effort in West Palm Beach, Florida to develop a community-oriented mitigation measure that can be utilized by other communities. In 2012, FRA co-sponsored with the Federal Transit Administration a Right-of-Way and Trespass Prevention Workshop that was attended by 174 industry stakeholders. Twenty-three initiatives were identified for reducing trespass accidents. These will form the core of FRA's research and development work on this topic for the next two or three years.

Reauthorization Priorities

As you know, portions of two important rail laws expire at the end of FY 2013: RSIA and the Passenger Rail Investment and Improvement Act of 2008 (PRIIA). The President's FY 2014 budget for FRA lays out a comprehensive, multi-year reauthorization blueprint for moving forward. The fundamental goal of this proposal is to take a more coordinated approach to enhancing the Nation's rail system–an integrated strategy that addresses safety and passenger and freight service improvements. This new approach better reflects the complex reality of how rail works in the United States–most track is privately-owned and carries a mix of passenger and freight trains. Safety is improved not just through regulations and inspections but also through capital investments; chokepoints often hinder the efficient movement of intercity passenger, commuter, and freight trains, while the elimination of grade crossings with strategic placement of overpasses and underpasses enhance rail, vehicular, and pedestrian safety.

FRA's reauthorization proposal's key priorities include the following:

- *Enhancing world-class rail safety.* Rail is already among the safest modes of transportation, and rail safety has only been improving in recent years. Nevertheless, better safety performance is imperative, and with innovative safety practices and new technologies, the railroad industry can achieve this goal.
- *Modernizing our rail infrastructure.* Past generations of Americans invested heavily in building the infrastructure we rely on today. Most segments of the Northeast Corridor were built more than a century ago, for example. Maintaining and modernizing these assets will lower long-term costs and result in a safer, more reliable rail system.

- *Meeting the growing market demand.* With 100 million more Americans expected by 2050, the national transportation system must be prepared to handle substantial increases in the movement of people and goods. Given the existing capacity constraints on other modes, rail will play an increasingly vital role in balancing America's transportation system by accommodating this growth, resulting in public benefits such as reduced reliance on foreign oil, reduced air pollution, increased safety, and more travel options. This budget incorporates market-based investments in building or improving passenger rail corridors, eliminating rail chokepoints, adding freight capacity, and conducting comprehensive planning.
- *Promoting innovation.* FRA's vision is for the domestic rail industry to be again world-leading–we want U.S. companies to develop patents for state-of-the-art rail technology, to supply rail operators throughout the world, and to employ the best engineers and railway workers. The United States should be exporting intellectual capital and rail products, not importing them.
- *Ensuring transparency and accountability.* Accomplishing the priorities described above can only occur if these programs are managed through a transparent process that makes it clear what public benefits and service improvements the American people are "buying" with their investments. The roles and responsibilities of the Federal government, States, Amtrak, freight railroads, and other stakeholders must be clear and based on sound public policy.

Need for Predictable Funding

An overarching issue that runs across all of these priorities is the need for sustained and predictable Federal funding for rail programs, similar to the treatment of other modes of transportation. Congress has for decades funded highway infrastructure and safety, transit, and aviation programs through multi-year authorizations that provide guaranteed funding. This enables States, local governments, and other stakeholders to plan for and make large-scale infrastructure investments on a year-to-year basis. Likewise, internationally, other major rail systems have been planned and developed through a predictable multi-year funding program.

The Administration proposes adopting this budgeting approach for rail, including authorizing mandatory contract authority through FY 2018 for FRA's new rail programs. The programs would be funded from resources in a new Rail Account of the Transportation Trust Fund.

Rail Safety Reauthorization Proposals

RSIA was a key piece of legislation to enhance rail safety comprehensively. The Act authorized 200 new safety positions over a five-year period, but less than a quarter were funded through appropriations. The Act also required FRA to establish a railroad safety technology grant program with $50 million in funding annually for FYs 2009 through FY 2013, but FRA received only one year of funding. For the last four and a half years, FRA has focused on establishing and implementing the regulations, programs, and other measures required by RSIA. Looking ahead, FRA is poised to begin fully implementing these regulations in an effort to drive safety rates to further record lows. In FRA's FY 2014 budget proposal, we have requested 30 new safety staff including 10 regional safety inspectors and 20 railroad safety specialists to directly support implementation of RSIA. The culture of continuous improvement in FRA's safety programs requires forward-thinking policies and proactive work to address future challenges. FRA is exploring options for addressing a number of important safety regulatory issues, including the following:

- *PTC*—As discussed earlier, RSIA mandates that PTC be implemented across a significant portion of the Nation's rail network by December 31, 2015. With limited exceptions and exclusions, PTC is required to be installed and implemented on Class I railroad main lines (*i.e.,* lines with over 5 million gross tons annually), over which any poisonous-or toxic-inhalation hazard commodities are transported; and on any railroad's main lines over which regularly scheduled intercity passenger or commuter operations are operated.
- In all, approximately 70,000 miles of track and 20,000 locomotives will have to be equipped with interoperable PTC technology. While some railroads will meet the deadline, many are likely to be challenged by technological and programmatic barriers.
- In a report to Congress last year, FRA highlighted radio frequency spectrum challenges that could impact timely PTC system implementation. In addition, the railroads must secure licensing approval from the Federal Communications Commission to install the approximately 22,000 antennas necessary to implement PTC.

- FRA's report also detailed obstacles faced by the industry and outlined mitigation strategies for Congressional consideration, including the extension of the PTC implementation deadline and alternative methods of mitigating the risks prevented by PTC systems.

- *Hours of service*—In 2011 FRA issued fatigue-science-based hours of service regulations for passenger train employees under new authority granted by RSIA. FRA would like to evaluate the benefits and costs of continuing on this course and focus on addressing other fatigue issues with possible expanded authority to regulate the hours of service of other train employees, signal employees, and dispatching service employees based on sound science. Other modal administrations within the U.S. Department of Transportation already have broad safety regulatory authority over hours of service. It may not be necessary to regulate in these areas.
- *Grade crossing analyses*—FRA would welcome the opportunity to work with Congress to establish an appropriate framework for addressing grade crossing issues related to blocked crossings and commercial motor vehicle accidents and incidents at crossings.
- *Harmonize operating rules*—FRA plans to evaluate the benefits and costs of harmonizing railroad operating rules. Each railroad has its own set of operating rules that may differ significantly from one division to another and from one railroad to another. Many operating crew employees are required to learn multiple different operating rules in order to operate safely in a single tour of duty. Harmonizing operating rules will likely reduce unnecessary confusion and create a safer working environment.
- *Improve protection of risk reduction and system safety analyses with respect to property damage claims*—For a risk reduction program to be effective, FRA must have confidence that railroads are conducting robust analyses to accurately identify risks present. FRA will continue to work to balance the interests of safety and the public interest with respect to the litigation protection afforded the railroads in conducting these analyses.
- *Modernize statutory safety requirements*—FRA would also like to modernize certain existing statutory requirements to better reflect current and future innovations and technologies. For instance, statutory requirements related to the movement of defective equipment could be updated to provide greater flexibility to FRA in handling such issues. Similarly, existing statutory language related to locomotives could be revised to account for modern locomotive and locomotive tender design and allow FRA to more readily tackle the safety issues related to the industry's recently expressed desire to achieve fuel efficiencies through use of liquefied natural gas-powered locomotives.
- *Encourage noise mitigation*—Current Environmental Protection Agency rules for railroad noise emissions do not consider the use of noise mitigation technologies and may be an obstacle to the deployment of high-speed passenger rail. Alternative rules may encourage railroads to reduce the impact of noise emissions on communities surrounding rail operations.
- *Research, Development, and Technology*—To date, FRA's research has centered on core rail safety issues such as hours of service and train control systems. The President's vision for rail includes expanding passenger service across the Nation and increasing train speed. While developing a modern rail system, FRA must continue to ensure that rail remains an extremely safe mode of transportation. Consequently, FRA must undertake a new line of research that solves the technical and associated issues necessary for implementing a comprehensive high-performance rail system. FRA proposes a new Research Development and Technology Program, funded at $55 million in FY 2014. Through this program, FRA will make upgrades to the Transportation Technology Center in Pueblo, Colorado that will allow new rail equipment to be tested. This will result in stronger safety standards and early identification of reliability issues, saving maintenance costs over the long run, developing a domestic workforce for rail initiatives, and ensuring better passenger service.

Conclusion

Thank you for the opportunity to appear before you today. Safety is FRA's number one priority, and we appreciate your attention and focus on such an important issue for the American public. We look forward to working with this Committee to pursue improvements in our safety programs and make our rail network as safe, reliable, and efficient as possible. I will be happy to respond to your questions.

APPENDIX

FRA Rulemakings Completed as of June 1, 2013, that Were Mandated, Explicitly or Implicitly, by RSIA

1. To specify the essential functionalities of mandated PTC systems, define related statutory terms, and identify additional lines for implementation. *(Sec. 104*).

2. To establish substantive hours of service requirements for passenger train employees. *(Sec. 108(d)).*

3. To update existing hours of service recordkeeping regulations. *(Sec.108(f)).*

4. To require State-specific action plans from certain states to improve safety at highway-rail grade crossings. *(Sec. 202).*

5. To require toll-free telephone emergency notification numbers for reporting problems at public and private highway-rail grade crossings. *(Sec. 205).*

6. To require the certification of conductors. *(Sec. 402*).

7. On concrete ties. *(Sec. 403(d)).*

8. To require owners of railroad bridges to implement programs for inspection, maintenance, and management of those structures. *(Sec. 417).*

9. On camp cars used as railroad employee sleeping quarters. *(Sec. 420).*

10. On prohibition of individuals from performing safety-sensitive functions for a violation of hazardous materials transportation law. *(Sec. 305).*

11. On emergency waivers. *(Sec. 308).*

12. Increase the ordinary maximum and aggravated maximum civil penalties per violation for rail safety violations to $25,000 and $100,000, respectively. *(Sec. 302*).

13. Amending regulations of the Office of the Secretary of Transportation to provide that the Secretary delegates to the Administrator of FRA the responsibility to carry out the Secretary's responsibilities under RSIA.

Completed RSIA-Mandated Guidance and Model State Laws

1. On pedestrian safety at or near rail passenger stations (guidance). *(Sec. 201).*

2. For the administration of the authority to buy items of nominal value and distribute them to the public as part of a crossing safety or railroad trespass prevention program (guidance). *(Sec. 208(c*)).

3. Model State law on highway users' sight distances at passively signed highway-rail grade crossings. *(Sec. 203).*

4. Model State law on motorists' violations of grade crossing warning devices. *(Sec. 208).*

Completed RSIA-Mandated Non-periodic Reports or Studies

1. Report to Congress on DOT's long-term (minimum 5-year) strategy for improving rail safety, including annual plans and schedules for achieving specified statutory goals, to be submitted with the President's annual budget. *(Sec. 102).*

2. Report to Congress on the progress of railroads' implementation of PTC. *(Sec. 104).*

3. Conduct study to evaluate whether it is in the public interest to withhold from discovery or admission, in certain judicial proceedings for damages, the reports and data compiled to implement, etc., a required risk reduction program. *(Sec. 109*).

4. Evaluate and review current local, State, and Federal laws regarding trespassing on railroad property, vandalism affecting railroad safety, and violations of highway-rail grade crossing warning devices. *(Sec. 208(a)).*

5. Report to Congress on the results of DOT research about track inspection intervals, etc. *(Sec. 403(a)-(b)).*

6. Conduct study of methods to improve or correct passenger station platform gaps *(Sec. 404*).

7. Report to Congress detailing the results of DOT research about use of personal electronic devices in the locomotive cab by safety-related railroad employees. *(Sec. 405).*

8. Report to Congress on DOT research about the effects of repealing a provision exempting Consolidated Rail Corporation, etc., from certain labor-related laws (45 U.S.C. § 797j). *(Sec. 408).*

9. Report to Congress on the results of DOT research about exposure of railroad employees and others to radiation. *(Sec. 411*).

10. Report to Congress on DOT study on the expected safety effects of reducing inspection frequency of diesel-electric locomotives in limited service by railroad museums. *(Sec. 415).*

11. Report to Congress on model plans and recommendations, to be developed through a task force to be established by DOT, to help railroads respond to passenger rail accidents. *(Sec. 503).*

Senator BLUMENTHAL. Thank you, Administrator Szabo.

Chairman Hersman?

STATEMENT OF HON. DEBORAH A.P. HERSMAN, CHAIRMAN, NATIONAL TRANSPORTATION SAFETY BOARD

Ms. HERSMAN. Thank you. Good morning, Senator Blumenthal, Senator Blunt, and members of the Committee.

The NTSB sent investigative teams to Connecticut, Missouri, and Maryland last month for four different accident investigations. In each of these accidents, there were problems that the NTSB has seen in our prior investigations.

On May 17, during the evening rush home, a Metro-North eastbound train derailed in Bridgeport. About 20 seconds after that train came to rest, it was struck by a westbound train. There were over 70 injuries.

Two days prior to the crash, a Metro-North inspection found a lack of ballast support at an insulated rail joint near the point of derailment. While this problem did not violate FRA track safety standards, the NTSB is evaluating the damaged section of track, as well as the adequacy of existing inspection standards.

A second Metro-North accident occurred on May 28, when a track foreman was struck and killed by a train that was on track that should have been out of service.

The NTSB has issued previous recommendations to the FRA to require redundant signal protection, such as shunting, to prevent this type of accident.

On Monday, we reiterated this recommendation to the FRA, and issued an urgent recommendation to Metro-North to require this redundant protection.

A track shunt is a device that crews can attach to the rails in work zones that alert the controller and give the approaching trains a stop signal. Shunting tracks is simple, feasible, and the equipment is readily available for a few hundred dollars. Workers' lives will be saved as a result of redundant protection.

In Baltimore County, Maryland, on May 28, a dump truck was struck at a highway rail grade crossing by a CSX freight train. This was a passive crossing, meaning that it had no lights or crossing gates. The markings that were present were dilapidated and faded. The collision resulted in the release of hazardous materials and a subsequent fire. The truck driver was seriously injured, and one responder and three nearby workers were also injured.

On May 25, in Chaffee, Missouri, a BNSF freight train was occupying the tracks in an interlocking when it was struck by a Union Pacific freight train. The resulting derailment caused a fire and the highway overpass above to collapse. Two U.P. crewmembers were injured and five motorists were injured as a result of the bridge collapse.

We believe that positive train control, or PTC, which the NTSB has called for since the 1970s, could have prevented or mitigated this crash.

Just yesterday, the NTSB held a board meeting on a head-on collision between two U.P. freight trains that resulted in three crewmember fatalities near Goodwell, Oklahoma, that also could have been prevented by positive train control.

PTC is a technology that serves as a backup for human error. When trains approach a red signal without slowing, PTC would stop the train.

Congress has imposed a deadline of 2015 for implementing PTC. Some railroads will meet this deadline. For those railroads that have made the difficult decisions and invested millions of dollars, they have demonstrated leadership.

For those railroads that will not meet the deadline, there should be a transparent accounting for actions taken and not taken to meet the 2015 deadline, so that regulators and policymakers can make informed decisions.

I appreciate the opportunity to appear before you today, and I look forward to answering your questions.

[The prepared statement of Ms. Hersman follows:]

PREPARED STATEMENT OF HON. DEBORAH A.P. HERSMAN, CHAIRMAN, NATIONAL TRANSPORTATION SAFETY BOARD

Good morning Senator Blumenthal, Ranking Member Blunt, and Members of the Subcommittee. Thank you for the opportunity to address you today concerning the National Transportation Safety Board's (NTSB) ongoing efforts to ensure rail transportation safety, including our ongoing investigations of the recent Metro-North passenger train derailment and sideswipe in Bridgeport, Connecticut, and the collision and derailment of two freight trains in Chaffee, Missouri.

Rail Transportation Safety in General

The NTSB has been extremely active in investigating train collisions and derailments. During the past 12 months, we have launched 12 rail investigations, including 2 that involve highway-rail grade crossings. Of these 12 rail launches, 4 have occurred within the past 5 weeks. In addition to tragic fatalities and serious injuries to passengers, crew members, and other individuals resulting from these crashes, 3 of the derailments also involved the release of hazardous materials that required the evacuation of local residents in Columbus, Ohio, Paulsboro, New Jersey, and Rosedale, Maryland. Also, yesterday the NTSB met to consider and take final action on the agency's investigation of the head-on collision of two freight trains in Goodwell, Oklahoma, on June 24, 2012.

Despite the workload of the NTSB rail investigators and the spate of train collisions and derailments during the past year, overall, train crash numbers are improving. According to Federal Railroad Administration (FRA) data, total rail accident/incident rates have declined from 19.67 occurrences per 1 million train miles in 2004 to 14.18 in March 2013, a 28 percent decrease. In addition, the highway-rail grade crossing accident rate has improved significantly in the past decade. These rail safety achievements have occurred during a period of increased demand for rail transportation in the United States. In 2011, the seven largest freight rail carriers had operating revenues of $67 billion compared to $47.8 billion in 2009—an increase of over $19 billion.[1] Also, intercity passenger rail and commuter rail providers have recently experienced load factor increases. For example, according to Amtrak, a record 31.2 million passengers rode its trains last year and data compiled by the American Public Transportation Association also show increased public transportation ridership levels in calendar year 2012 compared to the previous year.

Although the transportation of people and goods by rail has played an increasingly important role in the Nation's economy, we must not become complacent when

[1] *Back on Track: The Quiet Success of America's Freight Railways, The Economist, April 13, 2013.*

it comes to rail safety. The following summary of three of the rail collisions and derailments subject to NTSB investigations demonstrate the need for additional investments in safety technology. The NTSB's Most Wanted List also highlights important rail safety initiatives like Positive Train Control (PTC), limiting distraction, and investments in transportation infrastructure. Finally, safety would benefit from additional efforts to enforce rail safety legislative and regulatory requirements. For all of the ongoing investigations that are described, a probable cause has not yet been determined.

Derailment and Collision—Bridgeport, Connecticut, May 17, 2013

As described in the NTSB's preliminary report, at 6:01 pm on Friday, May 17, 2013, eastbound Metro-North Railroad passenger train, 1548, derailed. About 20 seconds after the eastbound train came to rest, it was struck by westbound Metro-North passenger train, 1581. As a result of the collision, 73 passengers, 2 engineers, and a conductor were transported to local hospitals with injuries. Damage was estimated by Metro-North at $18.5 million.

The Metro-North Commuter Railroad's New Haven Line runs east-west between Bronx, New York and New Haven, Connecticut. In the vicinity of the crash, the track structure consists of four main tracks. The maximum authorized speed on the four main tracks in the vicinity of the crash is 70 mph with no posted speed restrictions.

Train movements on the New Haven line are governed by the Metro-North Commuter Railroad operating rules and the signal indications of a traffic control signal system supplemented with cab signals and train control.

The more than 60 miles of track on the New Haven Line are visually inspected by Metro-North personnel three times per week. This track inspection is performed with the use of a hi-rail vehicle or on foot. The last track inspection prior to the derailment was performed on May 15, 2013, by hi-rail. The inspection found an insulated rail joint with inadequate supporting ballast and indications of vertical movement of the track system under load at catenary No. 734 on track 4 near milepost (MP) 53.3. It is important to note that this inspection finding did not disclose a violation of the FRA's Track Safety Standards (49 CFR Part 213). As part of its ongoing investigation, however, the NTSB is undertaking a comprehensive review of Metro-North track inspections and follow-up work and is also looking at the adequacy of the FRA's Track Safety Standards.

Preliminary indications are that the derailment occurred at MP 53.3. Sections of this rail containing rail joint bars are at the NTSB materials laboratory in Washington, DC, for further examination.

Initial information obtained from onboard event recorders indicates that the eastbound train was traveling at about 70 mph when it derailed. After the eastbound train came to rest, it was fouling the adjacent track, track 2, and was struck about 20 seconds later by the westbound train. Initial information from the event recorders indicates that the westbound train engineer applied the emergency brakes, slowing from 70 mph to 23 mph prior to striking the eastbound train.

The parties to the investigation include Metro-North Railroad, the FRA, the Association of Commuter Rail Employee, the Metropolitan Transportation Authority Police Department, Connecticut Department of Transportation, Brotherhood of Locomotive Engineers and Trainmen, United Transportation Union, and the Brotherhood of Maintenance of Way Employees Division.

The NTSB will conduct a thorough investigation of this event, complete it in an expeditious manner, establish its probable cause, and issue recommendations to prevent this type of event in the future.

Railroad Employee Fatality, West Haven, Connecticut, May 28, 2013

The NTSB is also investigating the tragic death of a Metro-North track foreman in a track work zone in West Haven, on the New Haven Line. We are working with the FRA, Metro-North, and the Metropolitan Transportation Authority Police Department and, among other things, examining the communications with the Metro-North rail traffic control center.

We have issued safety recommendations to the FRA in the past concerning additional safety requirements to protect maintenance-of-way work crews.[2] The NTSB submitted comments in response to an FRA notice of proposed rulemaking (NPRM)

[2] See *Collision of Massachusetts Bay Transportation Authority Train 322 and Track Maintenance Equipment near Woburn, Massachusetts, January 9, 2007,* Railroad Accident Report NTSB/RAR–08/01 (Washington, D.C.: NTSB, 2008) and Recommendation R–08–06 to the FRA:

Require redundant signal protection, such as shunting, for maintenance-of-way work crews who depend on the train dispatcher to provide signal protection.

issued last August to amend its Roadway Worker Protection regulation (49 CFR Part 214). In the NPRM, the FRA specifically asked for comments in response to one of the two NTSB safety recommendations concerning additional safety requirements for rail work crews.

Railroad Grade Crossing Crash, Rosedale, Maryland, May 28, 2013

On May 28, a three-axle roll-off straight truck approached and crossed a rail grade crossing consisting of two tracks. The truck was struck by a CSX freight train while it was crossing the tracks. This crossing is a passive crossing, which means there were no lights or crossing gate in place. The crossing was marked with cross buck signs and non-standard stop signs which were yellow. The paint on both stop signs was significantly faded and both were displaced from their original location, including one that hung upside down and faced away from oncoming traffic. The truck driver did not stop at the grade crossing.

The train, travelling at 49 miles per hour, struck the truck on the right side near the rear axle. The impact caused 15 train cars to derail. The seventh car carried sodium chlorate and the ninth through twelfth cars carried terephthalic acid, and these cars released their products. Additionally, there was a post-crash fire and subsequent explosion that was felt at least one mile away.

The truck driver was seriously injured, and four people responding to the accident or working nearby sustained injuries from minor to serious.

Railroad Train Collision, Resulting in a Highway Bridge Collapse, Chaffee, Missouri, May 25, 2013

On Saturday, May 25, 2013, at about 2:30 a.m., central daylight time, Union Pacific Railroad (UP) freight train, 2ASMAR–25, collided with BNSF Railway (BNSF) freight train U-KCKHKMO–O5T near Chaffee, Missouri. The crash occurred where UP and BNSF tracks cross at grade at a railroad interlocking (*Rockview Junction*). The BNSF train was occupying the interlocking when the UP train struck the 12th car behind the locomotives of the BNSF train. As a result of the collision, 13 cars of the BNSF train were derailed. Two locomotives and 11 cars of the UP train were derailed. Spilled diesel fuel from the derailed UP locomotives caught fire. Missouri State Highway M Bridge is above the *Rockview Junction* interlocking; collision forces resulted in the collapse of portions of the highway bridge. Thankfully, there were no fatalities on the trains or the roadway, but the UP engineer and conductor were injured and transported to a local hospital. Also, subsequent to the highway bridge collapse, two motor vehicles struck damaged highway elements and were involved in fires. Five occupants of the motor vehicles were injured and transported to a local hospital.

The UP train consisted of 2 locomotives and 60 cars. The BNSF train consisted of 3 locomotives and 75 cars. The weather was clear and 48° F at the time of the crash. The preliminary damage was estimated to be $11 million.

Event recorder data from the locomotives of both trains, as well as recorded data from the signal system, is being examined to determine train speeds and signal aspects prior to the collision. Initial data review indicates that the UP train was traveling about 49 mph when it struck the side of the BNSF train, which was traveling about 22 mph. Preliminary data indicate that the BNSF train received a signal indication permitting it to proceed through the interlocking, while the UP train received a stop signal indication at the interlocking. No PTC system is currently installed at this location.

Parties to the investigation are the FRA, Missouri Department of Transportation, Scott County Emergency Management Agency, Union Pacific Railroad, BNSF Railway, Brotherhood of Locomotive Engineers and Trainmen, United Transportation Union, and the Brotherhood of Railroad Signalmen.

The NTSB's Most Wanted List and Rail Safety

Each year, the NTSB issues a Most Wanted List of top transportation safety priorities designed to increase industry, Congressional, and public awareness of these important issues and recommended safety solutions. The current Most Wanted List includes three issue areas that pertain either specifically or more generally to the rail industry. These issues are: Positive Train Control, Distraction, and Preserving the Integrity of Transportation Infrastructure. Next, I will address each of these areas.

Positive Train Control (PTC)

In the NTSB's nearly half century of investigating railroad crashes, including hundreds of train collisions and over-speed derailments, we have seen mechanical defects, maintenance issues and track failures, but the biggest safety challenge is human error—and that's the area where technology can be so important. Since

2005, the NTSB has completed 16 investigations of rail crashes that could have been prevented or mitigated with positive train control. These 16 crashes claimed 52 lives and injured 942 more. The damages totaled hundreds of millions of dollars and in each of these crashes, the NTSB concluded that PTC would have provided critical redundancy that would have prevented the crash.

PTC prevents train-to-train collisions and overspeed derailments. Although human error cannot be eradicated, PTC technology is capable of supplementing the human operation of trains. Such systems provide a safety redundancy by slowing or stopping a train that is not being operated in accordance with signal systems and operating rules, as was the case in each of the 16 crashes referenced previously. For years, it has been in place on Amtrak trains in the Northeast and Michigan, but for PTC to reach its greatest safety potential, it must be implemented on all passenger and freight lines. With this technology, even if the train operator has fallen asleep or is distracted in some way, human lives will not be at risk. PTC however, would not have prevented the derailment and crash of the Metro-North trains in Bridgeport because they were operating on separate tracks. Nonetheless, in numerous rail collisions investigated by the NTSB, including the Goodwell, Oklahoma, crash the NTSB reviewed yesterday, the agency has concluded that had a PTC system been available, the collisions would have been prevented.

Because of the NTSB's repeated findings that technology based collision avoidance systems could provide the needed safety redundancy to prevent rail crashes, PTC was placed on the NTSB Most Wanted List of Transportation Safety Improvements at the inception of that list in 1990. Following the tragic head-on collision between a passenger train and a freight train in Chatsworth, California, on September 12, 2008, which resulted in 25 fatalities and more than 130 injuries, Congress enacted the Rail Safety Improvement Act of 2008 (RSIA). This law requires each Class I railroad over which poisonous-by-inhalation or toxic-by-inhalation hazardous materials is transported and regularly scheduled intercity or commuter rail passenger transportation travel to implement a PTC system by December 31, 2015. Encouraged by this legislative action, the NTSB's Safety Recommendation calling for PTC to be installed on railroads, was classified as closed and was removed from the Most Wanted List in October 2008.

As a result of the May 2011 rear-end collision between two CSX freight trains in Mineral Springs, North Carolina, and last June's collision of two UP trains in Goodwell, Oklahoma, collisions which killed five crewmembers, destroyed cars and goods, and put tracks out of service for days, the NTSB decided to refocus on rail safety and added PTC to our 2013 Most Wanted List.

In 2005, NTSB held a symposium on PTC to learn about the industry's progress on this issue and to reinvigorate dialogue among rail carriers, component manufacturers and government agencies. During that 2-day meeting, the NTSB examined each of the major aspects of PTC systems including safety, efficiency, and operational issues. This past February, the NTSB held a 1-day public forum on PTC. In opening the forum, I acknowledged there are real hurdles to clear in meeting the RSIA's December 31, 2015, mandate to implement PTC technologies. In particular, many public operators do not have the available capital they need to not only maintain but also upgrade their systems. Although a number of presenters at the forum addressed a variety of regulatory, technical, budgetary, product and spectrum availability, and legal issues associated with implementing PTC, the NTSB also heard from other presenters who described various success stories where carriers' PTC systems have already received type approvals and certification by the FRA.

There is much debate by policymakers over whether to extend the 2015 deadline established by RSIA. There are some railroads that have already met and others that plan to meet the 2015 deadline. For those railroads that have made the difficult decisions and invested millions of dollars, they should not be penalized for their leadership. For those railroads that will not meet the deadline, there should be accountability. Lives depend on it.

Distraction

As we all know, the serious public health and safety issues associated with distraction are not limited to road and highway travel. The NTSB has been concerned for many years about the danger of distraction across all transportation modes. For example, within the rail industry, in 2003, the NTSB issued an accident report concerning the May 28, 2002, head-on collision of two Burlington Northern Santa Fe (BNSF) freight trains near Clarendon, Texas, that resulted in the death of one of the train's engineers, injuries to the three other crewmembers, and damages exceeding $8 million. The NTSB determined the probable cause of the collision was one of the engineer's uses of a cell phone during the time he should have been attending to the requirements of the track warrant his train was operating under.

The NTSB focused again on the danger of distraction in the rail industry in investigating another head-on collision of two BNSF freight trains that occurred near Gunter, Texas, on May 19, 2004. The NTSB had determined that 25 calls were made by crewmembers from both trains during the trip and up to the time of the collision, and that 22 of those calls were of a personal nature. Similarly, in the tragic Chatsworth, California, Metrolink crash mentioned above, the NTSB determined that during the time periods the engineer was responsible for operating a train, the train operator sent 21 text messages, received 20 text messages, and made four outgoing telephone calls.

As a result of the Clarendon, Texas, collision, the NTSB issued a recommendation in 2003 to the FRA to issue regulations to control the use of cellular telephones and other wireless communication devices by railroad operating employees while on duty. In response to the recommendation, the FRA and its Rail Safety Advisory Committee closely examined the issue and, on October 7, 2008, published in the *Federal Register* Emergency Order No. 26, to restrict on-duty railroad operating employees from improperly using cellular telephones and other distracting electronic and electrical devices. On September 27, 2010, the FRA issued a final rule that supplanted Emergency Order No. 26 and codified most its requirements in a new subpart C, titled "Electronic Devices," to Part 220, of Title 49, Code of Federal Regulations. This recommendation has been closed because of this positive action by the FRA.

Preserving the Integrity of Transportation Infrastructure

As the American Society of Civil Engineers' 2013 Report Card for America's Infrastructure points out, the U.S. freight and passenger rail network consists of more than 160,000 miles of track, 76,000 rail bridges, and 800 tunnels. The Report notes both freight and passengers railroads have made significant investments in their infrastructure, using both public and private funding, but meeting capacity demands will be an increasing challenge as rail ridership and freight rail continue to increase. Of the 16 infrastructure categories evaluated in the Report Card, including aviation, inland waterways, ports, roads, and transit, Solid Waste (trash disposal) received the highest assigned rating—B– (Good). Rail and Bridges received the second highest assigned rating—C+ (Mediocre).[3]

The NTSB Most Wanted List item on transportation infrastructure points to the need for periodic, standard railway inspections for railcars and track used to replace defective segments as well as track originally laid down. For example, after investigating a March, 2001, derailment of Amtrak's *California Zephyr,* near Nodaway, Iowa, while operating on track owned by BNSF, resulting in 1 fatality and injuries to 78 people, the NTSB determined the probable cause of the derailment was the failure of the rail beneath the train, due to undetected internal defects.

Similarly, the NTSB investigated the January 18, 2002, derailment of 31 of 112 cars of a Canadian Pacific Railway freight train near Minot, North Dakota. Five tank cars carrying anhydrous ammonia, a liquefied compressed gas, catastrophically ruptured, and a vapor plume covered the derailment site and surrounding area. One resident was fatally injured, and 60 to 65 residents of the neighborhood nearest the derailment site were rescued. As a result of the crash, 11 people sustained serious injuries, and 322 people, including the 2 train crewmembers, sustained minor injuries. Damages exceeded $2 million, and more than $8 million was spent for environmental remediation. The NTSB's report indicated the probable cause of the derailment was an ineffective inspection and maintenance program that did not identify and replace cracked joint bars before they completely fractured and led to the breaking of the rail at the joint. Contributing to the severity of the accident was the catastrophic failure of five tank cars and the instantaneous release of about 146,700 gallons of anhydrous ammonia.

Other Important NTSB Rail Safety Recommendations

The NTSB has long advocated in-cab recording devices in order to better understand crew activities leading up to serious accidents. As a result of its investigation of the collision between a Maryland Rail Commuter train and an Amtrak train near Silver Spring, Maryland, on February 16, 1996, in which all operating crewmembers were fatally injured, the NTSB was unable to determine whether certain crewmember activities leading up to the crash may have contributed to the crash. Consequently, the NTSB recommended that the FRA

> Amend 49 *Code of Federal Regulations* Part 229 to require the recording of train crewmembers' voice communications for exclusive use in accident inves-

[3] *www.infrastructurereportcard.org* (March 2013).

> tigations and with appropriate limitations on the public release of such recordings. (Safety Recommendation R–97–9)

After its investigation of another railroad crash with no surviving crewmembers that occurred in 1999 in Bryan, Ohio, the NTSB reiterated Safety Recommendation R–97–9 to the FRA. The FRA responded that it

> . . . has reluctantly come to the conclusion that this recommendation should not be implemented at the present time. . . . [The] FRA appreciates that, as time passes and other uses are found for recording media that may create synergies with other public and private purposes, the Board's recommendation may warrant re-examination.

Based on this response and further meetings, the NTSB classified Safety Recommendation R–97–9 "Closed—Unacceptable Action."

Since the refusal by the FRA to act on the recommendation regarding in-cab recorders, the NTSB has continued to investigate crashes in which such recorders would have provided valuable information to help determine probable cause and develop safety recommendations. As a result of its investigation of the July 10, 2005, collision of two CN freight trains in Anding, Mississippi, the NTSB made the following safety recommendation to the FRA:

> Require the installation of a crash-and fire-protected locomotive cab voice recorder, or a combined voice and video recorder, (for the exclusive use in accident investigations and with appropriate limitations on the public release of such recordings) in all controlling locomotive cabs and cab car operating compartments. The recorder should have a minimum 2-hour continuous recording capability, microphones capable of capturing crewmembers' voices and sounds generated within the cab, and a channel to record all radio conversations to and from crewmembers. (Safety Recommendation R–07–3)

Most recently, as a result of the investigation into Chatsworth, California, head-on collision between a Metrolink commuter passenger train and a Union Pacific freight train, the NTSB reclassified Safety Recommendation R–07–03 "Closed—Unacceptable Action/Superseded." In that investigation, the NTSB noted that:

> In all too many accidents, the individuals directly involved are either limited in their recollection of events or, as in the case of the Chatsworth accident, are not available to be interviewed because of fatal injuries. In a number of accidents the NTSB has investigated, a better knowledge of crewmembers' actions before an accident would have helped reveal the key causal factors and would perhaps have facilitated the development of more effective safety recommendations.

The NTSB reclassified Safety Recommendation R–07–3 "Closed—Unacceptable Action/Superseded," when it issued Safety Recommendation R–10–1 to the FRA:

> Require the installation, in all controlling locomotive cabs and cab car operating compartments, of crash- and fire-protected inward-and outward-facing audio and image recorders capable of providing recordings to verify that train crew actions are in accordance with rules and procedures that are essential to safety as well as train operating conditions. The devices should have a minimum 12-hour continuous recording capability with recordings that are easily accessible for review, with appropriate limitations on public release, for the investigation of accidents or for use by management in carrying out efficiency testing and systemwide performance monitoring programs. (R–10–1)

The NTSB also issued the following Safety Recommendation to the FRA:

> Require that railroads regularly review and use in-cab audio and image recordings (with appropriate limitations on public release), in conjunction with other performance data, to verify that train crew actions are in accordance with rules and procedures that are essential to safety. (R–10–2)

Recommendations R–10–1 and R–10–2 are currently classified as "Open—Acceptable Response."

Based on the important safety and investigative role of inward-facing video and audio monitoring devices, the NTSB reiterated Safety Recommendations R–10–01 and –02 in its report[4] concerning collision of a BNSF coal train with the rear end

[4] See *Collision of BNSF Coal Train 322 With the Rear End of Standing BNSF Maintenance-of-Way Equipment Train, Red Oak, Iowa, April 17, 2011,* Railroad Accident Report NTSB/RAR–12/02 (Washington, D.C.: NTSB, 2012)

of a standing BNSF maintenance-of-way equipment train near Red Oak, Iowa. As a result of the collision, both crewmembers on the striking train were fatally injured. Damage was in excess of $8.7 million.

As the NTSB stated in its report, the rear-end collision near Red Oak again demonstrated the need for in-cab recording devices to better understand (and thereby prevent) serious railroad crashes that claim the lives of crewmembers, passengers, and the public. While video recorders will assist in the investigation of crashes, their value in preventing crashes cannot be overstated. Installation of inward-facing cameras can also assist railroads in monitoring rules compliance and identifying fatigued engineers. Such monitoring can lead to interventions *before* a crash occurs.

Closing

I appreciate the opportunity to appear before you today to discuss rail safety and I am prepared to answer your questions.

Senator BLUMENTHAL. Thank you, Chairman Hersman.

Ms. Fleming?

STATEMENT OF SUSAN A. FLEMING, DIRECTOR, PHYSICAL INFRASTRUCTURE ISSUES, UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE

Ms. FLEMING. Good morning, Mr. Chairman, Ranking Member Blunt, and other members of the Committee. Thank you for the opportunity to discuss rail safety.

As you heard, 2012 was the safest year in railroad history. And overall, rail safety has improved significantly with the accident rate dropping by almost 50 percent between 2004 and 2012.

However, as we heard, recent accidents in Connecticut, Missouri, and Maryland demonstrate the need for vigilance and further improvements in rail safety.

My statement is based on work currently being performed at the request of this committee and other members of the Senate, and will cover FRA's rail safety oversight, including existing and emerging challenges, as well as positive train control implementation. Our reports will be issued later this fall.

FRA is charged with regulatory oversight of the safety of U.S. railroads, both passenger and freight. Combined, the freight and commuter rail systems, plus Amtrak, have about 230,000 employees, over 1 million cars, and 200,000 miles of track in operation.

FRA primarily monitors railroad compliance with Federal safety regulations through routine inspections at specific sites on railroad systems. FRA's relatively small safety staff, about 640, including State inspectors, makes the railroads with their own inspectors the principal guarantors of railroad safety.

FRA has developed two models that use past accident, incident, and inspection data to help focus its oversight efforts. One targets inspection and the other seeks to allocate FRA's inspectors across its eight regions.

Both models are updated at least annually and are reviewed by FRA officials who may suggest modifications.

However, several FRA regional officials told us that the staffing decisions based on model results do not necessarily align inspectors with their perspective of the needs of the region, nor does it take a region's geography into account.

As we continue our work, we will further assess how FRA officials use these tools to accommodate changing safety risk and allocate inspectors.

Based on our work to date, we have identified several existing and emerging challenges affecting rail oversight.

First, rail safety stakeholders, including FRA, face a continued challenge of trying to reduce highway rail grade crossings and trespasser incidents. Stakeholders told us that this involves educating the public about the potential safety hazards and cooperating with other Federal, State, and local government agencies that have responsibility for funding road projects or closing those crossings.

Additionally, changes to freight flows such as the recent increase in train and truck traffic due to gas and petroleum drilling in the Midwest can increase the risk of highway rail grade crossing accidents.

Second, in the next 5 years, over 30 percent of FRA inspectors in its current safety disciplines will be eligible to retire. FRA does not have a specific plan to replace its aging inspector work force. In addition, it can take from 1 to 4 years to hire, train, and certify an inspector, depending on the inspector's level of experience.

Finally, FRA officials told us that they do not yet have sufficient staff with the required expertise to provide safety oversight of PTC and other emerging safety technologies.

Moving on to PTC implementation, as you know, the Rail Safety Improvement Act of 2008 called for PTC implementation on rail lines carrying either inner-city or commuter passengers, or cargo that carries certain toxic materials, by December 31, 2015. However, we have heard that most railroads report that they will not meet this deadline.

There are numerous interrelated challenges that are causing this delay, including the development of PTC components and their installation; system integration and field testing; and limited FRA resources to review railroads' PTC implementation and safety plans, and to certify those systems.

Commuter railroads face these same exact challenges and more, including dependency on implementation by the freight railroads and Amtrak, whose tracks they use, and obtaining sufficient radio frequency spectrum for radios.

It appears unlikely that PTC will be implemented by more than a small number of railroads by the deadline.

In its August 2000 report to Congress, FRA requested authorities, such as granting provisional certification of PTC systems to railroads, which would provide flexibility to meeting the deadline. FRA officials say these authorities could enable them to conduct oversight more realistically, by acknowledging the current state of implementation, and in turn could help better manage their and the railroads' limited resources.

Thank you, Mr. Chairman. This concludes my statement, and I would be pleased to answer any questions you may have.

[The prepared statement of Ms. Fleming follows:]

Rail Safety

PRELIMINARY OBSERVATIONS ON FEDERAL RAIL SAFETY OVERSIGHT AND POSITIVE TRAIN CONTROL IMPLEMENTATION

Why GAO Did This Study

The rail network is one of America's safest modes of transportation, although several recent rail accidents have reinforced the need for constant effort from the pri-

vate and public sectors to ensure safety for rail passengers, the public, and railroad employees. FRA, the Federal agency responsible for railroad safety, works with freight, commuter, and intercity passenger railroads and certain states to ensure the safety of the U.S. railroad network.

In 2007, FRA developed and implemented a risk-based approach to its safety inspections of the railroad network. In 2008, RSIA was enacted and, among other things, reauthorized FRA's rail safety program and included several new rail safety provisions, such as the implementation of PTC and creation of rail safety risk reduction plans.

This statement discusses GAO's preliminary observations about (1) how FRA oversees rail safety, (2) challenges to rail safety, and (3) PTC implementation by the U.S. rail industry. GAO examined FRA's overall rail safety framework and interviewed state rail safety officials and officials from FRA; selected Class I, II, and III railroads; and Amtrak on rail safety and PTC implementation.

GAO plans to issue reports on reviews of rail safety and PTC in the fall of 2013.

What GAO Found

The Federal Railroad Administration (FRA) primarily monitors railroads' compliance with Federal safety regulations through routine inspections by individual inspectors at specific sites on railroads' systems. Thirty states also employ railroad safety inspectors, who participate in a partnership program with FRA to conduct supplemental safety oversight activities based on FRA rail safety regulations and enforce state railroad safety laws. FRA applies a quantitative, risk-based approach, the National Inspection Plan, to inform its rail safety oversight efforts using analyses of past accident and inspection data and other information to target inspections in each region. FRA also uses a planning and evaluation tool, the Staffing Allocation Model (SAM), to distribute its inspection resources across each FRA region. However, according to several FRA regional administrators that GAO spoke with, the staffing decisions based on SAM results do not necessarily align with their perspectives on the inspector needs for their regions.

Based on GAO's work to date, there are several potential challenges affecting FRA's rail safety oversight. First, the Rail Safety Improvement Act (RSIA) required FRA to issue regulations requiring certain railroads to submit risk reduction plans within 4 years. FRA has not yet issued a final rule on the plans. Second, FRA does not have a specific plan to replace its aging inspector workforce. According to FRA officials, in the next 5 years, about 32 percent of FRA inspectors will be eligible to retire. Although FRA officials said that they anticipate being able to replace inspectors, it can take 1 to 2 years to find, hire, train, and certify a new inspector. Finally, FRA faces other ongoing and emerging safety challenges like addressing adverse weather conditions and their impact on railroad operations and equipment, educating the public on the potential hazards of rail-highway crossings, accommodating changes in rail safety risks including new freight flows that affect the need for inspections, and hiring and training a specialized inspector workforce to provide adequate safety oversight for emerging technologies including positive train control (PTC), a communications-based system designed to prevent train accidents caused by human factors.

GAO's work to date indicates that railroads may not be able to fully implement PTC by the 2015 deadline established in RSIA. This is because of the many interrelated challenges caused by the complexity and breadth of PTC implementation. For example, PTC components, such as the back office servers, which are needed to communicate vital information between locomotives and wayside signals, are still under development. In addition, the need to integrate PTC components and field test the system is a time- and resource-consuming process. Finally, some railroads had concerns with FRA's limited resources and ability to verify field testing and certify the system once it is fully implemented. Officials from freight railroads and FRA stated they will not compromise PTC safety functions and will ensure PTC is implemented to meet the requirements of the RSIA mandate. However, in attempting to implement PTC by the 2015 deadline, railroads may be making choices that could introduce financial and operational risks. For example, freight railroad representatives told us that without adequate time for field testing, PTC systems could potentially malfunction or fail more frequently, causing system disruptions.

PREPARED STATEMENT OF SUSAN A. FLEMING, DIRECTOR, PHYSICAL INFRASTRUCTURE ISSUES, UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE

Chairman Blumenthal, Ranking Member Blunt, and Members of the Committee:

We appreciate the opportunity to participate in this hearing to discuss the Federal Railroad Administration's (FRA) rail safety oversight activities. The rail network is

one of America's safest modes of transportation, although several recent rail accidents, including the Metro-North commuter rail accident in Bridgeport, Connecticut, the collision of BNSF and UP trains in Chaffee, Missouri, and the collision of a CSX train and a truck in Rosedale, Maryland, have reinforced the need for constant effort from both the private and public sectors to ensure that rail transportation remains safe for passengers, the public, and railroad employees. My statement will discuss our ongoing reviews of FRA's rail safety oversight and the implementation of positive train control, a communications-based system designed to prevent train accidents caused by human factors.

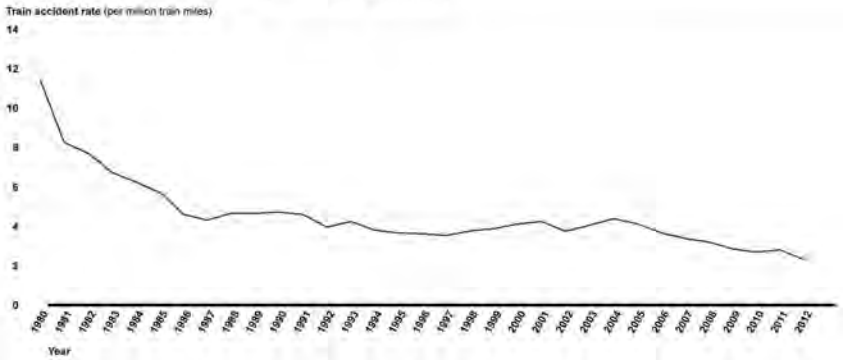
This testimony provides our preliminary observations from our ongoing work, being performed at the request of this committee and other Members of the Senate, regarding: (1) FRA's framework for safety oversight, (2) existing and emerging challenges to rail safety, and (3) PTC implementation. Our preliminary assessments of FRA's rail safety framework and the quantitative tools FRA uses to implement that framework are based on our reviews of FRA documentation and interviews with FRA headquarters and regional officials. In addition, we interviewed state rail safety officials and freight railroad officials from selected Class I, II, and III railroads.[1] We selected the railroads based on the class of railroad (as a proxy for size), types of railroads (long distance versus local service or a railroad that serves a small area such as a port or rail yard), and type of ownership (publicly held, privately held, or owned by a public agency) to get a range of different kinds of freight railroads. For our assessment of PTC implementation, we reviewed documents and interviewed officials from FRA and railroad associations, the four largest freight railroads, commuter railroads that were selected based on PTC implementation status and ridership levels (among other things), and Amtrak. We also selected PTC suppliers and independent PTC experts based on their involvement with PTC and recommendations from FRA, industry associations, and others.

We conducted our ongoing work in accordance with generally accepted government auditing standards. We provided a draft copy of this statement to FRA for their review. The agency had no comment. We plan to report the final results of our reviews in the fall of 2013.

Background

According to FRA data, 2012 was the safest year in railroad history. Overall, rail safety—measured by the train accident rate per million train miles—has improved markedly since 1980, as shown in figure 1. In addition, the accident rate dropped by almost 50 percent from 2004 to 2012.

Figure 1: Train Accident Rates per Million Train Miles, 1980 to 2012



Source: FRA.

Even with the significant reduction in accident rates, however, roughly 300 people were injured and 10 people were killed in train accidents on average each year, from 2003 to 2012.[2] Further, recent rail accidents underscore the importance of continued, consistent efforts to ensure rail safety.

[1] The Surface Transportation Board classifies railroads based on annual revenues. As of 2011 (the last year of data available), Class I freight railroads are those railroads that earn more than $433 million annually, Class II earn from about $35 million to $432 million annually and Class III railroads earn less than about $35 million annually.

[2] These figures do not include highway-railroad grade crossing or trespasser accidents.

FRA provides regulatory oversight of the safety of U.S. railroads, both passenger and freight. FRA develops and enforces regulations for the railroad industry that include numerous requirements related to safety, including requirements governing track; signal and train control systems; grade-crossing warning device systems; mechanical equipment, such as locomotives and tank cars; and railroad-operating practices. FRA also enforces hazardous materials regulations that relate to the safe transportation of such materials by rail.

The Rail Safety Improvement Act (RSIA) of 2008 was the first authorization of FRA's safety activities since 1994 and is due to be reauthorized in 2013.[3] RSIA overhauled Federal rail safety requirements by directing the FRA to, among other things, promulgate additional new rail safety regulations and guidance in areas such as railroad risk reduction plans, track inspections standards, and highway-rail grade crossing safety.

RSIA also required railroads to develop and submit a plan to FRA for implementing a PTC system on rail lines that carry intercity or commuter passengers or toxic-inhalation-hazard cargo by December 31, 2015.[4] Under RSIA, FRA is responsible for approving railroads' PTC implementation plans and certifying PTC systems prior to installation. PTC is a communication-based system designed to prevent some accidents caused by human factors, including train-to-train collisions and derailments caused by exceeding safe speeds. It is also designed to prevent incursions into work zones and movement of trains through switches left in the wrong position. By preventing trains from either entering a segment of track occupied by another train or moving through an improperly aligned switch, PTC could prevent accidents such as the one in the Chatsworth neighborhood of Los Angeles, California.[5] Railroads that are required to implement PTC can choose different PTC systems; however, railroads' PTC systems must be interoperable. This means that the components of different PTC systems must be able to communicate with one another in a manner to provide for the seamless movement of trains as they cross tracks owned by different railroads that may be using different PTC systems.[6,7]

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[3] Pub. L. No. 110–432, div. A, 122 Stat. 4848.

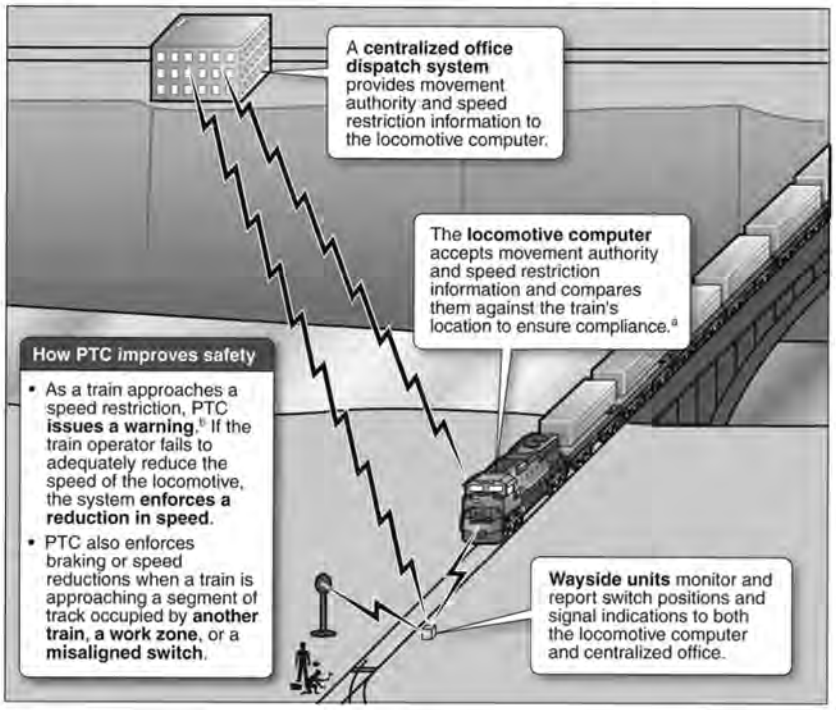
[4] Failure to complete PTC system installation on track where PTC is required prior to the deadline is subject to a $16,000 penalty per violation and $25,000 per willful violation. See 49 C.F.R. Appendix A to Part 236.

[5] In September 2008, a commuter train operator missed a red signal, causing the train to collide with a Union Pacific freight train, resulting in 25 deaths and over 100 injuries.

[6] Major freight railroads in the United States are implementing Interoperable Electronic Train Management System (I–ETMS) and Amtrak, which provides intercity passenger rail and predominantly owns the Northeast Corridor track that runs from Washington, D.C., to Boston, is implementing Advanced Civil Speed Enforcement System (ACSES). Although ACSES and I–ETMS are functionally the same, they represent different technical approaches.

[7] GAO, *Rail Safety: Federal Railroad Administration Should Report on Risks to the Successful Implementation of Mandated Safety Technology,* GAO–11–133 (Washington, D.C.: Dec. 15, 2010) and Federal Railroad Administration, *Report to Congress: Positive Train Control Implementation Status, Issues, and Impacts* (August 2012).

Figure 2: Basic Operation of a Positive Train Control (PTC) System



Source: GAO.

[a] Train location information is determined through various methods depending on the specific PTC system, including through satellite-based positioning systems and sensors installed along the track.

[b] Although RSIA does not require PTC systems to issue such warnings, the PTC systems that most railroads are implementing will do so.

FRA's Rail Safety Framework Includes Data to Inform Its Rail Safety Oversight Efforts but Faces Potential Oversight Challenges

FRA's Oversight Framework Primarily Uses Federal and State Inspectors to Oversee Railroad Safety Efforts

Our work to date indicates that FRA primarily monitors railroads' compliance with Federal safety regulations through routine inspections by individual inspectors at specific sites on railroads' systems. This inspection approach focuses on direct observations of train components, related equipment, and railroad property—including the track and signal systems—as well as operating practices to determine whether they meet FRA's standards. Inspectors also examine railroads' inspection and maintenance records. FRA's inspectors generally specialize in one of five areas, called inspection disciplines: (1) operating practices, (2) track, (3) hazardous materials, (4) signal and train control, and (5) motive power and equipment.[8] Inspectors typically cover a range of standards within their discipline during inspections. FRA's policy is for inspectors to encourage railroads to comply with Federal rail safety regulations voluntarily. When railroads do not comply voluntarily or identified problems are serious, FRA may cite violations and in certain instances take enforcement actions, including the assessment of civil penalties, to ensure compliance.[9]

[8] Inspectors in this specialty inspect railroad locomotives, passenger and freight cars, and their safety appliances such as air brakes.

[9] For Fiscal Year 2012, FRA's final civil penalty assessments and settlements totaled about $16.6 million for about 6,400 violation reports.

Our preliminary work has found that thirty states also employ railroad safety inspectors, who participate in a partnership program with FRA to conduct safety oversight activities, supplemental to FRA's activities, based on FRA rail safety regulations and to enforce state railroad safety laws. FRA trains and certifies state inspectors and includes them in its inspection planning efforts. However, FRA's relationship and coordination with each state is unique. For example, according to one state rail safety administrator we talked to, the Federal and state track inspectors have divided one state's territory to ensure that the inspectors' territories do not overlap. In addition, an FRA regional administrator mentioned that while his FRA and state inspectors' territories overlapped, effective coordination between inspectors avoids duplicative inspections. According to FRA officials, while state inspectors ensure compliance with state requirements, state inspectors are also responsible for ensuring compliance with Federal safety regulations.

In addition to Federal and state inspectors, the railroads have their own inspectors who are responsible for ensuring that railroad equipment, track, and operations meet Federal rail safety standards. Each railroad has its own inspectors or contracts with third parties to conduct the required inspections depending on the railroad's resources and FRA-mandated inspection responsibilities.

