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TECHNICAL REPORT

Improving the Safety and Security of Freight and Passenger Rail in Pennsylvania

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Summary

On October 24, 2006, the Pennsylvania House of Representatives adopted House Resolution (H.R.) 824, which calls for a "review of the existing Federal and State statutory and regulatory authority as it relates to the oversight of freight and passenger rail transportation systems" in Pennsylvania. The resolution reflects the significant role that railroad transportation plays in Pennsylvania; the concern for the safety and security of railroad employees, passengers, and the general public; and the potential economic effects of a significant disruption to rail services in the state. Such disruptions could result from an accident, such as the October 2006 derailment of ethanol-filled tank cars and the resulting fires in New Brighton, Pennsylvania, or a deliberate attack, such as the March 2004 commuter-train bombings in Madrid, in which nearly 200 people died.

The Pennsylvania Legislative Budget and Finance Committee (LBFC) asked RAND to respond to the study request in H.R. 824. This report presents the results of that study. It first describes the physical extent of the rail system in Pennsylvania and characterizes the flows of freight and passengers on it. This places the subsequent analysis in context and enables us to quantify the consequences of some types of railroad incidents. Legal authority at the state level is then reviewed to identify actions Pennsylvania could take within that authority to improve rail safety and security. Key risk factors for both safety and security of freight and passenger railroad systems are analyzed to identify actions that could be taken to improve the security of rail facilities, terminals, tunnels, bridges, and other rail infrastructure. However, we were unable to precisely identify the specific use of security measures in place at each rail facility in the state or to assess the immediate need to improve them, because of private-sector security concerns. Finally, we analyze examples of federal, state, and private-sector safety and security practices for passenger and freight railroads, reviewing the training of railroad employees in safety, security, and terrorism response; the status of critical safety technology such as positive train control (PTC) systems; and the systems that protect cargo distributed by rail. Together, these analyses provide an initial assessment of actions Pennsylvania might take to improve rail safety and security.

Rail Transportation Services in Pennsylvania

Pennsylvania is home to several key railroad corridors, over which four Class I rail carriers operate.[1] Norfolk Southern and CSX Transportation operate major corridors running roughly

[1] The Surface Transportation Board (STB) defines a Class I railroad in the United States as one "having annual carrier operating revenues of $250 million [in 1991 dollars] or more" after adjusting for inflation using a Railroad Freight Price

east-west through the state and along Lake Erie, and Canadian Pacific Railway and the Grand Trunk Corporation (a subsidiary of the Canadian National Railway) also operate in Pennsylvania. Regional and short-line carriers provide essential connectivity among customers and Class I main lines. These carriers include the Buffalo & Pittsburgh railroad, which operates along 500 miles of track, and the Reading Blue Mountain and Northern Railroad, which operates over more than 300 miles of track. The Northeast Corridor, running along the Delaware River in southeastern Pennsylvania, is Amtrak's busiest intercity passenger rail corridor and a key rail freight corridor too.[2] Amtrak also operates electrified service from Philadelphia to Harrisburg, and greater Philadelphia is served by the Southeastern Pennsylvania Transportation Authority (SEPTA), which operates light rail, rail rapid transit, and commuter rail systems.

Railroads in Pennsylvania also carry a significant amount of freight. In 2006, they carried 209 million tons of it. Rail freight originating in Pennsylvania and carried by rail consists largely of coal and primary metals. Three major rail freight corridors pass through Pennsylvania, providing essential regional and national connectivity. Major intermodal terminals are located at critical junctions and industrial areas, supporting both the regional and the national economy.

Of key concern with respect to safety in rail freight is the transport of hazardous materials. The hazardous materials most frequently shipped by rail are flammable liquids, gases, and corrosive materials. Shipments of toxic inhalation hazard (TIH) materials such as chlorine and anhydrous ammonia are of particular concern. An accident in 2005 in Graniteville, South Carolina, released chlorine gas, resulting in eight deaths, 500 injuries, and direct damage to equipment and track valued at more than $7.8 million. Data regarding the exact quantity of hazardous materials transported through any specific area are not available to the general public. However, using commodity characteristics and modal shares from the most recent Commodity Flow Survey (CFS) of the Bureau of Transportation Statistics, we estimate that approximately 11 million tons—more than 200,000 carloads—of hazardous materials travel within or through Pennsylvania annually.[3]

