National Transportation Safety Board

Robert L. Sumwalt, III
Vice Chairman

Testimony of Robert L. Sumwalt, Vice Chairman
National Transportation Safety Board
before the
U.S. House of Representatives
Committee on Transportation and Infrastructure
Subcommittee on Railroads, Pipelines and Hazardous Materials
January 30, 2007

Good morning Chairman Brown, Ranking Member Shuster and Members of the Subcommittee. My name is Robert Sumwalt and I am the Vice Chairman of the National Transportation Safety Board. I am being accompanied today by Mr. Robert Chipkevich, Director of Railroad, Pipelines and Hazardous Materials Investigations. Chairman Mark Rosenker asked me to represent the Board today to discuss railroad safety issues that are of concern to the Board. Mr. Chairman, I would like to take this opportunity to thank you, the Members of the Subcommittee and staff for inviting the Safety Board to testify today and for your focus on the furtherance of improving the safety of our Nation's railways.

The safety of the Nation's transportation system is the mission of the Board. I would like to discuss several areas of concern to you today—railroad fatigue, the transportation of hazardous materials in tank cars and positive train control.

Fatigue

Let me begin by saying train crew fatigue is an important issue at the Safety Board. Fatigue has been on our Most Wanted List since its inception in 1990 and, as you know, the problem is widespread. The problems associated with fatigue exact a heavy toll on our safety, productivity and quality of life. Our investigations show no one is exempt from the effects of fatigue. We have found fatigue to be a causal or contributing factor in crashes in every mode of transportation, particularly rail crashes.

The Safety Board most recently addressed this issue in its investigation of a collision between two freight trains at Macdona, Texas, on June 28, 2004. As a result of that accident, 3 people died from chlorine gas inhalation after a tank car was punctured.

The Safety Board determined that the probable cause of the collision of the Union Pacific Railroad train with a BNSF Railway train at Macdona was Union Pacific Railroad train crew fatigue that resulted in the failure of the engineer and conductor to appropriately respond to wayside signals governing the movement of their train. Contributing to the crewmembers' fatigue was their failure to obtain sufficient restorative rest prior to reporting for duty because of their ineffective use of off-duty time and Union Pacific Railroad train crew scheduling practices, which inverted the crewmembers' work/rest periods. Contributing to the accident was the lack of a positive train control system in the accident location.

The Safety Board concluded that the Union Pacific engineer had experienced micro sleeps followed by a deeper descent into sleep and that the conductor was most likely asleep during most of the trip. Work as a train crewmember entails an unpredictable job schedule that can make it difficult for employees to effectively balance their personal and work lives. The Board concluded in the Macdona report that the unpredictability of Union Pacific train crewmembers' work schedules may have encouraged them to delay obtaining rest in the hope that they would not be called to work until later on the day of the accident. During periods when the demand for crews is high, the additional pressure on crewmembers who have not had a full rest period can make achieving such a balance particularly difficult.

The Safety Board also found that the minimum rest periods prescribed by Federal regulations do not take into account either the rotating work schedules or the accumulated hours spent working and in limbo time. Limbo time, the time when a crew is neither operating the train nor yet released from duty, is most often associated with a crew's travel time to their final release point after the expiration of their 12-hour service limit. The time spent awaiting that transportation can be significant and can lead to very long workdays. For example, in June 2004, over 42 percent of the Union Pacific Railroad train crews in the San Antonio, Texas area spent greater than 12 hours on an assignment, over 24 percent spent greater than 13 hours, and 5 percent (or 760 train crews) spent greater than 15 hours.

As a result of the Macdona accident investigation, on July 20, 2006, the Safety Board recommended that the Federal Railroad Administration (FRA) 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 (R-06-14). The Board also recommended that the FRA establish requirements that limit train crewmember limbo time in order to address fatigue caused by this practice (R-06-15).

On October 24, 2006, the FRA advised the Safety Board that it lacks the statutory authority to adopt the requirements contemplated by either of these recommendations. Further, the FRA stated that any requirement that the railroads use scientifically based principles in assigning work schedules to reduce the effects of fatigue would almost certainly require that they not comply with the periods established by the Hours of Service Act.