FRA is a small agency relative to the railroad industry, making the railroads themselves the primary guarantors of railroad safety. Based on our work to date, FRA has about 470 inspectors in its headquarters and regional offices, in addition to about 170 state inspectors.[10] In contrast, the U.S. railroad system consists of about 760 railroads with about 230,000 employees and 200,000 miles of track in operation. FRA is also responsible for developing and enforcing regulations for commuter railroads and Amtrak.[11] Amtrak and commuter railroads operating outside of the Northeast Corridor operate largely over freight railroad tracks and carry over 670 million passengers a year over 23 billion miles. The FRA works with railroads to get their input on proposed regulations and rules through the Railroad Safety Advisory Committee (RSAC) process.[12] Several railroad officials we spoke with thought that the RSAC process was an improvement over the prior process, that they believe had been less collaborative and did not promote discussions among FRA, the railroads, and labor unions to share and understand each other's views on proposed Federal railroad safety regulations.

FRA Targets Its Inspections Based on Analyses of Past Accident and Inspection Data and Other Information

In 2006, FRA implemented a risk-based approach, using its National Inspection Plan (NIP), to allocate its limited inspection resources to ensure rail safety. The NIP consists of three elements: (1) a baseline plan that establishes safety goals for each railroad and state, (2) review and adjustment by regional administrators, (3) monitoring and evaluation of inspection activity.

The NIP's baseline plan attempts to minimize the predicted number and severity of railroad accidents given the number of available FRA inspectors in each FRA region. The quantitative model uses data including: (1) the most recent 3 years of accident data from reports that railroads are required to file about accidents that occur on their tracks; (2) data from FRA's inspection activity; and (3) information on railroad activities such as train miles and other data, to determine the scope of what FRA's inspectors should inspect in a given year.[13] In the middle of each calendar year, FRA updates the NIP with new accident data to estimate where the highest safety risks are and uses the results to create annual inspection targets for each inspector.

Our preliminary work indicates that after the baseline is established, FRA's regional management propose modifications to the inspection targets produced for each region using their judgment and knowledge of which railroads or disciplines may require more FRA oversight than the NIP's model indicates. Subsequently, FRA allows for a mid-year correction of the NIP, based on input from FRA's regional management. FRA regional administrators we spoke with indicated that this flexi-

[10] Six of these states (California, Illinois, Ohio, Pennsylvania, Texas, and West Virginia) comprise over 50 percent of the total number of state inspectors.

[11] There are currently 28 commuter railroads.

[12] FRA established the Railroad Safety Advisory Committee (RSAC) in 1996 to develop new regulatory standards, through a collaborative process, with all segments of the rail community, including railroads, shippers and other stakeholders, to fashion mutually satisfactory solutions on rail safety regulatory issues.

[13] Railroads are required to report monthly accident data within a month of the accident occurring and it may take 2 to 3 more months for FRA to review the information and make it available for use in the NIP. The NIP excludes highway-rail grade crossing and trespasser accidents from its analysis.

bility allows them to accommodate new or emerging rail safety risks by deviating from the original NIP targets. For example, they stated that they sometimes re-allocate inspectors to railroads that have had recent accidents, or because inspectors indicate a need for more oversight at a certain railroad based on assessments made during their regular inspection duties. Additionally, the effects of hurricanes, storms, or prolonged periods of adverse weather, such as heat or cold that could cause track failures, may require the reallocation of inspection resources. Throughout the year, FRA headquarters and regional management monitor the inspection activities against the modified inspection baseline to determine if the inspection targets are being met.

FRA has also developed the Staffing Allocation Model (SAM), which is a planning and evaluation tool used to assess its inspection resources from a nationwide perspective. Our work to date shows that FRA uses the SAM to establish targets for the number of inspectors in each FRA region and inspection discipline. In using the targets to help allocate and balance staff among disciplines and regions, FRA expects to minimize the resulting casualties and estimated costs of train accidents. FRA uses the SAM results to determine where they may need to adjust the number of inspectors in a given region and discipline. FRA rebalanced its workforce using the SAM model in 2007 and officials stated that more recent SAM results have not indicated the need for major movements of inspectors between regions or disciplines. However, FRA officials stated that when the SAM has shown a change in the distribution of their inspectors they are somewhat constrained from implementing the model's results due to budget constraints. FRA officials also told us that while the SAM model has been refined based on what they have learned from making improvements to the NIP, the SAM is not designed to take into account certain changes—such as increasing freight train volume or accidents in a particular region—as the SAM uses past accident data to provide a baseline for the nationwide distribution of its inspectors. FRA officials stated that they handle those types of changes on an as-needed basis through temporary detail assignment of FRA inspectors from other regions or headquarters.

In addition, our preliminary review indicates that FRA regional administrators also can provide input on the model's results based on their views on how many inspectors the region needs. However, FRA regional officials we talked to stated that the staffing decisions based on SAM results do not necessarily align their inspectors with their perspective of the needs in their region nor does it take a region's geography into account. While FRA headquarters officials anticipate that there may be minor variations from SAM's targets as a result of natural turnovers of inspectors (*e.g.,* retirements), they do not believe that these variations will have long-term impacts on FRA's safety activities in the regions. However, regional administrators expressed concern over the staffing pressures this can create. For example, one FRA regional administrator stated that when the staffing decisions did not provide for a replacement for a certain discipline, he was forced to cover that discipline's inspection load with inspectors from other states for 3 years until a replacement could be approved, hired, trained, and qualified.

As we continue our on-going work on rail safety oversight, we will further assess how FRA officials use these tools to accommodate changing rail safety risks and allocate inspectors across regions and inspection disciplines.

FRA Faces Several Potential Challenges to Its Rail Safety Oversight Mission

Based on our work to date, we have identified several potential challenges affecting FRA's rail safety oversight, including lack of a final rule requiring the submission of Risk Reduction Plans by specified railroads, lack of succession planning to ensure sufficient staff numbers and expertise, and other ongoing and emerging challenges.

Risk Reduction Plans

RSIA required FRA to develop a rulemaking requiring certain railroads to submit risk reduction plans, within 4 years of enactment, which was October 2012.[14] Our preliminary work has identified several reasons why a final rule has not yet been issued, according to FRA, including the need to resolve the issue of protection of sensitive business and safety information in the railroad's risk reduction plans. FRA officials told us that these plans would allow them to have a more proactive view of rail safety for these railroads that will complement FRA's current compliance-

[14] Specifically, RSIA required all Class I freight, intercity passenger, and commuter railroads (as well as any railroad whose safety performance was determined to be inadequate by the Secretary of Transportation) to develop and submit plans for DOT to review that would identify and propose to manage the rail safety risks on the railroad, such as rail safety technology and human fatigue management.

based approach. FRA officials also told us that they anticipate issuing a final rule in September 2014 and that they expect that the railroads will have risk reduction plans in place by 2016.

Succession Planning

Our work to date has found that FRA does not yet have a specific plan to replace its aging inspector workforce. According to FRA officials, in the next 5 years, 150 of FRA's 470 inspectors (about 32 percent) will be eligible to retire. FRA officials told us, however, that they have been able to find and hire qualified candidates in the past. However, other FRA headquarters officials and regional administrators we spoke with stated that replacing qualified inspectors is difficult, especially for the signal discipline, and getting inspectors fully qualified takes time. For example, FRA regional officials stated that it takes about 1 to 2 years to find, hire, train, and certify a new experienced inspector and 3 to 4 years to get an inexperienced trainee certified by FRA as a qualified inspector. Additionally, FRA officials stated that budget constraints may prohibit their current practice of hiring new inspectors before retiring inspectors leave so that some overlap can occur to facilitate the transfer of knowledge.

Other Challenges

Our preliminary work has identified several other ongoing and emerging rail safety challenges that FRA faces.

- *The effects of weather on railroad operations are an ongoing challenge.* FRA and the railroads continuously keep abreast of adverse weather conditions that can cause accidents, such as high temperatures that can cause tracks to go out of alignment and cause a derailment. FRA has issued several weather-related regulations concerning tracks, operating practices, and railroad equipment, and the railroads we spoke with adjust their operating practices to account for adverse weather.
- *All rail safety stakeholders face the continued challenge of trying to reduce highway-rail grade crossing and trespasser incidents.* Reducing these kinds of accidents represents a different challenge to FRA's current rail safety framework. Rail safety stakeholders stated that this involves educating the general public about the potential safety hazards that trains represent to cars, trucks, and pedestrians at grade crossings as well as cooperating with several other federal, state, and local government agencies that have responsibility for funding road projects or closing those crossings. Changes to freight flows, such as the recent increase in train and truck traffic experienced due to increased gas and petroleum drilling in the upper Midwest, can add train or truck traffic to previously low traffic areas increasing the risk of highway-railroad grade crossing accidents.
- *New technologies, such as PTC systems, are another challenge that FRA will have to incorporate into its rail safety oversight framework.* For example, because PTC systems are extremely complex command, control, and communications systems, the FRA believes it will require a specialized inspector workforce—which FRA currently does not have—to provide adequate safety oversight.

As we continue our on-going work, we will further assess the extent to which FRA is incorporating these existing and emerging challenges into its safety oversight framework.

Most Railroads Report They Will Miss the 2015 PTC Implementation Deadline Due to a Number of Challenges

Our work to date indicates that most railroads will not complete PTC implementation by the 2015 deadline due to numerous, interrelated challenges caused by the breadth and complexity of PTC.[15] Of the four major freight railroads we included in our review,[16] only one railroad expects to meet the 2015 deadline. Of the three remaining freight railroads we spoke to, representatives believe they will likely not have PTC fully implemented until 2017 or later. Commuter railroads, which primarily operate on routes that are owned and managed by freight railroads, generally must wait for freight railroads and Amtrak to roll out their PTC systems. Our

[15] In its May 2013 report, the Association of American Railroads noted that most railroads would not make the deadline.

[16] The four major freight railroads included in our review are BNSF, Norfolk Southern, CSX and Union Pacific—the largest Class I railroads based on operating revenue.

preliminary analysis indicates that freight and commuter railroads' inability to meet the 2015 deadline is due to a number of challenges.

- *Developing PTC components and PTC installation:* Some PTC components are still in development—most notably the PTC back-office server. One or more of these servers will be installed in over a dozen railroads' back offices and are needed to communicate vital information between the back office, locomotives, and waysides. According to the Association of American Railroads (AAR) and the railroads, back office system delays are due to system complexity, interfaces to other systems, and lack of supplier resources. Nearly all of the freight railroads included in our review anticipate they will not have a final version of the back office system until 2014 and have identified it as one of the significant factors preventing them from meeting the deadline. In addition, PTC installation is a time-and resource-consuming process. For example, railroads collectively will have to install approximately 38,000 wayside interface units.[17] According to AAR and freight railroads, the volume and complexity of installing these units is another significant reason most railroads cannot meet the 2015 deadline. Our ongoing work has found that railroads have also encountered unexpected delays while installing PTC. For example, in May 2013, FRA officials told us the Federal Communications Commission (FCC) recently requested railroads to halt their construction of radio antennae towers to allow FCC to clarify regulatory oversight of the towers being installed for PTC.[18] According to FRA officials, FCC halted the construction of these towers to ensure proper installation procedures were being followed including consulting with either the tribal or state historical authorities prior to the towers construction and installation. FRA officials told us they did not anticipate this issue but are working with FCC to resolve it as quickly as possible. However, the impact of halting construction on the towers may result in additional delays in railroads' time frames.
- *System integration and field testing:* Our work to date indicates that successful PTC implementation involves several components working together, many of which are first-generation technologies being designed and developed. All components must function both independently and together, or the PTC system could fail. To ensure successful integration, multiple testing phases must be conducted by the railroads—first in a lab environment, then in the field—before components are installed across the network. Most of the freight railroads we spoke with expressed concern with the reliability of PTC and emphasized the importance of field testing to ensure the system performs the way it is intended. Multiple phases of testing must take place to identify any defects, which then must be analyzed and corrected, and the system re-tested. One railroad representative with whom we spoke said that the PTC system components behaved differently in some field tests than in the laboratory tests. Identifying the source of such problems, correcting them, and re-testing could further contribute to railroads not meeting the 2015 deadline.
- *FRA resources:* Although most railroads we spoke with said they have worked closely with FRA throughout the PTC implementation process, some railroads cited concerns with FRA's limited resources and the agency's ability to help facilitate railroads' PTC implementation. Our work to date indicates that these concerns were based around two activities: field testing and certification. First, FRA officials must verify the field testing of PTC. However, FRA reported that it lacks the staffing resources to embed a dedicated FRA inspector at each railroad for regular, detailed, and unfiltered reporting on a railroads' PTC progress. To address the lack of staff to verify field testing, FRA has taken on an audit approach, whereby railroads submit field test results for approval as part of their safety plans.[19] Second, a PTC system must be certified before a railroad can operate it in revenue service. FRA certifies a PTC system by approving a railroad's safety plan. FRA set no specific deadline for railroads to submit the

[17] Wayside interface units receive information from signals and in turn communicate signal aspect information to the locomotive directly or through railroads' back offices.

[18] According to the FCC website, new tower construction must go through an FCC approval process and also a three stage review process depending on its location which includes: 1) environmental impact review, 2) state historical impact review, and 3) tribal land impact review. FCC notifies federally recognized tribes, Native Hawaiian Organizations, and State Historic Preservation Officers of proposed communications towers and allows these organizations to respond directly to the companies about their concerns.

[19] The PTC safety plan must include information about planned procedures for testing the system during and after installation, as well as information about safety hazards and risks the system will address, among other requirements.

safety plans, and according to FRA, to date only one railroad has submitted a final plan, which FRA has approved. As FRA stated in its 2012 report to Congress, FRA's PTC staff consists of 10 PTC specialists and 1 supervisor who are responsible for the review and approval of all PTC system certification documentation for 38 railroads. FRA has expressed concern that railroads will submit their safety plans to FRA at roughly the same time. Our initial analysis suggests that this timing creates the potential that FRA's review of these plans will become backlogged, since each of the railroad's plans will consist of hundreds, perhaps thousands, of pages of detailed technical information. FRA officials told us that they are dedicated to the timely approval of safety plans and that their oversight will not impede railroads from meeting the deadline. However, railroads report that their time frames are based on a quick turnaround from FRA; if quick turnaround does not occur, it could further delay PTC implementation.[20]

Based on our work to date, it appears that commuter railroads face these same PTC implementation challenges as well as others. First, because commuter railroads are generally using the PTC systems developed by freight railroads and Amtrak, they are captive in many respects to the pace of development of these entities and have few means to influence implementation schedules. In addition, commuter railroads also face challenges in funding PTC implementation due to the overall lack of federal, state, and local funding available to make investments in commuter rail. According to the American Public Transportation Association, PTC implementation will cost commuter railroads a minimum of $2 billion. Commuter railroads are nonprofit, public operations that are funded by passenger fares and contributions from federal, state, and local sources. Economic challenges such as the recession have eroded state and local revenue sources that traditionally support commuter rail capital expenses, and competing expenses such as state of good repair upgrades, leaving the commuter railroads limited in their funding to implement PTC.

Finally, commuter railroads report that obtaining radio frequency spectrum—essential for PTC communications—can be a lengthy and difficult process.[21] The FCC has directed commuter railroads to secure spectrum on the secondary market.[22] According to the FCC, spectrum is available in the secondary market to meet PTC needs.[23] While freight railroads have secured most of the spectrum needed for PTC implementation, commuter railroads have reported difficulty acquiring spectrum in the 220 MHz band, which is required to operate the data radios that communicate information between PTC components.[24] In particular, railroad officials have said that obtaining spectrum is a critical challenge in high density urban areas. Based on our preliminary work, without acquiring sufficient spectrum, railroads may be unable to adequately test their PTC systems, potentially causing further delays in meeting the 2015 PTC deadline.[25]

Our work to date also indicates that by attempting to implement PTC by the 2015 deadline, railroads may be making choices that could introduce financial and operational risks to PTC implementation. Representatives from freight railroads and FRA told us railroads will not compromise the safety functions of the PTC system and will ensure that PTC is implemented meeting RSIA requirements. However, freight railroad representatives also told us that they compressed time frames and undertook processes in parallel rather than sequentially—potentially increasing the financial and operational risk of PTC implementation. For example, railroads took

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[20] Railroads have developed common portions of the safety plan and submitted drafts to FRA for preliminary review to expedite final review. This way FRA staff will be familiar with portions of the plan that are common across plans before the finalized plan is submitted.

[21] Radio frequency spectrum is the medium for wireless communications and supports a vast array of commercial and governmental services. Commercial entities use spectrum to provide a variety of wireless services, including mobile voice and data, paging, broadcast television and radio, and satellite services.

[22] Secondary market policies and rules allow spectrum permit licensees to share their spectrum resource through spectrum lease arrangements. Users negotiate their own terms for sharing spectrum and FCC tracks these secondary market transactions. For more information on spectrum markets, see *Spectrum Management: Incentives, Opportunities, and Testing Needed to Enhance Spectrum Sharing,* GAO–13–7 (Washington, D.C.: November 2013).

[23] Presentation to the National Transportation Safety Board. "Positive Train Control: Is it on Track?" FCC, February 27, 2013.

[24] Seven freight railroads (Norfolk Southern, Union Pacific, BNSF, CSX Transportation, Canadian National, Canadian Pacific, and Kansas City Southern) together comprise PTC 220 LLC, a company that owns spectrum licenses. According to a PTC 220 LLC representative, these seven freight railroads will lease spectrum from PTC 220 LLC and will lease spectrum to other railroads based on availability for a fee.

[25] Amtrak officials also report that securing spectrum has been a major challenge in PTC implementation for them and has led to implementation delays.

a "double touch" approach to equipping locomotives, which involves taking locomotives out of service twice in order to begin installation while software was being developed.[26] Railroad representatives told us this approach is more expensive than installing the equipment once after the software is fully developed, as it involves more labor hours and more time that locomotives are offline rather than in operation. In addition, representatives from all freight railroads we spoke to expressed concern regarding the reliability of PTC and noted the importance of field testing as much as necessary to identify and correct problems. These representatives noted that without adequate testing, PTC systems could potentially malfunction or fail more frequently, causing system disruptions. FRA officials also expressed concern that if pressured to meet the 2015 deadline, railroads may rush through field testing and potentially implement a PTC system that is not entirely reliable leading to operational inefficiencies through slower trains or congestion.

In its August 2012 report to Congress, FRA identified areas for consideration in the event that Congress chooses to amend RSIA. Specifically, FRA requested the authority to extend the deadline for certain rail lines, grant provisional certification of PTC systems and approve the use of alternative safety technologies in lieu of PTC.[27] FRA officials told us these authorities could enable them to conduct oversight more effectively by acknowledging the current state of PTC implementation and better manage FRA's limited resources. Although to date there are few details on how these authorities would be applied, according to FRA officials, these authorities could assist in better managing resources allowing the agency to oversee and manage PTC implementation past the current deadline of December 31, 2015.

Based on our preliminary work, it appears unlikely that PTC will be implemented by more than a few railroads by the December 31, 2015, deadline. As we have discussed, PTC implementation is a massive, complex, and expensive undertaking—with valid challenges to meeting the deadline. However, although most railroads will not meet the PTC deadline, it does not necessarily suggest that they have not made a concerted effort to make progress in the implementation of PTC. Railroads and FRA both report continuing to search for ways to speed progress while maintaining safe rail operations in order to achieve complete deployment as soon as possible. Nonetheless, given the state of PTC technology and the myriad of PTC components that are required to work seamlessly in order for PTC to work reliably, concerns regarding the potential risks railroads may be taking in attempting to meet the deadline should be considered. Accordingly, FRA has requested authorities that could provide railroads the flexibility they need to successfully implement PTC.

Chairman Blumenthal, Ranking Member Blunt, and Members of the Committee, this concludes my prepared remarks. I am happy to respond to any questions that you may have at this time.

Senator BLUMENTHAL. Thank you, Ms. Fleming, for calling attention to the array of potential dangers, in terms of rail safety, and, in particular, the succession problem, which is a major challenge for this industry. A lot of people have observed on it.

And, Administrator Szabo, thank you for also highlighting the need to be concerned about the safety of the folks who work on our railroads.

And with that in mind, let me begin by asking Chairman Hersman, if this shunt had been used at the time that Robert Luden was working in West Haven, and a rail traffic controller in New York returned to service the track on which he was working, would his life had been saved?

Ms. HERSMAN. We believe if the shunt had been used properly, that both the controller in New York and a train trying to enter that track would have received an indication that that track block was occupied.

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[26] "Double touch" installation refers to partially installing groundwork equipment on thousands of locomotives, which will later need to be taken out of service to install the remaining equipment.

[27] According to FRA, this would allow a railroad to apply for provisional certification to operate a PTC system pending final submission, review, and approval of the railroad's safety plan by FRA.

Senator BLUMENTHAL. And the train, therefore, would have been stopped?

Ms. HERSMAN. Yes, we expect that those redundant safety measures could have saved that track worker's life.

Senator BLUMENTHAL. And that is the reason that you have recommended in the past that this kind of system, which by the way, I think costs about $200; am I right about that?

Ms. HERSMAN. Yes, sir. That is correct.

Senator BLUMENTHAL. You have recommended that it be adopted by Metro-North and other railroads around the country?

Ms. HERSMAN. That is right. MBTA experienced several worker fatalities in Woburn, Massachusetts when a shunt was not used, despite having shunting policies. The track was inappropriately released, a train entered that track, killing the track workers.

Some railroads do use shunts, and we have recommended that all of them do it.

Senator BLUMENTHAL. And you have with you, do you not, the inspection report that was done on May 15, 2 days before the May 17 collision?

Ms. HERSMAN. Yes, sir, I do.

Senator BLUMENTHAL. I would like to ask you to submit your copy for the record. You were very kind in providing me with a copy.

And if there is no objection, I will ask that it be made a part of the record.

[The information requested follows:]

Federal Railroad Administration Daily Inspection Report

May 15,2013 Federal signal inspector , report # 044.
inspected the railroad Metro North Commuter RR Co. [MNCW] in New York.
The inspection began in ROCKLAND county in the city of SUFFERN .
It ended in ORANGE county in the city of HARRIMAN.
The inspection was on the subdivision SYSTEM and division SYSTEM
Areas reviewed and defects found

	Units	Defects		Units	Defects
Railway worker protection	2	0			

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Senator BLUMENTHAL. Chairman Hersman, as you look at this report, calling your attention to the line that you pointed out to me yesterday when we discussed it, that makes reference to track 4, catenary 734, could you read that, so folks here can know what it says exactly?

Ms. HERSMAN. There is a handwritten notation on this page, under insulated joints, frogs and switches, that says "track 4, catenary 734, insulated joint, hanging ties, pumping under load."

Senator BLUMENTHAL. And if I understand correctly, I am going to try to put it in layman's terms, essentially, the tie was insufficiently supported. And, therefore, the track was unstable, so that the joint linking the two tracks at their connection was weakened by repeated travel over the track. And very likely, the cause of the

derailment was eventually the splitting of that rail, when the joint failed to work properly. Is that correct?

Ms. HERSMAN. The joint joins two separate sections of rail that are already separate. It is the joint bars that join those two sections of track. The hanging ties indicates that the rail and the ties were unsupported underneath, with insufficient ballast. And that concern, when they saw loads going over that section of track, the pumping that they describe, is that flexing that is occurring at the joint over and over again as the train wheels pass over that section of track, creating, certainly, a risk area and unstable condition.

The NTSB identified the point of derailment at that location. We are examining those fractured joint bars in the rail in our lab now.

Senator BLUMENTHAL. So if I said to you, my view is that this defect caused the derailment, you wouldn't disagree with me, would you?

Ms. HERSMAN. At the NTSB, we conduct a very thorough investigation, and we ensure that we gather all of the facts before we reach any conclusions.

Yesterday, the NTSB held a Board Meeting on an accident that occurred in Oklahoma about one year ago, and this investigation contained facts relevant to the probable cause that were not revealed until months into the investigation.

When we first went on scene in this investigation, we knew a crew had run a red signal, but we did not know why. When we looked at their medical records, they had passed the required vision and hearing tests, but we dug deeper to see if there was something else that we should understand about this.

We issued requests for his medical records, and we found that this engineer, in the 33 months prior to the accident, had 12 procedures on his eyes and over 50 visits to eye care providers. We did not get that from U.P. in the beginning of the investigation. But about halfway through from his optometrist, ophthalmologist, and physician, we were able to get this.

We had a locomotive engineer who was colorblind and whose visual acuity would not pass the tests. He could not see the signals.

Two years before the crash, he had told his eye doctors that he could not see train signals.

In the end, our probable cause for that accident was based on his inability to see those signals. But we also defined, in our investigation, that the vision testing standards that currently exist, testing vision and hearing every 3 years, are not adequate. They are not consistent with what we see in the medical standards required for pilots, for mariners, and for truck drivers. We recommended changes that we would like to see the FRA and the railroads make.

Our investigations do take a long time before we reach a probable cause, but the parties involved in an investigation can take action at any time to address safety issues.

Metro-North and FRA can move immediately on the things we are finding today, and the NTSB can issue urgent recommendations, as we did in the West Haven accident.

Senator BLUMENTHAL. Don't you think your report and final conclusions ought to be done more quickly than 18 months after the May 17 and May 27 accidents?

Ms. HERSMAN. Senator, I absolutely believe that we would like to have them done sooner. The reality is that, due to our workload, we simply cannot complete everything.

I know you have two accidents. Senator Blunt, you have one that we are investigating.

We have about 20 investigators in our rail pipeline and hazardous materials division, and they are handling 11 concurrent rail accidents. Some of those investigators traveled straight from one accident site last month to another. They are handling multiple investigations at the same time.

Our work requires us to take a look at a lot of different factors and really develop comprehensive solutions.

Through our party process, we do make sure that people have information to act on quickly. Metro-North and FRA are parties to the investigation, and they can act on safety issues at any time.

Just last week, I met with Metro-North. They are working to address over 200 of those joints on their property during the summer, to put them in a better state of safety.

These improvements should take place immediately, and we support parties taking those actions.

Senator BLUMENTHAL. I am going to turn to Senator Blunt.

Senator BLUNT. Thank you, Senator Blumenthal.

Mr. Szabo, Ms. Fleming said that on positive train control, if I heard her comments correctly, and I guess I could have checked the testimony, but I didn't, I think as I made notes here that PTC components were not available at this point, that field testing had not been done yet in an adequate way, that you had limited capacity to review what was happening, and the frequency to communicate had not been obtained yet. I guess I have a couple questions. One is, what have I left out of that list? And two is, do you think, based on those factors, it is workable to get there industrywide by 2015?

Mr. SZABO. If you go back and take a look at the report that we provided to Congress last fall, it really articulates the range of challenges that the industry has in meeting full PTC deployment by December 31, 2015.

And I think that is the key word there, full deployment. We absolutely believe that partial deployment can and will be achieved. But between the availability of spectrum; the availability of radios; the ability to get the technology necessary to set up back offices; the fact that the entire industry, as well as my agency sometimes, are competing for a very limited pool of expertise in implementing, there is no question that there are challenges that are going to be a roadblock to full deployment.

I think Chairwoman Hersman said it well, that should Congress consider an extension? What we recommended in our report was that FRA be given limited flexibility to, in essence, extend on a case-by-case basis. It should not be a blanket extension.

We really have to find this appropriate balance between keeping feet to the fire for expeditious implementation while also making sure that we allow the appropriate amount of time to ensure that it is done safely and reliably. And that is the challenge.

And so we would like to have the ability to actually weigh that due diligence. Actually, the terms that the chairwoman used was accountability for actions or the lack of actions on implementation,

to actually be able to measure that as we determine what type of extension might be necessary on a case-by-case basis.

Senator BLUNT. But your view is that case-by-case extension made by your agency would be what you would prefer to see happen?

Mr. SZABO. You know, again, it is part of ensuring that balance between timely implementation while also making sure that it is done safely and reliably.

Senator BLUNT. Do you have an estimate of cost of what this system—some of the notes I have here is over $10 billion, some say $12 billion. What is your——

Mr. SZABO. I can provide it to you for the record, but you are in the right range. It is a significant cost. It presents a challenge for the commuter industry.

Senator BLUNT. Have you had any discussions with the Federal Communications Commission about this, the spectrum, and the permitting? And how would you characterize those discussions?

Mr. SZABO. Yes, we have been having conversations with FCC on both of those, spectrum availability as well as the need to find a much better approach to siting these antennas.

I would call the conversation on spectrum availability considerably more of a challenge. FCC is conflicted in their mandate between the need to ensure resources are used efficiently, government resources used efficiently, and the need, from their perspective, to not give it away, vs. what we believe is a legitimate public safety issue, in particular for the commuter agencies and public agencies.

I think the conversations relative to siting the antennas are in a much better place, that there is a clear recognition now of the urgency of finding an alternative means, given the fact that there are some 22,000 antennas that need to be sited, and FCC's traditional process sites about 2,000 a year.

And, in particular, given that the vast majority of these, better than 95 percent, I believe, by one estimate, are just stick antennas that have minimal obstruction, minimal environmental impact, that perhaps we can find a way to be much more expeditious in siting those as we work through an alternative approach on the bigger antennas that may have some environmental issues.

Senator BLUNT. Ms. Hersman, this is just to clarify for me, you mentioned I think one head-on collision where a train derailed, and 20 seconds later, another train hit it.

Do I have that 20 seconds right?

Ms. HERSMAN. Actually, in that one, there was a train that derailed, and it was struck by another train that was on a different track from the train that derailed.

Senator BLUNT. Headed in the opposite direction on a different track that they would have passed, right?

Ms. HERSMAN. That is right. If the train had been upright, they would have passed each other. But the train was not upright and was fouling the track area, as the other train was passing through.

Senator BLUNT. I am just assuming that no system could totally prevent that, that you are going to have trains that pass each other in opposite directions, and at some second interval, no system is going to stop a train from derailing that does not get hit by the

train that is approaching it? I am not sure how many seconds that would be, but 20—no system prevents that.

But train maintenance, track maintenance, and other things go a long way toward anticipating it, and equipment maintenance. But not a system, am I right, in thinking that?

Ms. HERSMAN. Absolutely. Attention to track and a maintenance could have prevented the initial derailment. This is not an accident that would have been prevented by positive train control. But I will tell you that the engineer on the oncoming train saved a lot of lives. He threw the train into emergency and was able to get it slowed down to 23 mph when the collision occurred.

Senator Blumenthal saw firsthand the incredible damage, even at 23 mph. There would have been much more damage and potential lives lost if the train had not been slowed.

Human beings are still very good at making decisions in unusual situations. And in this case, the engineer could see the threat ahead and stop the train.

Senator BLUNT. Right, but nothing in positive train control would stop——

Ms. HERSMAN. No, sir, this was not——

Senator BLUNT.—trains from passing each other on opposite tracks at the same time, obviously, or you would not have a system that worked.

Ms. HERSMAN. Right. That is true.

Senator BLUNT. You said in your testimony that some rail operators have already complied, or will have complied by 2015. You want to tell me what you are saying there?

Ms. HERSMAN. Yes. We held a forum in February about the status of positive train control implementation. We heard from a number of witnesses. We asked the FRA who they thought would comply by the 2015 deadline. We were told that four operators would likely meet the 2015 deadline: Amtrak, Metrolink, Alaska Railroad and BNSF freight line.

Senator BLUNT. So, Ms. Fleming, in the case of all the sort of obstacles, there would be ways around all those obstacles for at least some people by 2015? The equipment availability, the testing, the FRA capacity, you think there is a way around that?

Ms. FLEMING. I think that Metrolink and BNSF are unique examples, in the sense that because of the accident, they were able to hit the ground running. BNSF has been using and testing PTC for decades, and so they have been on the forefront of that. Metrolink, right after the accident, really moved forward on that.

And one or both of them basically is not waiting for the first generation back-office server and is in fact purchasing their own and doing things a little bit differently than some of the other railroads are. So they have made a conscious effort to put the money into it.

Amtrak, it's our understanding that they will be in compliance with Michigan and the Northeast corridor, but they do not have the financial resources to actually equip their locomotives. So again, that is more of a partial 2015 implementation.

Senator BLUNT. Thank you. I will probably have more questions for the record.

Thank you, Chairman.

Senator BLUMENTHAL. We can also do a second round, a brief second round of questions, for this panel, because it is a very important panel.

I'm going to call on Senator Johnson.

STATEMENT OF HON. RON JOHNSON, U.S. SENATOR FROM WISCONSIN

Senator JOHNSON. Thank you, Mr. Chairman.

Mr. Szabo, the FRA, do you do Pareto analysis, Pareto charts, on the causation? Or maybe NTSB, do you do that analysis of what is the primary cause of these accidents?

Mr. SZABO. We do very deep root-cause analysis. In fact, if you take a look at the 43 percent reduction in accidents we have had over the past decade, it has been by aggressively using the data, the accident data that is available, to be much more strategic in coming up with our solutions.

Senator JOHNSON. Can you tell us the top five categories of causes of rail accidents?

Mr. SZABO. From the broadest standpoint, the number one risk area would be human factors. Second would be track-caused. And combined, those two probably are the chief causation for about 72 percent of all railroad accidents.

So, so much of our efforts over the last 5 years have been on drilling down on human factors and track causation, because we believe that gives us the biggest opportunity for continuous safety improvement.

Senator JOHNSON. I have heard the word resources used a couple times. I believe Ms. Fleming said limited resources, which is true.

Does anybody have the information in terms of how much capital expenditure per year is available to the industry? How much do they spend on capital improvements?

Mr. SZABO. We can get you that for the record. Perhaps Ed Hamberger on the second panel would be able to address that for the class I railroads, for the private railroads. And certainly we can get it to you for Amtrak and try to get it on the commuter railroads. But it is substantial.

Senator JOHNSON. OK. There was an interesting article, a column written by George Will on May 31, 2013 I would like to enter into the record.

[The information requested follows:]

"A MANDATE THAT IS OFF THE RAILS"

By George F. Will

WASHINGTON—Texting while driving is dangerous, especially if you are driving a train. A commuter train engineer was texting on Sept. 12, 2008, near Los Angeles, when he missed a stop signal and crashed into a freight train. Twenty-five people died.

Congress supposedly is incapable of acting quickly, and we are supposed to regret this. In 2008, however, Congress acted with dispatch. We should regret that it did. Herewith another lesson about the costs of the regulatory state, especially when it is excited, eager to make a gesture, and propelled by an uninformed consensus.

On Jan. 6, 2005, nine people had been killed in Graniteville, S.C., by chlorine gas leaking from a derailed freight train, but Congress did not spring into action. In 2008, however, California's 53-person congressional delegation was 12 percent of the House, and 24 percent of a House majority. So in less than a month after the commuter train collision, Congress, with scant opposition from railroads, and without

meaningful cost-benefit analyses, passed legislation requiring most railroads to implement, by 2015, Positive Train Control (PTC), a technology to stop trains by overriding some human mistakes.

So far, railroads have spent more than $2.7 billion on a system estimated to cost $10 billion to $14 billion—plus perhaps $1 billion in annual maintenance. PTC has not been installed, partly because it is not sufficiently developed. CSX Corp., which includes railroads among its assets, says the railroad industry is the Nation's most capital-intensive—and the $11 billion combined capital investments of all U.S. railroads in 2010 were approximately equal to the cost of PTC. The 2015 mandate will not be met.

The Federal Railroad Administration estimates that were PTC to be installed on thousands of locomotives and tens of thousands of miles of track, it would prevent perhaps 2 percent of the approximately 2,000 collisions and derailments, preventing seven deaths and 22 injuries annually. But because a dollar spent on X cannot be spent on Y, the PTC mandate must mean the sacrifice of other investments crucial to railroad safety (and efficiency).

Before returning to Harvard Law School, Cass Sunstein was Barack Obama's administrator of the Office of Information and Regulatory Affairs, measuring the benefits of regulations against their costs. Testifying to a House subcommittee on Jan. 26, 2011, Sunstein was asked if he could identify an administration regulation whose "benefits have not justified the cost." He replied:

> "There is only one big one that comes to mind. It is called Positive Train Control, and it is a statutory requirement, and the Department of Transportation had to issue it as a matter of law even though the monetizable benefits are lower than the monetizable costs. There aren't a lot like that."

Concerning Sunstein's sanguine conclusion, skepticism is permitted. Wayne Crews of the Competitive Enterprise Institute has recently published his "Ten Thousand Commandments: An Annual Snapshot of the Federal Regulatory State." This year's 20th-anniversary edition notes that regulation, the "hidden tax," costs almost $2 trillion not counted among the official Federal outlays. Using mostly government data, Crews concludes:

> The cost of regulations ($1.806 trillion) is now more than half the size of the Federal budget and 11.6 percent of GDP. This costs $14,768 per U.S. household, equal to 23 percent of the average household income of $63,685. Regulatory compliance costs exceed the combined sum of income taxes paid by corporations ($237 billion) and individuals ($1.165 trillion). Then add $61 billion in on-budget spending by agencies that administer regulations.

Crews' "Anti-Democracy Index" measures "the ratio of regulations issued by agencies relative to laws passed by Congress." In 2012, the index was 29, meaning that 29 times more regulations were issued by agencies than there were laws passed by Congress. "This disparity," Crews writes, "highlights a substantial delegation of lawmaking power to unelected agency officials."

Congress relishes such delegation of lawmaking because responsibility is time-consuming and potentially hazardous politically. Hence the Senate refuses to pass legislation the House passed in 2011 to require Congress to vote approval of any "major" regulation, defined as any with an economic impact of $100 million or more. If Congress were more clearly responsible for burdening the economy with such regulations, it would be less likely to pass them as sincerity gestures.

Internal Revenue Service misbehavior in the regulation of political advocacy, combined with the imminent expansion of the IRS to enable it to administer the coercions that are Obamacare, is sensitizing Americans to some of the costs of the regulatory state. There are many others, hidden but huge.

George Will's e-mail address is *georgewill@washpost.com.*

Senator BLUMENTHAL. Without objection.

Senator JOHNSON. He is talking about positive train control. The number he is using is that so far the railroads have spent about $2.7 billion on it. They are estimating somewhere between $10 billion and $14 billion of CapEx, about $1 billion per year in annual maintenance. He is listing that, in 2010, the total capital investment of the railroads is about $11 billion.

He is also, in this article, saying that Cass Sunstein, who was the former administrator of the Office of Information and Regu-

latory Affairs, when he was testifying before Congress, talked about positive train control in this way, he said that it is a statutory requirement of the Department of Transportation issued as a matter of law, even though monetized benefits are lower than monetized costs. He said there are not a lot like that.

So, I guess, with limited resources, I guess I just kind of want to get your evaluation, as much as we all love the concept of that, are we devoting too many resources, and are we imposing that too quickly? I mean, earlier in the column, he said this was really passed a month after a train accident in California, very rapid response by Congress.

Did we think that thing through well enough? And are we really demanding the railroads put too much money toward this one, again, potentially lifesaving and very wonderful technology, but is that at the expense of other potentially more beneficial technologies or capital expenditures on other safety areas?

Mr. SZABO. There is no question that PTC is a game changer in safety for the industry.

When I talk about human factors being the number one causation for roughly 40 percent of all railroad accidents, that is exactly what PTC is designed to prevent.

And so we have to recognize the tremendous safety benefits. It will, without question, drive down accident rates and lead to that continuous safety improvement. But we also have to be smart about how we implement it.

And that is why we are looking to see it implemented as expeditiously as possible while ensuring that it is done safely and reliably.

There is a balancing act here, Senator, and we have to make sure that we achieve it, that if we force deployment without having the chance to work the kinks out, we do run the risk of actually making the industry, on a short-term basis, less safe, as well as gumming up capacity.

And so there is a lot that has to be balanced to make sure that it is done right, while also being done expeditiously.

Senator JOHNSON. Do you disagree with Cass Sunstein's characterization that the monetized benefits are lower than the monetized costs?

Mr. SZABO. No, he has the actual figures there. But again, this was a congressional mandate. So our job was to implement what Congress required of us, and do it in the most cost-effective way possible.

Senator JOHNSON. So again, you are not disputing the fact that this is going to cost more than the benefit, which is not a real good sign for Federal regulation.

And the problem with that is that it is going to cost money, it's going to spend limited resources that may be spent better elsewhere. That is my question.

Mr. SZABO. I do not dispute the numbers that are in the calculation there. They are our numbers. My economists came up with those numbers.

But I will also say, in regulations of this nature, there are always benefits we believe that are not adequately measured.

Let's not dismiss the game-changing impact PTC can have on railroads.

Senator JOHNSON. Again, I am always concerned about unintended consequences. And the unintended consequence I am concerned about here is money spent on PTC not getting very good bang for the buck, relatively. Could that money be spent better elsewhere?

That is really what I was talking about with the Pareto analysis, in terms of directing those dollars spent in different areas.

I am just asking, what other areas would we be spending that money on, had you not been directed by Congress to spend it in PTC?

Do you understand the question? I will open it up to anybody who would like to respond to that. Are there other areas that the industry would rather spend the money on to improve safety that might be more effective, that might actually have a better benefit than the cost?

Mr. SZABO. I think the question would be better answered by the industry. But certainly, from our perspective, driving down human factors has to be first and foremost in our minds from a safety regime.

Senator JOHNSON. Ms. Hersman, do you have anything to add to that?

Ms. HERSMAN. Well, I would certainly defer to the industry to share what they would invest in otherwise.

But I will say this is a technology that we have recommended since the 1970s. It is a technology that the Federal Government has been funding through pilot programs for decades. And we know that there will be more accidents that PTC would prevent.

We are investigating accidents right now that could have been prevented by PTC.

PTC prevents the most catastrophic accidents, the ones where you have loss of life. And yes, you are right, I think the last straw that finally triggered congressional action was the Metrolink accident that killed 25 in Southern California. We had a texting locomotive engineer who ran a red signal. It was a PTC preventable accident.

But we also would like to see PTC prevent accidents that result in major hazmat releases and evacuations from communities, and the things that are the most catastrophic. We know that PTC is the solution to these catastrophic accidents. It is expensive, but it is important.

Senator JOHNSON. Could you just name the one area that you might spend money on next then? If this is number one, what would be the number two?

Ms. HERSMAN. I would agree with Administrator Szabo. When I look at the 11 investigations that we have ongoing right now, they basically break down into human factors and track.

And so improving rail infrastructure, that is also an issue that the NTSB has focused on. We have 10 items on our most wanted list of transportation safety improvements. PTC is one of them, but so is maintaining the integrity of our nation's infrastructure.

Senator JOHNSON. Thank you.

Ms. FLEMING. May I add a comment?

Senator JOHNSON. Sure.

Ms. FLEMING. I think one thing that we are not talking about here is reducing highway rail grade crossing and trespasser accidents. And actually, if you look at that, it has obviously gone down as well, but it is actually a higher percentage of overall accidents and fatalities. And it is something that is difficult to address, but it really involves working with multiple stakeholders. But it is something that really has to be tackled.

So I think when you think of rail safety, you have to really address it on a number of fronts.

Technology, I think, PTC is very promising. Our point is that it has to be installed in a way that ensures that the system functions as intended and is reliable. Our work has shown that there are a number of interrelated challenges that also pose risk and should be considered.

And I think other things, other technologies hold promise as well.

So from our perspective, we can't overlook reducing highway rail grade crossings and trespasser accidents, and really make sure that PTC is ready for prime time.

Senator JOHNSON. Can I just ask, what makes for the most dangerous rail crossing? Is it just traffic flow? Is there one big cause there?

Ms. FLEMING. I would probably defer to Administrator Szabo or Ms. Hersman. But I think, obviously, if you have a high traffic area, that certainly poses a risk. But I am probably not the best person to answer that.

Mr. SZABO. I do not know if there is one definitive risk that drives grade crossing accidents. I mean, more than 50 percent of them occur at grade crossings that are fully protected with gates and flashing lights and bells.

Really, we are trying to advance the position that the safest grade crossing is one that does not exist at all. And we really need to take a look at a more systematic approach. We proposed in our budget proposal eliminating grade crossings, strategic placement of overpasses and underpasses. And this advances safety for the rail network, for vehicles, for pedestrians, and improves the fluidity of traffic for all of the above also.

But the fundamentals in grade crossing safety come back to three Es: education, enforcement, and engineering. And so we need to continue to engineer improvements. We need to continue to work with local communities to enforce the laws that are in place. And we need to continue to work with educating drivers to not put themselves at risk by illegally trespassing through a crossing.

Senator JOHNSON. Thank you very much.

Senator BLUMENTHAL. Thank you, Senator Johnson.

Senator McCaskill?

STATEMENT OF HON. CLAIRE MCCASKILL, U.S. SENATOR FROM MISSOURI

Senator MCCASKILL. In talking about PTC, and I know that before I arrived, you discussed it with Senator Blunt, about a case-by-case basis extension. To quote you in your last answer, you said that we have to be careful that we do not make it less safe and gumming up capacity.

Aren't you a little bit worried that, rather than just biting the bullet and acknowledging that we are not going to be ready to roll this out in a way that is sound and safe and universal, that you are going to get a piecemeal approach that could do exactly what you indicated you are worried about doing, which is making it less safe and gumming up capacity?

Mr. SZABO. Senator, obviously, we have responsibility to ensure that does not happen. Believe me, a lot of people are doing a lot of good work in making significant progress.

And so the approach that we are proposing is to make sure that we find that right balance between ensuring that good progress continues to be made, that people are making that legitimate effort while also recognizing the challenges that are there, the risk to not getting it right, and making sure that the appropriate amount of time is provided for those tweaks that are necessary to ensure we get it right.

Senator MCCASKILL. I think I kind of get it. You want and not let——

Mr. SZABO. There cannot be a full ride.

Senator MCCASKILL. You don't want to let the pressure off of getting this done.

Mr. SZABO. Right.

Senator MCCASKILL. I get that. You want to "hold their feet to the fire" to push. But my sense is that everyone is really working on this and trying to make this happen. And this is just one of those areas, we see it with available technology and capacity in many other areas that the Federal Government tries to influence in terms of rules and regulations.

Do you get a sense that anybody is dragging their feet on this?

Mr. SZABO. For the most part, I think the effort is there, in that due diligence is being applied. But we need to make sure that we do not create an environment where people feel that there is a free out, and that that effort can be reduced.

Senator MCCASKILL. Well, I hope that you can do that in a way that does not lead to this case-by-case basis. Because first of all, case-by-case basis, whenever you do a case-by-case basis with the Federal Government, you are talking about something that is hard on its face, because that means each individual company has to figure out the Rubik's cube of how do they get the extension. And the amount of time, energy, and resources that goes into figuring that out, when if a really thorough look at the efforts that are being made and the timetable that is reasonable would indicate that maybe 2015 is not the right moment in time to say everybody has to be compliant, maybe it is 2016, but with maybe some way you can have a—forcing them to show you, which I think they are doing now. Aren't they showing you the progress as it goes along?

Mr. SZABO. Well, they have implementation plans, which we have reviewed and approved. But actually, we do believe that we can very systematically achieve this case-by-case approach that we are talking about by working with each one of the carriers on the amendments to their implementation plan. Since each one has already had to develop one now, all right, let's go back and do the assessment of where they are at, what are the very specific challenges that each railroad is facing, because while many of them are

the same, some are different. And then work with them to make an amendment in each case to their implementation plans, and manage it accordingly.

Senator MCCASKILL. Well, I think we obviously need to continue oversight in that way. And if you manage case-by-case basis without any byzantine bureaucratic problems, then we have got to somehow lift you up and celebrate you in this town, because I am not sure that a case-by-case basis is music to the ears of anybody who is regulated by the Federal Government. So hopefully we can accomplish that.

I would also like to talk about the train horn rule. I promised one of my colleagues who is not on this committee that has strong feelings about this, Senator Bennet from Colorado, that I would inquire about this.

I know that there is a workaround for communities for quiet zones, but can you talk a little bit about the flexibility on those workarounds and whether or not we have embraced sufficient flexibility where we obviously are protecting safety, but obviously the horn thing is a huge problem for many communities that are "bedroom communities."

And what is being required of them in terms of a workaround, I think, in some instances may be slightly too onerous, but I am certainly willing and open to hear your views on it.

Mr. SZABO. No, thank you for that question, because it is a great one. And as I said at the opening, I would like to remind you, I am a former mayor of what was a railroad community, two major rail yards, five railroads slicing through town. So I have lived both as a citizen as well as a municipal leader these challenges on a daily basis.

We are open to the utmost, highest level of flexibility, provided that an equivalent level of safety can be achieved. And that is the goal. That is all we need, is that good science be applied to show that whatever creative approach a community is choosing to use will generate an equivalent or superior level of safety.

There is no question, if you take a look at the statistics, that the whistleblower regulation has worked, how significantly grade crossing accidents have come down since my agency implemented that regulation about a decade ago.

So we are here today talking about a tragic grade crossing accident in Baltimore. So we need to make sure that, you bet, we will provide flexibility. Our goal is to be performance-based in our approach to safety. What we care about is the outcome, not telling you that you must do it this one and only way.

Senator MCCASKILL. OK, thank you very much.

Thank you, Mr. Chairman.

Senator BLUMENTHAL. Thank you.

Senator Thune?

STATEMENT OF HON. JOHN THUNE,
U.S. SENATOR FROM SOUTH DAKOTA

Senator THUNE. Mr. Chairman, thank you for holding the hearing today. We are here because we have had a lot of rail accidents of late, and that has brought additional attention to the importance of rail safety. And I want to thank our witnesses, both this panel

and the one to follow, for coming today to tell us about some of the lessons we can learn from these accidents.

I think it is important to look at the overall context of the rail industry over a long period of time. If you look since the passage of Staggers back in 1980, where the industry was partially deregulated, the train accident rate has fallen by 76 percent. So there has been a lot of progress made, a lot of gains made.

The railroads also last year invested $25 billion—I think somebody was asking a question earlier—in capital improvements. These are investments that help keep the railroad system safe, and ensure the efficient movement of freight throughout our country, which is something that many of us who represent states who are dependent upon railroads to move freight are very interested in.

And I think it is important that we, as a Congress, be careful not to impose undue regulation on the railroad industry, especially if these regulations force the railroads to spend money that might otherwise be used for needed infrastructure improvements.

I have been and continue to be especially concerned about the subject that my colleagues are talking about today, and that is the mandate that freight railroads and passenger rail lines install PTC technology by December of 2015. I think that is an overly aggressive timeline that railroads are going to have a very difficult time meeting for a number of reasons.

In order to implement PTC by the date mandated, they are going to have to defer more pressing maintenance and infrastructure improvements.

So I hope to introduce legislation in the coming weeks, along with others, that will reasonably extend the deadline for PTC implementation. I think we need to have additional flexibility for the railroads, if we truly want to see PTC systems installed in a manner that recognizes the technological challenges that currently exist for wide adoption and ensures that other necessary safety measures are not sidelined.

So I guess I would count myself among those who have expressed concern about that mandate and what it is going to mean in terms of overall safety and the investment that could be made in other areas. So I appreciate the insights that you all are sharing with us today.

And I guess I would like to ask, if I might, one question, and it has kind of been touched on in different ways today, Mr. Chairman. But this whole issue of case-by-case analysis vs. a sort of a blanket extension, there was a 5-year extension proposed in the House. The Senate had proposed allowing FRA to approve PTC extensions on a case-by-case basis.

And, Mr. Szabo, I am interested in knowing, if the FRA were to consider extensions on a case-by-case basis, based on the technological, financial, and logistical challenges that would be associated with that, how long would it likely take FRA to consider an application and to make a decision?

Mr. SZABO. You mean to get through our process?

Senator THUNE. Right.

Mr. SZABO. Assuming all information was complete, we believe that we could have it done in 30 to 45 days.

Senator THUNE. And how much would you have to devote in terms of resources? Is that a resource-intensive process?

Mr. SZABO. Well, it certainly consumes resources, but in our 2014 budget request, we are comfortable that we have requested the personnel necessary to execute our entire safety regime, which would include implementation of PTC.

Senator THUNE. Well, if I might just express a concern that has already been raised here, and that is there is not a high level of confidence, I would argue, right now, particularly, with regard to government agencies evaluating these issues on a case-by-case basis, which has already been alluded to. And it strikes me, at least, that it would make a lot more sense if we are talking about doing some sort of an extension for compliance with this, to do it in a way that recognizes that all the railroads are going to have to comply with that and do some sort of a blanket extension.

But again, we certainly welcome your input as we consider that. And I think it is really important that this be done in the right way, because if it is not, if it is rushed, I think it puts, perhaps, people even at greater peril and greater risk.

Mr. SZABO. Senator, ultimately, Congress acts, and we execute. So we will execute whatever direction Congress provides for us.

And I think we are all saying the same thing, that, ultimately, it is about finding that right balance between ensuring that this is done expeditiously while also making sure that it is done in a safe and reliable manner.

So I think we want the same outcome. And it is just a matter of working through details on how we get there.

Senator THUNE. Thank you.

Thank you, Mr. Chairman.

Senator BLUMENTHAL. Thank you, Senator Thune.

I have some additional questions, which I am going to ask now, as part of a brief second round, anyone else who has additional questions.

But just very briefly, you are not saying, are you, Administrator Szabo, that you are willing to forgo or abandon PTC? It is just a question of timing?

Mr. SZABO. Again, ultimately, that decision is made by Congress. But we believe that this is a game-changing safety technology. And again, if you take a look at where the biggest risk is in railroad accidents, it has a significant impact on safety for the public, as well as rail workers.

Senator BLUMENTHAL. And I want to bring you back, Chairman Hersman, to the report of December 15. As I read through this report, I see references to erosion of dirt, the same kind of weakness in ballast that almost certainly contributed to, if it did not cause that derailment and collision; the need for new ties; the need for other kinds of correction and repair on different parts of that track and neighboring tracks in that vicinity.

Wouldn't you agree, and you spoke earlier of infrastructure, bringing it down to the real life, so to speak, isn't this a searing indictment of the quality of that track?

Ms. HERSMAN. What this demonstrates is an inspection over 30 miles of track. You have two employees riding in a high rail vehi-

cle, and they are inspecting four lines, four separate tracks during a shift. They are identifying the defects that they have found.

This is certainly indicative of what we see in our investigations, and I know what the FRA sees in the railway environment. The track environment is one that is constantly deteriorating. You have to maintain it. You have to be vigilant. You have to be on top of it. You have to identify these defects. You have to put them into your workplan, figure out how they are going to be addressed. It is important for them to do inspections.

They are required to do inspections twice a week. Metro-North told our investigators they were doing them three times a week.

But yes, you are right. Here we have recorded defects that are similar to the one that we have identified that was near the point of derailment. These are all risks, and they need to be addressed.

And so what we need to understand is, this is one inspection. The NTSB will look back at all previous inspections, to see if this is a chronic problem, if it was dealt with effectively over time, if the fixes were appropriate, if their prioritization was appropriate, if their inspection intervals were appropriate for the circumstances.

This document tells us that they did an inspection and identified a number of defects. We have to understand if the FRA standards are adequate, or if things need to change and standards need to be strengthened.

Mr. SZABO. Senator, if I may add, just one comment on that. To me, my bigger concern as we drill down on this is better understanding the safety culture that exists on the property. And in due time, we will determine for sure whether this was or was not a violation——

Senator BLUMENTHAL. Well, the safety culture, I do not mean to interrupt, but the safety culture is a somewhat vague term. There are FRA standards. And apparently, these defects did not violate those minimal standards.

Mr. SZABO. And that is my point, Senator. That is actually the point I am trying to make, that we should not be approaching this as to whether it meets a minimal standard or not, but if something is identified that could cause risk, the culture needs to be that we immediately take the safe course of action.

Senator BLUMENTHAL. So if these were not violations of present FRA standards, maybe they should be?

Mr. SZABO. That is possible. In fact, we are not willing to say yet that it is not a violation.

I know NTSB has drawn that conclusion. We continue to hold that open.

Senator BLUMENTHAL. Let me——

Ms. HERSMAN. Just to be clear——

Senator BLUMENTHAL. Yes, Chairman?

Ms. HERSMAN.—this is Metro-North's position that it did not rise to the level of an FRA defect. If Metro-North believed that it had risen to the level of an FRA defect, it would have been noted on the front of the report that it was to be repaired immediately.

The NTSB is still investigating. We are providing commentary on what Metro-North has presented.

Senator BLUMENTHAL. That is a very important point. You may well find that these defects violated the existing Federal standards.

Mr. SZABO. That is correct.

Senator BLUMENTHAL. Let me just close by asking you, Mr. Szabo, speaking of standards and rules, my understanding is that the FRA missed deadlines set by law in a number of the 17 rail safety rulemakings that were required by the FRA. In fact, your agency has yet to finalize nine remaining rules, that two out of the five compliance manuals have been completed, but three remain outstanding to be done, and in fact, in the final rules, the effective date of those rules have sometimes been postponed.

Can you give us an explanation for the delays and the failure to meet deadlines?

Mr. SZABO. Sure. The Rail Safety Improvement Act of 2008 mandated FRA complete more than 40 rulemakings, major studies, reports. It also promised us 200 more individuals, and, ultimately, we were only allowed to hire 31 of those 200.