Passenger rail traffic in Pennsylvania is concentrated in the southeastern part of the state. Amtrak's Northeast Corridor is the busiest passenger line in the United States, carrying more than 10 million passengers per year. In 2007, 3.7 million Amtrak passengers boarded or alighted from an Amtrak train at 30th Street Station in Philadelphia, the third busiest passenger rail station in the nation. The Keystone Corridor connects Philadelphia to Harrisburg and carries approximately 1 million passengers annually. (Amtrak service outside this area carries significantly fewer passengers.) SEPTA rail lines provide approximately 150 million passenger trips annually throughout greater Philadelphia, and the Port Authority Transportation Corpo-

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Index developed by the Bureau of Labor Statistics (BLS). According to the Association of American Railroads (AAR), that threshold was $346.8 million in 2006. The STB also uses two other classifications, Class II and Class III; the industry has a different classification system, classifying non–Class I rail carriers as regional or short-line, with short-line further divided into local and switching and terminal. The American Short Line and Regional Railroad Association (ASLRRA) defines these on its website.

[2] Amtrak is formally known as the National Rail Passenger Corporation.

[3] AAR (2008) reported that in 2006, Class I railroads in Pennsylvania carried 4.5 million carloads weighing 209 million tons, for an average of approximately 47 tons per carload. This is less than the national average of 61 tons per carload (AAR, 2007, p. 37) and the 90-ton legislated maximum capacity of a chlorine tank car (The Chlorine Institute, 2007, p. 7).

ration links Center City Philadelphia to New Jersey, carrying approximately 40,000 passengers per day.

Passage of H.R. 824 was motivated by the likely consequences of a disruption of rail freight or passenger service in Pennsylvania to the state and its communities and to the nation. Any such disruption will adversely impact local users of those services, but the effect will be more significant in areas more heavily served by rail—coal-producing areas for rail freight, and greater Philadelphia for passenger transport. Broader effects of disruptions are harder to quantify. The rail freight system in Pennsylvania is very dense, providing the ability to reroute trains in the event of a disruption. Rerouting passenger traffic in the event of a disruption along the Northeast Corridor and from Philadelphia to Harrisburg would, however, be difficult because there are no parallel electrified routes and equipment changes would be necessary. Additionally, alternate routes carry high volumes of rail freight, and there is limited capacity available to accommodate passenger traffic (Weatherford, Willis, and Ortiz, 2008). Any disruption of passenger rail service in the area would substantially increase travel times, as passengers would have to be shifted to alternative modes. A more complete analysis of the effects of a disruption of passenger rail systems, including rail rapid transit, commuter, and intercity services, in Pennsylvania would have to consider the availability, capacity, speed, and cost of alternative modes to compensate for lost services.

Legal Framework for Rail Oversight

Legal oversight of rail is fundamentally a federal activity. The Surface Transportation Board (STB), the entity charged with overseeing rail regulation, has interpreted its powers broadly, sometimes preempting initiatives by local communities and states. A separate entity, the Federal Railroad Administration (FRA), is responsible for establishing and enforcing safety regulations. The Federal Railroad Safety Act of 1970 authorized FRA to partner with states to assist in enforcement of railroad safety laws. Thirty states, including Pennsylvania, now collaborate through FRA's State Rail Safety Participation Program. The Pennsylvania entity charged with this authority is the Pennsylvania Public Utility Commission (PPUC), which performs inspections on behalf of and in collaboration with FRA. The U.S. Department of Transportation (DOT) agency that has the authority to regulate the transport of hazardous materials by all modes is the Pipeline and Hazardous Materials Safety Administration (PHMSA).

Recent Pennsylvania laws regarding railroads have focused on economic development. The Rail Freight Preservation and Improvement Act of 1984 empowered the Pennsylvania DOT with some grant-making authority to assist struggling railroads. The State Railroad Infrastructure Act of 2004 established a state railroad bank and allows the Pennsylvania DOT Bureau of Rail Freight, Ports, and Waterways to provide economic development grants through the Rail Freight Assistance Program and the Rail Transportation Assistance Program.