Past FRA responses to fatigue-related safety recommendations have been similar. For example, after examining the fatigue issue across all modes of transportation, on June 1, 1999, the Safety Board recommended that the FRA 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 (R-99-2). This recommendation was promptly added to the Safety Board's list of Most Wanted Transportation Safety Improvements. However, while the FRA noted that it shared the Board's concern over the effects of fatigue on transportation safety, in its response to this recommendation it also noted that it lacked statutory authority to take the action needed. The Board accepted FRA's interpretation and closed the safety recommendation R-99-2 "reconsidered."

The Safety Board believes there is a need for legislative change that would provide the FRA authority to establish hours of service regulations and to address scheduling practices that affect fatigue.

Hazardous Materials

Following catastrophic railroad accidents in the 1970s, safety mandates, such as shelf couplers, head shields, and thermal protection, improved the performance of tank cars during derailments. Additional improvements have included enhanced accident protection for valves and fittings and requirements that specific hazardous materials, such as environmentally harmful substances, be transported in stronger tank cars.

However, despite these improvements, railroad accidents in the past five years, such as those in Minot, North Dakota; Macdona, Texas; and Graniteville, South Carolina have raised new concerns about the safety of transporting hazardous materials in railroad tank cars. The derailment of a Canadian Pacific Railway freight train near Minot on January 18, 2002, resulted in the catastrophic failure of five tank cars. Each tank car held almost 30,000 gallons of anhydrous ammonia, a poisonous liquefied gas. The nearly instantaneous release of 146,700 gallons of anhydrous ammonia resulted in a toxic vapor plume that was approximately 300 feet thick and 5 miles long. An estimated 11,600 residents of Minot were affected by the toxic plume. One resident was killed, 11 were seriously injured and 322 others sustained minor injuries. Damages and environmental clean-up activities exceeded $10 million. Another 74,000 gallons of anhydrous ammonia were released from six additional damaged tank cars over a five-day period following the derailment.

On January 6, 2005, a northbound Norfolk Southern Railway Company freight train, while traveling through Graniteville, South Carolina, encountered an improperly lined switch that diverted the train from the main track onto an industry siding, where it struck an unoccupied, parked train head-on. As a result of the collision, a tank car filled with liquefied chlorine was punctured and a chlorine vapor cloud filled the area. Nine people died as a result of chlorine gas inhalation. Approximately 554 people complained of respiratory difficulties and were taken to local hospitals. Of these, 75 were admitted for treatment. An estimated 5,400 residents within a 1-mile radius of the accident site were evacuated for several days.

In the Minot accident investigation report, the Safety Board concluded that the low fracture toughness of the steels used for the tank shells of the five cars that catastrophically ruptured contributed to their complete fracture and separation. The Board issued four safety recommendations to the FRA: conduct a comprehensive analysis to determine the impact resistance of the steels in the shells of pressure tank cars constructed before 1989 (R-04-4); based on this analysis, rank the pre-1989 pressure tank cars according to risk and implement measures to eliminate or mitigate their risk (R-04-5); validate the predictive model being developed to quantify the dynamic forces acting on railroad tank cars under accident conditions (R-05-6); and develop and implement fracture toughness standards for steels and other materials of construction for pressure tank cars used to transport liquefied compressed gases (R-04-7). We believe that the development of the predictive model and implementation of fracture toughness standards go hand-in-hand and will lead to tank car designs that can provide improved structural integrity and puncture resistance. The FRA has been responsive to these safety recommendations and, therefore, they are currently classified "open – acceptable response."

In the Graniteville accident investigation, the Safety Board again examined tank car crashworthiness issues. The Board found that the steel in the tank shell of the punctured chlorine car had a fracture toughness that was significantly greater than the fracture toughness of the ruptured tank cars in Minot. The higher fracture toughness in the Graniteville tank car contributed to the relatively quick arrest of the crack even though there was brittle fracture in its outer portions. Because of the improved properties of the steel and increased wall thickness, the Graniteville tank car was among the strongest tank cars currently in service. However, the Board concluded that, as shown in the Graniteville accident, even the strongest tank cars in service can be punctured in accidents that involve trains operating at moderate speeds.