But with more than 40 major rulemakings, reports, studies, we had to prioritize and try to work through them in a systematic order in approaching those first that we felt would have the most significant impact on safety, the greatest impact, the most immediate effect on safety.

So obviously, positive train control was made the highest priority and consumed the majority of our resources.

So we have continued to work down that list in a systematic manner. I look forward to completing the remaining work that is outstanding.

Senator BLUMENTHAL. Thank you. I know you do not disagree that meeting those Federal deadlines is important.

Mr. SZABO. It is always important.

Senator BLUMENTHAL. Not just because it is the law, but it is important to the rail workers as well as passengers and businesses that depend on the reliability and safety of freight transportation.

I want to thank all of this panel. I have additional questions that I am going to be submitting for the record. I do not want to keep both my colleagues and our next panel waiting, but I do want to just close by thanking all of the dedicated people who work for you in your agencies.

I have worked, for example, with the NTSB folks who came to Connecticut in the wake of that collision and derailment, and I know how much time they put in and how promptly they responded.

So thank you very much for your testimony, and thanks for the work that your agencies are doing. Thank you.

We will follow with the next panel. Let me welcome our next panel, equally distinguished and important, and say to you, thank you for being here.

First of all, let me introduce Ed Hamberger, who is President and CEO of the Association of American Railroads based here in Washington, D.C. Mr. Hamberger joined AAR in July 1998. He was a Managing Partner in the office of Baker, Donelson, Bearman and Caldwell, and he came to that firm in 1989 after serving as Assistant Secretary for Governmental Affairs at the Department of Transportation.

He began his career in transportation in 1977 as General Counsel of the National Transportation Policy Study Commission. And

in 1985, he was appointed as a member of the private sector advisory panel on infrastructure financing. And in 1994, he served as a member of the Presidential Commission on Intermodal Transportation. He has served on a variety of public service assignments. For example, he serves on a blue ribbon panel of transportation experts appointed by the National Surface Transportation Policy and Revenue Study.

He received his juris doctorate and both master of science and bachelor of science in foreign service from Georgetown University.

Kathryn Waters is Executive Vice President for Member Services at the American Public Transportation Association. She came to APTA in November 2007 from the Maryland Transit Administration in Baltimore, where she was Senior Deputy Administrator and responsible for all public transit operations departments, as well as the transit police.

She has more than 25 years of experience in the transit and railroad industry, serving in positions of leadership, including vice president of commuter rail and railroad management with the Dallas Area Rapid Transit District. She worked for 20 years with MTA's MARC train service.

Before joining the APTA staff, she chaired the APTA commuter rail committee and was Vice Chair of commuter and inner-city rail on APTA's executive committee. She too has been cited with numerous industry awards and recognition.

And we welcome you here, Ms. Waters.

Mr. James Stem is National Legislative Director of the transportation division, International Association of Sheet Metal Air, Rail, and Transportation Workers. His railroad career began in 1966 as a trainman for the Seaboard Air Line Railroad in Raleigh, and he joined the Brotherhood of Railroad Trainmen. He has worked as a trainman, switchman, hostler, helper, fireman, locomotive engineer, and he currently holds seniority as a locomotive engineer on CSX between Richmond, Virginia, and Abbeville, South Carolina.

He became interested in the union movement and became active in Local 1129 in Raleigh. He worked part-time as a special UTU organizer from 1973 through 1976, and was elected Secretary-Treasurer of Local 1129 in 1975. He also held the elected position of local Chairman and Legislative Representative, and has served as a delegate to five UTU international conventions from 1979 to 1995.

I want to extend a particular welcome to our next witness, Jim Redeker. He is Commissioner of Connecticut's Department of Transportation, and he has a long and distinguished career in transportation, most particularly, beginning with his career in the New Jersey Transportation Department. In 1978, he joined NJ Transit when it was first created. The following year he helped to build NJ Transit into the third-largest transit agency in the country.

In 30 years since, he has held positions of increasing responsibility. His portfolio of experience includes strategic planning and policy, capital programming, transportation planning, transit service planning and scheduling, and many other areas of expertise and experience. But perhaps most prominently, and importantly, he has served with extraordinary dedication and success as the Commis-

sioner of Transportation for Connecticut. He has pioneered and championed with great vision and courage new means of transit and new developments and investment in our Connecticut railroads and other areas of transit in Connecticut.

He has been a very strong environmental steward, as well as a champion of better, cleaner, more efficient transportation in Connecticut, and has worked closely with me and other officials, members of our delegation and other State officials.

And I thank Commissioner Redeker for joining us today and bringing to us the firsthand experience that he has had with some of the problems that we have been discussing with the earlier panel.

And to Michelle Teel, also a very hearty welcome. She is now head of the Missouri Department of Transportation's multimodal division. She has worked at Missouri DOT for 15 years and most recently as the local program's administrator for the design division, and assistant director of the motor carrier services division.

In her new capacity, Ms. Teel will oversee the division responsible for administering State and Federal programs that fund and support aviation, railroads, transit, waterways, and freight development.

She has a bachelor's degree in civil engineering from Washington University in St. Louis and a master's degree in business administration from the William Woods University in Fulton. And she is a licensed professional engineer and also a certified professional traffic operations engineer.

We welcome all of you and will begin with Mr. Hamberger.

STATEMENT OF EDWARD R. HAMBERGER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ASSOCIATION OF AMERICAN RAILROADS

Mr. HAMBERGER. Thank you, Mr. Chairman. I appreciate the opportunity to be here on behalf of members of the Association of American Railroads.

For our members, commitment to safety is job number one. It is not only good business, but it is the right thing to do, and we are committed to making sure that each of our 200,000 employees gets home after their shift safely every day.

And in fact, our record is good and getting better. 2012 was the safest year on record, and that exceeded the previous safest year on record of 2011, which itself exceeded the previous safest year on record of 2010.

According to data from the Bureau of Labor Statistics, railroads today have lower employee injury rates than other transportation modes and most other industries, including agriculture, mining, manufacturing, and construction.

Available data also indicate that U.S. railroads are safer than most major foreign railroads.

One of the reasons, and Senator Johnson put your finger on it, is the amount of money that we invest back into the infrastructure, $25 billion this year and $25 billion last year, $.40 of every dollar of private sector money back into the infrastructure.

Now, what does that mean? In the last 5 years, we bought 22,669 new state-of-the-art locomotives. We have installed nearly 77 mil-

lion new crossties, 2.9 million tons of new rail, and poured nearly 61 million cubic yards of ballast.

And I submit to you, Mr. Chairman, that the very foundation of rail safety is a network that is well-maintained. And if we did not believe that before, the testimony from the NTSB today certainly underscores that a well-maintained network is a safer network.

Another product of industry investment is the development of trackside instruments and inspection vehicles that traverse over the rail. These use technologies such as acoustics, radar, machine vision, lasers, optical geometry to identify safety issues in the track, on the wheels, and on the axles as the cars go by.

Many of these technological advances have been incorporated into the rail industries' equipment health monitoring initiative. It is a predictive and proactive maintenance system designed to detect and report potential safety problems and poorly performing equipment before they result in accidents or damage.

As an aside, Mr. Chairman, much of this work is being done at the Transportation Technology Center in Pueblo, Colorado, which is a research center the AAR runs under contract to the FRA. And the center has just been hired by Metro-North to help them develop track inspection procedures, so we are pleased to be able to bring our expertise to bear.

Let me turn to the technology that we have been talking about today, positive train control. Such a system requires highly complex technologies able to analyze and incorporate a large number of variables that affect train operations. A simple example: the length of time it takes to stop a train, what we affectionately call the breaking algorithm, depends on train speed, terrain, the weight and length of the train, the number and distribution of locomotives, the number of loaded or empty freight cars on the train, and other factors. This system must be able to take all these factors into account automatically, reliably, and accurately, and be able to do it across every operating railroad company, including passenger and freight.

PTC development implementation includes a daunting array of tasks that railroads must perform and technologies that must be developed.

I agree with both Chairwoman Hersman and Administrator Szabo, this must be a transparent process. And that is why last year, both APTA and the AAR submitted a white paper on the progress to date and the work yet to be done. As part of my testimony today, we have submitted an update as to where we are by railroad, what needs to be done by year.

We want to be transparent, but we do believe that while there will be some PTC in operation by 2015, 60,000 miles, 22,000 locomotives, the interoperability will not be achievable. Therefore, we are asking Congress to consider a straight 3-year extension from December 31, 2015, to December 31, 2018. I agree with Senator McCaskill and Senator Thune, this cannot be done piecemeal.

We are a network. One-third or more of our traffic intertwines between two railroads on any given day. We operate with commuter rail, Amtrak. This must be something we can depend on, some certainty in a 3-year extension.

Beyond that, I think there could be some authority given to the Department of Transportation to extend, if something that we do not know about pops up. And so that would be something that the Department of Transportation could do for a year or two.

And additionally, to ensure that railroads can operate safely and efficiently with the PTC system, the imposition of PTC-related operational requirements and associated penalties should be deferred until all PTC systems are fully integrated and testing has been completed.

My last point, Mr. Chairman, and I will make it brief, the FCC and PTC antennas, I know Mr. Blunt brought that up with the first panel and with Mr. Wheeler yesterday at his confirmation hearing. We appreciate you putting that on his radar screen. We are meeting with the FCC and FRA over the next couple days. We hope to be able to resolve that so we can go forward. But right now, we are under a stop order to not install any of the 22,000 antennas yet to be installed.

Thank you, and I look forward to answering any questions, and I apologize for running a minute late.

[The prepared statement of Mr. Hamberger follows:]

PREPARED STATEMENT OF EDWARD R. HAMBERGER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ASSOCIATION OF AMERICAN RAILROADS

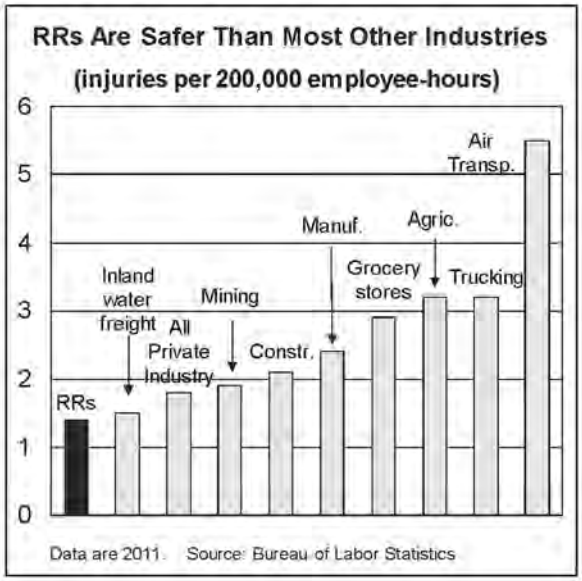
On behalf of the members of the Association of American Railroads, thank you for the opportunity to discuss rail safety. AAR freight railroad members, which include the seven large U.S. Class I railroads as well as approximately 170 short line and regional railroads, account for the vast majority of freight railroad mileage, employees, and traffic in Canada, Mexico, and the United States. Amtrak and several commuter railroads are also members of the AAR. In my testimony below, I will discuss several important topics associated with rail safety, ways that railroads are working to advance safety in those areas, and steps that we believe policymakers should take to promote rail safety.

Overview of Rail Safety

It's important to note at the outset that for our nation's freight and passenger railroads, pursuing safe operations is an absolute imperative. It makes business sense and it's the right thing to do. Through massive private investments in safety-enhancing infrastructure, equipment, and technology; cooperative efforts with rail labor, suppliers, customers, communities, and the Federal Railroad Administration (FRA); extensive employee training; and cutting-edge research and development, railroads are at the forefront of advancing safety.

The rail industry's strong and pervasive commitment to safety is reflected in its excellent safety record. In fact, 2012 was the safest year ever for America's railroads, breaking the previous record set in 2011. From 1980 to 2012, the train accident rate fell 80 percent, the rail employee injury rate fell 85 percent, and the grade crossing collision rate fell 82 percent. Since 2000, the declines have been 44 percent, 51 percent, and 45 percent, respectively, indicating that rail safety continues to improve. 2012 saw record lows in each of these categories.

According to data from the Bureau of Labor Statistics, railroads today have lower employee injury rates than other transportation modes (including trucks, inland water transportation, and airlines) and most other major industries, including agriculture, mining, manufacturing, and construction. Available data also indicate that U.S. railroads have employee injury rates well below those of most major foreign railroads.



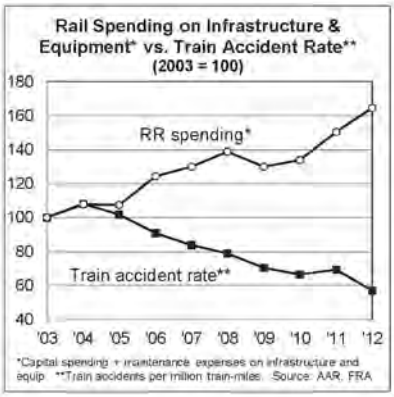
Virtually every aspect of rail operations is subject to strict safety oversight by the FRA. Among many other areas, railroads are subject to FRA regulation regarding track and equipment inspections; employee certification; allowable operating speeds; and the capabilities and performance of signaling systems. Hundreds of FRA per-

sonnel perform regular inspections of rail facilities and operations throughout the country. In many states, FRA safety inspectors are supplemented by state safety inspectors. Railroads are also subject to safety oversight by additional Federal agencies, including the Occupational Safety and Health Administration, the Pipeline and Hazardous Materials Safety Administration, and the Department of Homeland Security.

A Healthy Balance Sheet is Important to Safety

A commitment to safety demonstrated day in and day out in the workplace is critical to promoting safety. Railroads have this commitment. That said, a financially viable railroad is in a much better position to invest in safety enhancements and risk reduction strategies than a financially challenged railroad.

In recent years, railroads have been reinvesting more private capital than ever before in their infrastructure and equipment, including a record $25.5 billion in 2012. From 2008 to 2012, Class I railroads purchased 2,669 new state-of-the-art locomotives and rebuilt another 845 locomotives to improve their capabilities. Over the same time period, railroads installed nearly 77 million new crossties, installed 2.9 million tons of new rail, and placed nearly 61 million cubic yards of ballast. In addition, as described later in this testimony, railroads in recent years have devoted substantial resources to developing and implementing innovative new technologies. These investments have made railroads much safer. In fact, as the charts below show, there is a clear correlation between rail reinvestments and rail safety improvements.



Positive Train Control

The term "positive train control" (PTC) describes technologies designed to automatically stop or slow a train before certain accidents caused by human error occur. The Rail Safety Improvement Act of 2008 (RSIA) requires passenger railroads and U.S. Class I freight railroads to install PTC by the end of 2015 on main lines used to transport passengers or toxic-by-inhalation (TIH) materials.[1] Specifically, PTC as mandated by Congress must be designed to prevent train-to-train collisions; derailments caused by excessive speed; unauthorized incursions by trains onto sections of track where maintenance activities are taking place; and the movement of a train through a track switch left in the wrong position.[2]

Unprecedented Technological Challenge

Positive train control is an unprecedented technological challenge. A properly functioning, fully interoperable PTC system must be able to determine the precise location, direction, and speed of trains; warn train operators of potential problems; and take immediate action if the operator does not respond to the warning provided by the PTC system. For example, if a train operator fails to begin stopping a train before a stop signal or slowing down for a speed-restricted area, the PTC system would apply the brakes automatically before the train passed the stop signal or entered the speed-restricted area.

[1] TIH materials are gases or liquids, such as chlorine and anhydrous ammonia that are especially hazardous if released into the atmosphere.

[2] A switch is equipment that controls the path of trains where two sets of track diverge.

Such a system requires highly complex technologies able to analyze and incorporate the huge number of variables that affect train operations. A simple example: the length of time it takes to stop a train depends on train speed, terrain, the weight and length of the train, the number and distribution of locomotives and loaded and empty freight cars on the train, and other factors. A PTC system must be able to take all of these factors into account automatically, reliably, and accurately to safely stop the train.

PTC development and implementation includes a daunting array of tasks that railroads must perform, including:

- A complete physical survey and highly precise geo-mapping of the 60,000 miles of railroad right-of-way on which PTC technology will be installed, including geo-mapping of nearly 474,000 field assets (mileposts, curves, grade crossings, switches, signals, and much more) along that right of way.
- Installing PTC technology on approximately 22,000 locomotives.
- Installing approximately 36,000 "wayside interface units" (WIU) that provide the mechanism for transmitting information to locomotives and the train dispatching office from signal and switch locations along the right of way.

PTC locomotive cab display unit

- Installing PTC technology on nearly 4,800 switches in non-signaled territory and completing more than 12,300 signal replacement projects at locations where the existing signal equipment cannot accommodate PTC technology.
- Developing, producing, and deploying a new radio system and new radios specifically designed for the massive data transmission requirements of PTC at 4,200 base stations, 33,700 trackside locations, and on approximately 22,000 locomotives.
- Developing back office systems and upgrading dispatching software to incorporate the data and precision required for PTC systems.
- Installing more than 20,000 new antenna structures nationwide to transmit PTC signals.

Freight railroads have enlisted massive resources to meet the PTC mandate. They've retained more than 2,200 additional signal system personnel to implement PTC, and to date have collectively spent approximately $3 billion of their own funds on PTC development and deployment. Class I freight railroads expect to spend an additional $5 billion before development and installation is complete. Currently, the estimated total cost to freight railroads for PTC development and deployment is around $8 billion, with hundreds of millions of additional dollars needed each year after that to maintain the system.

Despite railroads' best efforts, due to PTC's complexity and the enormity of the implementation task—and the fact that much of the technology PTC requires simply did not exist when the PTC mandate was passed and has been required to be developed from scratch—much work remains to be done. Most of the effort to date has been directed toward development, deployment, and initial testing of technology that can meet the requirements of the legislation and which can be scaled to the huge requirements of a national system.

The task is made particularly complex by the need to ensure that PTC systems are fully interoperable[3] across all of the Nation's major railroads, and that the many potential failure points and failure modes in PTC systems are identified, isolated, and corrected—all without negatively affecting the safe movement of freight and passengers by rail throughout the country. In addition, the FRA must review each railroad's PTC safety plan and certify the railroads' PTC systems after the development and testing of the components are complete. Only then can a fully operable PTC installation be completed.

The FCC and PTC Antennas

Railroads also face non-technological barriers to timely PTC implementation. One such challenge that railroads are struggling to overcome right now involves regulatory barriers to the construction of antenna structures.

As part of PTC implementation, railroads must install tens of thousands of new antenna structures nationwide to transmit PTC signals. Approximately 97 percent of these structures will be relatively small poles, between 6 and 60 feet high, installed on railroad rights-of-way alongside railroad tracks. The remainder, approximately three percent, will be larger base stations similar to traditional telecommunication towers. Depending on the location, these larger structures may or may not be located on a railroad's right-of-way.

The Federal Communications Commission (FCC) maintains that all PTC antenna structures, regardless of their size or location on the right-of-way, are subject to the National Environmental Protection Act (NEPA) and the National Historic Preservation Act (NHPA). The FCC's current interpretation of its rules implementing these acts would subject every PTC antenna structure to a separate environmental evaluation process at the FCC. Depending on the outcome of this evaluation, a more comprehensive environmental assessment (EA) might be required.

According to the FCC, as part of each environmental evaluation, railroads must provide certain information on each antenna structure (height, location, etc.) to historic preservation officers within state governments and Native American tribes (depending on where the antenna structure will be installed) so that the state or tribe can determine if the installation will negatively impact areas of historic, cultural or religious significance. Notice of the construction must even be provided to tribes that do not currently reside along the railroad right-of-way but who have previously expressed interest in the county in which the antenna structure will be installed.

[3] Interoperability means that the PTC system on any railroad's locomotives can seamlessly interface with the systems of any other railroad.

On May 15 of this year, representatives of the railroads met with FCC staff to discuss the PTC antenna issue. The railroad representatives explained why the FCC's current approval process is unworkable for a deployment on the scale of PTC in the time-frame mandated by the RSIA and FRA's rules. Meanwhile, the FCC staff stated that railroads should not construct any antenna structures for PTC that have not gone through the complete environmental evaluation process, including tribal notice, while they consider ways to streamline the state and tribal approval processes. The railroad industry, the FRA, and the FCC are consulting to try to find a workable solution that will protect the interests of Native American tribes and allow the timely deployment of PTC. While the AAR is hopeful that a solution can be found, today construction of antenna structures is on hold. If our efforts with the FCC and the FRA cannot reach a workable solution to avoid antenna-by-antenna review, the timeline for ultimate deployment of PTC will be delayed.

Pending FRA Regulations

There are important PTC regulatory issues that are unresolved. For example, the current rules inadvertently subject yard movements over PTC-equipped main line track to PTC requirements. There are a number of technical and operational reasons making PTC impractical for yard movements. It was never anticipated that yard movements would be subject to PTC and doing so would adversely affect the efficiency of rail transportation. Another issue concerns en route failures of locomotives equipped with PTC. The current regulations impose operational restrictions so severe that, again, the fluidity of the rail network would be drastically impaired, despite the existence of the underlying safety systems and additional safety precautions that could be put in place. Finally, the regulations purport to exempt lines where there are very small amounts of TIH traffic and no passenger traffic, but the de minimis regulations are constructed so that they fail to achieve this objective. It is important to resolve these issues and AAR appreciates that FRA is considering them in a current rulemaking proceeding.

Extending the Statutory Deadline

In addition to the challenges presented by both the FCC and FRA issues, another critical variable to the successful implementation of a nationwide PTC network is the question of the proper operation of the system. Does the system work? To effectively answer this question, railroads will need adequate time to ensure that PTC works as intended and that the systems are communicating accurately. The industry believes it can achieve the objectives of the mandate with an implementation schedule that allows the technology to be developed as well as tested and proven so the safety and operational efficiency of the Nation's rail system are not put at risk.

Freight railroads will continue to aggressively pursue the implementation, activation and testing of PTC systems. However, due to both technological and non-technological uncertainties associated with the development and installation of PTC, it is a challenge to identify an exact date of completion of all necessary components to ensure the successful implementation of an interoperable system. Critical aspects include, but are not limited to, the testing and activation of PTC systems.

Consequently, the current PTC implementation deadline mandated by the Rail Safety Improvement Act of 2008 should be extended by at least three years from December 31, 2015, to December 31, 2018. Given the unprecedented nature of PTC and the uncertainties—both known and unknown—flexibility beyond December of 2018 should also be addressed, with the authority for that flexibility residing with the Secretary of the Department of Transportation. Additionally, in order to ensure that railroads can operate safely and efficiently with the PTC system, the imposition of PTC-related operational requirements and associated penalties should be deferred until all PTC systems are fully integrated and testing has been completed.

Railroads have been working extremely hard to meet the 2015 deadline. While the deadline for completion is important, ensuring that the testing and development of PTC proceeds appropriately is paramount. The intent and the goal is to ensure a new system that enhances safety.

A December 2010 report by the Government Accountability Office supports this view. The GAO noted that "implementing an immature system to meet the deadline could pose serious safety risks," and that "[i]dentifying and mitigating risks sooner, rather than later, would better ensure a reliable PTC system can be fully implemented to provide the intended safety benefits of this technology without resulting in unintended consequences."[4]

In an August 2012 report, the FRA confirmed that, "Given the current state of development and availability of the required hardware and software, along with deployment considerations, most railroads will likely not be able to complete full RSIA-required implementation of PTC by December 31, 2015."[5] The FRA report notes that PTC implementation on the scale required by the RSIA has never been attempted anywhere in the world.

For a more thorough analysis and understanding of freight rail industry efforts, implementation progress, and existing challenges, the Association of American Railroads' 2013 report, *PTC Implementation: The Railroad Industry Cannot Install PTC on the Entire Nationwide Network by the 2015 Deadline,* is included as "Attachment A."

Highway-Rail Grade Crossings and Trespassers

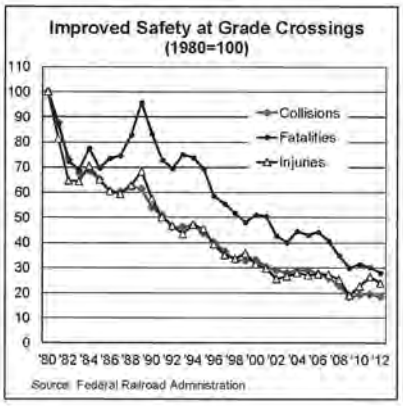
Collisions at grade crossings, along with incidents involving trespassers on railroad rights-of-way, are critical safety problems. These two categories typically account for more than 95 percent of rail-related fatalities. Although these incidents usually arise from factors that are largely outside of railroad control, and even though highway-rail crossing warning devices are properly considered motor vehicle warning devices there for the benefit of motorists, not trains, railroads are committed to efforts aimed at further reducing the frequency of crossing and trespasser incidents.

Much success has already been achieved. From 1980 through 2012, the number of grade crossing collisions fell 82 percent; injuries associated with collisions fell 76 percent; and fatalities fell 72 percent. Since 2000, the declines have been 44 percent, 24 percent, and 45 percent, respectively, indicating that grade crossing safety continues to improve. The grade crossing collision rate has fallen nearly every year since 1980; from 1980 through 2012, it fell 82 percent. And because total exposure

[4] Government Accountability Office, "Rail Safety: Federal Railroad Administration Should Report on Risks to the Successful Implementation of Mandated Safety Technology," Report No. GAO–11–133, December 2010. The quotes are from pages 22 and 46, respectively.

[5] Federal Railroad Administration, "Positive Train Control: Implementation Status, Issues, and Impacts," August 2012, p. 1.

(train-miles multiplied by motor vehicle-miles) has risen sharply over time, the reduction in crossing incidents and casualties per unit of exposure has been even higher.



America's freight railroads spend hundreds of millions of dollars each year to maintain and improve grade crossings. They also:

- Cooperate with state agencies to install and upgrade warning devices and signals, and bear the cost of maintaining them in perpetuity.
- Help pay to close unneeded crossings.
- Support Operation Lifesaver, a nationwide non-profit organization that educates the public about the need for proper behavior at grade crossings and on railroad property.
- Work with law enforcement and others to keep grade crossings safe.
- Solicit assistance from the public. In June 2012, the FRA issued a final rule requiring railroads to install signs at grade crossings with telephone numbers the public can use to alert railroads to unsafe conditions.

Under the Federal "Section 130" program, $220 million in Federal funds are divided among the states each year for installing new active warning devices, upgrading existing devices, and improving grade crossing surfaces. Several years ago, FRA noted that the Section 130 program "has helped prevent over 10,500 fatalities and 51,000 nonfatal injuries." Those figures are surely much higher now.

Without a budgetary set-aside like the Section 130 program, grade crossing needs would fare poorly in competition with more traditional highway needs such as highway construction and maintenance. Indeed, one of the primary reasons the Section 130 program was created in the first place was that highway safety—and especially grade crossing safety—traditionally received low funding priority. The surface transportation bill signed into law on July 6, 2012 will continue dedicated funding for this important program for two more years and will mean more injuries averted and more lives saved.

The vast majority of grade crossing collisions are the result of motorists' actions. Consequently, grade crossing accidents can best be reduced through a mix of *education, engineering,* and *enforcement.*

An organization that deserves special commendation for its efforts to educate the public about the dangers of grade crossings and trespassing on railroad rights-of-way is Operation Lifesaver. Operation Lifesaver—a non-profit whose mantra is "look, listen, and live"—started in Idaho in 1972 and now has chapters in the 48 contiguous states, Alaska, and the District of Columbia. Operation Lifesaver's presenters, many of whom are current or retired rail industry employees, have provided free safety presentations to millions of Americans, including school children, driver's education students, business leaders, truck drivers, and bus drivers. I urge you to generously fund this important educational organization. Railroads also believe that grade crossing safety should be part of commercial driver's license educational curricula.

Education alone is not enough to reduce the number of tragic grade crossing accidents. Engineering and enforcement actions are also critical. Railroads support research regarding the effectiveness of innovative types of warning devices, such as four quadrant gates. Because maximum safety can be realized if crossings are eliminated, the closing of crossings (and, where appropriate, grade separation) is the ultimate engineering improvement. In that regard, we recommend that Congress consider measures that would help incentivize grade crossing closures. Finally, there should be tough penalties for grade crossing traffic violations.

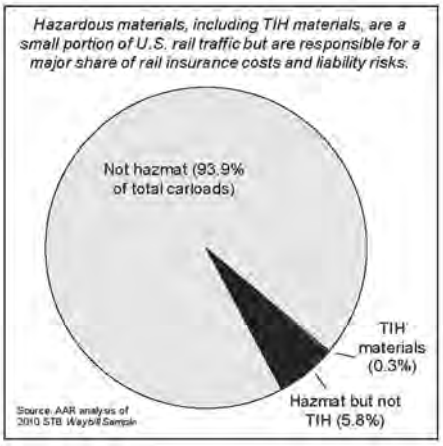
Grade crossing safety is only part of the public safety challenge. Trespassing is another area of concern. It is an unfortunate reality that too many people inappropriately use railroad property for short cuts, recreation, or other purposes, sometimes with tragic results. Railroads are engaged in ongoing efforts with Operation Lifesaver and others to educate the public that, for their own safety, they should stay off rail property.

The Transportation of Hazardous Materials by Rail

Although many types of chemicals pose little or no threat to anyone or anything, some chemicals are classified as hazardous. Depending on the year, U.S. railroads transport around 1.8 million carloads of hazardous materials. "Toxic inhalation hazard" (TIH) materials—gases or liquids, such as chlorine and anhydrous ammonia, that are especially hazardous if released into the atmosphere—are a subset of haz-

ardous materials. In 2010 (the most recent year for which data have been tabulated), U.S. railroads carried some 77,000 TIH carloads. Hazardous materials accounted for 6 percent of rail carloads in 2010; TIH materials accounted for 0.3 percent.

The rail hazmat safety record is excellent. In 2010, 99.998 percent of rail hazmat shipments reached their destination without a release caused by a train accident. Rail hazmat accident rates are down 91 percent since 1980 and 38 percent since 2000.



In fact, railroads are the safest mode for transporting hazmat. Railroads and trucks have roughly equal hazmat ton-mileage, but railroads have only about 5 percent of the hazmat incidents that trucks have. In other words, trucks are about 20 times more likely to have a hazmat incident than a train. Since 1982, railroads have incurred 15 fatalities due to hazmat transport; trucks have incurred 113.

Railroads and tank car builders are taking concrete steps to make chemical and hazmat transportation safer and more reliable. For example, they are enhancing tank car safety. Nearly half of all chemicals, and nearly all TIH materials, are transported in tank cars. Tank cars built today are vastly improved over earlier generations of tank cars, with higher grade steel, better thermal protection, improved valves and fittings, often thicker tanks, and many other improvements.

The industry committee responsible for establishing tank car design standards has adopted a proposal that will enhance the robustness of tank cars that carry TIH materials. That standard was the basis of a recent FRA rulemaking on TIH tank cars. Another proposed industry standard addresses ways to make petroleum and ethanol cars safer.

The railroad industry is also a key partner in the "Advanced Tank Car Collaborative Research Program" (ATCCRP), a cooperative effort involving the railroads, shippers (represented by the American Chemistry Council, the Fertilizer Institute, and the Chlorine Institute), tank car builders and owners (represented by the Railway Supply Institute), and several U.S. and Canadian government agencies. The program is sponsoring cutting-edge research aimed at further improving TIH tank car safety.

In addition, railroads work cooperatively with various Federal agencies—including the Pipeline and Hazardous Materials Safety Administration (PHMSA), the FRA, the Transportation Security Administration (TSA), and the Federal Emergency Management Agency (FEMA)—to help ensure safe and secure rail transport. For example:

- FEMA, FRA, PHMSA, TSA, and the railroads have jointly developed the *Rail Corridor Risk Management System* (RCRMS), a sophisticated statistical routing model designed to ensure that TIH materials are transported on routes that pose the least overall safety and security risk. The model uses a minimum of 27 risk factors to assess the safety and security of rail routes, including hazmat volume, trip length, population density along the route, and emergency response capability. When transporting TIH materials, railroads must use the routes deemed safest and most secure by the routing model.
- Railroads follow stringent TSA *"chain of custody" requirements* for rail cars carrying TIH materials. Transfer of TIH cars from a shipper to a railroad, from one railroad to another, and from a railroad to a receiver must be carefully documented. Rail cars carrying TIH materials cannot be left unattended while in certain high-threat urban areas.

- TSA regulations require railroads to *track TIH shipments.* Within five minutes following a TSA request, railroads must be able to identify the location of a particular tank car carrying TIH. Within a half hour, railroads must be able to report the location of all TIH tank cars currently on the rail network.
- PHMSA requires railroads to develop and implement *security plans* that include an assessment of security risks for hazmat shipments; background vetting and training of employees who work in hazmat transport; measures to restrict unauthorized access to hazmat cars; and coordination with shippers and receivers to minimize the duration of storage in transit.
- Railroads equip train dispatchers and crews with *information about hazmat on individual trains* and detailed emergency response information. In addition, railroads maintain contact lists for local emergency response agencies.
- Railroads provide *hazmat awareness training* to all employees who are involved in hazmat transportation. Employees responsible for emergency hazmat response efforts receive far more in-depth training.
- Rail industry personnel are in constant communication with the TSA, other agencies within DHS, the Department of Defense, DOT, the FBI, and state and local law enforcement agencies to *share intelligence and security information.*
- More than 25 years ago, the AAR established what is now the Security and Emergency Response Training Center (SERTC), a world-class facility that is

part of TTCI in Pueblo, Colorado. The SERTC has provided in-depth hazmat emergency response training to more than 40,000 emergency responders and railroad and chemical industry employees.

The rail transport of crude oil, which is considered a hazardous material, has been the subject of much discussion lately. Over the past couple of years, technological advances, along with relatively high crude oil prices, have led to sharply higher U.S. crude oil production. Historically, most crude oil has moved from production areas to refineries by pipeline. However, much of the recent increases in crude oil output has moved by rail. In 2008, U.S. freight railroads originated just 9,500 carloads of crude oil. In 2012, they originated nearly 234,000 carloads. Based on the approximately 97,000 rail carloads of crude oil in the first quarter of this year, more than 400,000 carloads are possible in 2013. Today, railroads transport approximately 10 percent of U.S. crude oil production, up from a miniscule percentage just a few years ago.

Railroads have an excellent crude oil safety record. Based on data from PHMSA, the "spill rate" for railroads from 2002–2012 was just 2.2 gallons per million crude oil ton-miles generated. The fact is, both pipelines and railroads are safe, reliable ways to transport crude oil. Each enhances our energy security and benefits consumers.

Safety-Enhancing Technologies

At a very basic level, railroading today seems similar to railroading 150 years ago: it still consists of steel wheels traveling on steel rails. This apparent similarity, however, masks a widespread application of modern technology and a huge variety of ongoing initiatives to research, test, and apply advanced technologies to promote a safer and more efficient railroad environment.

Many of these advancements were developed or refined at the finest rail research facility in the world: the Transportation Technology Center, Inc. (TTCI) in Pueblo, Colorado. TTCI is a wholly owned subsidiary of the Association of American Railroads. Its 48 miles of test tracks, highly-sophisticated testing equipment, metallurgy labs, simulators, and other diagnostic tools are used to test track structure, evaluate freight car and locomotive performance, assess component reliability, and much more. The facility is owned by the FRA but has been operated (under a competitively-bid contract with the FRA) by TTCI since 1984. TTCI is responsible for all the facility's operating costs and some capital costs. We extend a standing invitation to all members of this committee and others in Congress to visit TTCI and see firsthand the tremendous research and emergency response training that is being done there.

Among many other things, TTCI has been actively involved in the rail industry's research and technology development efforts to improve the performance of track and freight car component designs and materials. The most significant of these are improved suspension truck designs, improved maintenance of the wheel-rail interface, wheel inspection and cleanliness standards, and improved wheel and rail metallurgy.

In addition, TTCI continues to work with track suppliers and railroads to test and evaluate wear-and fatigue-resistant rail steels, innovative special track work and bridge designs, improved tie/fastener systems, and maintenance practices at its Facility for Accelerated Service Testing (FAST). As a result of these efforts, derailments caused by broken rails have decreased significantly over the past ten years.

A few of the many other examples of new safety-enhancing rail technologies developed in recent years or now being developed include:

- *Wayside detectors* identify defects on passing rail cars, including overheated bearings and damaged wheels, dragging hoses, deteriorating bearings, cracked wheels, and excessively high and wide loads.
- Trackside *acoustic detector systems* use "acoustic signatures" to evaluate the sound of internal bearings to identify those nearing failure. These systems supplement or replace systems that *measure the heat bearings generate* to identify those in the process of failing.
- Rail *defect detector cars* detect internal flaws in rails which are caused by fatigue and impurities introduced during manufacturing. A prototype of an advanced system dubbed the "phased-array" rail inspection system is being developed and tested at TTCI to detect hard-to-find internal rail defects.
- Advanced *track geometry cars* use sophisticated electronic and optical instruments to inspect track alignment, gauge, curvature, and other track conditions. A new system called the "vehicle track interaction system" is also used to locate

difficult-to-find track geometry defects. This information helps railroads determine when track needs maintenance.

- *Ground-penetrating radar* is being used to help identify problems below the ground (such as excessive water penetration and deteriorated ballast) that hinder track stability.
- Because a relatively small percentage of freight cars causes an inordinately high percentage of track damage and have a higher than usual propensity to derail, TTCI is working on ways to use *optical geometry detectors* to identify poorly performing freight trucks.[6]
- New automated detector systems are being tested and evaluated at TTCI to inspect the under carriage, safety appliances and truck components using *machine-vision-based car inspection systems.*
- Railroads are expanding their use of advanced communications systems. For example, the *Integrated Railway Remote Information Service (InteRRIS),* an advanced Internet database with wide potential applicability, was developed at TTCI. An early project using InteRRIS collects data from wheel impact load detector systems (which identify wheel defects by measuring the force generated by wheels on tracks) and detectors that monitor the undercarriage of rail cars (which identify structural defects or missing components such as key fasteners). InteRRIS processes the information to produce vehicle condition reports.

Many of these technological advances have been incorporated in the rail industry's Equipment Health Monitoring Initiative, a predictive and proactive maintenance system designed to detect and report potential safety problems and poorly performing equipment *before* they result in accidents or damage. In addition to reliably detecting cars that exhibit high levels of stress and reduce derailments, one of the purposes of EHMS is to work with freight car owners to develop efficient methods to proactively maintain the freight car fleet and keep out-of-service time to a minimum.

Rail industry safety will also be enhanced by the Asset Health Strategic Initiative (AHSI), a multi-year rail industry program initiated in December 2011 that will apply information technology solutions and processes to improve the safety and performance of freight cars and locomotives across North America.

In a nutshell, AHSI aims to improve safety and reduce costs across the rail industry by addressing mechanical service interruptions, inspection quality, and yard and shop efficiency. It is based on the recognition that improving asset health means more than just focusing on railcar and locomotive repair. Rather, it encompasses the entire rolling stock health cycle, incorporating prevention, detection, planning, movement, and repair.

For example, the Comprehensive Equipment Performance Monitoring (CEPM) program, which is just one part of the AHSI initiative, is a web-based application that captures data for railcar equipment components, including repair histories, the mileage the freight cars incorporating the components have traveled, and the current and past health status of the equipment. CEPM will make it much easier to track the health of individual railcar components and will provide crucial information on the health of entire classes of components, making early identification of potential safety problems much more likely.

As noted above, in recent years railroads have been reinvesting more than ever before back into their networks. These investments have had a pronounced positive impact on asset health and, as a result, improved safety. However, a strategic focus at the network level—like that provided by AHSI—will provide more significant returns and greater efficiencies than furthering incremental or local efforts. AHSI builds on existing industry capabilities and defect detector systems, including many of those described above, to provide a more comprehensive assessment of rail car and locomotive health. It's just one of many efforts by railroads to harness the power of advanced technologies for the benefit of their customers, their employees, and the communities they serve.

Safety and Passenger Rail

In the United States, freight railroads provide the foundation for most passenger rail. Around 70 percent of the miles traveled by Amtrak trains are on tracks owned by freight railroads, and dozens of commuter railroads operate, or plan to operate, at least partially on freight-owned corridors. In addition, most of the high speed and

[6] In terms of rail cars, "truck" refers to the complete four-wheel assembly that supports the car body.

intercity passenger rail projects under development nationwide plan to use freight-owned facilities.

Freight railroads agree that passenger railroading can play a key role in alleviating highway and airport congestion, decreasing dependence on foreign oil, reducing pollution, and enhancing mobility. But safety has to come first when it comes to passenger trains sharing track or rights-of-way with freight trains. Among other things, this means that in some cases—depending on train speeds and frequency, track standards, and other factors—separate tracks for passenger and freight trains might be needed. AAR believes that safety would be enhanced if these separate tracks were sufficiently far apart to minimize the likelihood that a derailment on one track could foul an adjacent track and lead to a collision involving a freight and passenger train.

Railroads and Fatigue

Railroads want properly rested crews—it's not in a railroad's best interest to have employees who are too tired to perform their duties properly. That's why railroads have long been working to find innovative, effective solutions to fatigue-related problems. Combating fatigue in the rail industry is a shared responsibility: employers need to provide an environment that allows employees to rest during off-duty hours, and employees must set aside time when off duty to obtain the rest they need.

Because factors that can result in fatigue are multiple, complex, and frequently intertwined, there is no single solution, and efforts to combat fatigue should be based on sound scientific research, not on anecdotes or isolated events. That's why railroads and their employees are pursuing a variety of scientifically-based fatigue countermeasures. Not every countermeasure is appropriate for every railroad, or even for different parts of the same railroad, because circumstances unique to each railroad influence the effectiveness and practicality of specific countermeasures. That said, individual railroads have been using the following countermeasures (among others) to help combat fatigue:

- Increasing the minimum number of *hours off duty* and providing *more predictable calling assignments* and rest opportunities between shifts.
- Focusing, when possible, on *returning crews home* rather than lodging them away from home and making away-from-home lodging more rest-inducing.
- Allowing employees to *request an extra rest period* when they report off duty if they feel excessively fatigued.
- Devising systems (including websites, e-mails, pagers, and automated telephone systems) to *improve communication* between crew callers and employees.
- Allowing employees who have been off work more than 72 hours (*e.g.,* on vacation) to begin their first shift in the morning rather than at night.
- Encouraging confidential *sleep disorder screening and treatment.*
- Offering *fatigue education programs* for employees and their families. Education is critical, since the effectiveness of fatigue initiatives depends on the actions of employees while off duty. Employees must make appropriate choices regarding how they spend their off-duty time, and education is important in encouraging sound decision making.

Conclusion

Railroads are proud of their safety record, which results from their recognition of their responsibilities regarding safety and the enormous resources they devote to its advancement. At the same time, railroads want rail safety to continue to improve. The rail industry is always willing to work cooperatively with you, other policymakers, the FRA, its employees, and others to find practical, effective ways to make this happen.

ATTACHMENT A—ASSOCIATION OF AMERICAN RAILROADS

PTC Implementation: The Railroad Industry Cannot Install PTC on the Entire Nationwide Network by the 2015 Deadline—May 2013 Update

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PTC Implementation: The Railroad Industry Cannot Install PTC on the Entire Nationwide Network by the 2015 Deadline—May 2013 Update

I. Introduction and Executive Summary

On January 18, 2012, the Association of American Railroads (AAR) submitted a status paper to the Federal Railroad Administration (FRA) titled "PTC Implementation: The Railroad Industry Cannot Install PTC on the Entire Nationwide Network by the 2015 Deadline" ("ISP," Attachment A). The ISP discussed the challenges faced in developing an interoperable PTC system and provided detailed data showing the progress that had been made.[1] The ISP concluded by stating that a nationwide, interoperable PTC network cannot be completed by the December 31, 2015, statutory deadline.

On February 10, 2012, the American Public Transportation Association (APTA) filed a companion paper with FRA, concurring with AAR that a nationwide interoperable PTC network is not achievable by December 31, 2015. In addition, in August 2012 FRA issued a report to Congress titled, "Positive Train Control Implementation Status, Issues, and Impacts." In this report, FRA reached a similar conclusion, stating, "[b]ased on the results of this report, FRA believes that the majority of railroads will not be able to complete PTC implementation by the 2015 deadline."

This paper updates the ISP and the tables that were attached to the ISP.[2] While enormous challenges remain in regard to developing a nationwide interoperable PTC system, there were many positive developments during 2012. These include:

- the first Geographical Information System (GIS) subdivision validations with FRA;
- the development and manufacture of 220 MHz radios;
- significant progress with locomotive installations;

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[1] This paper is based on information provided by the following eight railroads, which have to install PTC on routes over which TIH or passengers, or both TIH and passengers, are transported: the Alaska Railroad (ARR), BNSF Railway (BNSF), Canadian National (CN), Canadian Pacific (CP), CSX Transportation (CSX), Kansas City Southern (KCS), Norfolk Southern (NS), and Union Pacific (UP). passengers, or both TIH and passengers, are transported: the Alaska Railroad (ARR), BNSF Railway (BNSF), Canadian National (CN), Canadian Pacific (CP), CSX Transportation (CSX), Kansas City Southern (KCS), Norfolk Southern (NS), and Union Pacific (UP).

[2] This 2013 Update is intended to be read in conjunction with and as a supplement to the ISP. Attachment B updates the information in the various tables that were included in the ISP.

- improvements in the availability of Wayside Interface Units (WIUs);
- radio frequency propagation studies of Chicago, Kansas City, Los Angeles, New Orleans, New York, Minneapolis, St. Louis, Toledo, and other congested metropolitan areas have been completed or are in progress;
- FRA's modification of its regulations that permits railroads to base PTC installation on projected traffic in 2015;
- progress on the PTC Safety Plan that must be submitted to FRA before a PTC system can be certified; and
- FRA's recognition that activation of PTC should proceed from less complex to more complex areas.

Despite the positive developments in 2012 and the railroads spending approximately $2.8 billion to date to install PTC, the year confirmed and increased our understanding of the challenges that remain to completing a nationwide, interoperable PTC system. The most significant are:

- Wayside implementation continues to be constrained by the limited number of firms that provide signal design services. The signal system must still be individually redesigned and replaced at more than 7,000 locations before PTC wayside technology can be installed at those locations. Approximately 26,000 WIUs remain to be installed. This work must be accomplished without compromising signal system safety or the ability of the railroads to efficiently move the Nation's freight. Based on current experience and available resources, it is likely that wayside design and installation will extend into 2018.
- The track database, including critical features such as the presence of signals and switches, must be validated. The railroads must ensure that what is displayed to the train crew via the track database and onboard system reflects what is shown by railroad signals. It is a time-consuming and labor-intensive process.
- There is limited expertise available to accelerate design and development. The railroads have been developing expertise as they build the onboard, wayside, and back office segments.
- Core software delivery dates continue to slip, particularly in connection with the Back Office Server (BOS) for I–ETMS. The railroads do not expect the final release of core software, which is necessary before the PTC system can be lab and field tested, certified, and used in revenue service, until mid-2014.
- Full system testing will likely continue into 2015, as will the need to address issues with PTC components and software identified by the testing.
- Over 75 percent of the industry's employees must receive PTC training. From the perspective of the employee retaining the material and understanding its relevance, the optimal time to train an employee is when PTC is rolled out on the employee's territory.
- Once testing is complete, the limited number of FRA personnel available to work on PTC must still review each railroad's individual Safety Plan and certify the PTC system. While the provisional certification concept advanced by FRA could reduce the delay associated with certification, even a provisional certification will require time and review by FRA.
- Portions of the PTC regulation are still not final, with potential changes that could impact the scope of the implementation effort.
- As the potential for failure of individual components became clear, systems have been designed with more redundancy, thus lengthening the design process.
- PTC cannot be rolled out on an entire railroad all at once. Implementation of PTC must occur in phases and location by location, starting with less complex areas and proceeding to the more operationally complex areas, incorporating lessons learned at each step.

It is abundantly clear that the railroad industry cannot install interoperable PTC on the entire nationwide network by the December 31, 2015, deadline.

II. PTC Components

A. Locomotives

Approximately 22,000 locomotives, which constitute most of the Class I railroads' locomotive fleet, must be equipped with PTC technology.[3] The ISP identified several reasons why equipping locomotives with PTC technology is taking longer than projected in the railroads' original implementation plans.[4] However, several of those challenges were resolved or became less of a concern in 2012:

- vendor supply chain issues and capacity have improved and available hardware (but not software) components are generally being delivered on time;
- production of the 220MHz locomotive radio began in 2012; and
- hardware design changes necessary to support the messaging system on some railroads were completed.

These positive developments aided the railroads in making significant progress on their "double touch" strategy for equipping locomotives in 2012.[5] Over 3,000 locomotives were equipped or partially equipped in 2012; over 6,000 locomotives have been equipped or partially equipped to date. While the good news is that the number of equipped or partially equipped locomotives continued to climb in 2012, most of these locomotives were only partially equipped and will have to be cycled back through a shop to complete installation and perform PTC commissioning tests.

A significant development hurdle remains with the development of the onboard software that runs on the Train Management Computer (TMC) for the railroads using I–ETMS. The complexity of the software, combined with the many interfaces with other components of the PTC system, has resulted in multiple reviews of the design. The delivery date for this critical software component slipped several times over the course of 2012 and at the present time there is no delivery date for the final version of the onboard software. Nevertheless, sufficient progress has been made so that railroads plan to begin fully equipping locomotives with all necessary PTC equipment in 2013 rather than continuing to employ the double touch strategy.

While much work remains to be done in regard to equipping locomotives, the industry plans to have approximately ¾ of the locomotives required to be equipped with PTC technology fully equipped by December 31, 2015.[6]

B. Wayside Technology

For the reasons described in the ISP, tens of thousands of miles of existing signal system infrastructure still need to be replaced. As discussed previously, each of the approximately 12,300 replacement projects is complicated and lengthy, requiring individual analysis and design and signal replacements or upgrades before the WIU's can be installed at these locations.[7]

Qualified signal personnel are needed for design, installation, and validation, both in the lab and in the field. The limited number of qualified signal design firms and personnel available to the railroad industry continues to constrain how quickly railroads can complete the design, upgrade, installation, and testing required for PTC signal projects. The railroads have hired over 2,200 signal personnel specifically for PTC.[8] However, the great majority of these new hires provide assistance only with the installation of PTC at wayside locations, not with the more complicated analysis and design work that is typically handled by established signal design firms. Personnel hired for installation work are, of course, limited to performing work at locations where designs have been completed. Product availability has improved, although it continues to be a concern along with the extensive lab and field testing required for these products.

Despite these factors, railroads made considerable progress with installation of wayside technology in 2012. Over 7,000 WIU's were installed in 2012, bringing the total installed to approximately 9,700. That leaves approximately 26,000 WIU's of the approximately 36,000 total WIU's needed remaining to be installed.[9] Similarly, approximately 3,700 signal replacement projects were completed in 2012, bringing the total completed to over 5,000. However, that still leaves over 7,000 of the ap-

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[3] All the estimates in this paper are premised on the PTC regulations in existence on April 1, 2013. The industry has requested amendments to those regulations that would reduce certain estimates, including the number of locomotives that would need to be equipped with PTC.

[4] ISP at 4.

[5] "Double touch" refers to shopping locomotives twice to equip them with PTC, partially installing PTC equipment at the first shopping.

[6] See Table 1 in Attachment B.

[7] ISP at 6.

[8] See Table 2 in Attachment B.

[9] See Tables 3 and 4 in Attachment B.

proximately 12,300 PTC signal replacement projects identified by the industry to be completed.[10] The sheer volume and complexity of this safety-critical work, which impacts the functioning of railroad signal systems as well as PTC, is one of the most significant reasons that the railroad industry cannot meet the 2015 deadline. This work is expected to extend into 2018.

C. Switches

Most of the work involved in upgrading switches in non-signaled territory remains. In analyzing the technology required for switches, railroads have determined that these will be mostly turnkey solutions currently under development by several suppliers. In 2012, 227 switches were equipped with power, bringing the total so equipped to 436; 236 were equipped with WIU's, bringing the total so equipped to 361; and 36 were equipped with switch monitors, bringing the total so equipped to 148. Over 4,400 switches still need to be equipped with power and WIUs, and approximately 3,400 switch position monitors still need to be installed.[11]

D. Communications

As explained in the ISP, all PTC wayside locations and all PTC-enabled locomotives must be equipped with a complex, interoperable, wireless communications infrastructure.[12] Railroads have created a private radio frequency network capable of transmitting and receiving the data necessary to support an interoperable PTC network using spectrum in the 220 MHz band as the interoperability communications standard. To date, the seven Class I railroads have invested approximately $40 million in acquiring and managing 220 MHz spectrum.

Production quantities of PTC radios were first available in May 2012. Since then, railroads have been procuring and installing them. In parallel, railroads have undertaken numerous associated activities, including coverage analyses, site selection, antennae installation, and upgrading power supplies.

One of the key challenges that has emerged is deploying a national 220 MHz communications network for PTC that includes adequate coordination between railroads to avoid interference. Various tools are being developed to help mitigate interference, but this will continue to be a substantial task.

Some additional complexities associated with the design and implementation of the communications system became apparent in 2012. Complete signal wayside design and GIS data and train movement data are all necessary to properly design the radio network; each of these data elements must be taken into account to ensure there is adequate capacity to handle all the data. In addition, as new users roll out their PTC systems in locations where other railroads are already testing or using PTC, railroads will likely have to re-engineer their radio networks to address potential interference and ensure the additional demand for data can be met. Another issue that has emerged is the potential for delays associated with the Federal Communications Commission's environmental rules, including the separate completion of the environmental and historic preservation processes for each of the over 20,000 antenna structures required for PTC.

Four railroads have invested approximately $180 million to date in the development and installation of 220 MHz radios for base stations, wayside locations, and locomotives, each of which requires a distinct type of radio. Still, over 3,800 base station radios, over 31,000 wayside radios, and over 21,000 locomotive radios need to be manufactured and installed.[13]

Finally, in 2012 railroads studied spectrum needs in congested metropolitan areas and confirmed that railroads will need to acquire additional spectrum in Chicago. Other areas being studied include Kansas City, New York, Toledo, St. Louis, Minneapolis-St. Paul, and New Orleans. The adequacy of coverage in congested metropolitan areas will not be fully known until the PTC system is implemented and operational in those areas.

E. PTC Back Office

The pace of development of the Back Office Segment and PTC-related back office systems remains challenged by design complexity, availability of supplier resources, and scalability of the solution. Insofar as the I–ETMS BOS is concerned, the railroads and their contractors continued development in 2012, but a "final" version is not expected to be available until mid-2014.

The need to test thoroughly the PTC back office systems, including the BOS, and address issues and defects identified during the testing process also significantly im-

[10] See Table 5 in Attachment B.
[11] See Table 6 in Attachment B.
[12] ISP at 8.
[13] See Table 7 in Attachment B.

pact the pace of development. Lab testing of the related technologies and systems will generally find some defects, as was the case with the initial software release for the BOS, requiring subsequent revisions of the technologies or systems that fix the defects. Unavailability of the final production version of the BOS is one of the critical factors preventing the railroads from installing PTC on the entire nationwide network by the current 2015 implementation date.

1. Back Office Server

For the over one dozen railroads implementing the I–ETMS BOS, the software version that includes essential requirements for vital overlay PTC system certification is now scheduled to be ready for testing in mid-2014. A production version of the BOS software will be unavailable until after the required lab testing, likely late 2014 at the earliest. While the railroads are considering all possible strategies to expedite this schedule, at this time there is no apparent alternative strategy or approach that would significantly accelerate the delivery date. As with the software for the locomotive, the complexity of the BOS software combined with the many interfaces with other components of the PTC system has required detailed design and analysis to ensure proper operation.

2. Geographical Information System (GIS)

The railroads made substantial progress with respect to the GIS component of PTC systems in 2012. The industry developed a common approach to validation and verification of the data to ensure all essential data elements are captured. A common approach facilitates review by FRA and also provides non-Class I railroads a template they can use. Over 13,000 track miles were GIS mapped in 2012, bringing the total miles GIS mapped to approximately 80,000; approximately 15,800 track miles were data processed in 2012, bringing this total to over 41,000; and over 6,000 track miles of GIS data were converted to PTC subdivision files in 2012, bringing the total of converted track miles to over 9,000. However, much work remains to be done. Over 17,000 track miles remain to be GIS mapped; almost 56,000 miles remain to be data processed; and almost 88,000 miles remain to be converted to the PTC subdivision files needed for the locomotive's PTC system.[14] Furthermore, substantial work remains to be done to develop and implement sustainable processes to document and update the GIS coordinates every time one of the over 470,000 critical PTC assets are moved by more than 1 foot.