Federal security regulations enacted after the terrorist attacks of September 11, 2001, have augmented federal oversight of rail to include security. General oversight and rail safety continue to reside in the U.S. DOT, but oversight of security now resides in the U.S. Department of Homeland Security (DHS) under the Transportation Security Administration (TSA). The Implementing Recommendations of the 911 Commission Act of 2007 include a number of provisions related to rail, including the development of a national rail-security strategy and risk assessment; institutional risk assessments by rail carriers; new programs for rail-security train-

ing, rail-security exercises, and tank-car security testing; and rail-security research and development. PHMSA, in collaboration with TSA, has recently promulgated a new rail hazardous-materials transport rule.

Key Risk Factors of Rail in Pennsylvania

Risk comprises threats, vulnerabilities that threats can exploit, and the resulting consequences. Rather than deriving a measure of risks to rail in Pennsylvania, we analyzed these three factors individually. In doing so, we identified opportunities for Pennsylvania to address risks to rail by reducing the threat, vulnerability, or consequences of both accidents and terrorist attacks.

Threat

The terrorist threat to rail systems is well documented. The vast majority of terrorist attacks on rail systems are bombings—involving large truck-sized bombs, smaller hand-carried devices (the most common type), and/or incendiary devices—followed by armed attacks, sabotage, arson, and unconventional attacks. The most notable unconventional terrorist attack was the 1995 release of a nerve agent in the Tokyo subway, which resulted in 12 deaths and thousands of injuries. According to a prior RAND analysis of threats to passenger rail systems (Wilson et al., 2007), there is a high threat of attacks using small explosives; a medium threat of attacks using large explosives, small incendiary devices, or other weapons, sabotage, and hoaxes; and a low threat of attacks using large incendiaries and unconventional weapons. We assume that these threats apply to both rail freight and passenger rail, though the vast majority of recorded attacks have been against passenger systems.

FRA collects data on accidents that exceed a certain level of damage.[4] These accidents are characterized as train, grade crossing, or "other" (a large group that includes obstructions, explosions, and fires). Train accidents are further classified into derailments, collisions, and "other." From 1998 through 2007, more than 3,000 rail freight accidents in Pennsylvania were reported to FRA, approximately half of which were classified as "other." The rest are divided roughly equally between train accidents and grade-crossing incidents. Thirteen releases of hazardous materials by rail freight in Pennsylvania were reported to FRA during this period.[5] In the same period, more than 4,000 accidents or incidents in passenger rail occurred in Pennsylvania, of which slightly more than 200 were train accidents, 33 were grade-crossing incidents, and the remainder were "other" incidents, typically resulting in minor injuries to passengers or employees.

According to FRA, which collects data on the causes of rail accidents, the dominant causes of accidents in Pennsylvania over the past decade have been track defects, followed by human factors, "miscellaneous," motive power, and signals.

Reducing terrorist threats to rail requires effective law enforcement and intelligence gathering and analysis. The number of accidents can be reduced by proper enforcement of safety regulations, informed by analysis of accident causes.

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[4] The threshold level of damages in 2008 is $8,500 in property loss, any injury to an employee or passenger, or any release of hazardous materials.

[5] PHMSA has different reporting requirements. For consistency in our analysis, we used data from FRA.

Vulnerability of Rail Assets to Terrorist Attack

The presence of threat is a concern only when it is capable of exploiting a specific vulnerability; for example, crowded stations are vulnerable to bombings and armed attacks. Our analysis applies the concept of vulnerability to specific components of the rail infrastructure, including stations, track, tunnels, and bridges, based on the general accessibility of these components to would-be attackers. We have extended a measure of vulnerability of passenger rail systems developed in a RAND analysis of passenger rail infrastructure (Wilson et al., 2007) to rail freight infrastructure. That analysis concluded that trains and stations have relatively higher vulnerability than other infrastructure components, which have medium vulnerability. Extending the results to rail freight infrastructure, we conclude that dwelling locomotives and cars and yard and loading infrastructure have relatively higher vulnerability than track, bridges, and tunnels, which in turn are relatively more vulnerable than system operation and control infrastructure.