The Safety Board believes that modeling accident forces and applying fracture toughness standards, as recommended in the Minot accident report, will improve the crashworthiness of tank cars. However, because of the time that it will take to design and construct improved tank cars, the Board believes that the most expedient and effective means to reduce the public risk from the release of highly poisonous gases in train accidents is for railroads to implement operational measures that will minimize the vulnerability of tank cars transporting these products. Two research studies have addressed operational measures to reduce the vulnerability of tank cars transporting hazardous materials. The 1992 FRA report, *Hazardous Materials Car Placement in a Train Consist*, concluded that the rear one-quarter of a train is the most desirable location for cars containing hazardous materials and that reducing the speed and size of trains can reduce the number of cars derailed in an accident. The second study, "Minimizing Derailments of Railcars Carrying Dangerous Commodities Through Effective Marshaling Strategies," prepared for the Transportation Research Board, reached similar conclusions and provided some additional statistical information to support those conclusions. Therefore, the Safety Board recommended that the FRA require railroads to implement operating measures, such as positioning tank cars toward the rear of trains and reducing speeds through populated areas, to minimize impact forces from accidents and reduce the vulnerability of tank cars transporting chlorine, anhydrous ammonia, and other liquefied gases designated as poisonous by inhalation (R-05-16).

On October 24, 2006, the FRA responded that the railroad industry works to reduce risk through their "key train" program and other means. The key train program, which is a composite of the number of tank cars and types of cargo hazards, does include a 50 mph maximum train speed. However, the Board notes that the train involved in the Graniteville accident did not meet the industry's definition of a key train and it was actually operating less than 50 mph when the accident occurred. The FRA response noted that the actions called for by safety recommendation R-05-16 would be contrary to railroad safety and would result in significant costs to the railroad industry that could not be justified under any circumstances. Although the FRA notes that it will continue to examine this issue, the Board is disappointed in the lack of FRA action to reduce the vulnerability of tank cars carrying poisonous inhalation materials through operational measures.

Positive Train Control

Since 2001, the National Transportation Safety Board has investigated 28 railroad and 3 rail transit accidents involving train collisions and over-speed derailments. Most of these accidents occurred after train crews failed to comply with train control signals, failed to follow operating procedures in non-signaled (dark) territories, or failed to comply with other specific operating rules such as returning track switches to normal positions after completing their work at track sidings. Our accident investigations have identified human performance failures related to fatigue, medical conditions such as sleep apnea, use of cell phones, use of after-arrival track warrants in dark territory, loss of situational awareness, and improperly positioned switches.

Although the Safety Board has made numerous safety recommendations to address specific human performance issues, we have repeatedly concluded that technological solutions, such as positive train control systems, have great potential to reduce the number of serious train accidents by providing safety redundant systems to protect against human performance failures. As a consequence, positive train control has been on the Safety Board's list of Most Wanted Transportation Safety Improvements for 17 years.

The issue was highlighted in 2002 when a freight train and a commuter train collided head-on in Placentia, California. As a result of the investigation of this accident, the Board reiterated the need for positive train control systems, particularly on high-risk corridors where commuter and intercity passenger railroads operate. Most recently, the Board found that the lack of a positive train control system contributed to a commuter train derailment in Chicago, Illinois in 2005 that killed two passengers. The train derailed as it traversed a crossover from track 2 to track 1 that had a prescribed operating speed of 10 mph. The train was traveling 69 mph as it entered the crossover.

Since the Safety Board held a symposium on positive train control systems in March 2005, the Board notes that several railroads have taken positive action toward the development and implementation of these systems. Last year, the presidents of BNSF Railroad and Norfolk Southern Railway Company freight railroads and the executive director of Northeast Illinois Regional Commuter Railroad (Chicago Metra) passenger railroad announced that it was time for the industry to move forward on positive train control systems. On January 8, 2007, the FRA announced its approval of a positive train control system for a major railroad over 35 specific freight lines in 17 states. The Board is encouraged by these recent developments. We are pleased to see the FRA's announcement and agree this technology will pay great dividends in terms of lives saved and injuries prevented.

Mr. Chairman, this completes my statement, and I will be happy to respond to questions at the appropriate time.