3. Dispatch

The dispatch system must interact with the PTC system via a common interoperable interface with the BOS. For some railroads, the enhancements needed for the dispatch system are extensive and have taken considerable analysis and effort to design, code, and test. Additionally, changes made to the BOS require an analysis of the effect on the interface of the dispatch system with the PTC system. At least four railroads will not have a PTC-capable dispatch system until 2014.[15]

III. The Integration and Testing Challenge

The challenges and risks associated with integrating and testing the many components of PTC have not diminished. Many of the 20 plus PTC components have been tested by the supplier and some "nearest neighbor" testing of interfacing components has started with preliminary releases of software during 2012. However, end-to-end testing of the final system of interoperable software, with all known hazards mitigated, is still one to two years away.

Railroads have been nimble in adjusting to the testing challenge. As component releases are delayed due to the complexity of the design or the need to fix defects, the interaction of those components can quickly get out of sync on the release cycle timeline. Nevertheless, railroads have revised test plans and realigned resources to conduct nearest neighbor testing with intermediate versions of software as software delivery schedules have slipped. They have taken advantage of opportunities to test releases of software and hardware to ferret out defects and issues early in the release continuum, when more extensive integration testing is not yet possible. To keep the schedule moving forward to the extent possible, railroads have undertaken preliminary testing using software written to interim versions of "interface control documents" (ICDs) and written translators to bridge the gap between the different ICDs.[16] In some cases these stop-gap assemblages of software have been tested in the field with a hi-rail vehicle.

[14] See Table 8 in Attachment B.
[15] See Table 9 in Attachment B.
[16] ICDs contain the format for how systems communicate with each other.

Railroad testing has identified more than 600 software defects to date, underscoring the importance of thorough testing to ensure the integrity of the PTC system. While these efforts successfully identified potential defects, only true end-to-end testing with final software will determine whether the integration of all the PTC components is effective. Based on current schedules, this will not begin until late 2014. At that time any additional defects discovered will have to be analyzed and remediated, further delaying the time at which widespread PTC implementation can proceed.

IV. The Certification Process Could Take Considerable Time

AAR remains concerned that the certification process could take a considerable amount of time and that FRA will not have the resources to review and certify PTC systems expeditiously. As FRA acknowledged in its August 2012 Report to Congress, FRA will need at least 6 to 9 months to review PTC Safety Plans, and approximately 38 railroads will need certification.[17] In an attempt to expedite final review, in 2012 the Class I railroads' Joint Rail Safety Team (JSRT) developed a format and common portions of a PTC Safety Plan and submitted drafts for FRA review and comment. In addition, in 2012 FRA and the JRST began holding quarterly meetings to facilitate communications between the parties, discuss FRA's concerns about implementation, and clarify FRA's interpretation of the PTC regulations. The meetings continue to foster a good working relationship between the industry and FRA. However, while this joint effort of the railroads and FRA is helpful, each railroad will have a unique PTC safety plan that FRA will need to review and approve. Furthermore, while railroads have been and will continue partial installation of PTC equipment prior to certification, the time required for FRA certification is one of the critical elements impacting the date by which the PTC mandate can be implemented.[18]

As FRA also noted in its Report to Congress, the shortage of qualified people extends to FRA. FRA noted that its PTC staff consists of 10 PTC specialists and 1 supervisor, who are responsible for monitoring PTC system installation and testing nationwide and for the technical review and approval of all documentation associated with the statutorily-required PTC system certification.[19] Railroads will be submitting PTC Safety Plans, amendments to their PTC filings, and other related documents. FRA, as do the railroads, faces the challenge of key personnel retiring as well as other resource constraints that impact the agency's ability to review, comment, and approve the required documentation. As FRA noted in its Report to Congress, the industry remains concerned that the continued shortage of FRA resources could delay the implementation of an interoperable PTC system.

V. Interoperability: The Current Implementation Schedules Could Adversely Affect the Reliability and Effectiveness of PTC

A. Phasing in PTC

Attachment B to the ISP discussed problems that could arise from implementation schedules under which PTC is deployed first in locations presenting complex interoperability issues. The railroads suggested a phased approach to PTC under which PTC will be implemented in less operationally complex areas first, which is a departure from current implementation plans. FRA has indicated that it agrees with this general approach. Accordingly, the railroads intend to update the implementation schedules in their respective PTC Implementation Plans to take these complex interoperability issues into account.

The PTC Reliability Study recently provided by AAR to FRA raises significant concerns over the reliability of the fully assembled PTC system. The Study underscores the need for a phased approach for implementation that will allow the railroads to assess the PTC system in operation so that failures, while they will occur, can be reduced to the extent possible and the efficiency of the railroad network maintained to the greatest extent feasible. The time needed to phase in PTC is another reason why the industry cannot meet the current 2015 deadline to implement PTC on the entire nationwide network.

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[17] FRA Report to Congress, p. 41. Based upon the nearly 18 months that it took for FRA to approve the PTC Development Plan, a less complex document, the approval period could take even longer than estimated by FRA.

[18] FRA in its August 2012 Report to Congress suggested a legislative change that would permit FRA to provisionally certify PTC systems. Once provisionally certified, a railroad could operate its PTC system pending final review. While a constructive suggestion that could assist in evaluating PTC systems in operation, this change would not alter the fact that the railroads cannot install PTC on the entire nationwide network by the 2015 deadline. Even provisional certification will require a review and approval process for FRA. It is difficult to imagine that process will take less than 6 months.

[19] FRA Report to Congress, p. 41.

B. Interoperability Standards

Ensuring the interoperability of PTC requires numerous interoperability standards. AAR and its member railroads made considerable progress towards developing those standards in 2012. Attachment C describes the status of the interoperability standards required for PTC. Of the 34 standards being developed, 18 have been finalized. Drafts of 12 more have been published for public comment.

In 2012 it became clear that the railroads also need to adopt industry standards for the ongoing use and operation of PTC. These standards are necessary in order for the railroads operating a PTC system to ensure that updates to PTC hardware and software are acceptable. In the absence of such standards, there is no assurance that upgraded PTC components and software will be compatible with and continue to work with other components of the PTC system or that interoperability will be maintained.

VI. Rolling Out PTC

As noted above and in the ISP, PTC cannot be rolled out on an entire railroad system at the same time. It must be implemented in phases and location by location, typically on a subdivision basis.

Furthermore, as also stated in the ISP, training employees remains a daunting task that places practical limits on the speed with which PTC can be safely and effectively rolled out across a railroad system. While training courses and materials continue to be developed, the railroads recognize that this training must occur in a phased approach. Employees on each subdivision will have to receive significant training immediately prior to activation of PTC on the subdivision where they work. On the Class I railroads alone, approximately 68,000 engineers and conductors, 7,200 signal employees, 2,500 dispatchers, and thousands of others, including mechanics, electricians, and supervisors, will have to be trained on PTC. Delays in designing and installing PTC affect the pace of training railroad employees.

VII. Conclusion

The railroad industry has invested a tremendous amount of time, effort and money to complete a nationwide interoperable PTC-system as quickly as possible. As of the end of 2012, the railroads had invested approximately $2.8 billion (up from $1.6 billion at the end of 2011) and had also devoted millions of man-hours to the development of PTC.[20] However, as demonstrated above, the railroads will not be able to implement PTC on the entire nationwide network by December 31, 2015.

Because of all the uncertainties associated with the development and installation of PTC, it is impossible to set forth a precise timeline for completion of a nationwide, interoperable PTC network. Factors that affect a railroad's timeline for completion of PTC on its system, include variations in geography; type and age of the railroad's wayside signaling infrastructure (legacy relay technology must be converted to solid state technology); the density of train operations; the number of rail-to-rail interlockings; the number of connections with other railroads; and the number of operating environments (with different combinations of these factors) that must be addressed. In addition, until a railroad tests and installs its PTC system, it is impossible to know what other difficulties will be encountered and how they might affect progress in completing the railroad's PTC network. As discussed previously, the critical software for the back office server for I–ETMS will not be fully tested and ready to be installed until late 2014 at the earliest. Finally, the scope of the PTC network will impact a railroad's ultimate completion date.

Taking into account the above factors, the eight railroads providing data for this paper anticipate that by December 31, 2018, all PTC hardware will be installed and PTC will be in operation on most of the mandated PTC routes. (The date by which PTC will be in operation on all of a railroad's mandated PTC routes will vary by railroad.) The industry continues to seek ways to speed progress while maintaining safe operations in order to achieve complete deployment as soon as possible. Thus, while current projections show that a portion of the PTC network will not be completed by the end of 2018, that certainly could change.

Keeping in mind the uncertainty in projecting a completion date, Table 11 shows the railroads' current expectations regarding future annual PTC expenditures and annual installations of wayside interface units, base station radios, and PTC equipment on locomotives, as well as the number of employees they expect will be trained. (Table 11 is premised on the PTC network required by the current regulations.) Table 11 also shows by year the extent to which the railroads will have installed PTC on the routes that will have PTC capability. The year "2018 and beyond" column includes data for what the railroads currently project will remain to

[20] See Table 10 in Attachment B.

be done in and beyond 2018. The eight railroads anticipate they will have spent $8 billion by the end of 2018 on PTC.

This paper shows that the railroad industry has done its utmost to install a nationwide, interoperable PTC network. However, much work remains to be done. While substantial progress toward completing the network will have been made by the end of 2015, the entire project will not be complete by that date.

ATTACHMENT B

PTC Data [1]

Table 1.—Equipping Locomotives with PTC

Railroad	ARR	BNSF	CN	CP	CSX	KCS	NS	UP	Total
# to be equipped	54	4,000	1,000	1,143	4,100	591	3,811	7,267	*21,966*
# partially equipped to date	53	917	58	163	1,705	40	1,383	1,591	*5,910*
# fully equipped	0	146	0	0	0	0	0	0	*146*

Table 2.—Railroad Signal Personnel Hired or Retained Due to PTC

ARR	4
BNSF	820
CN	32
CP	35
CSX	494
KCS	36
NS	300
UP	539
Total	*2,260*

Table 3.—Integrated WIU Installation

Railroad	ARR	BNSF	CN	CP	CSX	KCS	NS	UP	Total
# integrated WIUs required to be deployed	54	5,709	1,061	491	5,029	620	4,249	11,895	*29,108*
# integrated WIUs deployed to date	0	4,518	67	49	487	238	597	3,003	*8,959*
# integrated WIUs remaining to be deployed	54	1,191	994	442	4,542	382	3,652	8,892	*20,149*

Table 4.—Stand-alone WIU Installation

Railroad	ARR	BNSF	CN	CP	CSX	KCS	NS	UP	Total
# stand-alone WIUs required to be deployed	38	1,180	699	620	1,167	217	1,096	1,934	*6,951*
# stand-alone WIUs deployed to date	0	209	0	15	10	42	39	452	*767*
# stand-alone WIUs remaining to be deployed	38	971	699	605	1,157	175	1,057	1,482	*6,184*

Table 5.—Signal Replacement Projects

Railroad	ARR	BNSF	CN	CP	CSX	KCS	NS	UP	Total
# locations of signal replacement required	0	3,965	134	66	1724	364	1,850	4,200	*12,303*
# locations replaced to date	0	2,490	89	26	561	180	597	1,255	*5,198*
# locations remaining to be replaced	0	1,475	45	40	1,163	184	1253	2945	*7,105*

[1] The data in this Attachment is based on estimates as of December 31, 2012, current PTC implementation plans on file with FRA (including amendments to plans that have been approved by FRA), and the regulations in existence on December 31, 2012.

Table 6.—Switches in Non-Signal PTC Territory

Railroad		ARR	BNSF	CN	CP	CSX	KCS	NS	UP	Total
	# needed	64	1,180	227	481	973	148	728	974	*4,775*
# non-signaled switch locations needing power & WIUs	# equipped with power to date	4	209	0	11	85	30	39	58	*436*
	# remaining to be equipped with power	60	971	227	470	888	118	689	916	*4,339*
	# equipped with WIUs to date	4	209	0	11	10	30	39	58	*361*
	*# remaining to be equipped with WIUs	60	971	227	470	963	118	689	916	*4,414*
# non-signaled switch locations needing switch position monitors	# needed	0	0	227	481	973	148	728	974	*3,531*
	# equipped to date	0	0	0	11	10	30	39	58	*148*
	# remaining to be equipped	0	0	227	470	963	118	689	916	*3,383*

Table 7.—Communications Deployment

Railroad		ARR	BNSF	CN	CP	CSX	KCS	NS	UP	Total
	# needed	33	731	181	134	1,285	120	700	1,036	*4,220*
# Base station 220 MHz radios	# installed	3	297	0	0	30	0	62	4	*396*
	# of future installations needed	30	434	181	134	1,255	120	638	1,046	*3,838*
# Wayside location 220 MHz radios	# needed	78	5,863	1,751	687	5,299	828	5,478	13,700	*33,684*
	# installed	0	1,282	0	0	748	0	78	102	*2,210*
	# of future installations needed	78	4,581	1,751	687	4,551	828	5,400	13,598	*31,474*
Locomotive 220 MHz radios	# needed	54	4,000	1,000	1,143	4,100	591	3,811	7,267	*21,966*
	# installed	0	146	0	1	20	0	0	2	*169*
	# of locomotives remaining to be equipped	54	3,854	1,000	1,142	4,080	591	3,811	7,265	*21,797*

Table 8.—Status of PTC GIS Projects

Railroad		ARR	BNSF	CN	CP	CSX	KCS	NS	UP	Total
# PTC assets to be* mapped and extracted for GIS consumption		2,800	95,925	25,630	17,802	114,731	9,641	77,000	130,000	*473,529*
# track miles required to be GIS mapped	# miles mapped to date	600	13,925	80	865	21,455	1,977	16,107	25,000	*80,009*
	# miles to be mapped	0	10,562	4,300	1,871	110	250	0	0	*17,093*
# track miles required to be data processed	# miles processed to date	600	9,758	20	273	7,742	153	231	22,500	*41,277*
	# miles remaining to be processed	0	14,729	4300	2,463	13,823	2,074	16,107	2,500	*55,996*
# track miles GIS data to be converted to PTC subdiv files	# converted to date	600	6,455	0	273	1,420	153	231	300	*9,432*
	# remaining to be converted	0	18,032	4,300	2,463	20,145	2,074	16,107	24,700	*87,821*

*The calculation of assets to be mapped includes the following: integer mileposts; signals; crossings; switches; interlockings/control point locations; permanent speed restrictions; the beginning and ending limits of track detection circuits in non-signaled territory; clearance point locations for every switch location installed on the main and siding tracks; and inside switches equipped with switch circuit controllers.

Table 9.—Status of PTC Dispatch System Projects

Railroad	Date System will be PTC-capable
ARR	April 2013
BNSF	Completed
CN	1st quarter 2014
CP	June 2014
CSX	3rd quarter 2014
KCS	1st quarter 2014
NS	3rd quarter 2013
UP	Completed

Table 10.—PTC Investment

Railroad	PTC investment through December 31, 2012 ($)
ARR	34,000,000
BNSF	739,694,000
CN	55,900,000
CP	102,340,000
CSX	585,000,000
KCS	50,374,000
NS	443,466,772
UP	$759,000,000
Total	*$2,769,774,772.00*

ATTACHMENT C

ITC Sourced Specifications	Total	Started	Delivered to AAR and Published for Comment	Revised and Sent to Railway Electronics Standards Committee for Adoption	Final Version Released by AAR
Interface Control Documents	8	8	4	3	3
Requirements Specifications	14	14	12	9	8
Architectural Specifications	2	2	2	2	2
Database Definitions	2	2	4	3	2
Protocol Specifications	3	3	3	3	2
Recommended Practices	1	1	1	0	0
Test Plans	1	1	1	1	1
Test Reports	0	0	0	0	0
Total Specifications	31	31	27	21	18

Table 11.—PTC Timeline Based on PTC Regulations as of 12/31/2012

Railroad	Class 1s	2013	2014	2015	2016	2017	2018 and beyond*	Totals
Component	Thru 2012							
Locomotives Partially Equipped	6,031	4,242	1,365	678	650	314	77	13,357
Locomotives Fully Equipped	224	987	6,948	7,425	4,425	1,509	448	21,966
Percent Complete	1%	6%	37%	71%	91%	98%	100%	
Wayside Interface Units installed	9,726	5,300	4,950	5,837	4,210	3,988	2,048	36,059
Percent Complete	27%	42%	55%	72%	83%	94%	100%	
Base Station Radios Installed	403	976	1,285	1,267	222	52	34	4,239
Percent Complete	10%	33%	63%	93%	98%	99%	100%	
PTC Route Miles Implemented	207	1,085	8,320	15,516	11,983	12,760	12,341	62,213
Percent Complete	0%	2%	15%	40%	60%	80%	100%	
Employees Trained	5,724	4,013	10,930	28,692	16,520	13,276	17,545	96,700
Percent Complete	6%	10%	21%	51%	68%	82%	100%	
PTC Spending ($M)	2,770	1,377	1,403	1,221	572	393	241	7,978
Cumulative Spending ($M)	2,770	4,147	5,549	6,771	7,343	7,736	7,978	

*The year 2018 and beyond column includes data for what the railroads currently project will remain to be done in and beyond 2018.Because of all the uncertainties associated with the development and installation of PTC, it is impossible to set forth a precise completion date. The railroads currently project that by the end of 2018, all hardware will be installed and PTC will be in operation on approximately 90 percent of the mandated PTC routes, by mileage. The industry continues to seek ways to speed progress while maintaining safe operations in order to achieve complete deployment as soon as possible.

Assumptions:

1—70% confidence factor in accomplishing the above metrics.

2—No FRA accomodation on yard movements in PTC territory. The spreadsheet only reflects the cost of equipping yard locomotives. The spreadsheet does not reflect the potential cost of operational impacts such as reduced operational efficiency and potential expenses that will be associated with resolving technical issues such as overloaded communications systems and the potential impossibility of accommodating PTC equipment on remote control locomotives.

3—Costs represent capital expenses only, no operating or maintenance expenses.

Senator BLUMENTHAL. Thank you, Mr. Hamberger.

Ms. Waters?

STATEMENT OF KATHRYN WATERS, EXECUTIVE VICE PRESIDENT, MEMBER SERVICES, AMERICAN PUBLIC TRANSPORTATION ASSOCIATION

Ms. WATERS. Good morning, Chairman Blumenthal, Senator Blunt, and members of the Committee. On behalf of the American Public Transportation Association, I thank you for the opportunity to testify on commuter rail safety. You have our written submission, and I will now try to summarize the key points.

As you said, my name is Kathryn Waters. I am APTA's Executive Vice President for Member Services. Before coming to APTA, I served as Senior Deputy Administrator in the Maryland Transit Administration in Baltimore. Before that, with Dallas Area Rapid Transit as Vice President for Commuter Rail and Railroad Management, where I had responsibility for the commuter rail system be-

tween Dallas and Fort Worth. And for many years, I worked in different capacities with the MARC train service in Maryland, culminating as Chief Operating Officer.

APTA is committed to safety. Passenger and employee safety is our number one priority for our commuter railroads.

Since 1882, APTA and its predecessor associations have been advocates for safety improvements. With that said, we are always working to make our industry safer.

While our testimony speaks to PTC, an effective safety system is about more than one specific procedure or technology. A culture of safety begins with a commitment by the senior leadership working with employees to adopt and adhere to common safety goals and practices. APTA's voluntary standard development program and the safety audit program are examples of the ways that the industry promotes safety. Both programs are described in my written statement.

APTA has consistently supported the concept of PTC, long before the Rail Safety Improvement Act of 2008, provided that proven technology, resources, and radio spectrum were available. APTA is working with its member railroads as we speak to meet the law's requirements on the Nation's commuter railroads.

We want to work with this committee on the best way to get PTC systems installed on commuter railroads. PTC, as you know, is defined as a system designed to prevent train-to-train collisions, overspeed derailments, incursions into established work zone limits, and the movement of a train through a switch left in the wrong position.

Some commuter railroads already have collision avoidance systems, some of which have been in place for many years. However, there is still no off-the-shelf technology capable of achieving all of the law's safety objectives today.

Key components of PTC systems, such as the software upgrades and revisions, and the roadway worker protection components, are still under development. This technology is also heavily dependent on the transmission of huge amounts of digital data, requiring newly designed radios and significant amounts of radio spectrum to deliver information to trains.

All of this is essentially untested in the actual commuter rail operating environment. Moreover, implementation costs are challenging, especially for publicly operated commuter railroads trying to deal with hundreds of state-of-good-repair projects unrelated to PTC, but many of which impact directly and significantly on the safety of operations.

Congress has appropriated only $50 million of the $250 million authorized for PTC, while implementation costs for commuter railroads are well in excess of $2 billion, and that excludes operating and inspection costs. As you know, many railroads in the East Coast are now also trying to deal with repair and rehabilitation costs related to Hurricane Sandy.

We have known about these challenges for some time. We have told Congress for several years that we are concerned about our ability to implement PTC by the deadline. We sought Federal funding to help commuter rail pay for the costs of the implementation. We have asked the FCC and Congress to provide radio spectrum

without cost for PTC implementation. We have also recommended the deadline for implementation be extended from 2015 to 2018.

And as Mr. Hamberger mentioned, we have been working with the FRA and with the freight railroads. We did do a report jointly with AAR concerning the challenges of meeting the deadline.

In its report to Congress, FRA recommended that it be allowed to approve a railroad to use alternative safety technologies on specified line segments in lieu of PTC, particularly in areas with low safety risk, if appropriately and properly justified to FRA. We support the FRA's recommendation to make such decisions.

We have also urged Congress to provide resources needed to do FRA inspections and reviews for approval of PTC systems, and to ensure that open standards on PTC technology are in place so that railroads can buy equipment and services in a competitive marketplace.

I appreciate the opportunity to testify today and would be happy to answer any questions.

[The prepared statement of Ms. Waters follows:]

PREPARED STATEMENT OF KATHRYN WATERS, EXECUTIVE VICE PRESIDENT, MEMBER SERVICES, AMERICAN PUBLIC TRANSPORTATION ASSOCIATION

Introduction

Chairman Rockefeller, Senator Thune, Acting Chairman Blumenthal and Senator Blunt, and members of the Commerce, Science and Transportation Committee, on behalf of the American Public Transportation Association (APTA) and its more than 1,500 member organizations, I thank you for this opportunity to testify on rail safety as it relates to the nation's commuter railroads. In particular, I will update the Committee on progress and challenges related to the implementation of positive train control (PTC) on the nation's commuter railroads.

My name is Kathryn Waters. I am APTA's Executive Vice President, Member Services, here in Washington, D.C. Before coming to APTA, I was Deputy Administrator at the Maryland Transit Administration in Baltimore, where I was responsible for all transit operations departments. Previously, I worked at the Dallas Area Rapid Transit (DART) in several positions, including Vice President—Commuter Rail and Railroad Management, and earlier, for MARC Train Service in Maryland, culminating as manager and chief operating officer.

As an APTA member, I served as chair of APTA's Commuter Rail Committee, and on APTA's Executive Committee as vice chair—commuter and intercity rail. I have represented APTA for more than 15 years on the rail safety advisory committee of the Federal Railroad Administration.

Overview

First and foremost, please let me state that APTA is unequivocally committed to safety: passenger and employee safety is the number one priority on our Nation's commuter railroads. Since its inception, APTA and its predecessor associations have been vocal advocates and active instigators for safety improvements. In the mid-1990s, APTA developed the Passenger Rail Equipment Safety Standards (PRESS) program to develop safety standards for commuter rail cars. More recently, our commitment to safety was heralded by the rail industry regulator, Federal Railroad Administrator (FRA) Joe Szabo, who announced safety statistics citing that 2012 was the safest year in railroad industry history. With that said, we are always working to make our industry safer.

APTA consistently supported the concept of positive train control (PTC) long before the Rail Safety Improvement Act (RSIA) of 2008, provided that proven technology, resources and radio spectrum necessary were available to put PTC into practice. We are working with our member railroads to meet the law's requirements that all of the Nation's commuter railroads have federally approved systems that help protect against accidents. We urge the Committee to focus on how to best install these still developing systems on an enormous and complicated network of interconnected railroads in a way that maximizes all of an operator's safety considerations while efficiently moving toward implementation. Commuter systems provide

important transportation in and around many of our metropolitan regions, and demand for service and ridership continues to grow.

Commuter rail safety has improved in recent years, but we continue to strive for improved safety. Commuter rail ridership has grown by 42 percent since 1990, going from just under 328 million trips then to more than 466 million trips in 2012, and safety on the Nation's commuter systems has improved. Over the past 10 years, fatalities have declined from just above 0.9 per 100 million passenger miles to 0.5 per 100 million miles in 2011. While commuter rail operators will always seek to improve and enhance safety, it is clear that travel by commuter railroad is among the safest modes of travel in the U.S.

About APTA

The American Public Transportation Association is a non-profit international association of more than 1,500 public and private member organizations, including transit systems and high-speed, intercity, and commuter rail operators; planning, design, construction, and finance firms; product and service providers; academic institutions, transit associations and state departments of transportation. APTA members serve the public interest by providing safe, efficient and economical transit services and products. More than 90 percent of the people using public transportation in the United States and Canada are served by APTA member systems.

Culture of Safety

While we address in this testimony a very significant element of the RSIA in the requirement to implement PTC, it is important that we make clear that PTC is but one element of an overall integrated approach to system safety. An effective safety culture is more important than any one specific procedure or technology. It begins with the commitment of the organization and senior leadership, working in collaboration with employees and labor in adopting common safety goals and expectations. It involves recognition that responsibility for safety lies at all levels and with all staff. One way our commuter rail agencies demonstrate their commitment is by having a comprehensive safety plan in place. It includes having sound policies and procedures, training, maintenance practices that include asset management and state of good repair considerations, data tracking for monitoring trends in operational, equipment, and infrastructure performance, and systems in place for auditing and assessing that performance. The transit and commuter rail industries have been leading on safety improvements over a 20 plus year evolution during which a great deal of attention and effort has been directed toward development of standardized systems and approaches to the delivery of safe service and work environments.

As an example, all commuter rail agencies have developed Safety Management Program Plans, the framework of which was based upon APTA's Safety Audit Program. The APTA Safety Audit program is a voluntary, comprehensive program developed over a decade ago when a number of North American rail transit systems requested APTA to develop and implement a standardized format for rail system safety and to provide an auditing service that would enable a transit system to determine the degree to which the standardized elements for rail transit system safety were being addressed. By way of the adaptation of existing industry best practices and system safety standards from the aerospace industry, the APTA Rail Safety Audit Program was inaugurated in 1989. This program was subsequently adopted in 1996 by the U.S. Department of Transportation Federal Transit Administration as the base guideline for its Federal state safety oversight requirements.

Currently there are dozens of rail transit systems and bus transit systems participating in APTA safety audit programs. These systems include mass transit/subway systems, light rail systems, automated guide-ways, heavy rail commuter systems, and bus transit operations across North America and Asia. Modal programs have been developed that are specific to urban rail, commuter rail, and bus safety management processes. The benefits derived from participation in the APTA Safety Management Program include:

- Adoption of safety management practices that have been established as an industry standard;
- Building and enhancing safety management processes for service delivery and workplace safety;
- Providing a tool for demonstrating transit system diligence for safety; and
- Providing a mechanism for continual improvement of system safety

Effective Safety Program Implementation includes policies and procedures on: Facilities Maintenance and Inspection; Vehicle Maintenance, Inspection and Repair; Rules and Procedures Review; Training and Certification; Emergency Planning and Response; Workplace Safety Program; Passenger and Public Safety; Rail Corridor

Operational Study; and Environmental Management Programs. These are just a portion of the lengthy list of considerations involved in ensuring a safe system.

Additionally, industry developed standards (such as PRESS and others) are contributing greatly to ongoing safety improvement. APTA has written over 270 standards and recommended practices, 71 of which address particular safety needs for mainline rail equipment, and over 111 for rail transit alone. Standards help improve the safety of public transportation systems by addressing vehicle crashworthiness, passenger door systems, emergency lighting and evacuation, and new standards to improve the safety of vehicle interiors including seat attachment strength and safer workstation tables. APTA has initiated new efforts within its standards body to improve current standards on vehicle design affecting derailments and has initiation new studies to better understand the potential for derailments at slow operating speed. Standards also define safe operating practices, inspection and maintenance of equipment, train control maintenance requirements, electrical propulsion system design, catenary electrical distribution wire maintenance, and wheel and axle assembly procedures among many other areas of a general nature including cyber and physical security, railcar procurement, tunnel ventilation, and sustainability.

Finally, APTA partners with the FRA, AAR and labor in developing rules to help design, build and operate safe transportation systems. In this regard, APTA is very active as an industry representative within the Rail Safety Advisory Committee (RSAC). Recently FRA and industry have collaborated on the development of language for new safety rules particular to high speed rail equipment. The public transportation industry and especially our commuter rail agencies will continue to maintain a strong emphasis on safety.

RSIA and PTC

As the members of this committee know, the Rail Safety Improvement Act (RSIA) of 2008 mandated that PTC technology be implemented on passenger railroad and certain freight railroads by December 31, 2015, and it authorized funding of $250 million over five years to assist with implementation. As defined in the statute, a positive control system is a "system designed to prevent train-to-train collisions, over speed derailments, incursions into established work zone limits, and the movement of a train through a switch left in the wrong position." When the RSIA was drafted in 2008, there was no off the shelf technology capable of achieving these safety objectives for all railroads—as is still the case today. Yet many commuter railroads have long made use of collision avoidance systems that would have protected against accidents that have occurred in recent years. Since the enactment of RSIA, APTA and its commuter rail members across the country have aggressively pursued the funding and technology necessary to implement this safety mandate by the current statutory deadline. However, challenges beyond our control have presented obstacles to implementation.

The initial conservative estimate for PTC implementation on commuter railroads was more than $2 billion, with more than 4,000 locomotives and passenger cars with control cabs and 8,500 track miles to be equipped. Since this initial estimate, as commuter railroads have begun their contracting and technology acquisitions, the estimated costs of implementation have risen well beyond the initial $2 billion estimate. These estimates do not include costs related to the acquisition and operation of the radio spectrum necessary to meet the interoperability requirements set forth under RSIA and they do not include costs associated with operating PTC systems.

To date, Congress has only appropriated $50 million of the total authorized amount. At a time when critical State of Good Repair backlogs are creeping above nearly $80 billion dollars on our nations public transportation systems, commuter railroads are being forced to choose between performing critical system safety maintenance projects and implementing PTC by 2015. Insufficient funding is a significant impediment to implementation for publicly funded railroads.

While Congress authorized $250 million for PTC implementation in the five Fiscal Years 2009 to 2013, only $50 million was appropriated during those years. It has also been suggested that Federal funding for high-speed rail projects can be used for PTC implementation costs, but this is only the case where existing commuter rail service and potential high-speed intercity passenger rail alignments are identical, and unfortunately that is not the case for most of the Nation's commuter rail operators. Similarly, debt financing and Railroad Rehabilitation & Improvement Financing (RRIF) loans have been suggested as a way to pay for PTC implementation, but many of the agencies charged with installing PTC on their commuter rail systems are carrying enormous debt service and many have substantial state of good repair capital projects—which are also necessary to ensure safe operations—that are competing for scarce resources.

Key components of PTC systems are still in the developmental phase, such as software upgrades and revisions, and roadway worker protection. Absent these essential elements, full implementation by 2015 will be impeded, even for those railroads that have secured the necessary funding. Moreover, the inability of most commuter railroads to acquire necessary radio spectrum is also impeding full implementation by 2015. The FCC has not responded to APTA's requests to make available spectrum available as a public safety imperative and insisted that the necessary bandwidth can be purchased on the open market. One railroad purchased spectrum only to have it now held up while the courts decide who owns the rights to sell the spectrum.

In 2011, after several years of working towards implementation and complying in good faith with FRA reporting requirements on PTC implementation plans, the APTA Commuter Rail CEOs committee concluded that the industry would not be able to fully implement interoperable PTC systems on all commuter railroads by the current deadline. Thus, APTA approved a policy position recommending that the deadline for PTC implementation be extended to December 31, 2018. It is important to add that APTA's position also states that extending the deadline shall not inhibit efforts to implement PTC on some commuter railroads prior to the existing deadline and in fact urges Congress to prioritize funding for those efforts. The hope was that lessons learned from early implementers such as Metrolink, would serve to facilitate and expedite implementation for other commuter railroads. Other APTA positions adopted in 2011 included recommendations that Congress appropriate Federal funding to cover 80 percent of PTC implementation costs for commuter railroads and direct the Federal Communications Commission (FCC) to provide radio spectrum, without cost, required for PTC implementation by publicly funded commuter railroads.

I should note that representatives from commuter rail systems across the Nation and APTA staff have conducted numerous meetings with Members of Congress and staff from congressional committees of jurisdiction to explain APTA's views and the challenges faced trying to implement PTC. While we have always expressed a commitment to implement PTC technologies, industry experience indicated that it would be difficult, if not impossible, to implement PTC on all of the Nation's commuter railroads by the 2015 deadline. We believe we acted responsibly by coming to Congress well before the deadline, rather than waiting for the deadline to become imminent.

Further, in January 2012, APTA shared a report with Congress which documented the technical challenges of implementing PTC. This report, which was written jointly with the Association of American Railroads (AAR), also outlined the technical challenges that freight railroads are experiencing in their effort to implement PTC and reached the shared conclusion that implementing a fully interoperable PTC network was not achievable by December 31, 2015.

Federal Railroad Administration Report to Congress

Under the Rail Safety Improvement Act, the FRA was statutorily required to transmit a PTC implementation status report to Congress in 2012. The goal of the report was to update Congress on the status of implementation, to identify major issues and to offer potential risk mitigation solutions. The FRA report which was issued in August 2012, stated, as part of the report's executive summary recommendations: "Based on the results of this report, FRA believes that a majority of railroads will not be able to complete PTC implementation by the 2015 deadline." It went on to say: "FRA recommends that it be allowed to approve a railroad to use alternative safety technologies on specified line segments in lieu of PTC, particularly in areas with lower safety risks, if appropriately and properly justified to FRA." Further, in its report to Congress, the Federal Railroad Administration recommended that:

> "Congress consider legislation that allows FRA to approve the use of alternative risk mitigation technologies in lieu of a PTC system on specified line segments if:
>
> - The use of the alternative technologies will not result in a decrease in the level of safety from that which currently exists.
> - The alternative technologies proposed provide an appropriate level of risk mitigation with regards to preventing train-to-train collisions, overspeed derailments, protection of roadway workers within their authorized work zones, and movement of a train through misaligned switches.
> - The alternative risk mitigation technology implementation plan, submitted as part of a petition to substitute alternative risk mitigation technologies for a

PTC system, implements the alternative risk mitigation technologies in order from areas of least risk to areas of greater risk.

- The alternative technologies are installed as soon as feasible.

APTA strongly supports the language contained in the FRA Report to Congress and recently adopted a policy in support of the FRA's recommendation to Congress. As adopted, the policy requests the FRA be allowed to consider alternative technologies in lieu of a PTC system on specified line segments. We believe that the statutory mandate for PTC implementation will only be strengthened by taking a system safety approach, rather than a "one size fits all" approach.

Additional APTA Recommendations

Alternative Risk Mitigation Technology

All APTA member railroads fully support initiatives that enhance safety. Not all railroads have the same operating environments, safety challenges or risk exposures. Some commuter railroads already have collision avoidance systems in place (some for many years) that protect against the occurrence of a train to train collisions such as Chatsworth. APTA in no way supports any blanket exceptions in this regard, but supports the FRA's recommendation that it be permitted to examine the feasibility of the use of alternative technologies on a line by line basis, and permit such uses only after rigorous analysis and evaluation of overall risk reductions.

While the vast majority of railroads would still require PTC, there would be some that could then prioritize their safety enhancement projects to address their most urgent safety risks first; freeing up the pipeline for procurement of PTC components and other resources in order to expedite implementation for other railroads.

In terms of any concerns regarding interoperability, there is nothing in the APTA policy or in the FRA's report to Congress that would change the statutory and regulatory requirements for interoperability. Any railroad's controlling locomotive that operates on another railroad must be able to communicate with and respond to the PTC system that will be installed. Similarly, if FRA is able to approve any alternative technologies, then any controlling locomotive operating on a line or segment where the alternative technology is installed must be able to communicate with that technology. If rolling stock will operate on lines with different technologies or even different PTC systems, more than one type of onboard equipment may need to be installed. For example, some commuter railroads that operate on the Northeast Corridor and a freight railroad must be able to interoperate with both the Advanced Civil Speed Enforcement System (ACSES) PTC system used by Amtrak as well as the Interoperable Electronics Train Management System (I–ETMS) PTC system being used by freight railroads, and anticipate having to install onboard equipment for both types of PTC systems to achieve interoperability.

In this regard, and while the National Transportation Safety Board (NTSB) is still conducting its investigation and has issued no findings, the unfortunate accident on the Metro-North Railroad in Connecticut makes clear that there is no one size fits all approach to rail safety for all situations. While we cannot comment on the details of the accident before the NTSB completes its investigation, their press release dated May 24, 2013 stated: "Positive train control is a technology that prevents two trains, traveling on a single track, from colliding with one another. The Metro-North trains involved in this accident were traveling on two separate but parallel tracks. The collision occurred after the eastbound train derailed. Because the trains were not traveling on a single track, it is not believed that PTC would have prevented the accident." We should also note that the Metro-North passenger rail cars damaged in the accident were designed according to specific strength requirements for the ends of cars that are intended to protect occupants in such a collision. They performed as designed, according to standards developed in part under the Passenger Rail Equipment Safety Standards (PRESS) program that APTA developed and administered in cooperation with FRA in the 1990s, as mentioned earlier in our testimony.

Open Standards/Federal Inspections

In addition to language concerning alternative technologies, APTA also recently approved policy positions requesting the FRA to promulgate open interface and communication standards permitting interoperability of products within PTC system hardware architecture to foster competition among providers. APTA also approved language put forth by Metrolink, requesting that Congress allocate additional funding to the FRA and other regulatory bodies to ensure adequate resources are available to inspect, review and authorize PTC implementation.

Conclusion

In closing, we want to reiterate the long standing and continued commitment the public transportation and commuter rail industry has for advancing the safety of our riders, employees and communities. We would also underscore that none of the PTC policies adopted by APTA are intended to prevent early implementation by those commuter railroads which seek to implement by or before the existing deadline. In fact, APTA has a long-standing policy and record of urging Congress to prioritize funding for early implementation efforts. As with any major initiative for nationwide implementation of a complex new technology, PTC implementation has posed, and is certain to continue to create, challenges that could not have been foreseen by legislators, regulators or implementers at the time of enactment.

On behalf of APTA and its members, we appreciate the work that this committee has done to enhance safety on our Nation's railroads. We look forward to continuing to work with you and your staff on this and many other common issues that face public transportation agencies.

Senator BLUMENTHAL. Thank you, Ms. Waters.

Mr. Stem?

STATEMENT OF JAMES A. STEM, JR., NATIONAL LEGISLATIVE DIRECTOR, TRANSPORTATION DIVISION, SHEET METAL, AIR, RAIL AND TRANSPORTATION (SMART) UNION

Mr. STEM. Good morning and thank you. Thank you, Senators Blumenthal and Blunt and Johnson. I am going to focus my verbal comments this morning on PTC and fatigue.

From the employee's viewpoint, any discussion concerning rail safety should always start with employee fatigue as a first topic. Our railroad corporations, as you heard this morning, are reinvesting more than $20 billion annually in upgrading, maintaining, and expanding their infrastructure, but are unwilling to invest anything in resolving the most pressing human factor and fatal safety issue. That is unpredictable work schedule, coupled with employee availability policies applied to the operating crews.

The Federal Railroad Administration, rail management, and rail labor, all agree that passenger hours of service regulations should be separated from freight hours of service regulations, because of the significant safety advantages of the predictable work schedules in passenger service.

The new passenger hours of service regulation also requires, for the first time, the use of scientific models to help create safe and efficient work schedules for operating crews. The resulting predictable work schedules in passenger service resolve most fatigue issues for these crews.

Contained in my packet of testimony were the recommendations from NTSB for two groups of issues, fatigue and positive train control.

A review of these recommendations leads to the obvious conclusion that fatigue of operating railroad employees was the basis for most of the recommendations, both for positive train control and for fatigue mitigation programs.

Before 1970, operating railroad employees could work and were often required to work 16-hour shifts, 7 days a week. The Rail Safety Improvement Act of 1970 changed that and reduced that so that our crews could only be required to work 12 hours a day, 7 days a week.

During the conversations and conferences that occurred after the RSIA of 2008 passed the House, the railroads' only suggestion for

improving the predictability of work schedules and mitigating fatigue was to limit the total hours that a safety critical employee could be required to work to 276 hours each month. That is 23 12-hour shifts. That 276-hour limit made its way into the RSIA and was signed into law.

The RSIA did contain provisions for two pilot projects sponsored by FRA for improving work schedules and employee notification. We have urged all the class I railroads to participate in a pilot project, but have not had a single railroad agree to do that.

Our suggested solution to the employee fatigue provides three options. Number one, give the employee that works in safety critical service a regular start time, so he or she knows days in advance when they must come to work. A large majority of our members have a regular start time and do not consider fatigue to be a safety issue. Employees with regular start times are not the employees who are dying in fatigue-related collisions that Ms. Hersman discussed earlier today.

If number one is not available, the second option that we are proposing is to notify the employee before going off duty what time they will be required to return to work for their next tour of duty. This option actually improves the availability of the employee by allowing the employee to return to service after only 10 hours off duty.

If neither one or two options are available, then we are suggesting move the required 10 hour of undisturbed rest that now immediately follows service to 10 hours of rest immediately preceding service. This is a 10-hour call which provides a significant improvement in the predictability of the work schedule. The result is the employee has at least 10 hours to rest and prepare for service.

The high level of professionalism and dedication of the operating crews running our railroads today are the only reasons that accidents like the one at Chaffee, Missouri, and the other ones highlighted here today aren't more frequent.

Positive train control. There are a few segments of our industry, as you have heard, that are asking Congress to grant a blanket extension of 3 to 5 years. The current required date for implementation is more than 30 months away today and was 7 years and 3 months from the time RSIA was passed.

If Congress chooses to grant a blanket extension for PTC, the railroads that are behind on their implementation schedule today will further slow or just stop the process until that new extension also expires.

Some railroads, including Amtrak, BNSF, and Metrolink, and Alaska Railroad, have announced that they will be able to meet the statutory deadline. Others will be partially complete.

The key point here that I have not heard in any other testimony is that, if PTC were applied today to the industry, it only requires implementation on 39 percent of the total mainline track.

So when Mr. Hamberger and others refer to 20,000 locomotives and thousands of miles of track, keep in mind that the current regulation only requires 39 percent of the track be implemented.

PTC also would end a very unsafe practice of using after-arrival blocks. That is a separate topic that was discussed in my testimony.

And I also want to point out and acknowledge that BNSF CEO Matt Rose was in the room earlier this morning. He had to leave. I think he was embarrassed that Mr. Hamberger would not give him his seat.

[Laughter.]

Mr. STEM. But I would encourage this committee and each individual Senator to discuss with Matt Rose the thought processes and how they arranged to have the deadline complied with by BNSF.

Thank you.

[The prepared statement of Mr. Stem follows:]

PREPARED STATEMENT OF JAMES A. STEM, JR., NATIONAL LEGISLATIVE DIRECTOR, SMART—TRANSPORTATION DIVISION

Chairman Rockefeller, Ranking Member Thune, Subcommittee Chairman Blumenthal, Senator Blunt, Members of the Commerce Committee, my name is James Stem and I am the National Legislative Director of the Transportation Division of the Sheet Metal, Air, Rail, Transportation Union (SMART) The SMART Transportation Division, formally the United Transportation Union, is an organization representing approximately 80,000 transportation employees with active rail members working in all operating crafts (engineers, conductors, yardmasters, trainmen, switchmen). Our members have a vested interest in the policies that impact our freight and passenger national rail network. Our organization has worked jointly with the rail industry and government entities for almost 150 years on transportation policies.

Thank you for the opportunity to testify today and present our views on improving rail safety. The rail industry is the source of tens of thousands of good middle-class union jobs. Railroad jobs are more than just jobs. . .they are careers with many of our members working 30, 40 and even 50 years for a single employer. These jobs are highly skilled with many of them requiring Federal certification.

Overall we are optimistic about the future prospects of the railroad industry. The freight side of the industry is investing more than $20 billion annually in its infrastructure and is well positioned to handle any additional freight that comes its way. One bright example of growth is oil shipments from the Bakken oil fields, where railroads are now shipping between 60 and 70 percent of that crude oil to destinations across the country. The oil boom in North Dakota would not be nearly as robust if it were not for the ability of the two railroads there to ship the crude out of the state. Coal shipments on the other hand are down and could be reduced dramatically in the coming months and years because of low natural gas prices and very challenging environmental regulations. Passenger rail is also doing well. With America's continued population growth, passenger rail is in a good position to respond to our Nation's mobility needs. We are excited about the numerous passenger rail service expansions that are occurring across the country and Amtrak's continued success.

America's passenger and freight railroads are involved in a rail renaissance that should bring decades of growth to both.

We are proud to be a part of the industry today, positioned to handle the additional freight which must come to rail from our highways, and also, prepared to provide flexible services like "mobile pipelines for oil", and efficient handling of multimodal containerized shipments. With a significant growth in our population, passenger rail is the most economic and environmentally friendly alternative to the mobility challenges facing our country. Our career rail employees have earned the equity to participate in the policy decisions that will impact our industry.

We are pro-active in our support for the industry and take an active role in policy discussions supporting the expansion of freight and passenger rail across the country. We also work with all segments of our rail and transit industries in legislative activities designed to highlight the advantages of rail. The long term growth and stability of the industry also relies upon safe and reliable operations.

While we are optimistic about rail's future and we take a pro-active role in supporting the industry, the long term growth and stability of the industry relies upon operating our railroads safely. UTU (SMART) and most of rail labor have a long history of cooperation and joint efforts in partnership with all segments of the rail industry on a variety of pertinent issues. We think one of the success stories of partnership that should be recognized is the Rail Safety Advisory Committee (RSAC)

that is sponsored by the Federal Railroad Administration. The RSAC was originally chartered during the Clinton administration, and was the first time that railroad management, rail labor, rail suppliers, and the FRA were all gathered together in an informal setting to participate in problem solving, an exchange of thoughts, and an opportunity for suggestions on improved safety, with the conclusion being a collaborative rule making process. RSAC continued to function productively through the Bush administration, and continues today. Our rail industry today is safer because of RSAC.

Employee Fatigue

Any discussion concerning rail safety should rightfully always start with Employee Fatigue as the first topic. Our railroad corporations are re-investing more than $20 billion annually in upgrading, maintaining, and expanding their infrastructure, but are unwilling to invest anything in resolving the most pressing and fatal of safety issues—Unpredictable work schedules coupled with employee availability policies.

The Federal Railroad Administration, rail management, and rail labor all agreed that Passenger Hours of Service regulations should be separated from freight hours of service regulations because of the significant safety advantages of the predictable work schedules in long distance and commuter rail passenger service. The new passenger hours of service regulation also requires the use of scientific models to help create safe and efficient work schedules for operating crews. The predictable work schedules in passenger service prevent most issues with fatigue for these crews.

However, work needs to be done on the freight side. There is no single issue that will provide more positive movement in safety improvement than resolving the employee fatigue issues associated with freight rail operations and many freight rail accidents in recent years. The first NTSB recommendations for implementation of Positive Train Control (PTC) in the early 1990s were a result of numerous rail accidents caused by employee fatigue and totally unpredictable work schedules of operating rail employees.

The safe movement of a freight train or a passenger train today is a complex operation requiring train handling skills, years of training and territorial qualifications over the specific track segment, and the ability to manage multiple priorities of speed restrictions, normal radio communications, and roadway worker authorities, highway crossings at grade, signals, and track authorities. One momentary lapse of situational awareness by a member of the operating crew can have disastrous results.

A working definition: "Fatigue means a complex state that is characterized by a lack of alertness and reduced mental and physical performance, often accompanied by drowsiness."

The unpredictable work schedules that apply to a large majority of crews operating trains between terminals require the crews to report for duty with two hours of notification, or less, regardless of the commitments that the railroad had made to the effected employees with previous lineups and forecasts. Aggravating this dangerous practice even further are the new terminologies of "Dropped Turns" and "Paper Deadheads". These terms are interchangeable and used by all the railroads to identify when the crew management system made a unilateral change in the employees' position for call. These new practices are used to justify holding the employee accountable for being in place for call well in advance of when his designated position should be called.

The practical application of this process is to require a safety critical employee to come to work when called out of turn, or face disciplinary sanctions which often times include suspension and termination.

Also directly connected to the unpredictable work schedules and the new practices of "Dropped Turns" and "Paper Deadheads" are the railroads unilateral "Attendance Policies" that can only be intended to require a safety critical employee to come to work when they are fatigued or sick.

If the current FRA regulation proposal for PTC were implemented, it would only require PTC be installed on less than 39 percent of the main line track in this country, with more than 60 percent of main line track continuing with the same system of operation, and, unfortunately, the same failed process of employee utilization. The railroads response to requests for pilot projects and improvements in predictable work schedules for the unassigned employees that work on call has been more of the same failed policies. As the amount of freight continues to grow in coming years, the non PTC main line track will have to absorb a large percentage of the growth with this major safety issue of fatigue unresolved.

Today, an employee working in unassigned service receives a "train lineup" when going off duty that is intended to provide an estimate about when their next report-

ing time will be. These lineups are accurate sometimes, but more often the lineups are inaccurate by many hours.

A human being can prepare for irregular work schedules if they know when they must start the tour of duty, but even our youngest and strongest employees cannot function safely if told they will go to work at 7 AM in the morning and then are called to work at 10 PM the night before. Predictable reporting times and notifying the employees when they are going to work are the only solution to this major safety issue.

We look forward to working with this Committee during the reauthorization of the Rail Safety Improvement Act to address these needed improvements in employee fatigue. For the past 18 years, the employees have been asking Congress and the railroads for a solution to fatigue but have met with little success.

When our operating employees are asked about safety improvements, the number one response is always "Just tell me when I must come to work. I will manage my personal life to be rested and alert if I only know when I must report."

Our suggested solution to employee fatigue provides three options:

(1) Give the employee a regular start time so he/she knows days in advance when they must come to work. A large majority of our employees have a regular start time and do not consider fatigue to be a safety issue. Employees with regular start times are not the employees who are dying in fatigue related collisions. Or

(2) Notify the employee before going off duty what time the employee will be required to return to work for the next tour of duty. This option actually improves the availability of the employee by allowing the employee to return to service after only ten hours off duty. And if neither (1) or (2) are not a viable option, then

(3) Move the required ten hours of undisturbed rest immediately following service that is now required to ten hours of undisturbed rest immediately preceding service by giving the employee at least ten hours of notification prior to reporting for service. This is a ten hour call which provides a significant improvement in the predictability of the work schedule. The result is the employee has at least ten hours to prepare for service.

The high level of professionalism and dedication of the operating crews running our railroads today are the only reasons that accidents and collisions are not more frequent. Attached with this testimony are references concerning accidents that have recently occurred where fatigue was a contributing factor, like the ones that occurred near Chaffee, Missouri on May 25, 2013, near Goodwell, Oklahoma in late June, 2012, and also near Two Harbors, Minnesota on September 30, 2010.

Also attached with this testimony are the numerous recommendations (177) that the NTSB has made to railroads over the past few decades to deal with employee fatigue. Most of these recommendations are still pending.

Positive Train Control

There are a few segments of our industry that are hoping Congress will grant a blanket extension of three—five years for PTC implementation. The current required date for implementation is more than 30 months away now on December 31, 2015.

If Congress chooses to grant a blanket extension for PTC, the railroads that are behind on their implementation schedule will further slow their progress, or just stop the process until that new extension expires.

Some railroads, including Amtrak, BNSF, and Metrolink in California, have announced that they will be able to meet the statutory deadline and are continuing the implementation and testing of the PTC components.

Any extension for PTC implementation should be on an individual basis, short in duration, and only after identifying the exact reasons that the current implementation date is not obtainable.

The PTC systems that are being implemented today contain all the information on the display screen that is necessary to operate a train safely. This will be the first time that the operating crews on the locomotive will have all that information contained in one place and displayed in real time. The quality of that information on the screen will significantly reduce the complexity of safely operating the train. The information contained on the screen is the crux of the safety advantage, not the enforcement of the system.

PTC has been debated for more than 20 years as a significant safety overlay for rail operations. It is time for PTC to be implemented to preserve the lives of rail operating crews and the safety of the communities served by our rail industry.

Attached with this testimony are two relevant documents for this discussion on implementation of PTC. First are the numerous recommendations (27) that NTSB has made the Federal Railroad Administration (FRA) to mandate PTC, and to our railroads concerning the need for PTC Second, is the presentation made at the February 27, 2013 NTSB Public Forum on Positive Train Control Systems by retired FRA Associate Administrator of Safety Grady Cothen. Mr. Cothen is recognized as one of the leading authorities on PTC, and it is with his permission that I attach this document for guidance and reference; this document is a summary of the history of PTC.

Amtrak

I need not remind this Committee about the importance of Amtrak. It's America's passenger railroad, rising up from the ashes of a cadre of bankrupt private service providers and charged with providing vital rail passenger service across America.

Amtrak is a partner with our private freight railroads, and has negotiated operating agreements with them for more than 40 years. Amtrak's employees, many of whom are federally certified, know and understand the complex operating rules that govern freight railroads, making Amtrak the right fit to operate this vital nationwide service.

Since its inception, Amtrak has done a remarkable job with often inadequate resources. While setting ridership records in recent years their safety record remains solid. Amtrak's growing passenger volumes has made them far more self-sufficient than in the past recovering 79 percent of their operating costs from ticket revenue. The high price of fuel, growing highway and airport congestion, and the significant increase in the number of passenger rail options, all contribute to the constant increases in ridership on Amtrak.

Even with their remarkable progress Amtrak has had no shortage of congressional critics who expect Amtrak to be the world's only profitable passenger railroad. We ask that your Committee take a fresh look at this American success story and work with the leaders of Amtrak and others to help "America's Railroad" build on their 40 plus years of success. Amtrak was created because the demand for rail passenger services remained strong, and the private railroads could not make a profit operating their own passenger trains.

Hazardous Material Shipments

The safest and most efficient form of movement of commodities that qualify as hazardous materials is by rail. These haz mat shipments require special handling by our rail operating crews, which include documentation and secure hand off procedures at interchange or crew change points. These products are given the extra attention that they require when moved by rail.

As our American manufacturing industries grow, these industries will require new chemical products that are available today. An increase in the quantity and number of products that qualify as hazardous materials is the expectation, and this will result in significant increases in rail hazmat shipments.

Switching haz mat cars also requires additional precautions. As some major shippers seek Congressional support for switching haz mat cars much more frequently in and out of trains to somehow achieve lower freight rates, we want to make sure that you understand the significant safety concerns that are involved in those choices. Switching and interchanging containers of very dangerous substances packaged in containers weighing 100 tons or more, is not an academic or a sanitary exercise.

We would like the opportunity to offer additional input to this Committee, should the consideration of mandating additional switching of haz mat cars to require changes in freight rates come before this Committee. The employees do have "skin in the game" when significant increases in switching of haz mat cars is under consideration. From our vantage point, this debate is not just about one group of large corporations attempting to involve Congress in their negotiations with another group of large corporations; rather, this debate centers on the safety of the operation and the current processes involving the proper handling of placarded hazardous materials. We hope this conversation never occurs in this Committee.

New Technology

Our railroads have historically been very slow in accepting and applying new technologies in the industry. Change is the hardest thing to accept in most work places, and it is also the only thing constant in continuing operations.

The use of new technologies for detection of flaws in wheels and hot journals is not universally applied, or required by FRA regulation. Most railroads choose to use some type of defect detectors, but the latest technologies are applied in very few locations.

New technology for detection of internal flaws in rail also is not required by regulation and used infrequently. The frequency of track inspections by Sperry Rail Services and similar rail flaw and track geometry detectors is an appropriate subject for additional questions. When a detector of any type discovers a flaw in a segment of rail, the FRA regulations require that defect to be either repaired or protected immediately. This process often means a multitude of ten mile per hour slow orders on a subdivision immediately following the Sperry rail inspections or similar operations. Some railroads indicate that not knowing about the defects and not having many slow orders in place are preferable to the new inspection technologies; the defects are then repaired when discovered through traditional means, including signal indications, visual inspections, or derailments.