These general results may be applied to Pennsylvania by comparing the predominant infrastructure types and the likelihood of attack. The concentration of stations and passenger rail operations in greater Philadelphia, the Northeast Corridor, and the Keystone Corridor indicates that this area has relatively higher vulnerability than other areas. A relatively more capable emergency response may also be mounted at the local level in this area. Protecting dwelling trains and yard infrastructure requires collaboration among the carriers and federal, state, and local officials and has already been the focus of federal initiatives. Securing the large amount of rail freight infrastructure outside of urban areas would be very difficult; hence, identifying key assets to protect among them is an important first step in reducing vulnerability.

Consequences

Given the number of passengers in some parts of Pennsylvania's passenger rail system and the types of materials shipped via rail freight, certain accidents and purposeful attacks could have significant consequences. According to FRA data for both passenger rail and rail freight from 1998 through 2007, train accidents resulted in a single death and 98 injuries, and highway-rail grade-crossing accidents resulted in 45 deaths and 172 injuries. The majority of casualties occur in the "other" category of accidents and incidents, defined as events that result in personal injury. Including "other" accidents and incidents, an average of 43 deaths and approximately 1,000 injuries occur on Pennsylvania rail systems annually.

Most train accidents do not result in significant direct damage to equipment, track, and infrastructure. Direct damage, however, does not include the costs of rerouting trains around the disruption, delays, or medical services provided to victims. The overwhelming majority of accidents between 1998 and 2007 incurred less than $100,000 in direct damage. Seven percent of the train accidents during this period resulted in direct damage valued at more than $1 million.

According to Wilson et al. (2007), terrorist attacks on rail systems have each resulted in an average of four deaths and 13 injuries. This figure treats each individual terrorist incident as a single attack and excludes the 1995 nerve-gas attack on the Tokyo subway, which would skew the results. The median for attacks resulting in at least one casualty is one death and 10 injuries; if all attacks are included in the calculation, the median number of casualties is zero.

The consequences of certain prior accidents provide insights into the potential consequences of terrorist attacks. Average casualty rates from accidents indicate that a successful attack on rail freight would not necessarily be catastrophic. However, the derailment and rup-

ture of 20 tank cars of fuel ethanol in New Brighton, Pennsylvania, in 2006 caused a fire that burned for several days, and a 2002 derailment in Minot, North Dakota, resulted in the release of anhydrous ammonia gas, killing one person and injuring more than 300 people, 11 of them seriously. Direct damages to equipment were reported to be greater than $3.0 million, and environmental remediation costs for that incident were reported to be more than $10 million. A successful attack on a freight train carrying TIH materials through a densely populated area could easily result in consequences an order of magnitude greater: tens of deaths, hundreds of injuries, and tens of thousands of persons displaced.

Research has confirmed the large-scale damages that could result from the accidental or purposeful release of hazardous materials. There is also evidence showing that effective emergency response can significantly limit the scale of human consequences in such incidents.

Rail accidents and incidents occur routinely in Pennsylvania; there is on average about one per day for both rail freight and passenger rail. The majority of these events do not cause injury or significant damage, and there has never been, to our knowledge, a terrorist attack against rail in Pennsylvania. Researchers have analyzed historical data regarding rail accidents and incidents to estimate the potential human and economic costs of future accidents and incidents. However, the lack of prior experience with sudden massive releases of TIH in urban areas, as might occur in a successful terrorist attack, suggests that using these data to estimate the potential human and economic costs of terrorist attacks against rail is likely to understate them.

Recent Federal and State Initiatives Seeking to Improve Rail Security

At the federal level, U.S. DOT and TSA have sought to reduce the risk of terrorist attacks on rail freight. The initial and ongoing effort is the Toxic by Inhalation Hazard Risk Reduction Program, in which TSA assumes that the risk of hazardous-materials transport is directly proportional to the dwell time and volume of materials transported through densely populated areas.[6] First implemented in New Jersey and New York and currently being implemented in Pennsylvania, the program seeks to establish secure storage areas for TIH materials and to expedite their movement through the system. More recently, PHMSA has directed rail freight carriers to transport TIH materials over the "safest and most secure commercially practicable routes."

The New Jersey Office of Homeland Security (OHS) participated closely with TSA and the Class I carriers in the execution of the Toxic by Inhalation Hazard Risk Reduction Program. In this way, New Jersey was able to build capacity in hazardous-materials security and worked closely with the Class I carriers to identify grant funding that would assist in the consolidation of operations and the improvement of security in certain yards and facilities.

Since 1990, the National Transportation Safety Board (NTSB) and FRA have made implementing technology to prevent railroad accidents, PTC in particular, a priority. The Railroad Safety Enhancement Act of 2008 (P.L. 110-432) requires Class I railroads to implement PTC on lines carrying hazardous materials and lines carrying both freight and passengers by 2015. This technology has the potential to increase railroad safety but has not yet been

[6] These assumptions are consistent with our risk-factor analysis and the existing literature on risks of transport of hazardous materials, which concludes that the likelihood of an attack on a dwelling car is high.

broadly deployed. To our knowledge, no rail freight demonstration projects of PTC exist in Pennsylvania; however, Amtrak implemented early-generation PTC systems along the Northeast Corridor and the Keystone Corridor. Class I railroads operating on these corridors have equipped their locomotives with the necessary technology to use these advanced signaling systems. Although they improve safety, PTC systems may also create new safety and security vulnerabilities if they malfunction or are compromised.

The Pennsylvania OHS has established the Commonwealth Critical Infrastructure Protection Program (CCIPP), a collaboration between the State Police, OHS, and the Pennsylvania Emergency Management Agency (PEMA). Rail transportation infrastructure is among the assets the program seeks to protect. Within CCIPP—a state-level complement to the National Infrastructure Protection Program—the State Police seek to prevent attacks through coordination with other law enforcement and intelligence agencies; OHS coordinates the program, and PEMA is responsible for response and recovery operations.

California is one state that has increased state-level oversight of rail and strengthened regulation of railroad security. In addition to its role in enforcing federal rail-safety regulations, the California Public Utilities Commission (CPUC) is developing capacity to improve rail security. CPUC was charged with enforcing the provisions of Assembly Bill 3023 and, ultimately, negotiating a settlement agreement with Class I carriers.[7] As a result of the settlement agreement, officials from the California OHS (on behalf of CPUC) reviewed and commented on Class I rail-security plans. In the future, CPUC inspectors are to be federally certified in both safety and security, so that they may issue security enforcement recommendations under the auspices of federal law. Additionally, California actively seeks to bring state-level knowledge regarding rail safety and security to short-line carriers that may not have the resources to establish robust safety and security programs on their own.

Railroad Actions to Improve Security

In response to the terrorist attacks of 2001, AAR formed a task force to draft a security plan and procedures. The resulting plan includes (1) a nationwide database of critical railroad assets; (2) assessments of vulnerabilities of those assets and rail operations; (3) assessment of the terrorism threat; (4) calculations of risk; (5) identification of countermeasures to reduce risk; (6) a definition of alert levels; (7) delineation of actions to be taken at each alert level; and (8) functions of the AAR operations center and railroad alert network. The AAR security plan was first issued in December 2001 and has recently been revised. However, it is not available for review by the public.

Each Class I carrier has developed a corporate security plan based on the AAR model. These are the security plans that each carrier reviews with TSA. Class I carriers claim to have made security improvements as a result of developing and implementing their plans. For example, CSX operates remote video surveillance equipment at certain yards and facilities. Both CSX and Norfolk Southern have enhanced their background checks on employees and contractors and have identified assets that are to receive greater security resources as a func-

[7] In 2006, California passed Assembly Bill 3023, which would have compelled rail freight carriers in the state to share security plans and file infrastructure protection plans with the state. A legal appeal resulted in a settlement agreement that allowed California officials to inspect Class I security plans but acknowledged federal authority over security.

tion of the security alert level. But representatives of railroad employees claim that the security actions taken by the Class I carriers are inadequate and that training has not kept up with the increased security requirements.[8]

AAR maintains guidelines on best practices for the safe transport of hazardous materials. These guidelines, which members are obligated to follow, specify the designation of "key trains" and "key routes," depending on the volume and types of hazardous materials transported. Key trains are restricted to a top speed of 50 miles per hour. Along key routes, track inspections are to occur twice each year, and wayside defective-bearing detectors are to be installed and operated at intervals no greater than 40 miles. AAR guidelines permit local emergency responders to request information regarding the types and quantities of hazardous materials that are transported through their communities. The guidelines also promote the use of several services to report chemical spills and provide community education.