Also, deferred maintenance normally brings concerns about rail flaws and cross tie replacements into many accident investigations. Rail replacement and routine track maintenance schedules are based on the amount of train traffic, weather conditions, and the stability of the road bed.

Our rail industry is also dealing with the distractions that some new technology brings to our workplace. The use of cell phones and Smart phones that allow texting and Internet connections have proven to be safety concerns for safety critical employees. We are working with the industry and FRA to get the best from technology and eliminate the distractions from inappropriate use.

Training

With tens of thousands of new employees coming into the freight and passenger rail industry in the near future, adequate and appropriate training is a major safety concern.

One requirement of the RSIA of 2008 was to require FRA to implement training standards for safety-related employees. The RSAC process collaboratively developed proposals for FRA to consider and on February 7, 2012 FRA issued an NPRM. Under the proposed rule, railroads will be required to develop comprehensive training programs for safety-related employees and then submit those programs to FRA for review and approval. Since the rule has not been finalized and thus there have been no training programs submitted the effectiveness of this effort is unknown. We are however happy to see that there is this focus on the need for the adequate training or our members.

Our experience is that the training of our members varies widely from railroad to railroad. Some of the larger railroads are reported to have excellent initial training programs for conductors and engineers and then rely almost exclusively on computer based training for follow-up training or what I call "training on your own." Railroads no longer use the traditional model of mentoring or apprenticeship where a new employee has the advantage of working with more mature employees with experience, skills, and good technique.

Forty years ago there were five members of a train crew and you spent years working as a brakeman before becoming a conductor and likewise years as a fireman before becoming an engineer. Today the standard crew size is two. Now railroads hire people off the street and train them to be a conductor in several short months. Then oftentimes this conductor moves right into training to become an engineer and in a year's time he is operating a locomotive at high speed across the country. We have reports of crews where both the conductor and engineer have very little experience and are charged with operating trains in challenging operating conditions. We are concerned about the long term impact of insufficient training processes that create employees that lack the confidence in their abilities to stop the movement when they suspect something is wrong.

It's expensive to train new people, so like some American companies, railroads when left to their own desires, will reduce training costs as much as possible for the short term gains involved.

Truck Size and Truck Weight Increases

Increasing truck weight limits would have serious implications for our environment. Many transportation professionals are working to find innovative ways to shift more freight shipments from our highways to our railroads as a congestion mitigation strategy, and also as a highway maintenance schedule strategy. Railroads move cargo nearly four times as far as trucks per gallon of fuel and emit one-third the pollutants per ton mile when compared to trucks. By allowing heavier trucks on the road and increasing taxpayer subsidies, Congress would be incentivizing more shipments of freight by trucks using public highways rather than by more fuel-efficient modes like rail. This is the reason why increases in truck weights have never resulted in fewer trucks on our highways.

Our railroads today do an excellent job of moving heavy loads around our country on privately owned and privately maintained rights of way. Our public infrastructure cannot absorb this additional burden.

An increase in highway maintenance expense and highway bridge replacements triggered by ignoring the current DOT bridge formulas and the engineering specifications for highways and bridges that created the current limits on truck size and weight will also have a negative impact on railroad safety. As many commuter rail authorities are seeking help in the funding of new safety technologies, including PTC, any increase in highway and bridge maintenance costs will absorb potential sources of revenue for safety improvements of rail passenger operations.

We urge this committee to take no action on any consideration of increases in truck size and truck weights until DOT completes the mandated study of costs. We think a required decrease in truck weight will be the conclusion drawn by the study.

Conclusion

As Congress struggles to deal with problems of inadequate and crumbling infrastructure, environmental concerns and energy issues, we ask that you keep in mind railroads as an important means to help address all these problems.

If many of us sitting in this room today had been successful over the past twenty years in getting a National Transportation Policy and a National Energy Policy, there is no argument that both freight and passenger rail would be a focus for energy efficiency, relieving highway congestion, preserving existing highway and bridge maintenance schedules, and also providing flexible viable options as our population continues to grow. The lack of either a Transportation or Energy policy has contributed to the struggle for appropriate solutions for our constant transportation problems.

As the price of fuel in this country continues to spiral upwards, we look forward to working with this Committee to find fresh ideas on how best to improve Amtrak and other rail passenger services to provide new travel options for our citizens around the country. Each time I pass through a major airport, I marvel at the number of flights listed on the board for destinations that are 350 miles or less from that airport. Higher speed rail and high speed rail would complement, not compete, with air travel services. If we shifted the passengers that are scheduled to fly 300 miles to higher speed rail, in most cases the passenger would arrive in the same amount of time. Open airport slots could then be filled with longer distance flights, and postpone the construction of new airports or new runways.

Faced with the problem of highway congestion, part of the answer should be to develop policies that shift freight and passenger traffic to railroads. A single freight train can take 280 trucks off the highway with a greatly improved use of fuel resources. The railroads have shared the fact that today our railroads can move one ton of freight almost 500 miles with one gallon of fuel oil. A high speed rail corridor can transport as many passengers as eight new lanes of interstate highway.

Looking at ways to address environmental concerns, keep in mind freight and passenger trains produce a fraction of the pollutants that trucks and automobiles use in moving the comparable number of tons and passengers.

In attempting to make America energy independent, consider trains are almost five times more fuel efficient than trucks. Another point should be under consideration—trains operate on privately owned and maintained rights of way and pay 100 percent of the cost of their use of that right of way. It is not the rail industry that is asking Congress to rebuild all the off ramps of the Interstate Highway system and forgive the extra bridge maintenance needed to increase the size and weight of big trucks moving on our highways.

When deciding about whether or not to pour new seas of concrete at airports and around cities, I urge this Committee to think about the less expensive and better alternative of building high and higher speed rail. A new commuter rail system is one of the solutions to local highway congestion.

Thanks again for the opportunity to appear here today and we look forward to working with this Committee to find ways to meet our Nation's transportation needs.

I will be happy to answer any questions the Committee members may have.

EXHIBIT 1

Positive Train Control Systems:
Will the promise be realized this time?

Grady C. Cothen, Jr.
before the
National Transportation Safety Board
February 27, 2013

Disclaimer

I am appearing in my own behalf at the request of the Board.

The views stated are my own. They are offered with the desire to advance public and employee safety and for no other purpose.

This testimony may not be attributed to my former employer or to any entity for which I have provided consulting services as an independent contractor.

Should I comment on actions taken at the FRA while I was employed there, my testimony reflects my best memory of how the events unfolded (subjective intent). The official record of actions taken and the basis for those actions is contained in the files and publications of the FRA (objective intent).

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Overview

- Background
- General Chronology
- Amtrak PTC Systems
- RSIA mandate 2008
- Initial regulations (2009-2010)
- Failure to request funding
- Initiatives withdrawn
- Pace of implementation
- Do we need more time?
- What benefits can we anticipate?

Background

- 1922-
  - Serious collisions led the ICC to issue order 13413 requiring 49 railroads to install either a trainstop or train control system on at least one division over which passenger trains were operated
  - Other orders followed
- Post WWII
  - Most intercity passenger service ended and many ATS/ATC systems were removed
  - ACS/ATC remained on NEC and ACS or ATS systems remained on a few other lines

Chronology

- 1971: First NTSB recommendation--ACS on all trains, speed control (ATC) on passenger trains
- 1982-3:
  - AAR/RAC initiated development of Advance Train Control Systems (ATCS), an open-architecture, integrated platform to serve business and safety needs
  - BN initiated development of the Advanced Railway Electronics System (ARES)
- 1987: NTSB recommends FRA require PTS
- 1986-1995:
  - ATCS successfully demonstrated on temporary test beds (CN, CP)
  - ARES successfully demonstrated on BN's Iron Range

Chronology

- 1991: NTSB asks for ATCS timetable
- 1993: BN abandons ARES for ATCS, except RF infrastructure
- 1994: FRA issues report to Congress giving thumbs up to ATCS, coins "PTC" to refer to the capabilities that communications-based train control (like ATCS or ARES) could offer, i.e.,
  - Positive train separation
  - Protection of roadway workers
  - Enforcement of speed restrictions (including temporary, civil)
- 1995: AAR pulls support for ATCS

Chronology

- 1994-1998: UP and BNSF developed and tested PTS; project discontinued
- 1998: NAJPTC program begins with objective to provide interoperability standards and demonstrate technology suitable for HSR on UP line in Illinois, including flexible block
- 1999: FRA's RSAC issues consensus report on PTC systems, calling for interoperability standards by the end of 1999
- 2006: NAJPTC downgraded to TTCI test;
  - Revenue test bed demonstration aborted,
  - Interoperability standards not delivered

Chronology

- 2005: FRA issues final rule on Performance-Based Train Control Systems, authorizing but not requiring innovative solutions and providing safety case methodology later adapted for use under the PTC mandate
- *Meanwhile* in the late 1990's-2008
  - BNSF, CSXT, UP, NS and Alaska RR pursue their own train control projects, initially using waivers to test and then new Performance-Based standards
  - BNSF ETMS was demonstrated most extensively and remains in limited revenue service on certain lines, upgraded based on lessons learned
  - Only Alaska RR demonstrated a full commitment to system-wide implementation (aided by Federal funding)

Amtrak PTC Systems

ACSES

- Early 1990's: Amtrak seeks guidance from FRA on train control required to achieve 150 mph on NEC
- 1998: FRA order requires installation on NEC from New Haven to Boston (CONDOT, P&W, CSXT, MBTA) and authorizes build-out south of NYC
- 2001: ACSES cutover for revenue service New Haven-Boston and on high-speed tracks in MD and NJ
- 2010: FRA grants type approval under RSIA
- Scheduled completion on NEC: Pending

Amtrak PTC Systems

ITCS

- 1994: MI DOT and Amtrak began development of the Incremental Train Control System (ITCS)
- 1999: ITCS placed in service under waiver on Amtrak's line in Michigan, governing both passenger and NS freight operations
- 2012: ITCS conditions adjusted for 110 mph operations; FRA grants ITCS type approval under PTC mandate

RSIA 2008

Sept. 12, 2008, Chatsworth, CA

Rail Safety Improvement Act of 2008 signed by President Bush Oct. 16, 2008:

"'positive train control system' means a system designed to prevent—

- train-to-train collisions,
- over-speed derailments,
- incursions into established work zone limits, and
- the movement of a train through a switch left in the wrong position."

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RSIA 2008

FRA final rule Jan. 15, 2010; amendments Sept. 27, 2010

This is the high-water mark of Federal policy on Positive Train Control

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Initial FRA Rule Compromises

- Limited protection within terminals
  - In passenger terminals, practical necessity to maintain fluid operations
  - Issue has returned in freight context re: yard switching that encroaches on main line
    - Here the issue appears to be which locomotives will be equipped with PTC required to be operative
    - Should be resolved with consideration for maximum authorized speeds on main lines and ability to use the signal system to hold equipped trains out

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Initial FRA Rule Compromises

- Reliance on signal system to protect movements over switches where monitored
  - Good safety rationale; alternative ~$1 billion in additional cost

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Initial FRA Compromises

- "Main line" exceptions where passenger service was infrequent (capital cost vs. revenue stream; recognition of reality); compensating safety measures required
- Exceptions for "*de minimis*" risk re: PIH traffic
  - First such expressly recognized exceptions in the history of railroad safety legislation (1893-)
  - Urged by industry; supported by prior writings of then-OIRA director
  - Initially limited to truly "*de minimis*" circumstances
    - Accordingly, not welcomed by industry

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Initial FRA Rule Compromises

- Rear-end collisions at restricted speed excepted
  - Lack of strong safety case when decision was made (not now)
  - Explicit concession made since "***Available PTC technology*** *does not track the rear end of each train as a target that another train must be stopped short of but instead relies on the signal system to indicate the appropriate action.*"
  - Tacit recognition that, if the Dec. 31 2015 target was to be met, ***available technology*** would probably have to do.
  - Explicit recognition that when technology was available, the rule should be strengthened.
  - Subsequent industry/FRA action provides means to plug that gap, which should lead to supplementary FRA rulemaking.

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Failure to Request Funding

- RSIA included authorization of $50 million annually for 5 years for rail technology grants, including PTC
  - Could have been important mechanism for resolution of remaining issues
  - By directing at passenger/freight interoperability issues, could have somewhat eased capital burden on Amtrak and commuter authorities
- Administration failed to request the funds; Congress appropriated $50 million for FY2010 anyway, but nothing thereafter

Initiatives Withdrawn

- RSIA required each Class I, intercity and commuter railroad to install PTC on—

  "(A) its main line over which intercity rail passenger transportation or commuter rail passenger transportation…is regularly provided;

  "(B) its main line over which poison- or toxic-by-inhalation hazardous materials…are transported; and

  "(C) such other tracks as the Secretary may prescribe by regulation or order

Initiatives Withdrawn

- "Such other tracks" were understood by many of us to be other heavily used lines were risks to crews, the public and the environment, were substantial, e.g.,
  - Major coal routes with high mgt,
  - Lines with significant ethanol, crude oil, or flammable compressed gas traffic
  - Dark territory approaching its capacity limits, with lots of meets and passes, endangering crews
- Note that, over the years, loss of life among crews and as a result of release of hazmat ***other than*** TIH has exceeded loss of life from release of TIH products.

Initiatives Withdrawn

- But FRA did not affirmatively require "other lines" to be categorically included in railroads PTC implementation plans.
- Rather, FRA used the concept defensively.
- Why? Because FRA recognized that, as of 2008 TIH traffic was found on most of the core of the rail system, but by 2015 that might not be the case.
  - The major freight railroads were already trying to find ways of ridding their networks of high liability TIH shipments.
  - A very effective way of doing so would be to convince the STB that all PTC installation/maintenance cost allocable to a line segment on which TIH was carried should be loaded on the TIH shipper.
  - But except where product substitution could be accomplished, doing so would be an immense public dis-benefit.
    - diversion to highway, or
    - loss of domestic economic activity.
- The defensive use was called the "residual risk" test.

Initiatives Withdrawn

- But AAR sued
- The "residual risk" test was removed from the regulation,
  - Leaving the public and railroad employees at risk on lines that could be stripped of passenger or TIH traffic; and
  - potentially leaving passenger railroads and TIH shippers to share 100% of PTC costs

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Initiatives Withdrawn

- FRA also removed the "alternative routing" test
- The result is that TIH routings will be more circuitous in the future and thus riskier than if the alternative routing analysis had been retained in the rule.

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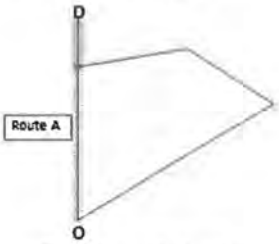
PIH Route Vulnerability

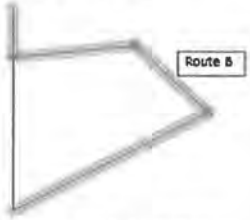
PTC will eliminate ~30% of PIH-related risk on a line segment. By selecting where to put PTC, a railroad could determine routing. Railroads have said they want to do this to consolidate traffic and hold down PTC cost. On *average*, this can only lead to greater circuity in PIH routing and potentially more switching of the traffic en route. Could nullify gains from Rail Routing Rule.

2008-2015 routing



This is the most simple and most common case—most O/D pairs are the same in 2008 and after the routing analysis

2016 w/PTC on B only



2016 routing with PTC on both lines would be Route A, but railroad wishes to avoid the investment. Route B segments carry other PIH traffic, so they would have to be equipped anyway.

Initiatives Withdrawn

- These changes were justified exclusively based on the need to lower costs.
- FRA never explained why the safety analysis was abandoned.

Initiatives Withdrawn

- In a second round of backtracking, FRA now proposes to liberalize its "*de minimis*" test, which was thought to be as far as the agency could reasonably go when the initial final rule was issued

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Initiatives Withdrawn

- Saving money is a good reason to limit regulatory burdens
- Saving money is not a legitimate reason to—
  - Dilute the response to a legislative mandate; or
  - Create market distortions that will increase social costs elsewhere in the economy, at least not without seriously studying what those costs are.

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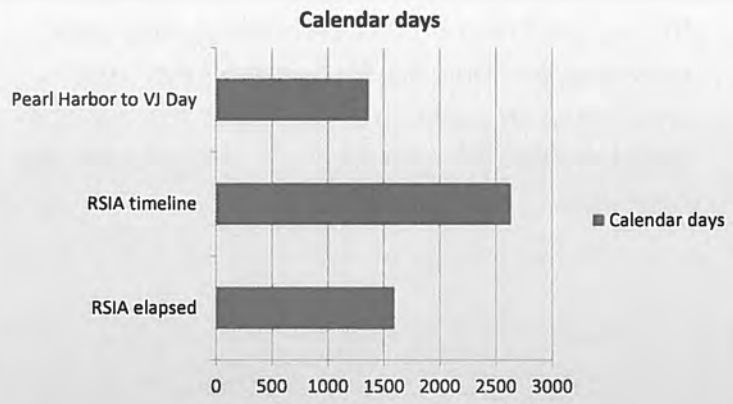
Pace of Implementation



27

Pace of Implementation

ACSES is providing safety on much of the NEC today for Amtrak passenger operations and all freight/passenger trains from New Haven to Boston--but can't be made interoperable or extended to other railroads until I-ETMS is ready

ITCS is providing safety on Amtrak's Michigan line (freight and passenger trains)

Pace of Implementation

Interoperable Electronic Train Management System (freight/passenger choice outside NE)

- Standards development—reasonably mature, but not complete
- Technology readiness—communications said to work well, ETMS core is well tested, balance unknown until revenue test bed is installed and utilized
- Safety case status—not yet submitted
- Miles of I-ETMS installed and operative—
  00,000 of ~60,000

Do we need more time?

- In discussions leading up the RSIA passage, FRA senior staff recommended to the committees that additional time be provided (through the end of 2018), or at least that FRA be given the ability to extend the time if truly necessary.
- However, based on the status of BNSF's proven ETMS technology, most of us expected faster action on I-ETMS standards, demonstration and certification.
- FRA's 2012 report to Congress provides a spirited defense of the complexity of the issue.

Do we need more time?

This is not the time to talk about more time.

- ✓ It's time to see remaining I-ETMS specifications adopted by AAR.
- ✓ It's time to demonstrate interoperable train control on revenue lines.
- ✓ It's time for the Congress to help with passenger funding needs.
- ✓ It's time to cut over some revenue miles with lots of trains running equipped and establish the reliability of the system.

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Do we need more time?

- When all of that is accomplished, then it will be time to talk about how many more days will be needed to satisfy the mandate.
- At that point, we will be confident that, this time, PTC will become a reality.
- At that point, we will better understand how much more time is required to finish the job.

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What Benefits Can We Hope to Achieve?

The greatest benefits will come from integration of technology, yielding synergistic power—

- Positive Train Control (PTC) systems
- Electronically Controlled Pneumatic (ECP) brakes
- Distributed Power (DP)
- Train Energy Management Systems (TEMS)
- Advanced Traffic Planning Systems (i.e., strategic and tactical movement planners)
- Other on-board and wayside technologies that can be plugged into the larger system.
- Variety of communications pathways, proprietary and commercial

Theses are not futuristic ideas; most are ready today, and progressive railroads are starting to make us of them.

What Benefits Can We Hope to Achieve?

	PTC	ECP	TEMS	DP	Advanced T.P.
Safety	■	■		■	
Service Reliability	■	■		■	■
Fuel savings	■	■	■	■	■
Asset utilization	■	■		■	■
Capacity	■	■	■	■	■
Reduced emissions	■	■	■	■	■

Assumptions: Integrated System, Mature State

Who will enjoy the benefits?

- Freight railroads
- Shippers and their customers
- Intercity and commuter passengers, including users of new HSR service not otherwise possible
- Communities through which railroads travel
- Travelers on the roads and highways
- Participants in our national economy
- The earth and its inhabitants

Apologies to Charles Schultz

EXHIBIT 2

NTSB Railroad Fatigue Recommendations 1990 - 2013

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Recommendation Report

Mode: Rail NTSB Report #: Rec #: R-91-026,R-91-027,R-91-041,R-91-042,R-91-045,R-91-047,R-91-048,R-93-009,R-96-020,R-96-021,R-96-022,R-96-056,R-96-063,R-99-002,R-99-053,R-99-054,R-99-055,R-99-056,R-99-057,R-99-061,R-01-027,R-02-023.R-02-024,R-06-003,R-06-014,R-06-015,R-06-016,R-06-017,R-07-001.R-09-010.R-09-011.R-12-016,R-12-017,R-12-01

Notation Id	7413_2	**Accident Date:**	N/A	**Issue Date:**	01/23/02
City/State:	Baltimore, MD	**NTSB Report #:**	SIR-01-02	**Most Wanted List:**	No

In 2000, the Maryland Transit Administration (MTA) experienced two similar accidents in the same location just 6 months apart. Both accidents involved the failure of an MTA LRV train to stop at the designated stopping point at the Baltimore-Washington International Airport Light Rail Station (BWI Airport Station). In both cases, the train struck a hydraulic bumping post apparatus at the end of the track. The Safety Board's investigation of the two accidents indicated that, although the direct cause of each accident was different, aspects of the MTA rail transit operation common to the two accidents influenced both their outcomes. Consequently, the Safety Board developed a special investigation report to address the safety factors affecting both accidents.

Recommendation # :	R-01-027	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO U.S. RAIL TRANSIT SYSTEMS: Ensure that your fatigue educational awareness program includes the risks posed by sleeping disorders, the indicators and symptoms of such disorders, and the available means of detecting and treating them.

# of Addressees:	31		**Overall Date Closed:**	N/A
Addressee:	Chicago Transit Authority	Closed - Acceptable Action	**Date Closed:**	06/25/04
Addressee:	Commonwealth of Pennsylvania, Allegheny County, Port Authority	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Dallas Area Rapid Transit Authority (DART)	Open - Await Response	**Date Closed:**	N/A
Addressee:	Denver Regional Transportation District	Closed - Acceptable Action	**Date Closed:**	02/24/06
Addressee:	Greater Cleveland Regional Transit Authority	Closed - Acceptable Action	**Date Closed:**	11/15/06
Addressee:	Massachusetts Bay Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/19/10
Addressee:	McKinney Avenue Transit Authority	Closed - Acceptable Action	**Date Closed:**	05/05/03
Addressee:	Memphis Area Transit Authority	Closed - Acceptable Action	**Date Closed:**	07/21/10
Addressee:	Metro (Bi-State Development Agency)	Closed - Acceptable Action	**Date Closed:**	09/26/02
Addressee:	Metropolitan Atlanta Rapid Transit Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	Metropolitan Transportation Authority New York City Transit	Closed - Acceptable Action	**Date Closed:**	06/28/02
Addressee:	Miami-Dade Transit Agency	Closed - Reconsidered	**Date Closed:**	04/15/04
Addressee:	New Jersey Transit	Closed - Acceptable Action	**Date Closed:**	05/08/07
Addressee:	Niagara Frontier Transit Authority	Open - Await Response	**Date Closed:**	N/A

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Recommendation Report

Addressee:	Port Authority Trans-Hudson Corporation	Closed - Acceptable Action	**Date Closed:**	06/14/02
Addressee:	Port Authority Transit Corporation	Open - Initial Response Received	**Date Closed:**	N/A
Addressee:	Regional Public Transit Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	Regional Transit Authority of Orleans and Jefferson	Open - Await Response	**Date Closed:**	N/A
Addressee:	Sacramento Regional Transit District	Closed - Reconsidered	**Date Closed:**	06/29/06
Addressee:	San Diego Trolley, Inc.	Open - Await Response	**Date Closed:**	N/A
Addressee:	San Francisco Bay Area Rapid Transit District	Closed - Acceptable Action	**Date Closed:**	07/29/02
Addressee:	San Francisco Municipal Transportation Agency	Open - Await Response	**Date Closed:**	N/A
Addressee:	Santa Clara Valley Transportation Authority	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Southeastern Pennsylvania Transportation Authority	Closed - Acceptable Action	**Date Closed:**	05/28/02
Addressee:	Southwest Ohio Regional Authority	Closed - Reconsidered	**Date Closed:**	05/31/05
Addressee:	State of California, Los Angeles County Metropolitan Transportation Authority	Closed - Acceptable Action	**Date Closed:**	06/20/12
Addressee:	State of Maryland, Transit Administration	Closed - Acceptable Action	**Date Closed:**	06/22/06
Addressee:	State of Washington, King County, Department of Transportation	Closed - Acceptable Action	**Date Closed:**	06/13/03
Addressee:	Tri-County Metro Transit District of Oregon	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Utah Transit Authority	Closed - Acceptable Action	**Date Closed:**	09/05/12
Addressee:	Washington Metropolitan Area Transit Authority	Closed - Acceptable Action	**Date Closed:**	07/16/02

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Recommendation Report

Notation Id	7508_1	**Accident Date:**	11/15/01	**Issue Date:**	11/27/02
City/State:	Clarkston, MI	**NTSB Report #:**	RAR-02-04	**Most Wanted List:**	No

The recommendation is derived from the Safety Board's investigation of the collision of two Canadian National/Illinois Central Railway (CN/IC) trains near Clarkston, Michigan, on November 15, 2001, and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued four safety recommendations, one of which is addressed to the Canadian National Railway (because the CN/IC is a subsidiary of the Canadian National Railway). 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.

Recommendation # :	R-02-023	**Overall Status:**	Closed - Acceptable Action	**Priority:**	

The National Transportation Safety Board recommends to the Canadian National Railway: Require all your employees in safety-sensitive positions to take fatigue awareness training and document when employees have received this training.

# of Addressees:	1		**Overall Date Closed:**	02/26/03	
Addressee:	Canadian National Railway	Closed - Acceptable Action		**Date Closed:**	02/26/03

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Recommendation Report

Notation Id	7508_2	**Accident Date:**	11/15/01	**Issue Date:**	11/27/02
City/State:	Clarkston, MI	**NTSB Report #:**	RAR-02-04	**Most Wanted List:**	Yes

On November 15, 2001, about 5:54 a.m., eastern standard time, Canadian National/Illinois Central Railway (CN/IC) southbound train 533 and northbound train 243 collided near Clarkston, Michigan. The collision occurred on the CN/IC Holly Subdivision at a switch at the south end of a siding designated as the Andersonville siding. Train 533 had been operating in a southward direction through the siding and was traveling at 13 mph when it struck train 243. Signal 14LC at the turnout for the siding displayed a stop indication, but train 533 did not stop before proceeding onto the mainline track. Train 243 was operating northward on a proceed signal on the single main track about 30 mph when the trains collided. Both crewmembers of train 243 were fatally injured; the two crewmembers of train 533 sustained serious injuries. The total cost of the accident was approximately $1.4 million.

Recommendation # :	R-02-024	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Develop a standard medical examination form that includes questions regarding sleep problems and require that the form be used, pursuant to 49 Code of Federal Regulations Part 240, to determine the medical fitness of locomotive engineers; the form should also be available for use to determine the medical fitness of other employees in safety-sensitive positions.

# of Addressees:	1	**Overall Date Closed:**	N/A
Addressee:	FRA	Open - Acceptable Response	**Date Closed:** N/A

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Recommendation Report

Notation Id	7680D_1	**Accident Date:**	11/03/04	**Issue Date:**	04/19/06
City/State:	Washington, DC	**NTSB Report #:**	RAR-06-01	**Most Wanted List:**	Yes

On Wednesday, November 3, 2004, about 12:49 p.m., eastern standard time, Washington Metropolitan Area Transit Authority (WMATA) Metrorail train 703 collided with train 105 at the Woodley Park-Zoo/Adams Morgan (Woodley Park) station in Washington, D.C. Train 703 was traveling outbound on the Red-Line segment of the Metrorail system and ascending the grade between the Woodley Park and the Cleveland Park underground stations, when it rolled backwards about 2,246 feet and struck train 105 at a speed of about 36 mph. Train 703 was operating as a nonrevenue train; that is, it was not carrying passengers. Train 105, a revenue train, was in the process of discharging and loading passengers at the Woodley Park station. There were about 70 passengers on board train 105. Some passengers had exited the train just before or during the collision. The District of Columbia Fire and Emergency Medical Service transported about 20 persons to local hospitals. Estimated property damages were $3,463,183.

Recommendation # :	R-06-003	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE FEDERAL TRANSIT ADMINISTRATION: Require transit agencies, through the system safety program and hazard management process if necessary, to ensure that the time off between daily tours of duty, including regular and overtime assignments, allows train operators to obtain at least 8 hours of uninterrupted sleep.

# of Addressees:	1	**Overall Date Closed:**	N/A
Addressee:	FTA	Open - Acceptable Response	**Date Closed:** N/A

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Recommendation Report

Notation Id	7675D_1	**Accident Date:**	06/28/04	**Issue Date:**	07/20/06
City/State:	Macdona, TX	**NTSB Report #:**	RAR-06-03	**Most Wanted List:**	No

About 5:03 a.m., central daylight time, on Monday, June 28, 2004, a westbound Union Pacific Railroad (UP) freight train traveling on the same main line track as an eastbound BNSF Railway Company (BNSF) freight train struck the midpoint of the 123-car BNSF train as the eastbound train was leaving the main line to enter a parallel siding. The accident occurred at the west end of the rail siding at Macdona, Texas, on the UP's San Antonio Service Unit. The collision derailed the 4 locomotive units and the first 19 cars of the UP train as well as 17 cars of the BNSF train. As a result of the derailment and pileup of railcars, the 16th car of the UP train, a pressure tank car loaded with liquefied chlorine, was punctured. Chlorine escaping from the punctured car immediately vaporized into a cloud of chlorine gas that engulfed the accident area to a radius of at least 700 feet before drifting away from the site. Three persons, including the conductor of the UP train and two local residents, died as a result of chlorine gas inhalation. The UP train engineer, 23 civilians, and 6 emergency responders were treated for respiratory distress or other injuries related to the collision and derailment. Damages to rolling stock, track, and signal equipment were estimated at $5.7 million, with environmental cleanup costs estimated at $150,000.

Recommendation # :	R-06-014	**Overall Status:**	Closed--No Longer Applicable	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require railroads to use scientifically based principles when assigning work schedules for train crewmembers, which consider factors that impact sleep needs, to reduce the effects of fatigue.

# of Addressees:	1		**Overall Date Closed:**	12/09/08	
Addressee:	FRA	Closed--No Longer Applicable		**Date Closed:**	12/09/08

Recommendation # :	R-06-015	**Overall Status:**	Closed--No Longer Applicable	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Establish requirements that limit train crewmember limbo time to address fatigue.

# of Addressees:	1		**Overall Date Closed:**	12/09/08	
Addressee:	FRA	Closed--No Longer Applicable		**Date Closed:**	12/09/08

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Recommendation Report

Notation Id	7675D_2	**Accident Date:**	06/28/04	**Issue Date:**	07/20/06
City/State:	Macdona, TX	**NTSB Report #:**	RAR-06-03	**Most Wanted List:**	No

About 5:03 a.m., central daylight time, on Monday, June 28, 2004, a westbound UP freight train traveling on the same main line track as an eastbound BNSF freight train struck the midpoint of the 123-car BNSF train as the eastbound train was leaving the main line to enter a parallel siding. The accident occurred at the west end of the rail siding at Macdona, Texas, on the UP's San Antonio Service Unit. The collision derailed the 4 locomotive units and the first 19 cars of the UP train as well as 17 cars of the BNSF train. As a result of the derailment and pileup of railcars, the 16th car of the UP train, a pressure tank car loaded with liquefied chlorine, was punctured. Chlorine escaping from the punctured car immediately vaporized into a cloud of chlorine gas that engulfed the accident area to a radius of at least 700 feet before drifting away from the site. Three persons, including the conductor of the UP train and two local residents, died as a result of chlorine gas inhalation. The UP train engineer, 23 civilians, and 6 emergency responders were treated for respiratory distress or other injuries related to the collision and derailment. Damages to rolling stock, track, and signal equipment were estimated at $5.7 million, with environmental cleanup costs estimated at $150,000.

Recommendation # :	R-06-016	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

TO THE UNION PACIFIC RAILROAD: Use the Macdona collision as a case study in fatigue awareness training to illustrate the shared responsibilities of the carrier to provide an employee the opportunity for adequate sleep and of the employee to acquire sleep sufficient to work at a safe level of alertness, and the options available if adequate sleep is not obtained.

# of Addressees:	1		**Overall Date Closed:**	08/19/10	
Addressee:	Union Pacific	Closed - Acceptable Action		**Date Closed:**	08/19/10

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Recommendation Report

Notation Id	7675D_3	**Accident Date:**	06/28/04	**Issue Date:**	07/20/06
City/State:	Macdona, TX	**NTSB Report #:**	RAR-06-03	**Most Wanted List:**	No

About 5:03 a.m., central daylight time, on Monday, June 28, 2004, a westbound UP freight train traveling on the same main line track as an eastbound BNSF freight train struck the midpoint of the 123-car BNSF train as the eastbound train was leaving the main line to enter a parallel siding. The accident occurred at the west end of the rail siding at Macdona, Texas, on the UP's San Antonio Service Unit. The collision derailed the 4 locomotive units and the first 19 cars of the UP train as well as 17 cars of the BNSF train. As a result of the derailment and pileup of railcars, the 16th car of the UP train, a pressure tank car loaded with liquefied chlorine, was punctured. Chlorine escaping from the punctured car immediately vaporized into a cloud of chlorine gas that engulfed the accident area to a radius of at least 700 feet before drifting away from the site. Three persons, including the conductor of the UP train and two local residents, died as a result of chlorine gas inhalation. The UP train engineer, 23 civilians, and 6 emergency responders were treated for respiratory distress or other injuries related to the collision and derailment. Damages to rolling stock, track, and signal equipment were estimated at $5.7 million, with environmental cleanup costs estimated at $150,000.

Recommendation # :	R-06-017	**Overall Status:**	Closed - Acceptable Action	**Priority:**	

The National Transportation Safety Board recommends that the Brotherhood of Locomotive Engineers and Trainmen and the United Transportation Union: Use this accident as a fatigue case study to illustrate the responsibility of the carrier to provide an employee the opportunity for adequate sleep and the responsibility of the employee to acquire sleep sufficient to work at a safe level of alertness, and the options available if adequate sleep is not obtained. Present this case study to your members at meetings, through written materials, and other appropriate methods.

# of Addressees:	2		**Overall Date Closed:**	10/17/07	
Addressee:	Brotherhood of Locomotive Engineers and Trainmen	Closed - Acceptable Action		**Date Closed:**	09/04/07
Addressee:	United Transportation Union	Closed - Acceptable Action		**Date Closed:**	10/17/07

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Recommendation Report

Notation Id	7870A_1	**Accident Date:**	07/10/05	**Issue Date:**	04/25/07
City/State:	Anding, MS	**NTSB Report #:**	RAR-07-01	**Most Wanted List:**	No

On Sunday, July 10, 2005, about 4:15 a.m., central daylight time, two CN freight trains collided head on in Anding, Mississippi. The collision occurred on the CN Yazoo Subdivision, where the trains were being operated under a centralized traffic control signal system on single track. Signal data indicated that the northbound train, IC2 1013 North, continued past a stop (red) signal at North Anding and collided with the southbound train, IC 1023 South, about 1/4 mile beyond the signal. The collision resulted in the derailment of 6 locomotives and 17 cars. About 15,000 gallons of diesel fuel were released from the locomotives and resulted in a fire that burned for about 15 hours. Two crewmembers were on each train; all four were killed. As a precaution, about 100 Anding residents were evacuated; they did not report any injuries. Property damages exceeded $9.5 million; clearing and environmental cleanup costs totaled about $616,800.

Recommendation # :	R-07-001	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require railroads to ensure that the lead locomotives used to operate trains on tracks not equipped with a positive train control system are equipped with an alerter.

# of Addressees:	1		**Overall Date Closed:**	04/24/12	
Addressee:	FRA	Closed - Acceptable Action		**Date Closed:**	04/24/12

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Recommendation Report

Notation Id	8126_3	**Accident Date:**	05/28/08	**Issue Date:**	07/23/09
City/State:	Newton, MA	**NTSB Report #:**	RAR-09-02	**Most Wanted List:**	No

On May 28, 2008, about 5:51 p.m., eastern daylight time, westbound Massachusetts Bay Transportation Authority (MBTA) Green Line train 3667, traveling about 38 mph, struck the rear of westbound Green Line train 3681, which had stopped for a red signal. The accident occurred in Newton, Massachusetts, a suburb of Boston. Each train consisted of two light rail trolley cars and carried two crewmembers—a train operator at the front of the lead car and a trail operator in the second car. The operator of the striking train was killed; the other three crewmembers sustained minor injuries. An estimated 185 to 200 passengers were on the two trains at the time of the collision. Of these, four sustained minor injuries, and one was seriously injured. Total damage was estimated to be about $8.6 million.

Recommendation # : R-09-010 **Overall Status:** Open - Await Response **Priority:** CLASS II

TO ALL U.S. RAIL TRANSIT AGENCIES: Review your medical history and physical examination forms and modify them as necessary to ensure that they elicit specific information about any previous diagnosis of obstructive sleep apnea or other sleep disorders and about the presence of specific risk factors for such disorders.

# of Addressees: 46 **Overall Date Closed:** N/A

Addressee:	Bay Area Rapid Transit District	Closed - Reconsidered	**Date Closed:**	09/04/12
Addressee:	Capital Metropolitan Transportation Authority	Closed - Acceptable Action	**Date Closed:**	09/05/12
Addressee:	Central Arkansas Transit Authority	Closed - Acceptable Action	**Date Closed:**	09/13/12
Addressee:	Charlotte Area Transit System	Closed - Acceptable Action	**Date Closed:**	09/25/12
Addressee:	Chattanooga Area Regional Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/02/12
Addressee:	Chicago Transit Authority	Closed - Acceptable Action	**Date Closed:**	08/19/10
Addressee:	Commonwealth of Pennsylvania, Allegheny County, Port Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	Commonwealth of Pennsylvania, Cambria County, Transit Authority	Closed - Acceptable Action	**Date Closed:**	04/27/10
Addressee:	Dallas Area Rapid Transit Authority (DART)	Closed - Acceptable Action	**Date Closed:**	02/15/11
Addressee:	Detroit People Mover	Open - Await Response	**Date Closed:**	N/A
Addressee:	Fort Worth Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/02/12
Addressee:	Galveston Island Transit	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Greater Cleveland Regional Transit Authority	Closed - Acceptable Action	**Date Closed:**	09/13/12
Addressee:	Hampton Roads Transit	Open - Await Response	**Date Closed:**	N/A
Addressee:	Jacksonville Transportation Authority	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Kenosha Transit	Closed - Acceptable Action	**Date Closed:**	09/19/12

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Addressee:	King County Metro Transit	Open - Await Response	**Date Closed:**	N/A
Addressee:	Massachusetts Bay Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/19/10
Addressee:	Memphis Area Transit Authority	Closed - Acceptable Action	**Date Closed:**	12/17/10
Addressee:	Metro Transit (Minnesota)	Closed - Acceptable Action	**Date Closed:**	09/14/11
Addressee:	Metropolitan Atlanta Rapid Transit Authority	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Metropolitan Transit Authority of Harris County	Open - Await Response	**Date Closed:**	N/A
Addressee:	Metropolitan Transportation Authority New York City Transit	Closed - Acceptable Action	**Date Closed:**	09/28/10
Addressee:	Miami-Dade Transit Agency	Open - Await Response	**Date Closed:**	N/A
Addressee:	Nashville Metropolitan Transit Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	New Jersey Transit	Closed - Acceptable Action	**Date Closed:**	09/13/12
Addressee:	New Orleans Regional Transit Authority	Closed - Acceptable Action	**Date Closed:**	01/29/13
Addressee:	Niagara Frontier Transit Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	Port Authority Transit Corporation	Open - Await Response	**Date Closed:**	N/A
Addressee:	Portland Streetcar	Open - Await Response	**Date Closed:**	N/A
Addressee:	Regional Transportation District	Closed - Reconsidered	**Date Closed:**	07/21/10
Addressee:	Sacramento Regional Transit District	Closed - Acceptable Action	**Date Closed:**	07/12/12
Addressee:	San Diego Metropolitan Transit System	Closed - Reconsidered	**Date Closed:**	09/13/12
Addressee:	San Francisco Municipal Transportation Agency	Open - Await Response	**Date Closed:**	N/A
Addressee:	Santa Clara Valley Transportation Authority	Closed - Acceptable Action	**Date Closed:**	01/31/11
Addressee:	Seattle Monorail Services	Open - Await Response	**Date Closed:**	N/A
Addressee:	Sound Transit	Open - Await Response	**Date Closed:**	N/A
Addressee:	Southeastern Pennsylvania Transportation Authority	Closed - Acceptable Action	**Date Closed:**	04/27/10
Addressee:	Sprinter (North County Transit District)	Open - Await Response	**Date Closed:**	N/A
Addressee:	State of California, Los Angeles County Metropolitan Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/20/12

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Recommendation Report

Addressee:	State of Maryland, Transit Administration	Open - Await Response	**Date Closed:**	N/A
Addressee:	State of Missouri, City of St. Louis, Metro Transit	Closed - Acceptable Action	**Date Closed:**	04/28/10
Addressee:	Tri-County Metro Transit District of Oregon	Closed - Acceptable Action	**Date Closed:**	06/14/11
Addressee:	Utah Transit Authority	Closed - Acceptable Action	**Date Closed:**	09/05/12
Addressee:	Valley Metro Rail	Open - Await Response	**Date Closed:**	N/A
Addressee:	Washington Metropolitan Area Transit Authority	Open - Acceptable Response	**Date Closed:**	N/A

Recommendation # : R-09-011 **Overall Status:** Open - Await Response **Priority:** CLASS II

TO ALL U.S. RAIL TRANSIT AGENCIES: Establish a program to identify operators who are at high risk for obstructive sleep apnea or other sleep disorders and require that such operators be appropriately evaluated and treated.

# of Addressees: 46 **Overall Date Closed:** N/A

Addressee:	Bay Area Rapid Transit District	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Capital Metropolitan Transportation Authority	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Central Arkansas Transit Authority	Closed - Acceptable Action	**Date Closed:**	09/13/12
Addressee:	Charlotte Area Transit System	Closed - Acceptable Action	**Date Closed:**	09/25/12
Addressee:	Chattanooga Area Regional Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/02/12
Addressee:	Chicago Transit Authority	Closed - Acceptable Action	**Date Closed:**	08/19/10
Addressee:	Commonwealth of Pennsylvania, Allegheny County, Port Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	Commonwealth of Pennsylvania, Cambria County, Transit Authority	Closed - Acceptable Action	**Date Closed:**	03/29/11
Addressee:	Dallas Area Rapid Transit Authority (DART)	Closed - Acceptable Action	**Date Closed:**	09/13/11
Addressee:	Detroit People Mover	Open - Await Response	**Date Closed:**	N/A
Addressee:	Fort Worth Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/02/12
Addressee:	Galveston Island Transit	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Greater Cleveland Regional Transit Authority	Closed - Acceptable Action	**Date Closed:**	09/13/12

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Addressee:	Hampton Roads Transit	Open - Await Response	**Date Closed:**	N/A
Addressee:	Jacksonville Transportation Authority	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Kenosha Transit	Open - Await Response	**Date Closed:**	N/A
Addressee:	King County Metro Transit	Open - Await Response	**Date Closed:**	N/A
Addressee:	Massachusetts Bay Transportation Authority	Closed - Acceptable Action	**Date Closed:**	08/19/10
Addressee:	Memphis Area Transit Authority	Closed - Acceptable Action	**Date Closed:**	12/17/10
Addressee:	Metro Transit (Minnesota)	Closed - Acceptable Action	**Date Closed:**	09/14/11
Addressee:	Metropolitan Atlanta Rapid Transit Authority	Open - Acceptable Response	**Date Closed:**	N/A
Addressee:	Metropolitan Transit Authority of Harris County	Open - Await Response	**Date Closed:**	N/A
Addressee:	Metropolitan Transportation Authority New York City Transit	Closed - Acceptable Action	**Date Closed:**	04/06/11
Addressee:	Miami-Dade Transit Agency	Open - Await Response	**Date Closed:**	N/A
Addressee:	Nashville Metropolitan Transit Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	New Jersey Transit	Closed - Acceptable Action	**Date Closed:**	09/13/12
Addressee:	New Orleans Regional Transit Authority	Closed - Acceptable Action	**Date Closed:**	01/29/13
Addressee:	Niagara Frontier Transit Authority	Open - Await Response	**Date Closed:**	N/A
Addressee:	Port Authority Transit Corporation	Open - Await Response	**Date Closed:**	N/A
Addressee:	Portland Streetcar	Open - Await Response	**Date Closed:**	N/A
Addressee:	Regional Transportation District	Closed - Reconsidered	**Date Closed:**	07/21/10
Addressee:	Sacramento Regional Transit District	Closed - Acceptable Action	**Date Closed:**	07/12/12
Addressee:	San Diego Metropolitan Transit System	Closed - Reconsidered	**Date Closed:**	09/13/12
Addressee:	San Francisco Municipal Transportation Agency	Open - Await Response	**Date Closed:**	N/A
Addressee:	Santa Clara Valley Transportation Authority	Closed - Acceptable Action	**Date Closed:**	11/24/10
Addressee:	Seattle Monorail Services	Open - Await Response	**Date Closed:**	N/A
Addressee:	Sound Transit	Open - Await Response	**Date Closed:**	N/A
Addressee:	Southeastern Pennsylvania Transportation Authority	Open - Acceptable Response	**Date Closed:**	N/A

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Addressee:	Sprinter (North County Transit District)	Open - Await Response	**Date Closed:**	N/A
Addressee:	State of California, Los Angeles County Metropolitan Transportation Authority	Closed - Acceptable Action	**Date Closed:**	06/20/12
Addressee:	State of Maryland, Transit Administration	Open - Await Response	**Date Closed:**	N/A
Addressee:	State of Missouri, City of St. Louis, Metro Transit	Closed - Acceptable Action	**Date Closed:**	04/28/10
Addressee:	Tri-County Metro Transit District of Oregon	Closed - Acceptable Action	**Date Closed:**	06/14/11
Addressee:	Utah Transit Authority	Closed - Acceptable Action	**Date Closed:**	09/05/12
Addressee:	Valley Metro Rail	Open - Await Response	**Date Closed:**	N/A
Addressee:	Washington Metropolitan Area Transit Authority	Open - Acceptable Response	**Date Closed:**	N/A

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Recommendation Report

Notation Id	8400A	**Accident Date:**	04/17/11	**Issue Date:**	05/10/12
City/State:	Red Oak, IA	**NTSB Report #:**	RAR-12-02	**Most Wanted List:**	No

On April 17, 2011, about 6:55 a.m. central daylight time, eastbound BNSF Railway (BNSF) coal train C-BTMCNMO-26, BNSF 9159 East, traveling about 23 mph, collided with the rear end of standing BNSF maintenance-of-way (MOW) equipment train U-BRGCRI-15, BNSF 9470 East, near Red Oak, Iowa. The accident occurred near milepost (MP) 448.3 on main track number two on the Creston Subdivision of the BNSF Nebraska Division. The collision resulted in the derailment of 2 locomotives and 12 cars. As a result of collision forces, the lead locomotive's modular crew cab was detached, partially crushed, and involved in a subsequent diesel fuel fire. Both crewmembers on the striking train were fatally injured. Damage was in excess of $8.7 million. The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the failure of the crew of the striking train to comply with the signal indication requiring them to operate in accordance with restricted speed requirements and stop short of the standing train because they had fallen asleep due to fatigue resulting from their irregular work schedules and their medical conditions. Contributing to the accident was the absence of a positive train control system that identifies the rear of a train and stops a following train if a safe braking profile is exceeded. Contributing to the severity of collision damage to the locomotive cab of the striking coal train was the absence of crashworthiness standards for modular locomotive crew cabs.

Recommendation # :	R-12-016	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require railroads to medically screen employees in safety-sensitive positions for sleep apnea and other sleep disorders.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	FRA	Open - Acceptable Response		**Date Closed:**	N/A

Recommendation # :	R-12-017	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Establish an ongoing program to monitor, evaluate, report on, and continuously improve fatigue management systems implemented by operating railroads to identify, mitigate, and continuously reduce fatigue-related risks for personnel performing safety-critical tasks, with particular emphasis on biomathematical models of fatigue.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	FRA	Open - Acceptable Response		**Date Closed:**	N/A

Recommendation # :	R-12-018	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Conduct research on new and existing methods that can identify fatigue and mitigate performance decrements associated with fatigue in on-duty train crews.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	FRA	Open - Acceptable Response		**Date Closed:**	N/A

Recommendation # :	R-12-019	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require the implementation of methods that can identify fatigue and mitigate performance decrements associated with fatigue in on-duty train crews that are identified or developed in response to Safety Recommendation R-12-18.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	FRA	Open - Acceptable Response		**Date Closed:**	N/A

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Recommendation Report

Recommendation # :	R-12-025	**Overall Status:**	Open Acceptable Alternate Response	**Priority:**	CLASS II

TO THE BNSF RAILWAY: Require all employees and managers who perform or supervise safety-critical tasks to complete fatigue training on an annual basis and document when they have received this training.

# of Addressees:	1		**Overall Date Closed:**	N/A
Addressee:	BNSF Railway Company (formerly Burlington Northern and Santa Fe Railway Company)	Open Acceptable Alternate Response	**Date Closed:**	N/A

Recommendation # :	R-12-026	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE BNSF RAILWAY: Medically screen employees in safety-sensitive positions for sleep apnea and other sleep disorders.

# of Addressees:	1		**Overall Date Closed:**	N/A
Addressee:	BNSF Railway Company (formerly Burlington Northern and Santa Fe Railway Company)	Open - Acceptable Response	**Date Closed:**	N/A

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Recommendation Report

Notation Id	5367A_4	**Accident Date:**	08/09/90	**Issue Date:**	09/16/91
City/State:	SUGAR VALLEY, GA	**NTSB Report #:**	RAR-91-02	**Most Wanted List:**	No

ABOUT 3:13 A.M. EASTERN DAYLIGHT TIME, ON 8/9/90, NORTH BOUND NORFOLK SOUTHERN (NS) FREIGHT TRAIN 188 COLLIDED WITH SOUTHBOUND NS LOCAL FREIGHT TRAIN G-38 AT CONTROL POINT DAVIS NEAR SUGAR VALLEY, GEORGIA. THE CONDUCTOR ON TRAIN 188 & THE CONDUCTOR & ENGINEER ON TRAIN G-38 WERE FATALLY INJURED. THE TRAINMEN ON BOTH TRAINS & THE ENGINEER ON TRAIN 188 RECEIVED MINOR INJURIES. DAMAGE WAS ESTIMATED AT $1,268,680.

Recommendation # :	R-91-026	**Overall Status:**	Closed - Unacceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE FEDERAL RAILROAD ADMINISTRATION: IN CONJUNCTION WITH THE STUDY OF FATIGUE OF TRAIN CREWMEMBERS, EXPLORE THE PARAMETERS OF AN OPTIMUM ALERTER SYSTEM FOR LOCOMOTIVES.

# of Addressees:	1		**Overall Date Closed:**	11/04/97
Addressee:	FRA	Closed - Unacceptable Action	**Date Closed:**	11/04/97

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Recommendation Report

Notation Id	5367A_1	**Accident Date:**	08/09/90	**Issue Date:**	09/16/91
City/State:	SUGAR VALLEY, GA	**NTSB Report #:**	RAR-91-02	**Most Wanted List:**	No

ABOUT 3:13 A.M. EASTERN DAYLIGHT TIME, ON 8/9/90, NORTH BOUND NORFOLK SOUTHERN (NS) FREIGHT TRAIN 188 COLLIDED WITH SOUTHBOUND NS LOCAL FREIGHT TRAIN G-38 AT CONTROL POINT DAVIS NEAR SUGAR VALLEY, GEORGIA. THE CONDUCTOR ON TRAIN 188 & THE CONDUCTOR & ENGINEER ON TRAIN G-38 WERE FATALLY INJURED. THE TRAINMEN ON BOTH TRAINS & THE ENGINEER ON TRAIN 188 RECEIVED MINOR INJURIES. DAMAGE WAS ESTIMATED AT $1,268,680.

Recommendation # :	R-91-027	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE NORFOLK SOUTHERN CORPORATION: IN CONJUNCTION WITH THE OPERATING UNIONS, CONDUCT AN EDUCATIONAL & COUNSELING PROGRAM DESIGNED TO IMPROVE TRAIN CREWMEMBERS' KNOWLEDGE OF HEALTH & DIET REGIMENS & OF METHODS OF AVOIDING SLEEP DEFICITS & SLEEP DEPRIVATION.

# of Addressees:	1		**Overall Date Closed:**	05/25/95
Addressee:	Norfolk Southern Corporation	Closed - Acceptable Action	**Date Closed:**	05/25/95

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Recommendation Report

Notation Id	5413A_7	**Accident Date:**	11/07/90	**Issue Date:**	08/23/91
City/State:	CORONA, CA	**NTSB Report #:**	RAR-91-03	**Most Wanted List:**	No

ON WEDNESDAY, NOVEMBER 7, 1990, ABOUT 4:11 A.M. PACIFIC STANDARD TIME, TWO ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY (ATSF) FREIGHT TRAINS COLLIDED HEAD ON AT MILEPOST (MP) 25.6 IN CORONA, CALIFORNIA. THE WESTBOUND ATSF FREIGHT TRAIN 818, WHICH WAS TRAVELING FROM BARSTOW, CALIFORNIA, TO HOBART YARD, CITY OF COMMERCE, CALIFORNIA, WAS ON THE CORONA SIDING. IT PASSED THE STOP SIGNAL, AND THE LEAD LOCOMOTIVE REENTERED THE MAIN TRACK AREA, BLOCKING ALL MOVEMENT ON THE MAIN TRACK. THE EASTBOUND ATSF FREIGHT TRAIN 891, WHICH WAS TRAVELING FROM HOBART YARD TO CHICAGO, ILLINOIS, WAS ON THE MAIN TRACK AND COLLIDED WITH TRAIN 818. EACH TRAIN HAD THREE-PERSON CREWS.

Recommendation # :	R-91-041	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT ATCHISON TOPEKA & SANTA FE RAILWAY COMPANY: In cooperation with the operating unions, develop an educational and counseling program designed to improve crewmembers' knowledge of health and diet regimens and methods of avoiding sleep deficits and sleep deprivation.

# of Addressees:	1		**Overall Date Closed:**	11/23/92	
Addressee:	Atchison, Topeka and Santa Fe Railway Company	Closed - Acceptable Action		**Date Closed:**	11/23/92

Recommendation # :	R-91-042	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT ATCHISON TOPEKA & SANTA FE RAILWAY COMPANY: IN COOPERATION WITH THE ASSOCIATION OF AMERICAN RAILROADS AND THE OPERATING UNIONS, DEVELOP A POLICY THAT WOULD ALLOW THE CARRIER TO STOP AN EMPLOYEE FROM ACCEPTING ASSIGNMENTS AND THAT WOULD ALLOW AN EMPLOYEE TO REPORT OFF DUTY WHEN THE EMPLOYEE IS IMPAIRED BY LACK OF SLEEP.

# of Addressees:	1		**Overall Date Closed:**	02/04/92	
Addressee:	Atchison, Topeka and Santa Fe Railway Company	Closed - Acceptable Action		**Date Closed:**	02/04/92

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	5413A_1	**Accident Date:**	11/07/90	**Issue Date:**	08/23/91
City/State:	CORONA, CA	**NTSB Report #:**	RAR-91-03	**Most Wanted List:**	No

ON WEDNESDAY, NOVEMBER 7, 1990, ABOUT 4:11 A.M. PACIFIC STANDARD TIME, TWO ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY (ATSF) FREIGHT TRAINS COLLIDED HEAD ON A MILEPOST (MP) 25.6 IN CORONA, CALIFORNIA. THE WESTBOUND ATSF FREIGHT TRAIN 818, WHICH WAS TRAVELING FROM BARSTOW, CALIFORNIA, TO HOBART YARD, CITY OF COMMERCE, CALIFORNIA, WAS ON THE CORONA SIDING. IT PASSED THE STOP SIGNAL, AND THE LEAD LOCOMOTIVE REENTERED THE MAIN TRACK AREA, BLOCKING ALL MOVEMENT ON THE MAIN TRACK. THE EASTBOUND ATSF FREIGHT TRAIN 891, WHICH WAS TRAVELING FROM HOBART YARD TO CHICAGO, ILLINOIS, WAS ON THE MAIN TRACK AND COLLIDED WITH TRAIN 818. EACH TRAIN HAD THREE-PERSON CREWS.