Class I carriers operating in Pennsylvania also provide emergency-response training to local first responders. At the request of the community or on its own initiative, CSX will provide training in the form of classroom sessions and self-study. Norfolk Southern also provides first-responder training and community-awareness services, generally under the auspices of the Transportation Community Awareness and Emergency Response consortium. Members of several communities that participated in CSX training indicated in interviews that the training was helpful and that it complemented their knowledge and skills. In particular, the Philadelphia Fire Department has a long-standing relationship with CSX, which has provided enhanced training for hazardous-materials specialists at the Emergency Response Training Center in Colorado. None of the communities that we contacted had experienced a hazardous-materials incident in recent years that would test the training or the communications protocols needed to mount an effective response.

Passenger Rail Security Best Practices

The literature on case studies of transit and passenger rail systems in the United States, Europe, and Japan identifies security best practices for passenger rail systems. The four primary categories of action to improve security are (1) design of stations, public areas, and trains to withstand explosive forces and provide a means of egress for the public and ingress for emergency response; (2) appropriate deployment of security technologies, such as closed-circuit television (CCTV) surveillance cameras; (3) a security and emergency-response organization with clear lines of communication that may be scaled to the required size for effective response; (4) planning and practicing of response to security incidents to refine systems and protocols.

Findings

1. Pennsylvania has a dense network of rail freight routes, though Class I railroads carry the vast majority of freight.

Four Class I railroads and nearly four dozen regional and short-line railroads provide rail freight services in Pennsylvania on a network covering more than 5,000 track miles, and alter-

[8] Two reports specifically address this issue: Teamsters Rail Conference (2005) and National Labor College (2006).

nate parallel routes exist within Pennsylvania or neighboring states. The result of this density of active rail freight service providers is that disruptions within the system can be rerouted relatively easily along parallel routes on the Class I carrier's network, or if appropriate and available, along other railroads—Class I, regional, or short-line.

2. Pennsylvania's passenger rail services are concentrated in the southeastern corner of the state.

Passenger rail infrastructure and services in Pennsylvania are concentrated in the greater Philadelphia region. SEPTA operates a large urban-transit system consisting of light rail, rail rapid transit, and commuter rail components. Amtrak's Northeast Corridor, which runs through Philadelphia along the Delaware River, connecting Boston to Washington, D.C., is the busiest intercity rail corridor in the United States. Its Keystone Corridor provides rail service between Philadelphia and Harrisburg. These and other systems interchange at 30th Street Station in Philadelphia. Other passenger rail systems in Pennsylvania carry an order of magnitude fewer passengers annually than the major systems in the southeastern corner of the state.

3. There is a documented terrorist threat to rail systems, and infrastructure will always be vulnerable.

Documented attacks have occurred against all types of passenger rail systems. The most common mode of attack is bombing of stations or loaded passenger cars; there is a lesser threat of armed attacks. Sabotage and unconventional attacks have also occurred, however, including a purposeful derailment of the Amtrak Sunset Limited in 1995 and the release of sarin gas, a potent nerve agent, in the Tokyo subway in the same year. With the exception of the Tokyo attack, relatively few casualties, on average, result from terrorist attacks on rail systems.

A prior RAND study assessed the vulnerability of passenger rail by considering the practicality of attacks against specific infrastructure components. Generalizing this approach to rail freight, we conclude that much of the infrastructure is accessible to would-be attackers and is vulnerable. However, the consequences of accidents in rail freight, if taken as a guide to possible consequences due to attacks, are relatively minor. Safety incidents in rail freight generally do not result in casualties and do not incur significant direct damages to track or equipment. Incidents involving the release of hazardous materials, however, can have far more severe consequences. Were such an incident to be perpetrated with the intent of maximizing casualties, the results could be catastrophic.

4. The extent and diversity of railroad infrastructure and operations in Pennsylvania require an equally diverse approach to security.

The rail freight and passenger rail network in Pennsylvania serves both densely populated urban areas and sparsely populated and difficult-to-access rural areas. Ensuring safety and security within the urban areas requires coordination among a number of different agencies, jurisdictions, and carriers. In rural areas, identifying appropriately equipped and trained emergency-response capabilities may be difficult.