Recommendation # :	R-91-045	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE ASSOCIATION OF AMERICAN RAILROADS: IN COOPERATION WITH MEMBER CARRIERS AND THE OPERATING UNIONS, DEVELOP A POLICY THAT WOULD ALLOW THE CARRIER TO PREVENT AN EMPLOYEE FROM ACCEPTING ASSIGNMENTS AND WOULD ALLOW AN EMPLOYEE TO REPORT OFF DUTY WHEN HE OR SHE IS IM PAIRED BY LACK OF SLEEP.

# of Addressees:	1		**Overall Date Closed:**	07/16/02	
Addressee:	Association of American Railroads	Closed - Acceptable Action		**Date Closed:**	07/16/02

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	5413A_2	**Accident Date:**	11/07/90	**Issue Date:**	08/23/91
City/State:	CORONA, CA	**NTSB Report #:**	RAR-91-03	**Most Wanted List:**	No

ON WEDNESDAY, NOVEMBER 7, 1990, ABOUT 4:11 A.M. PACIFIC STANDARD TIME, TWO ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY (ATSF) FREIGHT TRAINS COLLIDED HEAD ON A MILEPOST (MP) 25.6 IN CORONA, CALIFORNIA. THE WESTBOUND ATSF FREIGHT TRAIN 818, WHICH WAS TRAVELING FROM BARSTOW, CALIFORNIA, TO HOBART YARD, CITY OF COMMERCE, CALIFORNIA, WAS ON THE CORONA SIDING. IT PASSED THE STOP SIGNAL, AND THE LEAD LOCOMOTIVE REENTERED THE MAIN TRACK AREA, BLOCKING ALL MOVEMENT ON THE MAIN TRACK. THE EASTBOUND ATSF FREIGHT TRAIN 891, WHICH WAS TRAVELING FROM HOBART YARD TO CHICAGO, ILLINOIS, WAS ON THE MAIN TRACK AND COLLIDED WITH TRAIN 818. EACH TRAIN HAD THREE-PERSON CREWS.

Recommendation # :	R-91-047	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE BROTHERHOOD OF LOCOMOTIVE ENGINEERS: IN COOPERATION WITH ALL RAIL CARRIERS, DEVELOP A POLICY THAT WOULD ALLOW THE CARRIER TO PREVENT AN EMPLOYEE FROM ACCEPTING ASSIGNMENTS AND WOULD ALLOW AN EMPLOYEE TO REPORT OFF DUTY WHEN HE OR SHE IS IMPAIRED BY LACK OF SLEEP.

# of Addressees:	1		**Overall Date Closed:**	10/03/00	
Addressee:	Brotherhood of Locomotive Engineers and Trainmen	Closed - Acceptable Action		**Date Closed:**	10/03/00

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	5413A_3	**Accident Date:**	11/07/90	**Issue Date:**	08/23/91
City/State:	CORONA, CA	**NTSB Report #:**	RAR-91-03	**Most Wanted List:**	No

ON WEDNESDAY, NOVEMBER 7, 1990, ABOUT 4:11 A.M. PACIFIC STANDARD TIME, TWO ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY (ATSF) FREIGHT TRAINS COLLIDED HEAD ON A MILEPOST (MP) 25.6 IN CORONA, CALIFORNIA. THE WESTBOUND ATSF FREIGHT TRAIN 818, WHICH WAS TRAVELING FROM BARSTOW, CALIFORNIA, TO HOBART YARD, CITY OF COMMERCE, CALIFORNIA, WAS ON THE CORONA SIDING. IT PASSED THE STOP SIGNAL, AND THE LEAD LOCOMOTIVE REENTERED THE MAIN TRACK AREA, BLOCKING ALL MOVEMENT ON THE MAIN TRACK. THE EASTBOUND ATSF FREIGHT TRAIN 891, WHICH WAS TRAVELING FROM HOBART YARD TO CHICAGO, ILLINOIS, WAS ON THE MAIN TRACK AND COLLIDED WITH TRAIN 818. EACH TRAIN HAD THREE-PERSON CREWS.

Recommendation # :	R-91-048	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE UNITED TRANSPORTATION UNION: IN COOPERATION WITH ALL RAIL CARRIERS, DEVELOP A POLICY THAT WOULD ALLOW THE CARRIER TO PREVENT AN EMPLOYEE FROM ACCEPTING ASSIGNMENTS AND WOULD ALLOW AN EMPLOYEE TO REPORT OFF DUTY WHEN HE OR SHE IS IMPAIRED BY LACK OF SLEEP.

# of Addressees:	1		**Overall Date Closed:**	05/17/02	
Addressee:	United Transportation Union	Closed - Acceptable Action		**Date Closed:**	05/17/02

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Recommendation Report

Notation Id	6062_1	**Accident Date:**	08/30/91	**Issue Date:**	07/29/93
City/State:	LEDGER, MT	**NTSB Report #:**	RAR-93-01	**Most Wanted List:**	No

ON AUGUST 30, 1991, THE EASTBOUND BURLINGTON NORTHERN RAILROAD (BN) FREIGHT TRAIN 602 DEPARTED SHELBY, MONTANA, HEADING SOUTH. WESTBOUND BN FREIGHT TRAIN 603 DEPART GREAT FALLS, MONTANA, PROCEEDING NORTH. BOTH TRAINS WERE ROUTED OVER BN UNSIGNALED SINGLE TRACK LINE BETWEEN SHELBY AND GREAT FALLS. A BRANCH LINE DISPATCHER IN SEATTLE, WASHINGTON, CONTROLLED THE TRAINS' MOVEMENT BY ISSUING TRACK WARRANTS (TWS) THROUGH A COMPUTERIZED TRACK WARRANT CONTROL (CTWC) SYSTEM. AT 5:50 P.M. MOUNTAIN DAYLIGHT TIME AT MILEPOST 85.55 NORTH OF LEDGER, MONTANA, THE TWO TRAINS COLLIDED HEAD ON AT A CLOSING SPEED OF 87 MPH. AFTER IMPACT, FIRE ENSUED FROM SPILLED LOCOMOTIVE DIESEL FUEL, BURNING LOCOMOTIVE UNITS, TWO FREIGHT CARS, AND GRASS. NINE LOCOMOTIVE UNITS AND 22 CARS WERE DESTROYED; 9 CARS WERE DAMAGED. TRACK DAMAGE, EQUIPMENT REPLACEMENT, AND CLEAN-UP COSTS WERE ESTIMATED AT $19 MILLION. THREE CREWMEN WERE KILLED, AND FOUR WERE SEVERLY INJURED.

Recommendation # :	R-93-009	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE BURLINGTON NORTHERN RAILROAD: EVALUATE EACH DISPATCHER POSITION TO DETERMINE THE ADEQUATE NUMBER OF BREAKS NECESSARY TO MAINTAIN OPTIMUM MENTAL ABILITY; PROVIDE ADEQUATE PERSONNEL AND EQUIPMENT RESOURCES TO EFFECTIVELY MONITOR, TEST, EVALUATE, HELP, AND RELIEVE SHIFT DISPATCHERS.

# of Addressees:	1			**Overall Date Closed:**	06/18/01
Addressee:	BNSF Railway Company (formerly Burlington Northern and Santa Fe Railway Company)	Closed - Acceptable Action		**Date Closed:**	06/18/01

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Recommendation Report

Notation Id	6582A_1	**Accident Date:**	06/05/95	**Issue Date:**	09/11/96
City/State:	BROOKLYN, NY	**NTSB Report #:**	RAR-96-03	**Most Wanted List:**	No

ABOUT 6:12 A.M. ON 6/5/95, A NEW YORK CITY TRANSIT (NYCT) SOUTHBOUND SUBWAY TRAIN TRAVELING AT MAXIMUM ATTAINABLE SPEED PASSED A RED SIGNAL & COLLIDED WITH THE REAR CAR OF ANOTHER NYCT SUBWAY TRAIN THAT WAS STOPPED ON THE WILLIAMSBURG BRIDGE, WHICH SPANS THE EAST RIVER & WHICH LINKS THE BOROUGHS OF BROOKLYN & MANHATTEN. THE OPERATOR OF THE STRIKING TRAIN WAS FATALLY INJURED WHEN THE LEAD CAR OF HIS TRAIN PARTIALLY TELESCOPED INTO THE REAR CAR OF THE STRUCK TRAIN & HIS CAB WAS TOTALLY CRUSHED. SIXTY-SEVEN PASSENGERS & TWO EMERGENCY RESPONDERS WERE TREATED AT AREA HOSPITALS FOR SERIOUS OR MINOR INJURIES RESULTING FROM THE ACCIDENT.

Recommendation # :	R-96-020	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE FTA: IN COOPERATION WITH THE AMERICAN PUBLIC TRANSIT ASSOCIATION, DEVELOP A FATIGUE EDUCATIONAL AWARENESS PROGRAM & DISTRIBUTE IT TO TRANSIT AGENCIES TO USE IN THEIR FITNESS-FOR-DUTY TRAINING FOR SUPERVISORS & EMPLOYEES INVOLVED IN SAFETY-SENSITIVE ACTIVITIES.

# of Addressees:	1			**Overall Date Closed:**	01/11/00
Addressee:	FTA	Closed - Acceptable Action		**Date Closed:**	01/11/00

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	6582A_2	**Accident Date:**	06/05/96	**Issue Date:**	09/11/96
City/State:	BROOKLYN, NY	**NTSB Report #:**	RAR-96-03	**Most Wanted List:**	No

ABOUT 6:12 A.M. ON 6/5/95, A NEW YORK CITY TRANSIT (NYCT) SOUTHBOUND SUBWAY TRAIN TRAVELING AT MAXIMUM ATTAINABLE SPEED PASSED A RED SIGNAL & COLLIDED WITH THE REAR CAR OF ANOTHER NYCT SUBWAY TRAIN THAT WAS STOPPED ON THE WILLIAMSBURG BRIDGE, WHICH SPANS THE EAST RIVER & WHICH LINKS THE BOROUGHS OF BROOKLYN & MANHATTEN. THE OPERATOR OF THE STRIKING TRAIN WAS FATALLY INJURED WHEN THE LEAD CAR OF HIS TRAIN PARTIALLY TELESCOPED INTO THE REAR CAR OF THE STRUCK TRAIN & HIS CAB WAS TOTALLY CRUSHED. SIXTY-SEVEN PASSENGERS & TWO EMERGENCY RESPONDERS WERE TREATED AT AREA HOSPITALS FOR SERIOUS OR MINOR INJURIES RESULTING FROM THE ACCIDENT.

Recommendation # :	R-96-021	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE AMERICAN PUBLIC TRANSIT ASSOCIATION: ASSIST THE FEDERAL TRANSIT ADMINISTRATION IN DEVELOPING A FATIGUE EDUCATIONAL AWARENESS PROGRAM FOR TRANSIT AGENCIES TO USE IN THEIR FITNESS-FOR-DUTY TRAINING FOR SUPERVISORS & EMPLOYEES INVOLVED IN SAFETY-SENSITIVE POSITIONS.

# of Addressees:	1			**Overall Date Closed:**	01/23/02
Addressee:	American Public Transportation Association	Closed - Acceptable Action		**Date Closed:**	01/23/02

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	6582A_3	**Accident Date:**	06/05/96	**Issue Date:**	09/11/96
City/State:	BROOKLYN, NY	**NTSB Report #:**	RAR-96-03	**Most Wanted List:**	No

ABOUT 6:12 A.M. ON 6/5/95, A NEW YORK CITY TRANSIT (NYCT) SOUTHBOUND SUBWAY TRAIN TRAVELING AT MAXIMUM ATTAINABLE SPEED PASSED A RED SIGNAL & COLLIDED WITH THE REAR CAR OF ANOTHER NYCT SUBWAY TRAIN THAT WAS STOPPED ON THE WILLIAMSBURG BRIDGE, WHICH SPANS THE EAST RIVER & WHICH LINKS THE BOROUGHS OF BROOKLYN & MANHATTAN. THE OPERATOR OF THE STRIKING TRAIN WAS FATALLY INJURED WHEN THE LEAD CAR OF HIS TRAIN PARTIALLY TELESCOPED INTO THE REAR CAR OF THE STRUCK TRAIN & HIS CAB WAS TOTALLY CRUSHED. SIXTY-SEVEN PASSENGERS & TWO EMERGENCY RESPONDERS WERE TREATED AT AREA HOSPITALS FOR SERIOUS OR MINOR INJURIES RESULTING FROM THE ACCIDENT.

Recommendation # :	R-96-022	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE NEW YORK CITY TRANSIT: DEVELOP & DISSEMINATE A TRAINING & EDUCATION MODULE TO INFORM TRAIN OPERATORS & OTHER EMPLOYEES INVOLVED IN SAFETY-SENSITIVE POSITIONS ABOUT THE HAZARDS OF PERFORMING THEIR DUTIES WHILE FATIGUED.

# of Addressees:	1			**Overall Date Closed:**	10/13/99
Addressee:	Metropolitan Transportation Authority New York City Transit	Closed - Acceptable Action		**Date Closed:**	10/13/99

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	6768_1	**Accident Date:**	06/16/95	**Issue Date:**	11/26/96
City/State:	GARDNERS, PA	**NTSB Report #:**	SIR-96-05	**Most Wanted List:**	No

ABOUT 7:20 P.M. ON 6/16/95, THE FIREBOX CROWNSHEET OF GETTYSBURG PASSENGER SERVICES, INC., (GETTYSBURG PASSENGER SERVICES) STEAM LOCOMOTIVE 1278 FAILED WHILE THE LOCOMOTIVE WAS PULLING A SIX-CAR EXCURSION TRAIN ABOUT 15 MPH NEAR GARDNERS, PENNSYLVANIA. THE FAILURE RESULTED IN AN INSTANTANEOUS RELEASE (EXPLOSION) OF STEAM THROUGH THE FIREBOX DOOR & INTO THE LOCOMOTIVE CAB, SERIOUSLY BURNING THE ENGINEER & THE TWO FIREMEN. THE FIREMEN WERE TAKEN BY AMBULANCE TO AREA HOSPITALS. THE ENGINEER, WHO HAD THIRD-DEGREE BURNS OVER 65 PERCENT OF HIS BODY, WAS AIRLIFTED TO A BURN CENTER NEAR PHILADELPHIA. NONE OF THE 310 PASSENGERS OR OTHER CREWMEMBERS WERE INJURED. LOCOMOTIVE DAMAGE WAS LIMITED TO THE FIREBOX GRATES & CROWNSHEET, WITH SOME ANCILLARY SMOKE & DEBRIS DAMAGE TO THE LOCOMOTIVE CAB.

Recommendation # :	R-96-056	**Overall Status:**	Closed - Acceptable Action	**Priority:**	

THE NTSB RECOMMENDS THAT THE FRA: IN COOPERATION WITH THE TOURIST RAILWAY ASSOCIATION, INC., PROMOTE AWARENESS OF & COMPLIANCE WITH THE HOURS OF SERVICE ACT.

# of Addressees:	1			**Overall Date Closed:**	02/15/01
Addressee:	FRA	Closed - Acceptable Action		**Date Closed:**	02/15/01

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	6768_3	**Accident Date:**	06/16/95	**Issue Date:**	11/26/96
City/State:	GARDNERS, PA	**NTSB Report #:**	SIR-96-05	**Most Wanted List:**	No

ABOUT 7:20 P.M. ON 6/16/95, THE FIREBOX CROWNSHEET OF GETTYSBURG PASSENGER SERVICES, INC., (GETTYSBURG PASSENGER SERVICES) STEAM LOCOMOTIVE 1278 FAILED WHILE THE LOCOMOTIVE WAS PULLING A SIX-CAR EXCURSION TRAIN ABOUT 15 MPH NEAR GARDNERS, PENNSYLVANIA. THE FAILURE RESULTED IN AN INSTANTANEOUS RELEASE (EXPLOSION) OF STEAM THROUGH THE FIREBOX DOOR & INTO THE LOCOMOTIVE CAB, SERIOUSLY BURNING THE ENGINEER & THE TWO FIREMEN. THE FIREMEN WERE TAKEN BY AMBULANCE TO AREA HOSPITALS. THE ENGINEER, WHO HAD THIRD-DEGREE BURNS OVER 65 PERCENT OF HIS BODY, WAS AIRLIFTED TO A BURN CENTER NEAR PHILADELPHIA. NONE OF THE 310 PASSENGERS OR OTHER CREWMEMBERS WERE INJURED. LOCOMOTIVE DAMAGE WAS LIMITED TO THE FIREBOX GRATES & CROWNSHEET, WITH SOME ANCILLARY SMOKE & DEBRIS DAMAGE TO THE LOCOMOTIVE CAB.

Recommendation # :	R-96-063	**Overall Status:**	Closed - Acceptable Action	**Priority:**	

THE NTSB RECOMMENDS THAT THE TOURIST RAILWAY ASSOCIATION, INC.: IN COOPERATION WITH THE FRA, PROMOTE AWARENESS OF & COMPLIANCE WITH THE HOURS OF SERVICE ACT.

# of Addressees:	1			**Overall Date Closed:**	05/14/98
Addressee:	Tourist Railway Association, Inc.	Closed - Acceptable Action		**Date Closed:**	05/14/98

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	7155_6	**Accident Date:**	N/A	**Issue Date:**	06/01/99
City/State:	.	**NTSB Report #:**	SS-99-01	**Most Wanted List:**	No

DURING THE 1980'S, THE NATIONAL TRANSPORTATION SAFETY BOARD INVESTIGATED SEVERAL ACCIDENTS THAT INVOLVED OPERATOR FATIGUE. FOLLOWING COMPLETION OF THESE ACCIDENT INVESTIGATIONS, THE SAFETY BOARD IN 1989 ISSUED THREE RECOMMENDATIONS TO THE U.S. DEPT. OF TRANSPORTATION (DOT): EXPEDITE A COORDINATED RESEARCH PROGRAM ON THE EFFECTS OF FATIGUE, SLEEPINESS, SLEEP DISORDERS, AND CIRCADIAN FACTORS ON TRANSPORTATION SYSTEM SAFETY (I-89-1), DEVELOP AND DISSEMINATE EDUCATIONAL MATERIAL FOR TRANSPORTATION INDUSTRY PERSONNEL AND MANAGEMENT REGARDING SHIFT WORK; WORK AND REST SCHEDULES; AND PROPER REGIMENS OF HEALTH, DIET, AND REST (I-89-2) AND REVIEW AND UPGRADE REGULATIONS GOVERNING HOURS OF SERVICE FOR ALL TRANSPORTATION MODES TO ASSURE THAT THEY ARE CONSISTENT AND THAT THEY INCORPORATE THE RESULTS OF THE LATEST RESEARCH ON FATIGUE AND SLEEP ISSUES (I-89-3).

Recommendation # :	R-99-002	**Overall Status:**	Closed - Reconsidered	**Priority:**	Normal

THE NTSB RECOMMENDS THAT THE FEDERAL RAILROAD ADMINISTRATION: ESTABLISH WITHIN 2 YEARS SCIENTIFICALLY BASED HOURS-OF-SERVICE REGULATIONS THAT SET LIMITS ON HOURS OF SERVICE, PROVIDE PREDICTABLE WORK AND REST SCHEDULES, AND CONSIDER CIRCADIAN RHYTHMS AND HUMAN SLEEP AND REST REQUIREMENTS.

# of Addressees:	1			**Overall Date Closed:**	11/18/03
Addressee:	FRA	Closed - Reconsidered		**Date Closed:**	11/18/03

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	6899A_1	**Accident Date:**	07/02/97	**Issue Date:**	10/07/99
City/State:	DELIA, KS	**NTSB Report #:**	RAR-99-04	**Most Wanted List:**	No

ABOUT 2:15 A.M., 7/2/97, WESTBOUND UNION PACIFIC RAILROAD (UP) FREIGHT TRAIN NP-01, OPERATING ON A SLIDING TRACK, PROCEEDED PAST A WAYSIDE STOP SIGNAL AT THE END OF THE SIDING AND COLLIDED WITH THE SIDE OF EASTBOUND UP FREIGHT TRAIN ME-29, WHICH WAS OPERATING ON A MAINLINE TRACK ON THE UP RAILROAD NEAR DELIA, KANSAS. THE NP-01 TRAIN ENGINEER WAS KILLED, AND THE NP-01 TRAIN CONDUCTOR SUSTAINED MINOR INJURIES.

Recommendation # :	R-99-053	**Overall Status:**	Closed - Reconsidered	**Priority:**	

THE NTSB RECOMMENDS THAT THE FEDERAL RAILROAD ADMINISTRATION: REVISE THE FEDERAL REGULATIONS TO REQUIRE THAT ALL LOCOMOTIVES OPERATING ON LINES THAT DO NOT HAVE A POSITIVE TRAIN SEPARATION SYSTEM BE EQUIPPED WITH A COGNITIVE ALERTER SYSTEM THAT CANNOT BE RESET BY REFLEX ACTION.

# of Addressees:	1			**Overall Date Closed:**	08/06/02
Addressee:	FRA	Closed - Reconsidered		**Date Closed:**	08/06/02

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	6899A_2	**Accident Date:**	07/02/97	**Issue Date:**	10/07/99
City/State:	DELIA, KS	**NTSB Report #:**	RAR-99-04	**Most Wanted List:**	No

ABOUT 2:15 A.M., 7/2/97, WESTBOUND UNION PACIFIC RAILROAD (UP) FREIGHT TRAIN NP-01, OPERATING ON A SIDING TRACK, PROCEEDED PAST A WAYSIDE STOP SIGNAL AT THE END OF THE SIDING AND COLLIDED WITH THE SIDE OF EASTBOUND UP FREIGHT TRAIN ME-29, WHICH WAS OPERATING ON A MAINLINE TRACK ON THE UP RAILROAD NEAR DELIA, KS. THE NP-01 TRAIN ENGINEER WAS KILLED, AND THE NP-01 TRAIN CONDUCTOR SUSTAINED MINOR INJURIES.

Recommendation # : R-99-054 **Overall Status:** Closed - Acceptable Action **Priority:**

THE NTSB RECOMMENDS THAT THE UNION PACIFIC RAILROAD: ISSUE TO ALL EMPLOYEES, INCLUDING MANAGEMENT PERSONNEL, CURRENT FATIGUE AWARENESS MATERIAL REGARDING SHIFT WORK, WORK-REST SCHEDULES, AND PROPER REGIMENS OF HEALTH, DIET, AND REST.

# of Addressees: 1 **Overall Date Closed:** 09/06/00

Addressee:	Union Pacific	Closed - Acceptable Action	**Date Closed:**	09/06/00

Recommendation # : R-99-055 **Overall Status:** Closed - Acceptable Action **Priority:**

THE NTSB RECOMMENDS THAT THE UNION PACIFIC RAILROAD: REVISE YOUR FATIGUE AWARENESS PROGRAM TO INCLUDE A PROCESS FOR DOCUMENTING WHICH EMPLOYEES RECEIVE THE CURRENTLY AVAILABLE FATIGUE AWARENESS MATERIAL, ANY NEW OR UPDATED FATIGUE-RELATED INFORMATION, OR BOTH, AND FOR DETERMINING WHETHER THE RECIPIENTS UNDERSTAND THE DANGERS OF WORKING WHILE FATIGUED.

# of Addressees: 1 **Overall Date Closed:** 02/25/03

Addressee:	Union Pacific	Closed - Acceptable Action	**Date Closed:**	02/25/03

Recommendation # : R-99-056 **Overall Status:** Closed - Acceptable Action **Priority:**

THE NTSB RECOMMENDS THAT THE UNION PACIFIC RAILROAD: ESTABLISH, AT A MINIMUM, AN ANNUAL MANAGEMENT OVERSIGHT REVIEW PROCESS FOR THE FATIGUE AWARENESS PROGRAM TO ENSURE ITS EFFECTIVENESS AND TO IDENTIFY WAYS OF IMPROVING IT.

# of Addressees: 1 **Overall Date Closed:** 09/06/00

Addressee:	Union Pacific	Closed - Acceptable Action	**Date Closed:**	09/06/00

Recommendation # : R-99-057 **Overall Status:** Closed - Acceptable Action **Priority:**

THE NTSB RECOMMENDS THAT THE UNION PACIFIC RAILROAD: IN CONJUNCTION WITH THE OPERATING UNIONS, DISCUSS THE CIRCUMSTANCES OF THIS ACCIDEN WITH EMPLOYEES AND ADVISE THEM ABOUT THE OPERATING DANGER OF WORKING WHILE FATIGUED.

# of Addressees: 1 **Overall Date Closed:** 09/06/00

Addressee:	Union Pacific	Closed - Acceptable Action	**Date Closed:**	09/06/00

6/17/2013 3:26:06 PM

Recommendation Report

Notation Id	6899A_4	**Accident Date:**	07/02/97	**Issue Date:**	10/07/99
City/State:	DELIA, KS	**NTSB Report #:**	HZM-99-04	**Most Wanted List:**	No

ABOUT 2:15 A.M., JULY 2, 1997, WESTBOUND UNION PACIFIC RAILROAD (UP) FREIGHT TRAIN MKSNP-01, OPERATING ON A SIDING TRACK, PROCEEDED PAST A WAYSIDE STOP SIGNAL AT THE END OF THE SIDING AND COLLIDED WITH THE SIDE OF EASTBOUND UP FREIGHT TRAIN ZSEME-29, WHICH WAS OPERATING ON A MAINLINE TRACK ON THE UP RAILROAD NEAR DELIA, KANSAS. THE MKSNP-01 TRAIN ENGINEER WAS KILLED, AND THE MKSNP-01 TRAIN CONDUCTOR SUSTAINED MINOR INJURIES.

Recommendation # : R-99-061 **Overall Status:** Closed - Acceptable Action **Priority:**

THE NTSB RECOMMENDS THAT THE UNITED TRANSPORTATION UNION: IN CONJUNCTION WITH OTHER OPERATING UNIONS AND WITH THE UNION PACIFIC RAILROAD, DISCUSS THE CIRCUMSTANCES OF THIS ACCIDENT WITH YOUR MEMBERS AND ADVISE THEM ABOUT THE OPERATING DANGER OF WORKING WHILE FATIGUED.

# of Addressees: 1 **Overall Date Closed:** 10/23/03

Addressee:	United Transportation Union	Closed - Acceptable Action	**Date Closed:**	10/23/03

EXHIBIT 3

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Two freight trains collide in Missouri, bringing down overpass

Sat, May 25 2013

By Tim Bross

ST. LOUIS (Reuters) - Two freight trains collided at a rail intersection in rural Missouri on Saturday, triggering the collapse of a highway overpass when at least a dozen rail cars derailed and struck a support pillar, authorities said.

None of the seven people hurt in the fiery crash - two train workers and five occupants of two cars on the overpass - suffered life-threatening injuries, Scott County Sheriff Rick Walter said in a statement.

"One train T-boned the other one and caused it to derail, and the derailed train hit a pillar which caused the overpass to collapse," Sheriff's dispatcher Clay Slipis said of the pre-dawn crash near Chaffee, about 15 miles southwest of Cape Girardeau, in southeastern Missouri.

The collision of the BNSF Railway Co and Union Pacific trains also sparked a fire when diesel fuel leaked from one of the train engines, Slipis said.

The crash occurred just over a week after a commuter train derailed in Connecticut, striking another train and injuring more than 70 people during the evening rush hour.

On Thursday, a truck hit a bridge and triggered the partial collapse of the structure in Washington state, sending two cars plunging into the frigid Skagit River and raising concerns about the country's aging infrastructure. Three people were rescued.

In Missouri, Wayne Woods told a regional CBS affiliate that he rushed to the scene as soon as he heard the crash to try to halt traffic as he called in the emergency.

"We heard the crash and we stepped outside and my son said the overpass was down. Then we heard a car's tires squealing like it was coming to a stop and then a crash and a horn continuously blowing," he told KFVS television.

"I got over there, the train was on its side. They got the guys out and lifted them down off the train and got them off the overpass. One was kind of bloody and the other one looked like he was pretty shook up," he said.

NTSB TO INVESTIGATE

There was no immediate word on the cause of the train crash.

Robert Sumwalt, a National Transportation Safety Board member, said in a phone interview that his agency could take about a year to reach a finding on the cause of the crash.

He told reporters earlier the agency will review the railroads' operating procedures and the performance of the train crews.

Terry Williams, a spokesman for the NTSB, said that under normal circumstances a signal would halt traffic on one of the intersecting tracks.

Union Pacific said its train had been primarily carrying auto parts from Illinois to Texas when it struck the side of another train, and that a Union Pacific engineer and conductor were slightly injured, according to spokeswoman Calli Hite.

The Union Pacific locomotive and about a dozen cars derailed in the crash, she added. She said the accident was the second derailment involving one of the company's trains on the same stretch of track, and that the earlier one on January 29 was weather-related.

BNSF said its train, which was 75 cars long, had been hauling scrap metal and was heading south when it was struck, and that none of the crew was injured.

(Reporting by Eric Johnson in Seattle and Tim Bross in St. Louis; Writing by Cynthia Johnston and Alex Dobuzinskis; Editing by Peter Cooney, Dan Whitcomb and Philip Barbara)

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7 injured in Mo. train collision, overpass collapse

The National Transportation Safety Board is investigating a cargo train collision in southeast Missouri. Authorities say a highway overpass collapsed early today when rail cars slammed into one of the bridge's pillars after the collision. (May 25)

Katharine Lackey, USA TODAY 6:00 a.m. EDT May 26, 2013

Two vehicles crashed after coming upon the bridge after it had fallen.

(Photo: Cape Girardeau Fire Department)

Seven people were injured early Saturday morning in southeastern Missouri after two freight trains collided, taking out a nearby overpass.

A Union Pacific train hit a Burlington Northern Santa Fe train at a railroad intersection near Chaffee, Mo., Scott County Sheriff Rick Walter told KFVS-TV. The collision, which occurred around 2:30 a.m., caused the trains to derail and hit a pillar under the overpass, collapsing it.

There were no cars on the overpass when it collapsed, but Trooper Clark Parrott of the Missouri Highway Patrol said two vehicles crashed after coming upon the bridge after it had fallen.

Five people from those cars were taken to the hospital with arm and ankle fractures. A train conductor and locomotive engineer on the Union Pacific train were also injured.

One of the drivers, Christopher Cantrell, 22, said he didn't see the bridge had collapsed until it was too late.

All seven of the victims were treated and released by Saturday afternoon, Saint Francis Medical Center spokeswoman Felecia Blanton told the Associated Press.

Blanton said when she heard about the crash, she immediately went online and saw video footage of the scene and was bracing for the worst. She said it was "a real blessing" that the injuries were relatively minor, the most serious being a fracture.

"If you look at the pictures, they're very dramatic, and there are no serious injuries," she said. "So it's amazing."

Wayne Woods, a bystander who rushed to the scene of the crash, said, "I heard the crash and stepped outside, and my son said the overpass was down. Then we heard car's tires squealing like it was coming to a stop and a crash, and a horn continuously blowing ... When I got over there, the train was on its side."

At least a dozen Union Pacific train cars and a dozen Burlington Northern cars derailed in the accident.

The Union Pacific train was hauling auto parts from Salem, Ill., to Arlington, Texas, according to Union Pacific spokeswoman Calli Hite. The Burlington Northern train was hauling scrap metal, BNSF spokesman Andy Williams said.

The crash also ignited a fire that crews were able to extinguish quickly. The National Transportation Safety Board has been dispatched a team to investigate the incident.

The collision comes just two days after a span of an Interstate 5 bridge over the Skagit River in Washington collapsed — caused when an oversized truck hit an overhead girder — and just over a week after a commuter train derailed in Bridgeport, Conn., suspending rail service along the heavily traveled New York-Boston corridor.

Contributing: The Associated Press

NTSB investigating Oklahoma train crash

By Ron Miller, Associated Press

Recommend 3 0

OKLAHOMA CITY (AP) — Federal investigators want to know why a freight train streaking across the Oklahoma Panhandle failed to pull into a side track and instead charged down the main line and collided head-on with another train approaching from the opposite direction.

Three Union Pacific Railroad employees remained missing after the crash. The Oklahoma Highway Patrol suggested they had died, and the National Transportation Safety Board said there was "no survivable space" in the locomotives' cabins following the Sunday morning collision.

An early review found no problems with the signal system along the tracks near Goodwell, 300 miles northwest of Oklahoma City, NTSB member Mark Rosekind said Monday night. The track, too, appeared normal. The NTSB will check phone records to ensure that workers were not distracted from their duties by cellphones, and the agency also hoped to analyze data recorders similar to those found aboard airplanes, he said.

The Union Pacific trains collided just east of Goodwell, triggering a diesel-fueled fireball that appeared to weld the locomotives together. Two engineers and a conductor are missing. Rosekind referred questions to state medical officials but said there was "no survivable space" in the workers' compartments. One conductor jumped from his train and suffered only minor injuries. The NTSB plans to interview him.

The investigator said one of the trains was supposed to have been on a nearby side track as the other passed. There are sidings at Goodwell, one mile west of the accident site, and at Guymon, eight miles east, but it was unclear which train had the obligation to yield.

"One train had the right of way," Rosekind said. "We're still getting the data to figure out what was scheduled to happen. There was a side track, and we're trying to figure out who was supposed to be where and when."

The eastbound train, hauling mixed goods from Los Angeles to Chicago, had three lead locomotives and one following. The westbound, taking cars and trucks from Kansas City to Los Angeles, was pulled by two locomotives and pushed by one. Video had been recovered from the rear locomotives, and the remnants of what is believed to be one of the so-called black box data recorders has been pulled from one train.

"Those are critical to our investigations. We can ... virtually see what happened," Rosekind said in a telephone interview from Guymon.

Rosekind said the trains' brakes appeared normal and no cellphones were found in the wreckage. The NTSB would check the crew members' recent work schedules and rest

Union Pacific crews work to repair damaged track at the site of a head-on train collision near Goodwell, Okla.

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periods, and also their evaluations, he said. It was also looking into the track's speed rating after a cross-country truck driver said he was "pacing" the train at 88 mph shortly before the crash. Freight can travel at speeds of up to 80 mph, but only on tracks with the highest ratings for cargo. Passenger trains can travel faster on higher quality rails.

A preliminary report could come out within two weeks, though it could be a year before a final report is released, Rosekind said.

A witness to the accident, Gary Matthews, of Independence, Mo., said neither train blew a horn or signaled with lights as they barreled toward each other over the stark Panhandle landscape.

"I was thinking, I'm going to see a train crash unless somebody does something," Matthews said Monday in a telephone interview with The Associated Press.

Matthews was traveling from Phoenix to Missouri along U.S. 54 beside the ribbon of rail. The westbound train seemed to slow considerably before the crash, but the eastbound was still traveling at "65 or better" when the trains hit about 50 yards from him, he said.

"A blast of hot air came through the side glass, and it put a burn on you like you step out of an air-conditioned bar into 110 degrees, through the glass," he said. "There was a thud and it was over. Smoke was rolling. Smoke went up so high it was like a foundry on fire, and it was barreling straight up," he recalled.

"After I seen it, the feeling went through me, it scared the far out of me, and I didn't stop until I reached Emporia" in Kansas, about 350 miles away. He was interviewed Sunday by the Guymon Daily Herald newspaper and reached Monday by the AP.

"I didn't even stop," Matthews said, as he recalled watching the scene unfold in his rearview mirror.

Betsy Randolph, a trooper with the Oklahoma Highway Patrol, described a "tangled, mangled burning mess."

"They have to let the metal cool ... to see if they can get in there and find the bodies of the missing, and that may never happen," said Randolph.

The United Transportation Union identified those aboard the trains as conductor Brian L. Stone, 50, of Dalhart, Texas; engineers Dan Hall and John Hall; and conductor Juan Zurita, who escaped virtually uninjured. The Halls are not related.

Rosekind said the NTSB wanted to interview Zurita and said the conductor will not see federal sanctions for abandoning the train when an accident was imminent.

Rosekind said railroads may have their own policies. Union Pacific declined to comment, citing the federal investigation.

Workers toilled Monday in an effort to restore the line to a working condition. In the meantime, rail traffic southwest from Guymon was shut down.

"It will be a slight inconvenience," said Scott Robertson, the superintendent at Farmers Elevator Inc. in Goodwell. "The wheat harvest is nearly done, and I haven't seen anything at any of the elevators around here sending (wheat) out. It's going to delay some deliveries, but it's not going to have that much of an impact."

Many freight lines don't run on a set schedule and the number of trains through an area can vary from day to day, said Rob Kulat, a spokesman with the railroad administration. He and railroad officials referred questions to the NTSB.

Associated Press writer Justin Juozapavicius contributed to this report from Tulsa, Okla.

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Print this article

Scene of Train Accident Clear; Questions Remain

Originally printed at http://www.northlandsnewscenter.com/news/iron-range/Scene-of-Train-Accident-Clear-Questions-Remain-104181349.html

By KBJR News 1
October 1, 2010

Two rail workers remain hospitalized today after a frightening train collision near two harbors yesterday.

Three men were treated for more minor injuries and have been released.

Meanwhile the site of the head on train collision has been cleaned up just 24 hours after the accident but serious questions remain about how this accident could have happened.

Around four Thursday afternoon, two CN trains collided head on.
Five people were on the trains, three of whom were treated and released from a Two Harbors hospital.

Two others remain hospitalized in Duluth.

Two empty cars derailed and 15 cars, carrying taconite pellets, derailed, spilling their loads.

The locomotives also derailed suffering some damage.

At least one was leaking oil.

By Friday though, the scene is much different.

CN crews have been at the location near the Boomer Crossing north of Two Harbors, throughout the night, and have successfully cleaned up the wreckage.

And in fact the rail line is repaired and trains have been traveling on it.

CN spokesperson Patrick Waldron said "A significant number of heavy equipment has been deployed to the scene and has been working throughout the night to re-rail or remove the cars."

The Federal Railroad Administration and the National Transportation and Safety Board, however, remain on the scene.

CN has issued no statements regarding what may have caused the collision.

Waldron said "The cause of this accident remains under investigation, by CN and that investigation has been joined by the FRA and the National Transportation and Safety Board, and those two agencies have representatives on site."

Neither the Federal Railroad Administration nor the NTSB have released any preliminary reports on what may have caused this collision, only saying the investigation is ongoing.

However according to a report by Trains-Dot-Com it says CN is blaming the accident on employee failure but the report did not go into detail as to the nature of that alleged failure.

NTSB blames crew error for 2010 train crash in northeastern Minnesota

Associated Press TwinCities.com-Pioneer Press
Posted:

TwinCities.com

Crew error likely is to blame for a head-on collision between two Canadian National freight trains that injured all five crew members in northeastern Minnesota in 2010, federal investigators said Tuesday.

The National Transportation Safety Board issued its report on the Sept. 30, 2010, crash north of Two Harbors that derailed three locomotives and 14 rail cars and caused an estimated $8.1 million in damage.

The NTSB concluded the probable cause was the southbound train crew's error in leaving a siding before the northbound train had passed.

The southbound train pulling 116 cars loaded with iron ore pellets did not have authority to operate on the single main track and the northbound train pulling 118 empty cars did have authority, the report found. The southbound train was supposed to wait until the northbound train had passed but did not, the report concluded.

According to the report, the trains were operating on a track with no wayside signals to tell engineers whether the track ahead is clear or occupied by another train or work crews. Engineers operating in so-called "dark territory" must rely solely on train dispatchers.

The NTSB also noted crew fatigue and "inadequate crew resource management" contributed to the crash, WDIO-TV reported. The board said the use of cellphones by crew members on the southbound train and by the engineer on the northbound train "was a distraction to the safe operation of both trains and an indication of a clear disregard" for CN rules and Federal Railroad Administration regulations.

The report said the mechanical condition of the trains, the weather, drug or alcohol impairments, and the actions of the northbound train crew were not factors in the accident.

CN will review the NTSB's recommendations and prepare a response, said Patrick Waldron, a spokesman for the railroad.

EXHIBIT 4

NTSB Most Wanted List

Critical changes needed to reduce transportation accidents and save lives.

Implement Positive Train Control Systems

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating every civil aviation accident the United States and significant accidents in other modes of transportation – railroad, highway, marine and pipeline. The NTSB determines the probable cause of the accidents and issues safety recommendations aimed at preventing future accidents. In addition, the NTSB carries out special studies concerning transportation safety and coordinates the resources of the Federal Government and other organizations to provide assistance to victims and their family members impacted by major transportation disasters.

National Transportation Safety Board

WWW.NTSB.GOV/MOSTWANTED

Implement Positive Train Control Systems

What is the issue?

Trains are a part of daily life, whether transporting passengers or cargo. But we do not have to accept train accidents as a given, particularly those involving head-on collisions. Such collisions are often due to human factors, such as fatigue, sleeping disorders, use of medications, and distractions. Fatigue played a role in a July 2005 train collision in Anding, Mississippi, that killed all four operators. In May 2008 in Newton, Massachusetts, the operator of a transit train was killed after she fell into a microsleep and her train collided with another train. And once again, in April 2011 near Red Oak, Iowa, fatigue was the issue when two trains collided, killing two crew members.

What can be done...

Although human error cannot be eradicated, there is technology capable of supplementing the human operation of trains—positive train control. Such systems provide a safety redundancy by slowing or stopping a train that is not being operated in accordance with signal systems and operating rules, as was the case in every accident listed above. Positive train control prevents train-to-train collisions and overspeed derailments. For years, it has been in place on Amtrak trains in the Northeast, but for positive train control to reach its greatest safety potential, it must be implemented on all passenger and freight trains. With this technology, even if the train operator has fallen asleep or is distracted in some way, human lives will not be at risk.

Statistics

Although legislation enacted in the aftermath of the Chatsworth, California, collision mandated positive train control systems for certain railroad lines by 2015, as of March 9, 2011, 10,000 miles of these tracks were exempt from this mandate—which is a troubling fact. Since 2005, the NTSB has investigated 15 accidents in which 50 people were killed and 942 people were injured. In each of these accidents, the NTSB concluded that PTC would have provided critical redundancy that would have prevented the accident.

Picture from Landsirsea.com

For more information, visit **www.ntsb.gov/mostwanted**

National Transportation Safety Board

EXHIBIT 5

6/17/2013 10:44:27 AM

Recommendation Report

Mode: Rail NTSB Report #: Recommendation Text: positive train control

Notation Id	7339A_1	**Accident Date:**	01/17/99	**Issue Date:**	06/12/01
City/State:	BRYAN, OH	**NTSB Report #:**	RAR-01-01	**Most Wanted List:**	No

ABOUT 1:58 A.M. EASTERN STANDARD TIME ON 1/17/99, THREE CONSOLIDATED RAIL CORPORATION (CONRAIL) FREIGHT TRAINS OPERATING IN FOG ON A DOUBLE MAIN TRACK WERE INVOLVED IN AN ACCIDENT NEAR BRYAN, OHIO. WESTBOUND MAIL-9, TRAVELING NEAR MAXIMUM AUTHORIZED SPEED ON TRACK NO. 1, STRUCK THE REAR OF A SLOWER MOVING WESTBOUND TRAIN, TV-7, AT MILEPOST (MP) 337.22. THE COLLISION CAUSED THE DERAILMENT OF THE 3 LOCOMOTIVES UNITS AND THE FIRST 13 CARS OF MAIL-9 AND THE LAST 3 CARS OF TV-7. THE DERAILED EQUIPMENT FOULED THE NO. 2 TRACK AREA AND STRUCK THE 12TH CAR OF TRAIN MGL-16, WHICH WAS OPERATING EASTBOUND ON THE ADJACENT TRACK. THE IMPACT CAUSED 18 CARS IN THE MGL-16 CONSIST TO DERAIL. THE ENGINEER AND CONDUCTOR OF MAIL-9 WERE KILLED IN THE ACCIDENT. THE CREWMEMBERS OF TV-7 AND MGL-16 WERE NOT INJURED. TOTAL ESTIMATED DAMAGES WERE $5.3 MILLION.

Recommendation # :	R-01-006	**Overall Status:**	Closed--No Longer Applicable	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Facilitate actions necessary for development and implementation of positive train control systems that include collision avoidance, and require implementation of positive train control systems on main line tracks, establishing priority requirements for high-risk corridors such as those where commuter and intercity passenger railroads operate. (Supersedes R-93-12, R-87-16, R-97-13)

# of Addressees:	1		**Overall Date Closed:**	12/09/08	
Addressee:	FRA	Closed--No Longer Applicable		**Date Closed:**	12/09/08

6/17/2013 10:44:27 AM

Recommendation Report

Notation Id	7411_1	**Accident Date:**	02/05/01	**Issue Date:**	12/20/01
City/State:	Syracuse, NY	**NTSB Report #:**	RAR-01-04	**Most Wanted List:**	No

At about 11:40 a.m., eastern standard time, on February 5, 2001, eastbound Amtrak train 286, with 100 passengers and 4 crewmembers, struck the rear of eastbound CSX Transportation (CSXT) freight train Q620 on the CSXT railroad near Syracuse, New York. On impact, the lead Amtrak locomotive unit and four of the train's five cars derailed. The rear truck of the last car of the 92-car CSXT freight train derailed, and the car lost a portion of its load of lumber. At the time of impact, the passenger train was traveling 35 mph; the freight train was traveling 7 mph. The accident resulted in injuries to all 4 crewmembers and 58 of the passengers aboard the Amtrak train. No CSXT crewmember was injured. A small amount of diesel fuel spilled from the fuel tank on the lead Amtrak locomotive unit, but no fire resulted. Total damages were estimated to be about $280,600.

Recommendation # :	R-01-021	**Overall Status:**	Closed - Acceptable Action	**Priority:**	

The NTSB recommends that the Federal Railroad Administration: Evaluate the applicability to U.S. operations of the safety requirements established by Transport Canada for lone-engineer operation on the Quebec North Shore & Labrador Railway, and implement any found to have interim utility for U.S. passenger trains that operate in areas now lacking a system of positive train control.

# of Addressees:	1		**Overall Date Closed:**	04/01/05	
Addressee:	FRA	Closed - Acceptable Action		**Date Closed:**	04/01/05

6/17/2013 10:44:27 AM

Recommendation Report

Notation Id	7558_1	**Accident Date:**	05/28/02	**Issue Date:**	06/13/03
City/State:	Clarendon, TX	**NTSB Report #:**	RAR-03-01	**Most Wanted List:**	No

At 8:57 a.m., central daylight time, on May 28, 2002, an eastbound Burlington Northern Santa Fe (BNSF) coal train collided head on with a westbound BNSF intermodal train near Clarendon, Texas. Both trains had a crew of two, and all crewmembers jumped from their trains before the impact. The conductor and engineer of the coal train received critical injuries. The conductor of the intermodal train received minor injuries; the engineer of the intermodal train was fatally injured. The collision resulted in a subsequent fire that damaged or destroyed several
of the locomotives and other railroad equipment. Damages exceeded $8 million.

Recommendation # :	R-03-002	**Overall Status:**	Closed - Unacceptable Action	**Priority:**	

The National Transportation Safety Board makes the following safety recommendations to the Federal Railroad Administration: In territory not equipped with a positive train control system, restrict the issuance of track warrant authority that contains an after-arrival requirement to trains that have stopped at the location at which they will meet the opposing train.

# of Addressees:	1		**Overall Date Closed:**	08/06/04	
Addressee:	FRA	Closed - Unacceptable Action		**Date Closed:**	08/06/04

6/17/2013 10:44:27 AM

Recommendation Report

Notation Id	7558_2	**Accident Date:**	05/28/02	**Issue Date:**	06/13/03
City/State:	Clarendon, TX	**NTSB Report #:**	RAR-03-01	**Most Wanted List:**	No

At 8:57 a.m., central daylight time, on May 28, 2002, an eastbound Burlington Northern Santa Fe (BNSF) coal train collided head on with a westbound BNSF intermodal train near Clarendon, Texas. Both trains had a crew of two, and all crewmembers jumped from their trains before the impact. The conductor and engineer of the coal train received critical injuries. The conductor of the intermodal train received minor injuries; the engineer of the intermodal train was fatally injured. The collision resulted in a subsequent fire that damaged or destroyed several
of the locomotives and other railroad equipment. Damages exceeded $8 million.

Recommendation # :	R-03-003	**Overall Status:**	Closed - Reconsidered	**Priority:**	

The National Transportation Safety Board makes the following safety recommendation to the General Code of Operating Rules Committee: Add language to the track warrant rules to ensure that in territory not equipped with a positive train control system, track warrant authority that contains an after-arrival requirement is issued only to trains that have stopped at the location at which they will meet the opposing train.

# of Addressees:	1		**Overall Date Closed:**	11/15/06	
Addressee:	General Code of Operating Rules Committee	Closed - Reconsidered		**Date Closed:**	11/15/06

6/17/2013 10:44:27 AM

Recommendation Report

Notation Id	7590_3	**Accident Date:**	04/23/02	**Issue Date:**	11/06/03
City/State:	Placentia, CA	**NTSB Report #:**	RAR-03-04	**Most Wanted List:**	No

On Tuesday, April 23, 2002, about 8:10 a.m. Pacific daylight time, eastbound BNSF freight train PLACCLO3-22 collided head on with standing westbound Southern California Regional Rail Authority (Metrolink) passenger train 809 on the No. 2 track at Control Point (CP) Atwood in Placentia, California. Emergency response agencies reported that 162 persons were transported to local hospitals. There were two fatalities. Damage was estimated at $4.6 million.

Recommendation # :	R-03-023	**Overall Status:**	Closed - Acceptable Action	**Priority:**	

The National Transportation Safety Board makes the following safety recommendation to the Association of American Railroads: Report to the National Transportation Safety Board the milestones and activities needed for completion of the interoperability standards for positive train control systems and your priorities for completion of this effort.

# of Addressees:	1		**Overall Date Closed:**	10/07/05	
Addressee:	Association of American Railroads	Closed - Acceptable Action		**Date Closed:**	10/07/05

6/17/2013 10:44:27 AM

Recommendation Report

Notation Id	7615A_1	**Accident Date:**	10/12/03	**Issue Date:**	11/23/05
City/State:	Chicago, Ill	**NTSB Report #:**	RAR-05-03	**Most Wanted List:**	No

On October 12, 2003, about 4:38 p.m., central daylight time, westbound Northeast Illinois Regional Commuter Railroad (Metra) train 519 derailed its two locomotives and five passenger cars as it traversed a crossover from track 1 to track 2 near Control Point 48th Street in Chicago, Illinois. The train derailed at a recorded speed of about 68 mph. The maximum authorized speed through the crossover was 10 mph. There were about 375 passengers and a crew of 3 on board. As a result of the accident, 47 passengers were transported to eight local hospitals. Of these, 44 were treated and released, and 3 were admitted for observation. Damages from the accident exceeded $5 million.

Recommendation # :	R-05-010	**Overall Status:**	Closed - Unacceptable Action	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require train crews to call out all signal indications over the radio, including clear signals, at all locations that are not equipped with automatic cab signals with enforcement or a positive train control system.

# of Addressees:	1		**Overall Date Closed:**	07/19/12	
Addressee:	FRA	Closed - Unacceptable Action		**Date Closed:**	07/19/12

6/17/2013 10:44:27 AM

Recommendation Report

Notation Id	7615A_3	**Accident Date:**	10/12/03	**Issue Date:**	11/23/05
City/State:	Chicago, IL	**NTSB Report #:**	RAR-05-03	**Most Wanted List:**	No

On October 12, 2003, about 4:38 p.m., central daylight time, westbound Metra train 519 derailed its two locomotives and five passenger cars as it traversed a crossover from track 1 to track 2 near Control Point 48th Street in Chicago, Illinois. The train derailed at a recorded speed of about 68 mph. The maximum authorized speed through the crossover was 10 mph. There were about 375 passengers and a crew of 3 on board. As a result of the accident, 47 passengers were transported to eight local hospitals. Of these, 44 were treated and released, and 3 were admitted for observation. Damages from the accident exceeded $5 million.

Recommendation # :	R-05-012	**Overall Status:**	Closed - Acceptable Alternate Action	**Priority:**	CLASS II

Based on its investigation of the October 12, 2003, Metra train derailment in Chicago, Illinois, the National Transportation Safety Board makes the following safety recommendations to Metra: Require your train crews to call out all signal indications over the radio, including clear signals, at all locations that are not equipped with automatic cab signals with enforcement or a positive train control system.

# of Addressees:	1		**Overall Date Closed:**	11/28/06	
Addressee:	Metra (Northeast Illinois Regional Railroad Corporation)	Closed - Acceptable Alternate Action		**Date Closed:**	11/28/06

6/17/2013 10:44:28 AM

Recommendation Report

Notation Id	7615A_2	**Accident Date:**	10/12/03	**Issue Date:**	11/23/05
City/State:	Chicago, IL	**NTSB Report #:**	RAR-05-03	**Most Wanted List:**	No

On October 12, 2003, about 4:38 p.m., central daylight time, westbound Metra train 519 derailed its two locomotives and five passenger cars as it traversed a crossover from track 1 to track 2 near Control Point 48th Street in Chicago, Illinois. The train derailed at a recorded speed of about 68 mph. The maximum authorized speed through the crossover was 10 mph. There were about 375 passengers and a crew of 3 on board. As a result of the accident, 47 passengers were transported to eight local hospitals. Of these, 44 were treated and released, and 3 were admitted for observation. Damages from the accident exceeded $5 million.

Recommendation # :	R-05-013	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO METRA (NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD):
Install a positive train control system on your commuter train routes.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	Metra (Northeast Illinois Regional Railroad Corporation)	Open - Acceptable Response		**Date Closed:**	N/A

6/17/2013 10:44:28 AM

Recommendation Report

Notation Id	7746A	**Accident Date:**	09/17/05	**Issue Date:**	12/22/05
City/State:	Chicago, IL	**NTSB Report #:**		**Most Wanted List:**	No

In the October 12, 2003, accident, westbound Metra train 519 derailed about 4:38 p.m. while operating at 68 mph as it traversed a crossover from track 1 to track 2 in the vicinity of Control Point 48th (CP 48) Street in Chicago, Illinois. The entire train, operating with two locomotives in the lead and five passenger cars, derailed. The maximum authorized speed through the crossover was 10 mph. There were about 375 passengers and a crew of 3 on board. As a result of the accident, 47 injured passengers were transported to eight local hospitals. Of these, 44 were treated and released, and 3 were admitted for observation. Damages from the accident exceeded $5 million.
In the September 17, 2005, accident, eastbound Metra train 504 derailed about 8:35 a.m., central daylight time, while operating at a speed of about 69 mph as it traversed the crossover in the vicinity of CP 48. The entire train, operating in the push-mode, was comprised of five cars and one locomotive at the rear. The train derailed as it traversed the crossover routing the train from track 2 to track 1. The crossover had a prescribed operating speed of 10 mph. The fourth car from the head end of the train struck a steel girder of a bridge that carried the tracks over 47th Street. Metra reported that there were 185 passengers on the train; 129 were injured and required medical attention. Of those, 38 were seriously injured and required hospitalization and 2 were fatally injured.

Recommendation # :	R-05-018	**Overall Status:**	Closed - Unacceptable Action	**Priority:**	CLASS I

The National Transportation Safety Board recommends that the Northeast Illinois Regional Commuter Railroad Corporation: Install an automatic train control system with cab signals and train control enforcement over the entire Joliet Sub District, until a positive train control system is installed. (Urgent)

# of Addressees:	1		**Overall Date Closed:**	11/28/06	
Addressee:	Metra (Northeast Illinois Regional Railroad Corporation)	Closed - Unacceptable Action		**Date Closed:**	11/28/06

6/17/2013 10:44:28 AM

Recommendation Report

Notation Id	7793A_1	**Accident Date:**	05/19/04	**Issue Date:**	06/29/06
City/State:	Gunter, TX	**NTSB Report #:**	RAR-06-02	**Most Wanted List:**	No

About 5:46 p.m., central daylight time, on May 19, 2004, two BNSF Railway Company (BNSF) freight trains collided head on near Gunter, Texas. The southbound train, BNSF 6789 South, was traveling about 37 mph, and the northbound train, BNSF 6351 North, was traveling about 40 mph when the collision occurred. The trains were being operated under track warrant control rules on non-signaled single track. The collision resulted in the derailment of 5 locomotives and 28 cars. About 3,000 gallons of diesel fuel were released from the locomotives and resulted in a fire. The southbound train engineer was killed, and the southbound train conductor was airlifted to a hospital in Dallas with serious burns. The crewmembers on the northbound train were transported to a local hospital, where they were admitted. Estimated property damages exceeded $2 million.

Recommendation # :	R-06-010	**Overall Status:**	Open - Unacceptable Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Prohibit the use of after-arrival track warrants for train movements in dark (non-signaled) territory not equipped with a positive train control system.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	FRA	Open - Unacceptable Response		**Date Closed:**	N/A

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Recommendation Report

Notation Id	7793A_2	**Accident Date:**	05/19/04	**Issue Date:**	06/29/06
City/State:	Gunter, TX	**NTSB Report #:**	RAR-06-02	**Most Wanted List:**	No

About 5:46 p.m., central daylight time, on May 19, 2004, two BNSF Railway Company (BNSF) freight trains collided head on near Gunter, Texas. The southbound train, BNSF 6789 South, was traveling about 37 mph, and the northbound train, BNSF 6351 North, was traveling about 40 mph when the collision occurred. The trains were being operated under track warrant control rules on non-signaled single track. The collision resulted in the derailment of 5 locomotives and 28 cars. About 3,000 gallons of diesel fuel were released from the locomotives and resulted in a fire. The southbound train engineer was killed, and the southbound train conductor was airlifted to a hospital in Dallas with serious burns. The crewmembers on the northbound train were transported to a local hospital, where they were admitted. Estimated property damages exceeded $2 million.

Recommendation # :	R-06-012	**Overall Status:**	Closed - Unacceptable Action	**Priority:**	CLASS II

TO THE BURLINGTON NORTHERN SANTA FE RAILWAY COMPANY: Discontinue the use of after-arrival track warrants for train movements in dark (non-signaled) territory not equipped with a positive train control system.

# of Addressees:	1		**Overall Date Closed:**	05/23/13	
Addressee:	BNSF Railway Company (formerly Burlington Northern and Santa Fe Railway Company)	Closed - Unacceptable Action		**Date Closed:**	05/23/13

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Recommendation Report

Notation Id	7793A_3	**Accident Date:**	05/19/04	**Issue Date:**	06/29/06
City/State:	Gunter, TX	**NTSB Report #:**	RAR-06-02	**Most Wanted List:**	No

About 5:46 p.m., central daylight time, on May 19, 2004, two BNSF Railway Company (BNSF) freight trains collided head on near Gunter, Texas. The southbound train, BNSF 6789 South, was traveling about 37 mph, and the northbound train, BNSF 6351 North, was traveling about 40 mph when the collision occurred. The trains were being operated under track warrant control rules on non-signaled single track. The collision resulted in the derailment of 5 locomotives and 28 cars. About 3,000 gallons of diesel fuel were released from the locomotives and resulted in a fire. The southbound train engineer was killed, and the southbound train conductor was airlifted to a hospital in Dallas with serious burns. The crewmembers on the northbound train were transported to a local hospital, where they were admitted. Estimated property damages exceeded $2 million.

Recommendation # :	R-06-013	**Overall Status:**	Open - Unacceptable Response	**Priority:**	CLASS II

The National Transportation Safety Board recommends that the Association of American Railroads and the American Short Line and Regional Railroad Association: Encourage your members to discontinue the use of after-arrival track warrants for train movements in dark (non-signaled) territory not equipped with a positive train control system.

# of Addressees:	2		**Overall Date Closed:**	N/A	
Addressee:	American Short Line and Regional Railroad Association	Open - Unacceptable Response		**Date Closed:**	N/A
Addressee:	Association of American Railroads	Closed - Acceptable Action		**Date Closed:**	08/19/10

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Recommendation Report

Notation Id	7870A_1	**Accident Date:**	07/10/05	**Issue Date:**	04/25/07
City/State:	Anding, MS	**NTSB Report #:**	RAR-07-01	**Most Wanted List:**	No

On Sunday, July 10, 2005, about 4:15 a.m., central daylight time, two CN freight trains collided head on in Anding, Mississippi. The collision occurred on the CN Yazoo Subdivision, where the trains were being operated under a centralized traffic control signal system on single track. Signal data indicated that the northbound train, IC2 1013 North, continued past a stop (red) signal at North Anding and collided with the southbound train, IC 1023 South, about 1/4 mile beyond the signal. The collision resulted in the derailment of 6 locomotives and 17 cars. About 15,000 gallons of diesel fuel were released from the locomotives and resulted in a fire that burned for about 15 hours. Two crewmembers were on each train; all four were killed. As a precaution, about 100 Anding residents were evacuated; they did not report any injuries. Property damages exceeded $9.5 million; clearing and environmental cleanup costs totaled about $616,800.

Recommendation # :	R-07-001	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require railroads to ensure that the lead locomotives used to operate trains on tracks not equipped with a positive train control system are equipped with an alerter.

# of Addressees:	1		**Overall Date Closed:**	04/24/12	
Addressee:	FRA	Closed - Acceptable Action		**Date Closed:**	04/24/12

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Recommendation Report

Notation Id	7870A_4	**Accident Date:**	07/10/05	**Issue Date:**	04/25/07
City/State:	Anding, MS	**NTSB Report #:**	RAR-07-01	**Most Wanted List:**	No

On Sunday, July 10, 2005, about 4:15 a.m., central daylight time, two CN freight trains collided head on in Anding, Mississippi. The collision occurred on the CN Yazoo Subdivision, where the trains were being operated under a centralized traffic control signal system on single track. Signal data indicated that the northbound train, IC2 1013 North, continued past a stop (red) signal at North Anding and collided with the southbound train, IC 1023 South, about 1/4 mile beyond the signal. The collision resulted in the derailment of 6 locomotives and 17 cars. About 15,000 gallons of diesel fuel were released from the locomotives and resulted in a fire that burned for about 15 hours. Two crewmembers were on each train; all four were killed. As a precaution, about 100 Anding residents were evacuated; they did not report any injuries. Property damages exceeded $9.5 million; clearing and environmental cleanup costs totaled about $616,800.

Recommendation # :	R-07-007	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE CANADIAN NATIONAL RAILWAY: Develop and implement a positive train control system that includes collision avoidance capabilities on main line tracks, establishing priority requirements for high-risk corridors such as those where passenger trains operate.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	Canadian National Railway	Open - Acceptable Response		**Date Closed:**	N/A

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Recommendation Report

Notation Id	7870A_5	**Accident Date:**	07/10/05	**Issue Date:**	04/25/07
City/State:	Anding, MS	**NTSB Report #:**	RAR-07-01	**Most Wanted List:**	No

On Sunday, July 10, 2005, about 4:15 a.m., central daylight time, two CN freight trains collided head on in Anding, Mississippi. The collision occurred on the CN Yazoo Subdivision, where the trains were being operated under a centralized traffic control signal system on single track. Signal data indicated that the northbound train, IC2 1013 North, continued past a stop (red) signal at North Anding and collided with the southbound train, IC 1023 South, about 1/4 mile beyond the signal. The collision resulted in the derailment of 6 locomotives and 17 cars. About 15,000 gallons of diesel fuel were released from the locomotives and resulted in a fire that burned for about 15 hours. Two crewmembers were on each train; all four were killed. As a precaution, about 100 Anding residents were evacuated; they did not report any injuries. Property damages exceeded $9.5 million; clearing and environmental cleanup costs totaled about $616,800.

Recommendation # :	R-07-008	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO ALL CLASS I RAILROADS: Ensure that alerters are installed on all your lead locomotives used to operate trains on tracks not equipped with a positive train control system.

# of Addressees:	7		**Overall Date Closed:**	N/A	
Addressee:	BNSF Railway Company (formerly Burlington Northern and Santa Fe Railway Company)	Closed - Reconsidered		**Date Closed:**	10/05/07
Addressee:	Canadian National Railway	Closed - Acceptable Action		**Date Closed:**	06/22/11
Addressee:	Canadian Pacific Railway	Open - Acceptable Response		**Date Closed:**	N/A
Addressee:	CSX Transportation, Inc.	Closed - Acceptable Action		**Date Closed:**	05/11/10
Addressee:	Kansas City Southern Railway Company	Closed - Acceptable Action		**Date Closed:**	04/24/12
Addressee:	Norfolk Southern Corporation	Closed - Reconsidered		**Date Closed:**	02/29/08
Addressee:	Union Pacific	Closed - Acceptable Action		**Date Closed:**	08/19/10

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Recommendation Report

Notation Id	8126_1	**Accident Date:**	05/28/08	**Issue Date:**	07/23/09
City/State:	Newton, MA	**NTSB Report #:**	RAR-09-02	**Most Wanted List:**	No

On May 28, 2008, about 5:51 p.m., eastern daylight time, westbound Massachusetts Bay Transportation Authority (MBTA) Green Line train 3667, traveling about 38 mph, struck the rear of westbound Green Line train 3681, which had stopped for a red signal. The accident occurred in Newton, Massachusetts, a suburb of Boston. Each train consisted of two light rail trolley cars and carried two crewmembers—a train operator at the front of the lead car and a trail operator in the second car. The operator of the striking train was killed; the other three crewmembers sustained minor injuries. An estimated 185 to 200 passengers were on the two trains at the time of the collision. Of these, four sustained minor injuries, and one was seriously injured. Total damage was estimated to be about $8.6 million.

Recommendation # :	R-09-008	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE FEDERAL TRANSIT ADMINISTRATION: Facilitate the development and implementation of positive train control systems for rail transit systems nationwide.

# of Addressees:	1			**Overall Date Closed:**	N/A
Addressee:	FTA	Open - Acceptable Response		**Date Closed:**	N/A

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Recommendation Report

Notation Id	8126_2	**Accident Date:**	05/28/09	**Issue Date:**	07/23/09
City/State:	Newton, MA	**NTSB Report #:**	RAR-09-02	**Most Wanted List:**	No

On May 28, 2008, about 5:51 p.m., eastern daylight time, westbound MBTA Green Line train 3667, traveling about 38 mph, struck the rear of westbound MBTA Green Line train 3681, which had stopped for a red signal. The accident occurred in Newton, Massachusetts, a suburb of Boston. Each train consisted of two light rail trolley cars and carried two crewmembers—a train operator at the front of the lead car and a trail operator in the second car. The operator of the striking train was killed; the other three crewmembers sustained minor injuries. An estimated 185 to 200 passengers were on the two trains at the time of the collision. Of these, four sustained minor injuries, and one was seriously injured. Total damage was estimated to be about $8.6 million.

Recommendation # :	R-09-014	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE MASSCHUSETTS BAY TRANSPORTATION AUTHORITY: Develop and implement a positive train control system for all of your rail lines.

# of Addressees:	1			**Overall Date Closed:**	N/A
Addressee:	Massachusetts Bay Transportation Authority	Open - Acceptable Response		**Date Closed:**	N/A

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Recommendation Report

Notation Id	8400A	**Accident Date:**	04/17/11	**Issue Date:**	05/10/12
City/State:	Red Oak, IA	**NTSB Report #:**	RAR-12-02	**Most Wanted List:**	No

On April 17, 2011, about 6:55 a.m. central daylight time, eastbound BNSF Railway (BNSF) coal train C-BTMCNMO-26, BNSF 9159 East, travelling about 23 mph, collided with the rear end of standing BNSF maintenance-of-way (MOW) equipment train U-BRGCRI-15, BNSF 9470 East, near Red Oak, Iowa. The accident occurred near milepost (MP) 448.3 on main track number two on the Creston Subdivision of the BNSF Nebraska Division. The collision resulted in the derailment of 2 locomotives and 12 cars. As a result of collision forces, the lead locomotive's modular crew cab was detached, partially crushed, and involved in a subsequent diesel fuel fire. Both crewmembers on the striking train were fatally injured. Damage was in excess of $8.7 million. The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the failure of the crew of the striking train to comply with the signal indication requiring them to operate in accordance with restricted speed requirements and stop short of the standing train because they had fallen asleep due to fatigue resulting from their irregular work schedules and their medical conditions. Contributing to the accident was the absence of a positive train control system that identifies the rear of a train and stops a following train if a safe braking profile is exceeded. Contributing to the severity of collision damage to the locomotive cab of the striking coal train was the absence of crashworthiness standards for modular locomotive crew cabs.

Recommendation # :	R-12-020	**Overall Status:**	Open - Await Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require the use of positive train control technologies that will detect the rear of trains and prevent rear-end collisions.

# of Addressees:	1			**Overall Date Closed:**	N/A
Addressee:	FRA	Open - Await Response		**Date Closed:**	N/A

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Recommendation Report

Notation Id	8396	**Accident Date:**	07/14/09	**Issue Date:**	05/24/12
City/State:	Bettendorf, IA	**NTSB Report #:**	RAR-12-03	**Most Wanted List:**	No

On July 14, 2009, about 2:08 a.m., central daylight time,1 Dakota, Minnesota & Eastern Railroad (DME) freight train B61-13, consisting of two locomotives and 83 railcars, was operating southboundF F under track warrant authority4 in non-signaled territory on the main track when it went into Bettendorf Yard via the misaligned north yard hand-operated switch. Event recorder data showed that the train was operating at 25 mph before the DME train's engineer activated the emergency brakes as the train entered the yard. However, the braking action was only able to slow the train to about 21 mph before it struck 19 loaded railcars on yard track No. 3, derailing 4 of those railcars, in addition to derailing 9 railcars and the 2 locomotives on the DME train. The engineer and the conductor on DME train B61-13 sustained fatal injuries.

The north yard hand-operated switch had been left incorrectly lined from the main track onto the yard track by the crew of BNSF Railway local train RCHI4274-13I (BNSF local). The collision occurred on the DME Davenport Subdivision, near milepost (MP) 187.8 in Bettendorf, Iowa. Train movements were authorized by track warrants issued by a DME train dispatcherF F located in Sioux Falls, South Dakota. The maximum authorized speed for the main track in the Bettendorf area was 25 mph. There was no signal system to govern train movements or convey information regarding the north yard hand-operated switch position.

The NTSB determined that the probable cause of the accident was the BNSF Railway local train RCHI4274-13I crew releasing track warrant authority before returning the north yard hand-operated switch to the correct position. Contributing to the accident was the dispatcher for DME, granting track warrant authority to DME train B61-13 without holding a job briefing, which would confirm the accurate positions of all applicable main track switches. Also contributing to the accident was a hand-operated switch position reflector target that could not be observed by the crew of train B61-13 at a sufficient distance to stop the train and avoid the accident.

Recommendation # :	R-12-027	**Overall Status:**	Open - Unacceptable Response	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require railroads to install, along main lines in non-signaled territory not equipped with positive train control, appropriate technology that warns approaching trains of incorrectly lined main track switches sufficiently in advance to permit stopping.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	FRA	Open - Unacceptable Response		**Date Closed:**	N/A

Recommendation # :	R-12-028	**Overall Status:**	Closed - Reconsidered	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Revise Title 49 Code of Federal Regulations Section 218.105(d)(1) to require that, until the appropriate switch position technology is installed on main track switches in non-signaled territories that are not equipped with positive train control, train crews releasing track authority to the dispatcher must hold job briefings with the dispatcher and clearly convey the position of all main track switches that were used prior to releasing track warrant authority.

# of Addressees:	1		**Overall Date Closed:**	04/18/13	
Addressee:	FRA	Closed - Reconsidered		**Date Closed:**	04/18/13

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Recommendation Report

Recommendation # :	R-12-029	**Overall Status:**	Closed - Reconsidered	**Priority:**	CLASS II

TO THE FEDERAL RAILROAD ADMINISTRATION: Require that until appropriate switch position warning technology is installed on main track switches (in non-signaled territory not equipped with positive train control), when a main track switch has been reported relined for a main track, the next train to pass the location approach the switch location at restricted speed. That train crew should then report to the dispatcher that the switch is correctly lined for the main track before trains are allowed to operate at maximum authorized speed.

# of Addressees:	1		**Overall Date Closed:**	04/18/13	
Addressee:	FRA	Closed - Reconsidered		**Date Closed:**	04/18/13

Recommendation # :	R-12-031	**Overall Status:**	Open - Acceptable Response	**Priority:**	CLASS II

TO THE CANADIAN PACIFIC RAILWAY: Require that until appropriate switch position warning technology is installed on main track switches (in non-signaled territory not equipped with positive train control), when a main track switch has been reported relined for a main track, the next train to pass the location approach the switch location at restricted speed. That train crew should then report to the dispatcher that the switch is correctly lined for the main track before trains are allowed to operate at maximum authorized speed.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	Canadian Pacific Railway	Open - Acceptable Response		**Date Closed:**	N/A

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Recommendation Report

Notation Id	8464	**Accident Date:**	09/30/10	**Issue Date:**	03/08/13
City/State:	Two Harbors, MN	**NTSB Report #:**	RAR-13-01	**Most Wanted List:**	No

On September 30, 2010, about 4:05 p.m. central daylight time, a southbound Canadian National Railway freight train collided head on with a northbound Canadian National Railway freight train near Two Harbors, Minnesota. The collision occurred near milepost 13.5 on Canadian National Railway's Iron Range Subdivision. The trains were operating in nonsignaled territory. The northbound train had 118 empty iron ore railcars and had authority to operate on the single main track. The southbound train had 116 railcars loaded with iron ore and did not have authority to operate on the single main track. The crew of the southbound train entered the main track after failing to properly execute an after-arrival track authority. A total of three locomotives and 14 railcars derailed. All five crewmembers on the two trains were injured and transported to hospitals. Four crewmembers were treated and released; one crewmember remained hospitalized for further treatment. Canadian National Railway estimated damages at $8.1 million.

As a result of its investigation of this accident, the National Transportation Safety Board (NTSB) makes recommendations to the Federal Railroad Administration, Canadian National Railway, the Brotherhood of Locomotive Engineers and Trainmen, the United Transportation Union, Canadian Pacific Railway Limited, Kansas City Southern Railway Company, Norfolk Southern Railroad, and Union Pacific Railroad. The NTSB also reiterates previous recommendations to the Federal Railroad Administration, BNSF Railway, and the American Short Line and Regional Railroad Association. The NTSB also reiterates and reclassifies recommendations to the Federal Railroad Administration.

Recommendation # :	R-13-009	**Overall Status:**	Open - Initial Response Received	**Priority:**	CLASS II

TO THE CANADIAN NATIONAL RAILWAY COMPANY: Discontinue the use of after-arrival track authorities in nonsignaled territory not equipped with positive train control.

# of Addressees:	1		**Overall Date Closed:**	N/A	
Addressee:	Canadian National Railway	Open - Initial Response Received		**Date Closed:**	N/A

Recommendation # :	R-13-016	**Overall Status:**	Open - Await Response	**Priority:**	CLASS II

TO CANADIAN PACIFIC RAILWAY LIMITED, KANSAS CITY SOUTHERN RAILWAY COMPANY, NORFOLK SOUTHERN RAILROAD, AND UNION PACIFIC RAILROAD: Discontinue the use of after-arrival track authorities for train movements in nonsignaled territory not equipped with a positive train control system.

# of Addressees:	4		**Overall Date Closed:**	N/A	
Addressee:	Canadian Pacific Railway	Open - Initial Response Received		**Date Closed:**	N/A
Addressee:	Kansas City Southern Railway Company	Open - Await Response		**Date Closed:**	N/A
Addressee:	Norfolk Southern Corporation	Open - Initial Response Received		**Date Closed:**	N/A
Addressee:	Union Pacific	Open - Await Response		**Date Closed:**	N/A

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Recommendation Report

Notation Id	6247A_1	**Accident Date:**	11/11/93	**Issue Date:**	11/23/94
City/State:	KELSO, WA	**NTSB Report #:**	RAR-94-02	**Most Wanted List:**	No

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. AS A RESULT OF THE ACCIDENT ALL FIVE CREWMEMBERS FROM BOTH TRAINS WERE KILLED.

Recommendation # :	R-94-013	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMEND 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.

# of Addressees:	1		**Overall Date Closed:**	01/26/01	
Addressee:	FRA	Closed - Acceptable Action		**Date Closed:**	01/26/01

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Recommendation Report

Notation Id	6247A_3	**Accident Date:**	11/11/93	**Issue Date:**	11/23/94
City/State:	KELSO, WA	**NTSB Report #:**	RAR-94-02	**Most Wanted List:**	No

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. AS A RESULT OF THE ACCIDENT ALL FIVE CREWMEMBERS FROM BOTH TRAINS WERE KILLED.

Recommendation # :	R-94-017	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE BURLINGTON NORTHERN RAILROAD: IN CONJUCTION WITH THE UNION PACIFIC RAILROAD, IDENTIFY AND EVALUATE ALL POTENTAIL 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.

# of Addressees:	1		**Overall Date Closed:**	02/12/01	
Addressee:	BNSF Railway Company (formerly Burlington Northern and Santa Fe Railway Company)	Closed - Acceptable Action		**Date Closed:**	02/12/01

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Recommendation Report

Notation Id	6247A_4	**Accident Date:**	11/11/93	**Issue Date:**	11/23/94
City/State:	KELSO, WA	**NTSB Report #:**	RAR-94-02	**Most Wanted List:**	No

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. AS A RESULT OF THE ACCIDENT ALL FIVE CREWMEMBERS FROM BOTH TRAINS WERE KILLED.

Recommendation # :	R-94-018	**Overall Status:**	Closed - Acceptable Action	**Priority:**	CLASS II

THE NTSB RECOMMENDS THAT THE UNION PACIFIC RAILROAD: IN CONJUNCTION WITH BURLINGTON NORTHERN RAILROAD, 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.

# of Addressees:	1		**Overall Date Closed:**	02/12/01	
Addressee:	Union Pacific	Closed - Acceptable Action		**Date Closed:**	02/12/01

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Recommendation Report

Total Number of Recommendations for Recommendation Report: 27

Senator BLUMENTHAL. Thank you, Mr. Stem.

Commissioner Redeker?

STATEMENT OF JAMES P. REDEKER, COMMISSIONER, CONNECTICUT DEPARTMENT OF TRANSPORTATION

Mr. REDEKER. Good morning, Senator Blumenthal, Senator Blunt, Senator Johnson. I am honored to be here this morning, representing the Connecticut Department of Transportation, as well as the Chair of the Northeast Corridor Commission.

Connecticut's rail freight and passenger freight system is significant. The New Haven line is the busiest rail line in the country for commuter trains. We also have Shoreline East, several branch lines, and Amtrak intercity service operates on the Northeast Corridor and through the inland route to Springfield.

The State of Connecticut has a unique role in the Northeast Corridor, as we are the owner of 46 miles of the Northeast Corridor, second only to Amtrak in ownership.

As owner, we have invested significant amounts of money to provide a safe infrastructure. In the last 10 years alone, we have invested over $3.2 billion in the New Haven line while Amtrak has invested only $64 million.

Of the $3.2 billion, $2 billion comes from State of Connecticut bond dollars, while the remainder is Federal Transit Administration rail formula or discretionary funding.

Despite the progress, there is a $4.5 billion backlog in critical state-of-good-repair that needs to be addressed in the near term. A critical priority is the replacement of cab signal automated train control. And while this system is extremely effective, it must be upgraded, and this occurs at the same time as the implementation of positive train control, which, as you heard, has both financial and implementation challenges.

I should note that PTC is estimated to cost Connecticut $130 million in addition to cab signal upgrades, and that it will impact our ability to continue the pace of investment and state-of-good-repair.

Now, Connecticut is not alone in addressing the backlog of state-of-good-repair investments. The Northeast corridor relies on over 1,000 bridges and tunnels, many of which were constructed over a century ago, and in desperate need of repair.

Key segments are at capacity or overcapacity. In 2010, the Northeast Corridor infrastructure master plan identified a need for an expenditure of $2.6 billion in annual expenditures over 20 years to achieve state-of-good-repair.

The Northeast Corridor Commission is now updating that capital plan report. There is a critical needs and infrastructure report that identifies long-term needs and will be delivering a 5-year plan at the end of this year.

Now turning to the maintenance and operation of the New Haven line, Connecticut has an operating agreement with Metro-North to provide for the delivery of operations, as well as the maintenance of facilities, track, bridges, power signals, and rolling stock. Amtrak maintains its portion.

Metro-North's track inspection programs all comply with relevant Federal guidelines and standards. All track is inspected twice each week or more. All bridges are inspected annually. And our track in-

spectors are trained to identify deviations and defects. And critically, they have the responsibility and authority to take a track out of service or to repair it immediately, if necessary.

Metro-North also inspects with specialized equipment, Sperry rail cars and track geometry cars, twice a year, which exceeds the Federal Railroad Administration.

Our track inspectors meet all the qualifications of FRA. They are all foremen possessing high level of skills and experience, so they can detect deviations from track standards.

And we are in compliance with all the Rail Safety Improvement Act of 2008 programs that have had deadlines established for them.

With regard to employee safety, Metro-North has worked to completely transform the safety culture and has been actually commended through the APTA audit of safety and been given kudos for its clearly demonstrated leadership in the safety and security of customers and employees as a top priority.

Now the derailment that occurred on May 17 has been talked about before. When we look at what happened there, I should note that service had to be suspended on the entire Northeast Corridor in Connecticut. The derailment destroyed track signals and catenary, and the remaining two tracks that could have been used were out of service due to long-term repairs that Connecticut is investing in to deal with the backlog of the state-of-good-repair.

Now, amazingly, we put 2,000 feet of track back in just a couple days. And within 5 days, full service was restored.

A critical point: Connecticut's level of investment in that state-of-good-repair is programmed over the next decade to take care of that backlog. But it will take a decade where two tracks may still be out of service on the Northeast Corridor's busiest commuter rail line—two out of four tracks for a decade.

The incident with the track foreman that was struck and killed was an unfortunate incident. Metro-North has taken many procedures in place to try to address the safety protocols to prevent that in the future.

A preliminary report on June 4 noted that Metro-North inspectors, they found a defect 2 days before the derailment. But, as noted, that was not a requirement to immediately take it out of service. It was just, rather, put into a priority for future maintenance, as are all inspections in terms of their protocols.

With regard to the latest NTSB finding and recommendation, Metro-North has acted upon that immediately. And they are taking both technological and procedural aspects of their protocols to prevent any future incidents.

I will commend Metro-North for taking action well in advance of any NTSB findings and working with the Transportation Technology Center doing extra inspections, increasing the right-of-way inspections, and exploring solutions to better employee safety.

And I am convinced that together, Connecticut DOT, Metro-North, and NTSB will work together to significantly and even more improve the quality and safety of our right-of-way and our service.

And I appreciate this time, and appreciate any questions at the end of the testimony.

[The prepared statement of Mr. Redeker follows:]

PREPARED STATEMENT OF JAMES P. REDEKER, COMMISSIONER, CONNECTICUT DEPARTMENT OF TRANSPORTATION

Good morning Senator Blumenthal, Ranking Member Blunt, and Members of the Subcommittee. I am Jim Redeker, Commissioner of the Connecticut Department of Transportation (CTDOT). I am also the current Chair of the Northeast Corridor Commission. I am honored to have the opportunity to discuss passenger and freight rail safety on the Northeast Corridor and in particular, on the rail lines within the State of Connecticut.

Connecticut's Rail Infrastructure and Investments

Connecticut's rail freight and passenger system is strategically located between New York City and Boston. There are numerous freight railroads, ranging from a large Class I railroad to shorter regional and local railroads. There are also three passenger rail operations; the New Haven Line (NHL) commuter service operates between New Haven, Connecticut and Grand Central Terminal in New York City with connecting branches to New Canaan, Danbury, and Waterbury; the Shore Line East (SLE) commuter service which operates between New Haven and New London; and Amtrak intercity passenger service provided along the Northeast Corridor (NEC) between Washington and Boston, and the inland route between New Haven and Springfield, Massachusetts.

The State of Connecticut has a unique role on the NEC, since the state owns 46 miles of the NEC infrastructure between New Haven and the New York border as well as three branch lines. In total, Connecticut owns 235 track miles on the NEC and the three branch lines.

As the owner, Connecticut has invested significant state and Federal resources to upgrade the rail infrastructure, including track, catenary and bridges. Connecticut has funded the complete replacement of 405 New Haven Line electric passenger vehicles and the construction of related new maintenance facilities to support that fleet. As a result of the State's investment, progress toward a State of Good Repair has been strong. It is important to note that the Connecticut portion of the NEC is not part of the Amtrak capital program. As a result, almost all of the funding for the infrastructure is solely a state responsibility. In the last 10 years, Connecticut has invested over $3.2 billion in the NHL, while Amtrak has invested $64 million in track-related. Of the $3.2 billion, two-thirds, or over $2 billion has been funded by state bond funds, while the remainder is Federal Transit Administration rail formula or discretionary funding.

Despite the progress, there is an estimated $4.5 billion backlog in critical State of Good repair needs that have to be addressed in the near-term. Included in this backlog are catenary replacement, four major moveable bridges between Greenwich and New Haven as well as numerous fixed bridges on the line. The State has invested substantial dollars over the years to maintain these bridges in order to meet the demand for passenger and freight service on one of the most heavily traveled rail lines in the country. A critical priority is replacement of the cab signal automatic train control system; while this system is extremely effective, it must be upgraded. This occurs at the same time as the implementation of Positive Train Control (PTC). PTC requirements present both financial and implementation challenges. CTDOT continues to work collaboratively with MNR to advance this effort by the 2015 deadline. I should note that PTC is estimated to cost CTDOT $130 million in addition to the cab signal upgrades, and that will impact our ability to maintain the pace of SOGR normalized replacement of assets as well as desired capacity improvements.

Northeast Corridor Infrastructure and Investments

Connecticut is not alone in addressing the backlog of SOGR investments. The NEC relies on over 1,000 bridges and tunnels, many of which were constructed over a century ago and are in desperate need of replacement or repair. Key segments of the NEC are operating at or near capacity, such as the Hudson River Tunnels between NY and NJ, which carry over 70,000 riders daily and have no space for additional trains during rush hour. Major components of the NEC's electrical and signaling systems date back to the 1910s, making service on the line highly susceptible to malfunctions and delay. Major investment in the Corridor is essential to reduce delays, achieve a state-of-good-repair, and build capacity for growth. In 2010, the NEC Infrastructure Master Plan (Master Plan) estimated that the Corridor required approximately $2.6 billion in annual expenditures over twenty years ($52 billion total) in order to achieve state-of-good-repair and build infrastructure capable of supporting passenger rail demand forecasts for 2030. Investment levels over the past several decades have been critical in supporting the NEC's enviable record of continuous safe operation but have barely covered the costs of normalized replace-

ment of basic components. They fall far short of the levels needed to address repair backlogs and meet future needs. The NEC Commission is currently in the process of developing an updated capital investment plan for the NEC that will address the needs of freight, commuter and intercity services. A copy of a report entitled, "Critical Infrastructure Needs on the Northeast Corridor" is available on the NEC Commission website at *www.nec-commission.com.* The Commission is scheduled to complete the capital plan by the end of this year.

Safety of Connecticut Rail Operations

Turning to operations and maintenance of the NHL, CTDOT has an operating agreement with the Metropolitan Transportation Authority's Metro-North Railroad (MTA/MNR) to operate the NHL. This agreement assigns responsibility to MNR for maintenance of rail facilities including track, bridges, culverts, power and signals, and rolling stock. AMTRAK is responsible for maintaining the infrastructure they own and provides those services as part of the operating agreement CTDOT has for Shore Line East service.

Metro-North's track inspection programs are designed to comply with all relevant Federal guidelines and standards. All track is visually inspected twice each week. All bridges are inspected annually. Track inspectors are trained to identify deviations and defects. Critically, they have the authority and responsibility to take immediate action, if necessary, such as reducing train speeds or taking the section of track out of service entirely. In addition to defects that require immediate action, FRA guidelines and standards require track inspectors to make note of ANY deviations to the basic track structure. These other types of deviations are noted so that there can be follow-up—either by programmed maintenance or in the next visual inspection. MNR also inspects the right-of-way with specialized equipment (track geometry car/Sperry Rail Car) twice a year—exceeding FRA requirements.

Federal track safety standards also identify requirements for the qualifications of inspectors. All of MN track inspectors are qualified foremen, possessing a higher level of experience and knowledge so that they can accurately detect deviations from track standards.

I would also note that MNR is in compliance with all provisions of the Rail Safety Improvement Act of 2008 that have had program implementation dates established. There are elements of RSIA—such as PTC—that are still in process, but we are in compliance with the interim deadlines required under the Act.

Employee Safety

With regard to employee safety, Metro-North has worked to completely transform the safety culture throughout MNR over the past two decades. As a result, there has been a drastic reduction of FRA reportable employee injuries from 1,000 per year in the early 1990s to the current, sustained annual average of below 200 per year since 2008 (a reduction of 500 percent). MNR was the last recipient of the MTA Chairman's Safety Award (2011) for its stellar safety record amongst the MTA family.

In 2011, the American Public Transit Association (APTA) conducted an audit of the MNR System Safety Program Plan (SSPP) which resulted in the following commendation, "APTA commends the management staff at MNR for its commitment and openness to further improve its system safety and security programs. MNR has clearly demonstrated that the safety and security of its customers and employees are its first priority. This open commitment to improving safety and security provides an excellent foundation for a proactive safety and security culture that is ultimately supported by all employees. APTA supports this proactive management approach to continuous improvement in the areas of safety and security performance." Moving forward, MNR will continue to focus on customer and employee safety as the railroad's top priority.

Recent Derailment and Employee Fatality

Despite an excellent safety record and maintenance efforts, MNR experienced two safety events this May. At approximately 6 p.m. on May 17, an eastbound NHL passenger train derailed and was struck by a westbound train between Bridgeport and Fairfield, Connecticut. About 250 passengers were on each train at the time of the incident. 73 passengers and 3 MNR personnel were transported to area hospitals with injuries. The NTSB arrived at the scene within hours of the incident.

Service on the NHL was suspended between South Norwalk and New Haven and Amtrak NEC service was suspended between Boston and New York. The derailment destroyed track, signal and catenary systems on two tracks. The remaining two tracks are out of service due to a CTDOT project to replace 100 year old catenary and fixed bridges in the area of the derailment. As a result, the 4 track capacity of the NEC was reduced to 2 tracks, and both of those were fouled by the derail-

ment. Amazingly, 2,000 feet of the 2 track infrastructure was completely rebuilt, tested and restored to service four days later and full service was restored the following day.

I would like to pause to make an important point. CTDOT's current level of state and rail formula funding has been programmed over the next decade to address the backlog of replacement or major rehabilitation of the NHL infrastructure. That includes 20 moveable and fixed bridges, 80 miles of catenary replacement, a new signal system, and PTC. Without additional funding, CTDOT anticipates that additional 2 track outages will be required on sections of the NEC for the next decade, eliminating critical capacity and redundancy through Connecticut.

On May 28, 2013, a Metro-North track foreman was struck and killed by a Metro-North passenger train traveling at 70 mph in West Haven, Conn. The foreman had requested the section of track be taken out of service for maintenance. Two Metro-North rail traffic controllers, one of whom was a student controller, placed the section out of service. But the student controller reopened the track a little more than an hour later without the approval of the qualified controller or the foreman.

Prior to this incident, on May 4, 2013, another Metro-North rail traffic controller mistakenly placed out-of-service track back in service. Two days later, Metro-North instituted additional operations control procedures, but these procedures did not prevent the May 28 fatal incident.

NTSB Preliminary Reports and Recommendations

A preliminary report by the NTSB issued on June 4 noted that Metro-North inspectors found a track defect two days before the May 17 derailment. However, NTSB further indicated that the Federal standards and guidelines currently in place did not require immediate action for any of those track defects noted.

On June 17, the National Transportation Safety Board issued an urgent safety recommendation to Metro-North Railroad to provide redundant protection for track maintenance crews who depend on train dispatchers to provide signal protection. The NTSB is urgently recommending that Metro-North require redundant signal protection, such as shunting, in these circumstances. A shunt is a device that crews can attach to the rails in a work zone that alerts the controller and gives approaching trains a stop signal.

Metro-North received NTSB's recommendation and will implement safety improvements as quickly as possible. Metro-North acted immediately after the fatal accident to activate a new procedure to prevent a Rail Traffic Controller from removing a block on a track without the explicit approval of the Chief Rail Traffic Controller. Previously a block could be removed by an RTC with the verbal permission of the roadway worker on the scene of the track work. In addition, the railroad already has begun working on a technological solution beyond the current system of verbal confirmations. It will require mechanical input from the roadway worker to implement and relinquish all blocks.

Current Actions by Metro-North/MTA

While the NTSB investigation is ongoing, in consultation with CTDOT, Metro-North has already taken action to review its existing programs and processes in advance of formal NTSB recommendations. These actions include:

- Retaining Transportation Technology Center Inc. TTCI is the internationally-renowned research affiliate of the American Association of Railroads which will assess our track maintenance and inspection programs, and to identify ways we can improve our efforts to maintain our right-of-way.
- Inspecting and conducting an inventory of all similar joints—it is important to note that no joint bar defects were found.
- Increasing inspections of our right-of-way using specialized equipment on loan from other railroads.
- Exploring solutions to better protect railroad employees working in the right-of-way.
- Building in additional safeguards to our procedures in the railroad's operations control center regarding returning tracks to revenue service.

CTDOT and Metro-North will continue to support the NTSB's investigation and will also implement any recommendations.

Closing

I appreciate the opportunity to appear before you today to discuss rail safety and I am prepared to address any questions you have.

Senator BLUMENTHAL. Thank you, Commissioner.

And now Ms. Teel?

STATEMENT OF MICHELLE TEEL, P.E., PTOE, MULTIMODAL OPERATIONS DIRECTOR, MISSOURI DEPARTMENT OF TRANSPORTATION

Ms. TEEL. Thank you, Chairman Blumenthal, Ranking Member Blunt, and Senator Johnson. I am pleased to be here to share the State experience of freight and rail passenger safety.

Missouri has a long history with railroads, from James Eads building the first Mississippi River railroad bridge crossing, to the Jesse James gang robbing trains, to today's unit trains carrying oil from northern hydraulic fracking operations. Missouri's railroads have seen and done it all.

Missouri is the fourth most rail-intensive state. In 2012, Missouri railroads carried 438 million tons of goods, more than any other mode in our state, even trucks.

Missouri is home to the second and third largest U.S. rail hubs in Kansas City and St. Louis, respectively. Missouri has 4,000 miles of mainline tracks, 7,000 public and private rail crossings, four intercity passenger rail routes. And six of the Nation's seven class I railroads operate in Missouri.

With such a massive amount of rail traffic, the potential for danger is around every corner, and in every rail yard.

As you heard, just 3 weeks ago in Southeast Missouri, two trains collided at a railroad diamond intersection. When these trains collided, they also hit a MoDOT bridge, causing it to collapse. A total of seven people were involved in the incident, and amazingly, the worst injury was a broken bone.

But this incident speaks to the importance of railroad safety and the need to systematically and constantly work to improve it.

One week after this incident, a barge carrying an extremely large crane broke loose, floated downriver, and became wedged under a Missouri River rail crossing in St. Louis. It took nearly 3 days to remove the crane.

Interstate commerce is the driver of the Missouri and U.S. economy, and incidents like these can have far-reaching consequences.

Missouri is one of a handful of states with strict State railroad safety regulations. It includes requirements for operating practices, reporting, grade crossing safety, tariffs, train equipment, and training.

Missouri assesses each operating railroad for intrastate revenues to fund four railroad safety inspectors. These inspectors also enforce Federal regulations, so we coordinate closely with the Federal Railroad Administration inspectors.

Another area of concern is grade crossing safety. From 2008 to 2012, there were 192 grade crossing incidents resulting in 41 fatalities in our state. This put Missouri as fifth worse in the U.S. The funding Congress provides for improving this crossings makes up approximately 80 percent of the funds MoDOT has available for this purpose.

Railroads have never been safer, but there is still so much to do.

Missouri is also home to four passenger rail routes. The Missouri River Runner is a State-sponsored route from Kansas City to St.

Louis. There are also two national routes, the Texas Eagle and the Southwest Chief. Finally, an Illinois State-sponsored route, the Lincoln Service, originates in St. Louis, Missouri.

These routes are experiencing high ridership growth, and the Missouri River Runners growth is exceptional. Since 2007, ridership is up 74 percent. Ticket revenue is up 112 percent. On-time performance is around 90 percent. And customer satisfaction for this route has gone from last in the country to seventh.

Missouri was awarded $50 million in the FRA's high-speed intercity passenger rail program funding. This leveraged another $20 million investment from railroads in our state. These investments target on-time performance and safety for both freight and passenger rail.

Missouri, Illinois, California, and Michigan all worked as a team to acquire new and safer passenger rail equipment, which is currently in the procurement process. Without Federal investment, this new equipment would not be possible.

Thank you again for the opportunity to share information on Missouri's role in freight and passenger rail safety. The opportunities for additional rail investment are tremendous. Missouri recently completed a rail plan that identified $1.4 billion in unmet needs for passenger and freight rail in our state.

I urge you to continue investment in railroads, as it is key to the success of America's transportation system and economy.

Thank you.

[The prepared statement of Ms. Teel follows:]

PREPARED STATEMENT OF MICHELLE TEEL, P.E., PTOE, MULTIMODAL OPERATIONS DIRECTOR, MISSOURI DEPARTMENT OF TRANSPORTATION

Introduction

Thank you, Chairman Rockefeller and Ranking Member Thune, for inviting me to participate in this hearing. I am Michelle Teel, the Missouri Department of Transportation's Multimodal Operations Director. I'm so pleased to be here to share the state experience of freight and passenger rail safety in America's transportation system. The nation's rail system is an essential part of surface transportation. Missouri has a long history with railroads, from James Eads building the first Mississippi River railroad bridge to the Jesse James gang robbing trains to today's unit trains carrying oil from northern hydraulic fracking operations, Missouri's railroads have seen and done it all.

I am here today to share Missouri's unique story regarding railroads and railroad safety.

Missouri's Rail System

Missouri is the fourth most rail intensive state. In 2012, Missouri railroads carried 438 million tons of goods, more than any other mode in our state, even trucks. This amount of freight equates to nearly 11 million fully loaded trucks. If lined up end-to-end, they would circle the earth six times.

Missouri's central U.S. location makes it the crossroads for freight. Missouri is home to the second and third largest U.S. rail hubs in Kansas City and St. Louis, respectively. Missouri is second only to Chicago, Illinois. These figures are based on size. If tonnage is used for comparison; Kansas City's terminal experiences the most tonnage in the U.S. Missouri has 4,000 miles of main line track, 7,000 public and private rail crossings, four intercity passenger rail routes, and six of the nations seven Class I railroads operate in Missouri. With such a massive amount of rail traffic, the potential for danger is around every corner and in every rail yard.

Just three weeks ago, in southeast Missouri, a Union Pacific train collided with a Burlington Northern Santa Fe train at a railroad diamond intersection. When these two trains collided, they also hit a MoDOT bridge causing it to collapse. A total of seven people were involved in the incident and, amazingly, the worst injury

was a broken bone, but this incident speaks to the importance of railroad safety and the need to systematically and constantly work to improve it.

One week after this incident, a barge carrying an extremely large crane (being used on a MoDOT bridge replacement project) broke loose. It floated down river, took out major power lines and became wedged under and against Norfolk Southern's Missouri River crossing in St. Louis. It took nearly three days to remove the crane. Norfolk Southern's midwestern train operations came to a grinding halt. Interstate commerce is a driver of the Missouri and U.S. economy. Incidents like these can have far reaching consequences.

Freight Rail Safety

Missouri is one of a handful of states with strict state railroad safety regulations. They include requirements for operating practices, reporting, grade crossing safety, tariffs, train equipment, and training. Missouri assesses each operating railroad for intrastate revenue to fund four railroad safety inspectors. Each of these safety inspectors specializes in disciplines to ensure coverage of the state regulations. Because MoDOT railroad safety inspectors become certified inspectors through the Federal Railroad Administration's program, they also enforce Federal regulations. If you recall, I mentioned there are approximately 4,000 miles of main line track in Missouri. This is an immense amount of territory for four inspectors to cover, so we coordinate closely with the Federal Railroad Administration inspectors.

Another area of concern is grade-crossing safety. Missouri has 3,800 public crossings scattered statewide. They require significant attention. From 2008 to 2012, there were 192 grade crossing incidents resulting in 41 fatalities. This put Missouri as fifth-worst in the U.S. The funding Congress provides for improving these crossings makes up approximately 80 percent of the funds MoDOT has available for this purpose. This is very important to Missouri and I urge you to continue to invest in these critical safety improvements. To give you some scale, Missouri receives approximately $6 million per year in Federal highway funding for 3,800 public crossings. The state invests approximately $1.2 million. Railroads have never been safer, but there is still much to do.

Safety data is a key tool used to address railroad safety. This data helps our MoDOT railroad staff prioritize crossing improvements. It also helps our railroad safety inspectors focus on particular regions of the state, given what the data is showing. For example, in 2012, MoDOT focused on 11 of Missouri's 114 counties. More than 50 percent of all railroad incidents occurred within these counties. Through engineering, enforcement, education, and emergency medical services, Missouri makes every attempt to use the data to be as strategic as possible with limited resources.

Passenger Rail Safety

Missouri is home to four passenger rail routes. The *Missouri River Runner* is the state-sponsored route from Kansas City to St. Louis. There are also two national routes, the *Texas Eagle* and the *Southwest Chief*. Finally, Illinois' state sponsored *Lincoln Service* originates in St. Louis, Missouri. These routes are experiencing ridership growth. There is a need for continued investment to help ensure the safety of the passengers and crews. In addition, continued investment is needed to address capacity issues. Both freight and intercity passenger rail are experiencing growth in the same corridor.

The *Missouri River Runner's* growth is exceptional since 2007. Ridership is up 74 percent, ticket revenue is up 112 percent, on-time performance is around 90 percent and customer satisfaction for the route has gone from last in the country to seventh. The railroad the *Missouri River Runner* operates on is a Union Pacific road which is also seeing increases in traffic. MoDOT is committed to ensuring the viability and safety of both freight and passenger movements.

Missouri was awarded $50 million in the Federal Railroad Administration's High Speed Intercity Passenger Rail Program funding. This leveraged another $20 million in investment from host railroads. These investments along the *Missouri River Runner* route target on-time performance and safety for both freight and passenger rail. They have and will continue to contribute to both of these goals for the foreseeable future. However, continued investment in passenger rail is necessary to address increasing passenger movements.

Passenger rail safety also comes in the way of equipment. Missouri, Illinois, California and Michigan all worked as a team to acquire new and safer passenger rail equipment, which is currently in the procurement process. Without Federal investment, this new equipment would not be possible. Missouri is an active member in the Next Generation Equipment Committee and committed to the goals and objectives of this important body, consisting of the FRA, Amtrak and interested states.

Conclusion

Thank you again for the opportunity to share information on Missouri's role in freight and passenger rail safety. The opportunities for additional rail investment are tremendous. Missouri recently completed a state rail plan which identified $1.4 billion in unmet needs for passenger and freight rail. I urge you to continue investment in railroads, as it is key to the success of America's transportation system and economy.

Senator BLUMENTHAL. Thank you, Ms. Teel.

We are going to begin our questioning with Senator Johnson, and then Senator Blunt and I will follow.

Senator JOHNSON. Thank you, Mr. Chairman. I appreciate that. I am sorry I am going to have to leave earlier.

But I just really have one question for as many people who really want to speak to the issue.

Mr. Redeker, you basically were talking about the point I was trying to make with the earlier panel. As much as we would all love to see positive train control fully implemented and saving lives, the investment in that has a cost. And that cost is investment in other areas of safety.

And my other concern—and again, I want whoever wants to weigh in on this to give be given that opportunity.

There seems to be challenges technologically, whether it is even possible. There are challenges in terms of whether the spectrum is even going to be made available.

So I would just like, starting with you, Mr. Redeker, to speak to that point.

Is this even possible? Is Congress trying to force something that just simply cannot be done?

Mr. REDEKER. I would like to point out that Connecticut's capital program identifies PTC as a priority, but I think the timeframes are unrealistic in terms of being able to achieve them.

I also should note that on the New Haven-Hartford-Springfield high-speed intercity corridor route, that project includes installation of a new signal system and positive train control, which, frankly, would have been born by Amtrak, if it was not being borne by the state of Connecticut in that corridor.

But we have, as a result, had to spread out some of our other investments for state-of-good-repair projects, or capacity expansion projects, over a longer period of time.

So it is a tradeoff that we have made of deferring some additional investments, be it for capacity or for state-of-good-repair, with a priority being PTC. And we are partnering with Metro-North because we are part of their overall system, and actually being part of the first pilot segment for the Metro-North system, so Connecticut is leading in that.

So we are committed to safety. We have made some tradeoffs in timing for other projects. And we are, frankly, struggling with all the issues everyone else is struggling with in terms of spectrum and radios and integration and cost.

Senator JOHNSON. Ms. Waters?

Ms. WATERS. Yes, I would like to speak specifically to a few of our member railroads and what they are doing and what their challenges are.

The Southeastern Pennsylvania Transportation Authority, or SEPTA, operates commuter rail, as well as other transit modes in the Philadelphia region. SEPTA is one that is anticipating to meet the target. They have set that as a priority. You may have read recently, earlier this week, they are putting a bridge out of service, probably next month. They have already spent $130 million to stay on track to meet the 2015 deadline. Much more in expenditures to come between now and then.

But to get there, they had to defer their bridge replacement program. And so there is a bridge over the Schuylkill where trains will not be running most likely next month. And that means that the service on that line will be disrupted for some indeterminable amount of time with alternate bus transportation. And most of us know that, comparing the travel times between the bus and the rail, that those customers will be back in their single occupancy vehicle on the highways.

We have another member, we spoke, I think, Ms. Hersman spoke about Alaska Railroad being one that expected to be on time, and they certainly do, and are continuing to work aggressively to meet the deadline. They are having significant challenges with the spectrum.

In fact, they are having an interesting challenge in that apparently they are negotiating with PTC–220, and they cannot obtain or afford the insurance that is required.

Hopefully, they will be able to work through that, but that is potential delay, nonetheless, for one railroad that is committed and expecting to be on time.

We have a small Northwestern commuter railroad that, about a year ago, essentially went on record to say they just do not have the funds. It is a small operation, about 30 trains a day, pretty much only in the a.m. and p.m. peak. They operate on a short line railroad with very light freight traffic.

They said, we just simply cannot afford to do this. And their alternatives are, one, to reduce their service by about two-thirds to come under the threshold required for PTC, which I believe is 12 trains a day; or to simply on December 31, 2015, discontinue service.

Senator JOHNSON. So there are real costs.

Mr. Hamberger, very quickly. I am about out of time.

Mr. HAMBERGER. Thank you, Senator Johnson.

And let me just say, before I answer the question, I want to get in on the record, we are not seeking repeal of this mandate. We have $3 billion into it. We have too much work into it, and this is a decision from the CEO level on down, we are committed to getting this done. We need more time to do it.

If we were back in 2008 and you said, how could you spend $10 billion to improve safety, PTC would be part of the mix, but it would be more of the roadside detectors, more of the capital projects and maintenance projects that I referenced. We have a safe railroad. But the list of projects is never ending. And so we would be spending even more money on the basic blocking and tackling, along with some of these other technologies.

Senator JOHNSON. Thank you.

Thank you, Mr. Chairman, for your indulgence.

Senator BLUMENTHAL. Thank you very much, Senator Johnson. Senator Blunt?

Senator BLUNT. Thank you, Chairman. A truly great Chairman lets the other members ask their questions so they can get on to the things that we are already behind on. And I thank you, Chairman, for doing that.

Also, great panel. Thanks to all of you for being here. Lots of good information. I am sure I will have other questions to ask in writing for your response later.

Mr. Redeker, on the choices you said you were having to make about more customer service and maintenance, if you did not have the PTC requirement, even though Mr. Hamberger says the railroads want to now finish this up, would you have chosen to prioritize PTC? I am going to have to have pretty quick answers here.

Mr. REDEKER. I think we have a very efficient and effective cab signaling system today. It needs to be upgraded, and that would have been our top priority.

Senator BLUNT. OK.

Ms. Teel, thanks for being here. Every state thinks they have the top of whatever the hearing is about. I think we do have the busiest rail state in the country. And if you look at a railroad map of the country, I believe that would bear that out.

The Chaffee accident, where I think a bridge went down, a highway bridge, it was the overpass bridge, who takes care of replacing that bridge? And how is the process going?

Ms. TEEL. That process is going well. The railroads have indicated that they are—one in particular is going to take care of the cost for that. And once the investigation is final, all those determinations will be finalized. But we have a really good partnership with those class I railroads, and we feel confident that those costs are going to be taken care of by the railroad.

Senator BLUNT. And did you say that crossing accidents were the big percentage of accidents that happen, in our state, at least?

Ms. TEEL. Correct.

Senator BLUNT. And I believe, Mr. Hamberger, between crossing and trespassing, you get almost to 100 percent. It is like 90 some percent of all——

Mr. HAMBERGER. Over 95 percent of fatalities, yes, sir.

Senator BLUNT. All right, crossings and people who should not be on the track, who are on the track.

Mr. HAMBERGER. Yes, sir. And, unfortunately, our research shows that about a third of those trespassers are suicides.

Senator BLUNT. They intend to be on the track?

Mr. HAMBERGER. Yes, sir.

Senator BLUNT. About a third.

Ms. Teel, the working relationship between what you do at the Missouri Department of Transportation and both the NTSB and the FRA, how would you explain that setup?

Ms. TEEL. Senator, it is a great working relationship. In fact, we also enforce the Federal Railroad Administration regulations and work closely with the regional office in Kansas City and have also worked with NTSB on the investigation in Chaffee, Missouri. And

we are proud of the partnership that we have not only with those agencies, but also with the railroads in our state.

Senator BLUNT. Mr. Stem, is there any difference now between the way passenger work schedules go out for passenger rail or freight rail?

Mr. STEM. Yes, sir. Passenger rail now has its own hours of service regimen. They are based on predictable work schedules, and they do have to, by regulation, apply the science that is available.

Senator BLUNT. And your testimony was really focusing on making those even better. They are already different, but your testimony was focused that they should be even better?

Mr. STEM. My testimony indicates that the problem is with the freight hours of service and the totally unpredictable work schedules and the new pressures that are being applied by the railroads in an attempt to significantly reduce the numbers of safety critical employees that they have to have on staff to continue the level of service that is present today.

Senator BLUNT. So if I heard that right, you think the passenger service efforts are actually better than the freight?

Mr. STEM. Yes, sir. They are a model for us to aim for with improvements in the fatigue mitigation strategies and plans that are now being required.

Senator BLUNT. OK.

Mr. Hamberger, on that topic, and then the topic of only needing to apply to 39 percent, I want to be sure I have your sense.

Mr. HAMBERGER. My sense is that 39 percent is low. We are a 90,000-mile network, and we are putting PTC on 60,000 miles. That does not quite equal 39 percent by my math.

With respect to fatigue management, Mr. Stem is correct. That is something that both labor and management are working on cooperatively across the board in many areas. With respect to the predictability of our network, a freight railroad is not a passenger railroad. We do have predictable time for yard service and for local service. But for over the line long-distance trains, that can be dependent upon what our customers want, when they are ready to have their shipments go.

We cannot have a 10-hour call window. If someone is scheduled to report at 12 and calls up at 10 and says I am ill, I cannot get there, then what? We have to wait to give someone else a 10-hour notice, so that train that was going to leave at 12 has to wait 10 hours until a replacement crew can get there?

We are a 140,000-mile, including the short lines, outdoor assembly line. We have mudslides, snow, washouts, all of which makes this schedule unpredictable. We support the 10-hour uninterrupted call, but right after the work ends in the first place.

Senator BLUNT. Thank you, and I will have some questions, a few more questions for some of you. Thank you all.

Mr. STEM. Senator Blunt, if I may add, 39 percent figure is not my figure. That is the Federal Railroad Administration estimate: 140,000-mile network, including some short lines that will be required to apply PTC. And I think Mr. Hamberger is close. It was 60,000 miles of a 140,000-mile segment, and they have been able to negotiate that mileage down to 50,000 miles. So that is the FRA figure.

Senator BLUNT. Since we have come back to this, does the system, Mr. Hamberger, have to be interoperable?

Mr. HAMBERGER. Yes, sir. It is so that a railroad, just to use a name, a Union Pacific locomotive that goes through Chicago has to be interoperable with Metro, the commuter rail there, with Amtrak operating there, with every other class I railroad operating there. And if that Union Pacific, we have what is called run through power, if that locomotive goes through Chicago and continues on its way on a CSX track, it has to be able to talk to the CSX back office.

And that is one of the challenges, that we do not even have that software yet for the back office. It is going to be delivered sometime this summer.

Senator BLUNT. Thank you, Mr. Chairman.

Senator BLUMENTHAL. Thank you, Senator Blunt.

And thank you, Mr. Stem, for clarifying that point.

Let me begin my questioning, if I may, with Commissioner Redeker.

You made what, for me, is an extraordinarily important point about the investment that Connecticut taxpayers are making in these lines. I think the numbers that you used were $3.2 billion over the last 10 years, as compared to $60 million invested by Amtrak, which I think attests to the leadership that you have provided, along with the Governors and the continuing vision and commitment going forward to make the investment by State taxpayers, which I think is done in other states as well, maybe not to the same extent, but certainly not without great fiscal challenge and difficulty at a time when State governments face tremendous deficits. We talk a lot here about our Federal deficit, but obviously the states have been extremely challenged fiscally.

And so let me begin by asking you about the continuing work that is ongoing on the Northeast Corridor, which has reduced capacity in certain areas from four tracks to two. Did that reduction in capacity exacerbate or aggravate the disruption that occurred as a result of the collision and derailment?

Mr. REDEKER. Yes, Senator. We have about 15 miles of two tracks out of service. Our bridge structures, which are being rehabilitated concurrently with catenary replacement, are two-track structures. So in that section, we are doing several bridges. And that means that those tracks are out of service. They have been for almost 2 years, and we are about ready to complete that this year.

But we have about 80 more miles of catenary and several more miles, many, many more bridges to do, which means that at the pace of the investment that the state has been able to make, which is significant, nonetheless, the backlog is extraordinary. And it is going to take another decade to complete that, to bring that system to a state-of-good-repair.

Now that is a historical anomaly, in some sense, because the state of Connecticut chose to be unique among many, and own the Northeast Corridor instead of Amtrak in the time period when those decisions were being made. And as a result of legislation, we have not been part of the Amtrak capital plan. We are not eligible for that funding source. Although the new high-speed rail program in its latest incarnation does allow Connecticut to apply for high-

speed money, and we are preparing to do that if there is a resource available and an appropriation that comes forward.

So we have a lot to do. We are committed to doing it because of the real important economic engine that the Northeast Corridor means for the state of Connecticut.

Senator BLUMENTHAL. Some of those bridges are more than 100 years old. Is that right?

Mr. REDEKER. That is correct. A hundred years is probably our average.

Senator BLUMENTHAL. And the funding responsibilities may be anomalous, but the aging state of our infrastructure is common across the United States, is it not?

Mr. REDEKER. That is correct. We are about 1910 vintage for across the Northeast Corridor. So, therefore, the nature of that infrastructure, the need for rehabilitation, and some of the capacity constraints, which are felt not just by Connecticut with tracks out, but two-track systems in New Jersey, two-track systems in Baltimore that, in the long run, are really the constraints for the Corridor to grow, and to have redundancy in cases where you need to rebuild.

So the Corridor is challenged. Working through the Commission, we are trying to identify the next 5-year capital program to address the most critical needs based on the utilization and priority, which I think is unique for the Commission. It is a new challenge. But we think we will be able to be up to that and deliver a capital plan that both states and the Federal Government and freight rail partners can invest in to bring that system as quickly as possible to state-of-good-repair.

Senator BLUMENTHAL. Thank you.

Ms. Teel, let me ask you also on the issue of state commitment and impacts of these kinds of incidents, I look at the picture of what happened in Chaffee, Missouri, on May 25, and miraculously, apparently, nobody was killed in this incident. But I can see from what happened to the highway as a result of the train collision and bridge collapse there that there must be very, very substantial State costs in repairing this major highway. Is that correct?

Ms. TEEL. Mr. Chairman, the railroad has worked very closely with the state, and we are confident that the railroad is going to fully reimburse the state for those costs. In fact, they had the bridge that you have that photo of removed in a day. It was absolutely remarkable to see the work that the railroad has put into making this as efficient as possible and making the lines correct again.

And I am confident that because of these strong partnerships and because of—well, certainly, we will have to wait for the investigation to be complete, but I am confident that the railroad will indeed have those expenses and not the state of Missouri.

Senator BLUMENTHAL. And are you faced in Missouri with the same kinds of need to upgrade infrastructure, not just routine maintenance but also bridges that are aging, track that is in need of replacement?

Ms. TEEL. Correct, Mr. Chairman. Certainly, we have those infrastructure needs in our system in Missouri.

We have a very large highway system in Missouri, 32,000 miles of highway, 10,000 bridges. We do not own any railroad track in the state. However, we certainly have the grade crossings, 7,000 grade crossings in our state. Half of those are public. Only half of those have lights and gates, so there is huge opportunity for continued State investment and Federal investment to make those grade crossings safer. And also, there is the inspection role that we have of all of the track in our state that we work together with the Federal Railroad Administration.

But certainly, Missouri is no different from any other state. We have critical funding needs, aging infrastructure, and it is an absolute concern in our state as well.

Senator BLUMENTHAL. Mr. Stem, you may have heard Ms. Teel talk about the Missouri railroads, and she said that the Missouri railroads have seen and done it all. I kind of have the feeling that you have seen and done it all in the course of your career in working on the railroads. And I wonder if you could give this committee your personal view of the current state of safety on the railroads, particularly as it affects the men and women who do the kind of work that you have done for your life.

Mr. STEM. Thank you, Senator Blumenthal, for the question.

I agree with Mr. Hamberger's initial statement, that safety is improving in our industry today. We still have work to do. We are reducing the number of fender-benders. We are focusing on reducing the minor incidents, and we are being successful at that.

My testimony indicates that the big-ticket items, the fatal collisions, are going up, not down. And there is a whole menu of reasons for that.

As you heard Mr. Szabo and Ms. Hersman testify earlier, human factors are the number one cause of accidents. Now sometimes those human factors are unaccounted for in design or a piece of equipment that was manufactured that malfunctioned, and it also does not address the specifically deferred maintenance on tracks.

But knowing what we know today about positive train control and fatigue mitigation, that is where the low-hanging fruit is. That is the best opportunity for significant improvement in the overall safety.

It is not just for the employees. Every time we have one of these major collisions that kills an employee, the surrounding community is also involved, many times with evacuations.

The amount and number of hazardous material products that are moving by rail today is growing. That is the safest form of transportation for those products, and that is exactly where they should be. But that means that any time there is an incident, anytime there is a collision, the local community's equity goes up in that collision.

So I encourage the Committee to continue to work on that, to help us with fatigue mitigation. From the employee's standpoint, that is exactly why PTC was mandated.

And on that 61 percent of the mainline track that will not be equipped with PTC, some of which will be short line track, we will continue the same level of operation that we have today, and the same fatigue mitigation failures that we have today, unless Congress acts.

Senator BLUMENTHAL. Your view is that the fender-benders have diminished in frequency but the higher costs and more disastrous kinds of incidents are occurring more frequently?

Mr. STEM. Yes, sir. That is correct. And, overall, the statistics show that safety is improving in our industry. And I am thankful for that. And we are overall reducing the number of employee on-duty fatalities.

And many of those were result of switching accidents, which are still occurring.

But fatigue, positive train control, was designed to help us get those fatal injuries to employees down.

Senator BLUMENTHAL. Ms. Waters and Mr. Hamberger, do you agree with that view?

Ms. Waters?

Ms. WATERS. Mr. Hamberger?

Mr. HAMBERGER. No. The employee injury rate, which is, I believe, the single best indicator of "are we getting safer" in terms of our employees, continues to go down. And when I said it was the safest year on record in 2012, and again in 2011 and again in 2010, the employee injury rate is one of those three indicators to say it is the safest year on record. That continues to go down.

2012, there was an unfortunate 16 employees killed. That is 16 too many. We are dedicated to getting that to zero.

But it is something that we are focused on, some of those, it is my understanding, in fact, were fatalities of employees in automobile accidents while on duty. And so we are focused.

I want to say to Mr. Stem, he said it, that the professionalism of our employee base is what helps drive safety, and that is absolutely right. It is professionalism and dedication, peer-to-peer counseling, and those are important programs. And so we are looking forward to continuing on fatigue management, employee training, employee education, any number of issues that we are working together on.

So it is something that we take very seriously and are indeed focused on. So hopefully, I will be back here next year, and tell you that 2013 was even safer than 2012 in terms of employee injuries.

Senator BLUMENTHAL. I hope so, too.

Ms. Waters?

Ms. WATERS. I would concur with Ed. I am not going to expand upon that.

Senator BLUMENTHAL. I have a couple more questions, just briefly.

Commissioner Redeker, on the plus side, on the bright side of infrastructure investment, am I correct in the view that the investment in the M8 cars, which were involved in the derailment collisions in May, probably prevented more catastrophic injuries and even deaths, because of the structural advances that those cars reflect?

Mr. REDEKER. Yes, we invested as the State and as partner with Metro-North on the newest cars manufactured to the newest standards for buff strength for a commuter rail coach. They certainly held up well in that accident. I cannot speak to what would have happened were they not there, but I think it is a measure of our commitment to safety, our investment in that.

That was another 100 percent State-funded investment in an entire rolling stock to bring the latest standards to the commuters in Connecticut.

Senator BLUMENTHAL. And reference has been made to the inspection by Sperry Rail cars. Could you describe that method, and why it is superior to the high-rail method?

Mr. REDEKER. I think it is just another means for inspection. We have terrific inspectors. They are well-qualified. Their experience within high-rail vehicles is probably unmatched, in terms of what they can bring to an inspection report. They can feel it, they know it, they have experience.

Technology brings a lot more to the table, and I think adding significant layers of additional inspection help. But not every defect is going to be found by a Sperry Rail car and not every defect is going to be found, necessarily, by a high-rail vehicle. So by applying several techniques, we are trying to have redundant inspections, maximize what we can prioritize, and then address the defects that are found as quickly as possible in priority order. And that is the practice that Metro-North uses, again, all in compliance with the current guidelines from FRA.

Senator BLUMENTHAL. Have you had an opportunity to review the inspection report that we have made a part of the record that was done on May 15?

Mr. REDEKER. Yes, in fact, I got it yesterday from your staff.

Senator BLUMENTHAL. And are you concerned by the findings there as to defects in the ballast and support and rail joints and other areas of the track?

Mr. REDEKER. Actually, no. That is a standard inspection report. The kinds of things that were found and noted are addressed on a regular, routine basis. And they are addressed quickly.

Any defect, and I think it was mentioned, any defect found on the front of that page required immediate attention and is done immediately. And if anything was found that was identified as a real safety hazard, that track would have been put out of service or repairs done immediately.

So I think it is a measure of a system that constantly needs maintenance. It is the heaviest utilized commuter railroad in the country, and it has significant freight over it each and every day. It requires this kind of inspection and then a regular program each and every day of going out to maintain.

Senator BLUMENTHAL. Do you receive these inspection reports regularly?

Mr. REDEKER. No, I do not. Metro-North collects those, maintains them, and Connecticut DOT, as the contractor, has oversight responsibilities. And we do inspect those records and audit them on a regular basis.

Senator BLUMENTHAL. How often do you inspect them?

Mr. REDEKER. We go out on a monthly basis to Metro-North offices and review all of their practices and all their files in terms of how they operate and maintain the system.

Senator BLUMENTHAL. And then do you check on whether the repairs are made?

Mr. REDEKER. We do on an audit basis. Otherwise, we leave that to Metro-North.

Senator BLUMENTHAL. And how often is the audit?

Mr. REDEKER. Again, monthly, we go down and check, and we will pull a few samples and see how that process worked.

Senator BLUMENTHAL. And do you know whether this kind of routine practice is in accord with what other states do?

Mr. REDEKER. I am sure it is, because the routine track inspection and maintenance program is a guideline from FRA, and that is what all railroads are following at this point.

Senator BLUMENTHAL. Thank you.

I want to thank the entire panel. This has been an excellent morning, both panels, but particularly your panel for the excellent hands-on views that you have provided and the perspective that you have given us, and we really appreciate your taking the time in being with us today. Thank you very much.

Mr. HAMBERGER. Mr. Chairman, if I might, it has been a long morning, and Mr. Stem and I do not always agree on every detail, but today is his birthday, so please join me in saying happy birthday.

Senator BLUMENTHAL. Congratulations on your 35th birthday.

[Laughter.]

Mr. STEM. Thank you, Mr. Chairman.

Senator BLUMENTHAL. And we will take all of your statements for the record, along with the exhibits and keep the record open for a week, in case you want to submit anything further.

Thank you very much.

[Whereupon, at 12:34 p.m., the hearing was adjourned.]

A P P E N D I X

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BARBARA BOXER TO HON. JOSEPH C. SZABO

Question 1. When does the FRA anticipate completing its final rules clarifying the requirements if a PTC failure occurs en route, and whether or not PTC will be required in railyards? Can you commit to completing those rules by the end of this calendar year? The railroads have said that getting those requirements clarified and finalized is absolutely essential as they move forward with PTC deployment.

Answer. As of the date of this hearing, the draft of the PTC final rule is being finalized.. FRA understands the importance of regulatory certainty for the industry to properly plan for PTC implementation, and FRA will move the rule as quickly as possible.

Question 2. How is the FRA working with the Federal Communications Commission (FCC) to ensure that spectrum challenges are resolved quickly so that PTC can be implemented nationwide? Also, how is the FRA working with the FCC to clarify the FCC's new requirements for tower and antenna applications?

Answer. FRA is providing the FCC technical advice on the communications requirements of PTC. Ultimately, however, spectrum allocation is in the purview of the FCC. The FCC shares spectrum management responsibilities and functions with the National Telecommunications and Information Administration (NTIA). While the FCC has authority over commercial spectrum usage as well as that of local and State governments, NTIA manages the Federal government's use of spectrum for defense and other Federal purposes.

FRA has no statutory or regulatory authority over spectrum allocation or availability. FRA and the FCC are working together with the railroad carriers and Tribal and other stakeholders in developing an expedited tower approval process that satisfies FCC and carrier requirements for compliance with National Historic Preservation Act (NHPA) and National Environmental Protection Act (NEPA). The FCC is developing a proposed Program Comment to govern review for PTC wayside facilities under section 106 of the NHPA. While a revised FCC process is likely necessary to increase the rate of processing of the volume of tower approval requests generated by PTC deployment, the requirement for NEPA and NHPA act requirements are not "new"; the NEPA was enacted in 1969, and the NHPA, in 1986.

Question 3. Your testimony stated that the FRA should be able to certify the Southern California Regional Rail Authority's (Metrolink's) PTC system later this year. Most of the passenger and freight rail operators in California have told me they will meet the 2015 deadline. Why has California been able to stay on track for meeting the deadline, while other regions are struggling?

Answer. The passenger, commuter, and freight railroads in California have suffered from the same technical challenges experienced by freight railroads elsewhere in the country. Resolution of these issues has resulted in significant schedule slippage. With the exception of Metrolink and its freight partners Union Pacific Railroad Company (UP) and BNSF Railway Company (BNSF), the other California passenger and commuter railroads are still in the system-design phase and have not begun the system-test phase. Based on the technical challenges that Metrolink, UP, and BNSF have experienced, and the other railroads' state of progress, FRA believes it unlikely these other railroads will be able to fully complete system development and approval by the 2015 deadline. Many will, however, be able to accomplish partial to substantial deployment. Even Metrolink, with the technical support of UP and BNSF, has found it necessary to delay the operational start of the PTC system from 2012 to 2014.

As previously indicated in the FRA August 2012 report to Congress, there is a limited pool of qualified personnel with PTC implementation experience. Many of these people have been diverted to support Metrolink and southern California PTC deployment efforts, which have left a shortage of qualified personnel to carry out PTC deployment in other locations.

In addition to personnel shortages, there are component development, supply, installation, and integration/testing issues. Any development must include sufficient testing to make sure the systems work as intended. The current requirement, at a minimum, makes sufficient testing very difficult.

Regarding the development of PTC components and the installation of PTC systems, the Government Accountability Office (GAO) has reported in its August 2013 PTC report that "some PTC components are still in development—most notably the [PTC] back office server. One or more of these servers will be installed in over a dozen railroads' back offices and are needed to communicate vital information between the back office, locomotives, and waysides. According to the [Association of American Railroads (AAR)] and the railroads, back office system delays are due to system complexity, interfaces to other systems, and lack of supplier resources. Nearly all of the freight railroads included in our review anticipate they will not have a final version of the back office system until 2014 and have identified it as one of the significant factors preventing them from meeting the deadline. In addition, PTC installation is a time-and resource-consuming process. For example, railroads collectively will have to install approximately 38,000 wayside interface units. According to AAR and freight railroads, the volume and complexity of installing these units is another significant reason most railroads cannot meet the 2015 deadline.

As to PTC system integration and field testing, GAO has said in the same report that its work to date indicates that "[s]uccessful PTC implementation will require numerous components to work together, many of which are first-generation technologies being designed and developed for PTC. All components must properly function when integrated or the PTC system could fail. To ensure successful integration, railroads must conduct multiple phases of testing—first in a laboratory environment, then in the field—before installation across the network. Representatives from all of the freight railroads [GAO] spoke with expressed concern with the reliability of PTC and emphasized the importance of field testing to ensure the system performs the way it is intended and that potential defects are identified, corrected, and re-tested. One railroad representative [GAO] spoke with said that in some field tests, the PTC system components behaved differently than in the laboratory tests because labs do not reflect field conditions completely. Identifying the source of these types of problems is an iterative process; consequently, correcting the problems and re-testing can be time-consuming and potentially further contribute to railroads not meeting the 2015 deadline."

Question 4. Some passenger rail operators argue they will miss the 2015 PTC deadline because Congress has not provided sufficient funding. However, as you know, Congress recently appropriated $10.6 billion for high speed and intercity passenger rail investments, for which PTC was an explicit authorized use. Several California rail operators received grants from this program explicitly for PTC, and plan to meet the 2015 deadline. I understand that Railroad Rehabilitation and Improvement Financing (RRIF) loans can also be used for PTC. Is it true that few rail operators outside of California chose to apply to the HSIPR or RRIF programs for the purpose of implementing PTC, and instead put other capital investments ahead of PTC as their top priorities?

Answer. The mandate for the High-Speed Passenger Rail Program (HISPR) was to help address the Nation's transportation challenges by making strategic investments in an efficient network of passenger rail corridors that connect communities across the country through a competitive grant process. HISPR funding was provided to several California railroads to install PTC in support of the California High Speed Rail initiative. With the exception of California, which has already made significant infrastructure investments, non-California railroads are at earlier phases of high-speed rail infrastructure investment. Completion of these essential track infrastructure improvements are a prerequisite for the installation and use of PTC in high-speed operations.

Unlike grant programs, the Railroad Rehabilitation & Improvement Financing (RRIF) program is a direct loan and loan guarantee program. Direct loans may fund up to 100 percent of a railroad project with repayment periods of up to 35 years and interest rates equal to the cost of borrowing to the Federal government. The willingness of railroads to take advantage of the RRIF is governed in a large part by their ability (either actual or perceived) to make the required repayments.

Finally, FRA has anecdotal evidence that some railroads have put "state of good repair" projects necessary to provide passenger/commuter service ahead of PTC projects. "State of good repair" projects correct past deferred maintenance, or replace capital assets that have exceeded their useful life. Failure to make the "state of good repair" repairs to existing infrastructure and equipment would increase the probability and gravity of a system failure, thereby decreasing system safety. Failure to make the "state of good repair" repairs would also necessitate reduction or termi-

nation of service, which could adversely impact the public, and in the latter situation make installation of PTC a moot point.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. AMY KLOBUCHAR TO HON. JOSEPH C. SZABO

Question 1. Mr. Szabo, PTC technology holds great promise to reduce the number of train accidents caused by excessive speed, conflicting train movements, and failure to obey signals, but there are significant challenges in implementing these systems.

Short line railroad companies in Minnesota, for example, have concerns about the implementation costs of PTC as well as their ability to meet the deadline. In fact, in the FRA report to Congress on the status of PTC deployment, FRA reported that "Given the current state of development and availability of the required hardware and software, along with deployment considerations, most railroads will likely not be able to complete full . . . implementation of PTC by Dec. 31, 2015," adding that only partial deployment could be accomplished by the deadline.

Has there been any consideration given to providing funding for Class II and III railroads that are significantly impacted by the initial capital and ongoing maintenance and software upgrade costs associated with PTC in order to help them meet the deadline? Has there been any consideration given to re-visit the requirements necessary for Class II and III railroads that operate on Class I PTC equipped tracks?

Answer. FRA first notes that the PTC mandate does not apply to Class II and Class III railroads directly, but a small number of Class II and Class III railroads are required to install PTC where they interoperate with Class I railroads. FRA has already provided several regulatory exceptions for small railroads that allow them to avoid the installation of PTC in situations where they operate over a Class I railroad's track (see 49 C.F.R. 236.1006(b)(4) and 49 C.F.R. 236.1019(a)) during the initial PTC roll-out period.

However, FRA also recognizes that there may be circumstances in previously-executed private agreements under which Class I railroads would be entitled to require the Class II or Class III railroad to use a controlling locomotive equipped with PTC as a condition of operating. FRA believes that the proposed exceptions, when issued, will provide Class II and Class III railroads an appropriate exemption from PTC installation consistent with tenant-host commercial agreements and the statutory PTC mandate. If Congress were to amend the PTC mandate, FRA would re-visit the exceptions available to Class II and Class III railroads to be consistent with the revised mandate.

Further, FRA has in the past implemented grant funding programs to support installation of PTC, for which Class II and Class II railroads would be eligible. However, Congress did not appropriate that funding beyond one year. Finally, Class II and Class III railroads are also eligible to apply for Railroad Rehabilitation and Improvement Financing (RRIF) loans to fund PTC projects.

Question 2. Mr. Szabo, according to the Department of Transportation there are more than 250,000 highway-rail grade crossings in the U.S. Although the highway safety picture has improved considerably over the last decade, 300–400 people are killed every year and more than 1,100 are injured at grade crossings. According to the rail safety group Operation Lifesaver, eight people were killed at rail grade crossings in Minnesota in 2012. As you're aware, the safety at rural crossings remains a significant problem. What is the Federal Railroad Administration doing to advance alternative lower cost grade crossing safety technology for better protection at the thousands of rural crossings across the country? Federal funding for the United States Department of Transportation Railway-Highway Crossings Program is $220 million per year. Is this funding level sufficient in your view?

Answer. In recent years, highway-rail grade crossing accidents have resulted in the second-largest number of rail-related deaths in the United States, 33 percent of the total. Yet grade crossing safety has shown vast improvement, as a result of substantial public investment in crossing warning devices and greater public awareness of the risks at grade crossings. Accordingly, the number of grade crossing accident deaths has declined by 30 percent over the last decade. FRA is fully committed to reducing the number, frequency, and severity of collisions at highway-rail grade crossings.

Currently, there are 212,212 at-grade highway-rail grade crossings and dedicated pathway-rail grade crossings, which include public, private, and pathway (pedestrian) crossings. Approximately 55 percent of public crossings are equipped with automatic warning devices. Many of the public crossings that do not have automatic

warning devices are in rural areas where highway traffic volumes are low. FRA currently is studying the use of warning signs that are enhanced by the use of flashing LEDs, which make the signs more noticeable to an approaching motorist. FRA is a participant in the Department's Connected Vehicle research initiative. With additional research, Connected Vehicle technology, coupled with PTC, may serve as a potential future low-cost warning system for highway-rail grade crossings.

When engineering and construction solutions are necessary to improve safety, communities can incur costs. This is why FRA's Fiscal Year 2014 budget proposal includes funding for mitigating community impacts, including safety enhancements.

The Railway-Highway Grade Crossing Program (section 130 of title 23 of the United States Code), which is administered by the Federal Highway Administration (FHWA) has proved to be effective in the reduction of highway-rail grade crossing collisions and related fatalities. FRA strongly supports the continuation of the program. Additional funding would enable states to treat additional crossings, many of which may be in rural areas.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BARBARA BOXER TO HON. DEBORAH A.P. HERSMAN

Question 1. Some rail operators have suggested that PTC would only be able to prevent a small fraction of train accidents. How would you respond to that?

Answer. The vast majority or railroad accidents are minor in nature and, thankfully, do not result in fatalities or significant injuries. The accidents which the National Transportation Safety Board (NTSB) has investigated involve significant damage, including fatalities and injuries.

Despite more reliable equipment and increased redundancies within the operating environment, NTSB investigations continue to reveal human factors that contribute to accidents. The two largest causes of accidents in recent years include human-factor and derailments due to track problems. Operational accidents, or those classified as human-factor related, can be prevented with technology, notably positive train control (PTC).

Further, PTC preventable human-factor caused accidents can have catastrophic consequences. For example, train passenger deaths as occurred in the 1997 Silver Spring, Maryland, and the 2008 Chatsworth, California collisions, or significant releases of hazardous materials that affect communities and result in exposure fatalities that occurred in the 2004 Macdona, Texas and the 2005 Graniteville, South Carolina accidents can be prevented by PTC. While small in number, these catastrophic accidents are the ones we want to prevent.

Question 2. When did the NTSB first propose that PTC systems be implemented, and when did this issue make it onto the NTSB's "Most Wanted List"? How long after that did it take for the FRA and rail operators to begin making a significant effort to implement PTC?

Answer. The NTSB first recommended an advanced train control system, a PTC predecessor, in 1970. This recommendation was addressed to the Federal Railroad Administration (FRA) and recommended:

> If it receives additional statutory authority under legislation now in progress, study the feasibility of requiring a form of automatic train control at points where passenger trains are required to meet other trains. (R–70–20)
>
> The NTSB's original "Most Wanted" list (MWL) of Transportation Safety Improvements was adopted in September 1990. Positive Train Separation was on the original MWL. (The NTSB changed "Positive Train Separation" to "Positive Train Control Systems" in May 2001.)

Congressional funding for joint FRA-industry pilot programs addressing PTC development started in the early 1990s. In 1997, the FRA's Railroad Safety Advisory Committee (RSAC), which advises FRA on many of its rulemakings, established a working group, which included representatives of the railroad industry, to address PTC. The group was tasked to address the Federal regulations and their applicability to new train control systems under development and to draft new regulations as necessary. The FRA published a final rule in, "Standards for Development and Use of Processor-Based Signal and Train Control Systems," which was effective on June 6, 2005. This rule established performance-based standards for processor-based signal and train control systems but did not require implementation.

Most railroads, however, did not make a significant effort to implement PTC until Congress passed the Rail Safety Improvement Act (RSIA) of 2008, following the 2008 Chatsworth, California collision that claimed 25 lives. Some railroads were independently developing PTC systems but had not agreed on one design standard

to allow interoperability. Interoperability is critical in allowing trains to operate over tracks owned by various entities, particularly in the case of passenger trains that operate on multiple railroads under trackage rights agreements.

Following the enactment of RSIA, the NTSB closed the following recommendation and removed PTC from the MWL.

Facilitate actions necessary for development and implementation of positive train control systems that include collision avoidance, and require implementation of positive train control systems on main line tracks, establishing priority requirements for high-risk corridors, such as those where commuter and intercity passenger railroads operate. (R–01–6)

In 2012, the NTSB adopted a new MWL which included PTC in large part because it appeared that implementation plans were stalled in the railroad industry.

There has been great resistance from some in the railroad community to implement PTC, but there is no greater hazard than two trains colliding. The loss of life, property, and the environment can be significant.

Question 3. The NTSB hosted a forum on PTC in February. What did you learn about rail operators' progress in implementing PTC? Does it appear most rail operators have done everything possible within their powers to meet the 2015 deadline?

Answer. The NTSB acknowledged during its PTC forum that there are significant hurdles towards meeting the December 31, 2015, deadline in RSIA to implement PTC. In particular, many commuter agencies do not have the available capital needed to maintain their systems nor upgrade them. A number of presenters at the forum addressed a variety of regulatory, technical, budgetary, and legal hurdles to implementing PTC. However, the NTSB also heard from other presenters who described various success stories where carriers implementing PTC systems have already received approvals and certifications from the FRA.

The NTSB learned there are some railroads that have already met, and others that plan to meet, the 2015 deadline. Railroads that have made the difficult decisions and invested millions of dollars should be commended for their leadership in promoting rail safety. For those railroads that will not meet the 2015 deadline, for whatever reason, there needs to be transparency and accountability to comply with the PTC mandate that was set by Congress.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BARBARA BOXER TO EDWARD R. HAMBERGER

Question 1. The Interoperable Train Control Committee is developing key standards for software and hardware that will allow different rail operators' PTC systems to be fully interoperable. Standards for some key features are months behind schedule, hindering the pace of the entire industry. What is the status of the remaining standards the Committee is working to develop?

Answer. There are a total of 52 Railway Electronic Standards related to PTC. Of these, 42 standards have been developed and released for industry use. All of the remaining standards are in development and are being progressed. The members of the Interoperable Train Control Committee and its various subcommittees are working aggressively to address the remaining standards. The goal is for these standards to be published this year.

Question 2. What pressure can be brought to bear on key software and hardware vendors to speed up their process of delivering the necessary components of PTC? I understand that they are behind schedule. As their customers, how does the rail industry intend to help resolve these delays?

Answer. The biggest problem has been the development of the back office server software which is a year late. This software enables communications between the various railroad dispatch centers and all locomotives in operation. In other words, this is the key to interoperability. That software was released for field testing on July 15 which will likely last well into 2014.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BARBARA BOXER TO KATHRYN WATERS

Question 1. Administrator Szabo of the FRA testified that the leading cause of train accidents is human factors (38 percent). Since PTC is largely designed to prevent accidents caused by human error, does APTA believe investing in PTC be a high budgetary priority for passenger rail operators?

Answer. As a statutory mandate, PTC is already a high budgetary priority for our members. However, it should be noted that PTC does not prevent all human factors

accidents, nor can railroads ignore attending to, and the funding of, necessary activities to reduce the risks associated with the other 62 percent of train accidents.

In 2010, the FTA released a report stating that the current backlog of state of good repair projects on our Nation's transit assets totaled nearly $80 billion. This number does not include the over $2.75 billion necessary to implement PTC on commuter railroads, nor the millions needed to purchase or lease radio spectrum for interoperability. Despite the tremendous cost, Congress has appropriated only $50 million to assist publicly funded commuter railroads with implementing Positive Train Control.

Question 2. I understand that there are two major technological platforms in use as rail operators implement PTC throughout the nation, but some passenger rail operators are considering using other alternatives. How would those technologies be interoperable with rail lines using the existing technological platforms? Can you assure me that the alternative technologies would provide an equivalent level of safety?

Answer. In addition to the Advanced Civil Speed Enforcement System (ACSES) and the Interoperable Electronic Train Management System (I–ETMS), the FRA has already approved the Port Authority Trans Hudson (PATH) commuter railroad in New York/New Jersey to install Communications Based Train Control (CBTC). CBTC is a system more aligned with and in use in some metro/subway operations, with protections similar to PTC. It is not interoperable with either ACSES or I–ETMS. FRA has also approved Incremental Train Control System (ITCS) for use in the Amtrak High Speed PTC systems in Michigan from Chicago to Dearborn, and the Communications Based Overlay Signal System (CBOSS), a mix of ITCS and I–ETMS, under development by Caltrain in California.

Similarly, if any alternative technologies are approved for use, ALL trains that operate on that system or line segment must be able to communicate with that technology. For example, a train equipped with I–ETMS will not be interoperable with the ACSES system installed on the Northeast corridor, unless that train is additionally equipped with ACSES or the waysides are equipped with the capacity to transmit both ACSES and I–ETMS messages; a commuter railroad operating in California that does not operate on the Northeast Corridor will not be equipped with ASCES, and therefore will not be interoperable with that system, but it will be interoperable with all the trains that operate on its lines in California.

As we stated in our testimony, not all railroads operate in the same environments or face the same risks and hazards, and yet the PTC statute requires that some install a PTC technology to protect against risks that may not be present on that railroad. For example, on low risk line segments with light traffic density, slower speeds, and/or reduced comingling of freight and passenger traffic, alternative technologies may provide sufficient mitigation. APTA supports the FRA's recommendation for possible approval of alternative technologies that are equivalent in protection based on the actual level of risk and exposure, as evaluated by the FRA on a line segment by line segment basis, and not a blanket or unilateral approval of any technology on an entire line or railroad.

Question 3. Given the very long lead time to developing a certifiable PTC system, any alternative PTC technologies should be well defined and developed by now. What specific types of alternative technologies do your members intend to use in lieu of existing PTC platforms?

Answer. As stated in our testimony, all APTA member commuter railroads are moving forward diligently to prepare for PTC implementation, as that is the current requirement.

The PTC Interoperable Train Control Committee (ITC), which is composed of many members of the freight railroad community, has drafted numerous standards covering Positive Train Control systems, subsystems and interfaces. (Passenger railroads are not voting members of the ITC and are therefore dependent upon the ITC to include passenger standards.) The expectation is that it will now be possible for systems integrators and manufacturers to produce new systems which will interface with I–ETMS and be compatible with the requirements of the PTC rule, thus reducing the lead time going forward.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JOHN THUNE TO HON. JOSEPH C. SZABO

Question 1. In her written testimony, Ms. Fleming of GAO wrote that "FBA's PTC staff consists of 10 PTC specialists and one supervisor who are responsible for the review and approval of all PTC system certification documentation for 38 railroads. FRA has expressed concern that railroads will submit their safety plans to FRA at

roughly the same time. Our initial analysis suggests that this timing creates the potential that FBA's review of these plans will consist of hundreds, perhaps thousands, of pages of detailed technical information." How do you assess this statement by GAO? Is there a potential for a backlog of PTC applications?

Answer. The GAO assessment of the situation is accurate and only adds to the myriad issues with the PTC statutory requirement, the most notable of which is its billions of dollars in regulatory costs over and above its quantified safety benefits. For this issue, in order to help mitigate the potential backlog in PTC applications, FRA plans to augment the dedicated PTC staff with support from senior technical staff. The additional staff consists of a Senior Scientist/Technical Advisor, a Program Manager for Advanced Technologies, a Senior Electronics Engineer, and two Electronics Engineers. Even with the augmented staff, there remains a potential for application backlogs, and the addition of these staff members to the review process may cause them to be diverted from their primary assignments.

Indications are that FRA will receive the majority of the safety technical documentation for review simultaneously in the period just before the December 31, 2015, deadline.

Let me emphasize that until railroads complete PTC system design, development, integration, and testing, they will have insufficient data to finish the required safety documentation to be sent to FRA. Let me also emphasize that railroads' completion of PTC system design, development, integration, and testing requires *prior* resolution of many, if not all of the technical and programmatic issues identified both in the FRA August 2012 report to Congress entitled "Positive Train Control Implementation Status, Issues, and Impacts" (*http://www.fra.dot.gov/eLib/details/L03718*) as well as in GAO's June 2013 report (*http://www.gao.gov/assets/660/655298.pdf*).

As you know, FRA's report listed the following seven types of technical obstacles to complete PTC implementation that had been identified so far: lack of necessary radio frequency spectrum; lack of necessary radios; lack of necessary design specifications; lack of necessary back office servers (which contain the mechanism that enables interoperability of PTC systems between different railroads) and lack of necessary dispatch systems; need for verification of track databases with accuracy more precise than that needed in a non-PTC environment; need for engineering related to the installation of PTC system components; and need for proof of the reliability and availability of installed PTC systems in order both to provide the desired level of safety and to minimize any adverse impact on the railroad's operations. In addition, FRA's report noted two types of programmatic issues: issues related to budgeting and contracting (*e.g.,* the tightening of public-sector budgets and the need to comply with procurement regulations) and issues related to an insufficient supply of qualified personnel and essential PTC system components, since railroads subject to the PTC mandate are all competing for a limited set of these resources.

In the same vein, the GAO report cited "the numerous, interrelated challenges caused by the breadth and complexity of PTC." First, GAO highlighted that some key PTC components are still in development and that the installation of PTC components "is a time-and resource-consuming process." Regarding the installation phase of PTC implementation, GAO gave the example of the Federal Communications Commission's request that railroads halt their construction of PTC-related antennas "to ensure proper installation procedures were being followed including consulting with either the tribal or state historical authorities prior to. . .installation." Second, GAO pointed to the need for system integration and field testing of PTC components, "many of which are first-generation technologies being designed and developed." Third, GAO underscored its concern about FRA resources, a point I will return to now.

The additional time required to solve all of these technical and programmatic obstacles to PTC implementation, coupled with the statutory completion date of December 31, 2015, results in significant schedule compression, with a subsequent reduction in the time available for FRA personnel to complete the necessary certification review and approval of railroads' safety documentation submissions before the existing 2015 statutory deadline.

While there may be some commonality in safety documentation submissions because of the use of similar technology that may facilitate the review process, each of the railroads is unique, which will require separate review of their individual applications. These two factors (schedule compression and railroad uniqueness) aggravate FRA's staffing limitations.

Further, the number of railroad applications requiring FRA review and approval has been reduced from 38 to 37. FRA, in conjunction with the 38th railroad, was able to qualify the railroad for a regulatory exemption from PTC installation. FRA is, however, beginning discussions with a number of "new start" railroads on their requirements for PTC installation that may lead to an increase in the number of

railroad applications requiring FRA approval above the 37 applications currently identified, which would worsen the FRA staffing issue. FRA's FY 2014 budget proposal includes funding levels that would be sufficient for implementing the agency's complete safety program, including work associated with PTC implementation.

Question 2. How would your assessment change if Congress decides to provide a PTC extension that requires FRA approval on a case by case basis and these requests for questions are presented at roughly the same time as the safety plans?

Answer. In general, FRA believes a PTC extension, especially coupled with the allowance of alternative technologies that enhance safety in a more cost-effective way, has the potential to generate significant quantifiable regulatory cost savings. As FRA's 2009 regulatory impact analysis showed,[1] and several subsequent reports have confirmed, PTC is expected to have about $10 billion in net costs over 20 years (costs over and above the quantified safety benefits). FRA expects the costs to be about 20 times greater than the benefits. Not only would a PTC extension, together with permitting alternative technologies that improve safety more cost-effectively, change our assessment of the GAO's findings on our possible staffing issues, it would generate net benefits to society as a whole compared to current law, though quantification of these benefits would depend on the industry providing relevant cost-benefit information.

To the extent that railroads have differing completion dates, an extension of the completion date mandated by the Rail Safety Improvement Act of 2008 (RSIA) would reduce the number of applications requiring concurrent review by FRA. The enactment of legislation providing for extension of the PTC implementation deadline would have the effect of mitigating backlogs, but the scope of the review process would not change. FRA believes that obtaining the authority to approve the use of proven, mature, traditional signal and train control systems on low-risk lines in lieu of PTC would accelerate PTC-deployment efforts in a way that would greatly enhance railroad safety at lower costs. Existing technologies, such as Automatic Train Stop and Automatic Train Control, have over 90 years of safe, successful operation and are not relatively high-risk, software-centric development efforts such as PTC.

If the RSIA were amended so as to provide the Secretary with authority to permit an extension in an individual case, FRA would not expect that a railroad would submit a request for such an extension concurrently with its PTC Safety Plan. The review process for such an extension would be addressed separately.

Question 3. Of the 38 railroads that will need to submit certification documents, how many applications do you think will be approved in enough time to have their PTC system implemented by December 31, 2015? What percentage of required PTC equipped rail lines will this represent?

Answer. FRA has requested that railroads resubmit their PTC Implementation Plans, modifying them to reflect their anticipated completion dates based on known technical and programmatic issues. The resubmitted plans are to reflect their "best case" estimates for completion, irrespective of the current RSIA deadline. Revision of PTC-deployment schedules to reflect the impact of programmatic and technical issues, if permitted by Congress, would reduce schedule and cost pressures arising from the December 31, 2015 completion date. Once FRA has received and reviewed these plans, FRA will be able to better estimate what percentage will be complete by the December 31, 2015, deadline. Of course, the current statutory deadline is extremely difficult and expensive for many railroads to meet.

Question 4. Understanding that not all railroads will implement PTC by the mandated deadline, what options would FRA have? Will these railroads be able to continue to operate?

Answer. If the existing statutory deadline remains in place, FRA would continue its work with stakeholders to ensure PTC is implemented as efficiently, reliably, and safely as possible. However, even with efficient and reliable work from FRA, the agency continues to emphasize that PTC would impose billions of dollars in costs over and above the quantified safety benefits. It is worth noting that the 2009, "expected case" cost-benefit ratio of 22 to 1 was calculated before FRA and the GAO identified the significant implementation challenges associated with PTC, and it is reasonable to assume that certain costs have increased as a result of these challenges.

While taking note of the overall implementation issues, the agency has considerable discretion to decide whether to take enforcement action. FRA has numerous options available if enforcement action is appropriate including civil monetary penalties, emergency orders, and individual liability actions. However the effectiveness

[1] For this analysis, please see: *http://www.regulations.gov/#!documentDetail;D=FRA-2008-0132-0060.*

of these actions is greatly reduced because of the significant costs associated with PTC deployment. Railroads, especially passenger railroads, are already facing significant financial shortfalls that are delaying their resolution of the known technical and programmatic PTC-deployment issues. Enforcement actions based on an inability to complete deployment by December 31, 2015 would only further delay railroads' completion of PTC by requiring their reprogramming funds to address FRA enforcement actions, away from PTC deployment efforts.

Although PTC implementation may not be complete, railroads must retain their current methods of operation and levels of safety. In calendar year 2012, the train accident rate for all accidents for all causes was only 2.34 per million train-miles. This represents over a 40-percent decrease in train accidents since 2003. Also, in recent years FRA has implemented a number of new regulations to reduce some of the human-factor causes of accidents that PTC is intended to prevent. For example, FBA's 2011 final rule governing the hours of service of passenger train crews, which draws on detailed, scientific research into the cause of train operator fatigue, should help improve the alertness of engineers and conductors operating passenger trains. Similarly, another FRA final rule issued the same year sets minimum safety standards for the eligibility, training, testing, certification, and monitoring of train conductors, which should improve the safety performance of train conductors on both passenger and freight trains.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JOHN THUNE TO HON. DEBORAH A.P. HERSMAN

Question. It is likely that certain railroads will be able to implement PTC by the December 31, 2015, deadline while others will not. Is there any danger to this "piecemeal" approach? Can all of PTC's safety potential be met?

Answer. The full benefits of a PTC system will be realized when railroads operate their trains equipped with PTC enforcement on tracks in PTC territory. During implementation, non-equipped trains operating on PTC territories will still pose a risk, since non-equipped trains will still be susceptible to the single-point failure that the human factors present (dispatcher, train crew, or roadway worker). Once PTC is fully implemented, there will still be provisions in the regulations to operate non-equipped trains on PTC territories to accommodate enroute failures, very similar to how trains operating in cab signal territory are accommodated presently.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DEB FISCHER TO HON. DEBORAH A.P. HERSMAN

Question 1. Chairman Hersman, I believe that we should possibly be expecting a rule on the use of PTC in rail yards. Do you believe the use of PTC in rail yards, where the speed is usually less than five miles per hour, is a good use of the technology?

Answer. Train movements within rail yards can involve the transfer, shuttle or switching of rail cars that are done without using the air brake system on the section of cars involved in the movement. These types of movements diminish the effectiveness of any PTC system since PTC calculates braking distance using train consist information and relies on adequate braking from every car instead of just locomotive braking. In addition, train movements in yard limits have limited speed (not to exceed 20 mph) and sight requirements. Current PTC technology does not enforce train separation for train movements below 20 mph.

A proposal has been made to the FRA that yard limits be defined as 20 miles in all directions on the main track from yards, allowing trains to operate non-equipped trains on the main track for a 20 mile radius in conflict with equipped trains. If this proposal is agreed upon by the FRA, non-equipped trains will pose a risk within this 40 mile distance and be susceptible to the single-point failure that human factors present.

Question 2. Chairman Hersman, you noted that in-cab recording devices could be used to "better understand crew activities leading up to serious accidents." Do any rail companies currently use these devices? Do you know what the cost is for the device, and for implementation? It seems like a commonsense recommendation, I'm wondering why there would be hesitancy on installing these devices?

Answer. Some railroads currently use this equipment. Following the 2008 fatal collision in Chatsworth, CA, the Southern California Rail Authority (Metrolink) installed inward facing cameras in cabs. BNSF has installed video cameras in motor

vehicles (highway vehicles) to enhance safe operations and has plans to install this equipment on hi-rail vehicles.

On July 25, 2013, a U.S. District Court issued a ruling that allowed the Kansas City Southern (KCS) Railway to install inward facing cameras in the cabs of its locomotives (*Kansas City Southern Railway Co.* v. *Brotherhood of Locomotive Engineers & Trainmen, et al.*). The ruling declared that any disputes between the unions and the railroad would be considered as a "minor dispute" under the Railway Labor Act and subject to be resolved through binding arbitration. This ruling may pave the way for other railroads to move forward with the installation of inward facing cameras.

The NTSB does not have information on the cost of installing this equipment, but we can provide contact information for Metrolink, KCS, and BNSF to discuss their costs.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JOHN THUNE TO SUSAN A. FLEMING

Question 1. I understand that GAO is in the process of conducting a study examining the challenges railroads face in fully implementing PTC by the December 31, 2015, deadline. What are some of these challenges?

Answer. Challenges to meeting the 2015 deadline are complex and interrelated. In addition, PTC installation is a time-and resource-consuming process and to-date railroads have encountered some unexpected delays while installing PTC. There are three key challenges including:

- *Developing system components and PTC installation:* Many of the PTC components had not been developed before RSIA was enacted and some continue to be in various stages of development, most notably the I–ETMS back office server. Nearly all of the freight railroads included in our review anticipate they will not have a final version of the back office system until 2014 and have identified it as one of the critical factors preventing them from meeting the deadline.
- *System integration and field testing:* In order to ensure successful integration of PTC components, many of which are first generations components, railroads must conduct multiple phases of testing before being installed across the network. Representatives from most of the freight railroads we spoke with expressed concern with the reliability of PTC and emphasized the importance of field testing to ensure that the system performs the way it is intended. Field testing is an iterative process; consequently, correcting the problems and retesting can be time-consuming and potentially further contribute to railroads not meeting the 2015 deadline.
- *FRA resources:* Concerns with FRA's limited staffing resources and the agency's ability to help facilitate railroads' implementation of PTC are focused on two of FRA's responsibilities: PTC field testing and PTC system certification. First, FRA has reported that it lacks the staffing resources to embed a dedicated FRA inspector at each railroad and has taken an audit approach to field testing, whereby railroads submit field test results for approval as part of their safety plans. Second, FRA set no specific deadline for railroads to submit the safety plans for system certification and according to FRA; to-date only one railroad has submitted a final plan, which FRA has approved. FRA and railroads have expressed concern that railroads will submit their final safety plans to FRA at approximately the same time, resulting in a review backlog particularly since each plan is expected to consist of hundreds, perhaps thousands, of pages of detailed technical information.

Finally, generally commuter railroads face these same PTC implementation challenges, as well as other challenges including an overall lack of funding available to make investments in commuter rail and challenges related to difficulties in acquiring spectrum in the 220 MHz band, which is required to operate the data radios that communicate information between PTC components.

Question 2. What obstacles does FRA face in approving applications for PTC systems in a timely manner? In your written testimony you noted that FRA has only 10 PTC specialists and a PTC supervisor. Is this staffing level adequate to approve plans in time to meet the December 31, 2015, deadline?

Answer. Both FRA and railroads voiced concerns that FRA's staffing level is not adequate to approve plans in time to meet the December 31, 2015 deadline. However, FRA officials told us that they are dedicated to the timely approval of safety plans and that their oversight will not impede railroads from meeting the deadline.

In an effort to help facilitate the safety plan review, some railroads told us they have submitted draft portions of their safety plans to FRA for preliminary review to expedite the process. This way FRA staff will be familiar with portions of the plan that are common across plans before the finalized plan is submitted. In addition, FRA has asked for additional authority for deadline extensions on a case-by-case basis and provisional certification which may also provide an opportunity to manage limited resources.

Question 2a. Assuming it is adequate, if Congress provided a case by case PTC extension, would the FRA be able to handle this additional workload?

Answer. Flexibility in extending the deadline may help FRA better manage limited resources by, for example, preventing a potential review backlog resulting from final safety plans being submitted at the same time—a concern raised by both the freight railroads and FRA. In addition, we found railroads at various stages in their implementation process; providing flexibility in extending the deadline for certain railroads acknowledges these differences and also may help railroads mitigate risks and ensure PTC is implemented in a safe and reliable manner.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JOHN THUNE TO EDWARD R. HAMBERGER

Question 1. How much money has the freight rail industry spent to date to implement PTC?

Answer. To date, railroads have collectively spent approximately $3 billion of their own funds on PTC development and deployment.

Question 2. How much more do you estimate will be needed?

Answer. Currently, the estimated total cost to freight railroads for PTC development and deployment is around $8 billion, with hundreds of millions of additional dollars needed each year after that to maintain the system.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. DEB FISCHER TO EDWARD R. HAMBERGER

Question. Since the implementation of PTC was mandated by the Federal government, I am wondering if you could give me some insight on other safety measures you all have considered, but have been unable to move ahead with due to challenges with PTC implementation. What are your other safety priorities, apart from PTC, and why?

Answer. PTC-preventable accidents account for only 4 percent of mainline accidents. In contrast, track-caused accidents account for 35 percent of mainline accidents and equipment-caused accidents account for 21 percent of mainline accidents. It is no surprise that the industry devotes significant resources to addressing these primary causes of accidents. In fact, the industry is investing more than ever before in its infrastructure and equipment, including a record $25.5 billion in 2012.

In addition, the industry continues to invest in research to improve its performance. AAR operates the leading rail research facility in the world, the Transportation Technology Center, Inc., in Pueblo Colorado. As mentioned in AAR's testimony, TTCI has undertaken extensive research in the track area, including evaluating steel with potentially improved fatigue resistance, improved track fastener systems, and better inspection technologies. On the equipment side, TTCI is investigating improved suspensions, better wheel metallurgy, and trackside detectors that can detect rail car defects. AAR's written testimony contains more information on these and other important initiatives.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JOHN THUNE TO KATHRYN WATERS

Question. How much money have commuter railroads spent to date to implement PTC? How much more do you estimate will be needed?

Answer. Commuter Railroads have informed APTA that, to date, they have spent approximately $458.5 million and they currently estimate that their costs to implement PTC will exceed $2.75 billion (2 commuter rail agencies did not respond to our inquiry). The latter estimate is already in excess of the $2 billion estimate that APTA had previously stated. Given the remaining unknown aspects of this implementation, that cost estimate could continue to change.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. DEB FISCHER TO KATHRYN WATERS

Question. Ms. Waters, you note in your testimony that the FCC has not responded to your requests to make available spectrum for PTC implementation.

Question 1a. How much spectrum would be necessary, in your estimate, to meet the needs of PTC systems?

Answer. Spectrum Requirements: Commuter rail spectrum needs are localized to their operational corridors and the amount required is specific to each Economic Area (EA). While it is not appropriate to aggregate the national total of local needs, we are seeking individual blocks in the local EAs. Original industry needs were specified for each commuter rail operation in a study conducted for APTA and the Federal Transit Administration, with funding provided through the Transit Cooperative Research Program (TCRP) Project J–6, Quick Response for Special Needs. The TCRP is sponsored by the Federal Transit Administration; directed by the Transit Development Corporation, the education and research arm of the American Public Transportation Association; and administered by The National Academies, through the Transportation Research Board. We are providing the Committee with a copy of the TCRP J–6 Report (see Appendix A—Spectrum Estimate Details). Also, in response to the inquiry of the Committee, we asked our member agencies whether they had new estimates that differed from the TCRP report estimates. Also attached with this response is a table reflecting the known differences from the report's estimates.

Question 1b. Is it possible to utilize spectrum sharing for these purposes?

Answer. Spectrum sharing: In some cases, commuter rail agencies are currently planning to share spectrum with freight rail hosts or Amtrak, or to piggyback on their procurement of the required spectrum. However, in some cases, commuter rail agencies simply do not yet have sufficient information regarding the decisions that may be made by the freight rail carriers. The findings of the TCRP report indicated that "the freight railroads have acquired various nationwide and regional channels in the 220 band (via an organization called PTC–220 LLC) for PTC use along their freight rail lines, however they have also indicated sharing of these frequencies is possible in shared freight/passenger service rail corridors."

[Attachment to Ms. Waters' responses.]

Commuter Rail Spectrum Needs
(reflects changes from 2010 TCRP Report)
July 31, 2013

State	Commuter Rail Agency	AGENCY (short)	Anticipated Spectrum Needs (in kHz) (2010 TCRP quick study)	Actual Spectrum Needs (in kHz)
AK	Alaska Railroad Corporation (ARRC) Anchorage, AK	AKRR	425	200
CA	Southern California Regional Rail Authority (Metrolink) Los Angeles, CA	SCRRA	500	700-1000*
CA	Peninsula Corridor Joint Powers Board (PCJPB) San Francisco-Oakland, CA	PCJPB	325	
CA	North County Transit District (NCTD) Oceanside San Diego, CA	NCTD	326	175
CA	Altamont Commuter Express (ACE) Stockton, CA	ACE	350	
CT	Connecticut Department of Transportation (CDOT) (East shore line) Hartford, CT	CDOT	300	
FL	South Florida Regional Transportation Authority (TRI-Rail) Pompano Beach/Miami, FL	SFRTA	325	325
IL	Northeast Illinois Regional Commuter Railroad Corporation (Metra) Chicago, IL	METRA	600	
IN	Northern Indiana Commuter Transportation District (NICTD) Chicago, IL-Chesterton, IN	NICTD	350	150
MA	Massachusetts Bay Transportation Authority (MBTA) Boston, MA	MBTA	475	
MD	Maryland Transit Administration (MTA) (Brunswick and Camden lines Only) Baltimore, MD	MARC	475	Sharing CSX/Amtrak
ME	Northern New England Passenger Rail Authority (NNEPRA) Portland Boston, MA-NH-RI	NNEPRA	350	
MN	Metro Transit Minneapolis-St. Paul, MN	Northstar	275	

NJ	New Jersey Transit Corporation (NJ TRANSIT) Newark, NJ	NJT	500	500
NM	Rio Metro Regional Transit District (RTD) (NM Rail Runner Express) Albuquerque, NM	NM RailRunner	375	
NY	MTA Long Island Rail Road (MTA LIRR) Jamaica New York	LIRR	475	475
NY	Metro-North Commuter Railroad Company (MTA-MNCR) New York New York	MNR	550	550
OR	Tri-County Metropolitan Transportation District of Oregon (TriMet) Portland, OR	TriMet	250	0**
PA	Southeastern Pennsylvania Transportation Authority (SEPTA) Philadelphia, PA	SEPTA	450	450
PA	Pennsylvania Department of Transportation (PENNDOT) Harrisburg, PA	PENNDOT	575	
TN	Regional Transportation Authority (RTA) Nashville, TN	Nashville	750	unknown
TX	Trinity Railway Express (TRE) Dallas-Fort Worth-Arlington, TX	TRE	275	225-250
TX	Fort Worth Transportation Authority (Tho T) (Planned Cottonbelt line) Fort Worth Dallas-Fort Worth-Arlington, TX	Ft Worth T-Rex (new project)		225-250
TX	Denton County Transit Authority (DCTA) Denton, TX	Denton Co	250	100-150
TX	Capital Metro Austin, TX	CapMetro	250	0**
UT	Utah Transit Authority (UTA) Salt Lake City, UT	UTA	300	0**
VA	Virginia Railway Express (VRE) Alexandria, VA	VRE	325	225
WA	Central Puget Sound Regional Transit Authority (ST) Seattle, WA	Sound Transit	425	unknown

NOTE: Missing data indicates no change anticipated from 2010 Report. CDOT, PENNDOT and NNEPRA were not surveyed by APTA.
NOTE #2: NY MTA has been unable to acquire spectrum in 4 of the 9 counties in which it operates.
* Metrolink spectrum estimates include needs anticipated up to 10 years from implementation.
** These agencies have a spectrum requirement of 0 kHz because they are currently pursuing a non-communications-based model.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JOHN THUNE TO JAMES P. REDEKER

Question. At the hearing you mentioned that implementing PTC will cost the State of Connecticut $130 million, and will prevent you from performing other needed rail repairs. How can diverting funds to PTC implementation have a negative effect on commuter rail safety? Are there specific projects you have had to delay or cancel?

Answer. First and foremost, rail safety projects are a top priority for the Connecticut Department of Transportation and are treated as such in the development of the Department's Five Year Capital Program.

The Program for the Office of Rail also includes numerous unfunded state-of-good-repair, modernization and capacity improvement projects, including:

Fixed and movable bridge replacement on the New Haven Line
Signal system replacement on the New Haven Line (last two phases)
New Haven-Hartford-Springfield corridor improvements
Rail Station parking improvements and expansions
High level platform rehabilitation
Customer service initiatives

The Department manages all of these systems to maintain safe operations, however, there may eventually be reliability and/or capacity issues that arise.

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