5. Effective response is essential for minimizing casualties and economic damage resulting from rail safety and security incidents.

Prior research has concluded that effective response is an important element in reducing the consequences of attacks or accidents. However, providing effective emergency-response ser-

vices can be difficult and requires appropriate resources, training, planning, interagency coordination, and practice. Exercises, both tabletop and in the field, are an important component of emergency-response training to ensure that lines of communication are clear and logistics practiced.

6. There is significant flexibility within existing legal authority for Pennsylvania to play an active role in shaping its rail safety and security.

Legal authority over rail infrastructure and operations is largely a federal activity. However, since states partner with FRA in enforcing key railroad-safety legislation, there are many opportunities for states to take an active role in overseeing rail safety and security. Within the current regulatory system, states perform many safety- and security-related functions, both in collaboration with federal agencies and on their own. New Jersey and California are two significant examples.

Possible State-Level Actions to Improve Rail Safety and Security

1. Use state rail development funding to improve rail transportation and safety and security.

The Pennsylvania Department of Transportation's (PennDOT) Rail Freight Assistance Program and Rail Transportation Assistance Program provide grants to bolster rail infrastructure as an economic-development tool, preserving rail services throughout the state. PennDOT could create a complementary program to fund safety and security improvements to regional and short-line railroads, possibly under the authority of the Rail Freight Preservation and Improvement Act. Straightforward improvements to track and supporting infrastructure of these railroads could have a significant effect on safety and security, for two principal reasons. First, smaller carriers tend to be undercapitalized and to operate on lower-rated track than the Class I carriers; thus they experience higher accident rates. Second, in the event of a significant disruption, such as one that would result from disabling a major bridge or tunnel, reconstituted regional or short-line routes may be able to improve the resilience of the rail freight system. Federal homeland-security grant programs already exist and may be a source of funding for such activities. Two examples of such programs are the Buffer Zone Protection Program[9] administered by the Federal Emergency Management Agency (FEMA) and the Transit Security Grant Program[10] administered by DHS.

2. Be prepared to provide a wide range of support services, depending on local needs.

Each of the Pennsylvania communities in which rail operations occur has unique abilities to plan for and mount a response to a rail safety or security incident. State officials, possibly from the Pennsylvania OHS, could assist communities in identifying key components of infrastructure and in applying for grant programs to bolster and improve them. In the event of an incident, state resources may augment local capabilities or may coordinate the entire response. Ensuring that such planning and response is effective requires close coordination of the rel-

[9] For more information, see http://www.fema.gov/government/grant/bzpp/index.shtm (as of September 21, 2008).

[10] For more information, see http://www.dhs.gov/xgovt/grants/gc_1178820367100.shtm (as of September 21, 2008).

evant state agencies—the State Police, PPUC, OHS, and PEMA, among others—with local communities, carriers, and system operators.

3. Coordinate simulations and exercises including personnel from local and state agencies, neighboring states, federal agencies, volunteer organizations, and the railroads.

The Commonwealth of Pennsylvania, possibly led by PEMA, could coordinate training exercises that simulate or rehearse for a serious hazardous-materials release or terrorist railroad incident. Such training would test lines of communication and allow participants to practice logistics, deployment, evacuation, and other response and recovery operations. This would provide state agencies with critical hands-on understanding of their roles in disaster response and would improve interagency communication. Ideally, these exercises would include both freight and passenger rail and would be conducted throughout the state. Participation among state agencies, local first responders, and railroad personnel and employees should improve communication and ultimately reduce the impacts of intentional or accidental railroad incidents.

4. Build state-level capacity in rail safety and security.

PPUC could seek to emulate the example of CPUC in carrying out its responsibilities under the State Rail Safety Participation Program and that of the New Jersey OHS in its collaboration with TSA on security matters. FRA and TSA have welcomed the increased involvement of these states. Moreover, state resources and expertise could be focused on areas not necessarily covered by FRA or TSA. For example, CPUC investigates all incidents that occur at grade crossings in the state, something that FRA does not do. The expertise gained at the state level could be transferred to regional and short-line railroads, which may not have the resources or the in-house expertise to implement certain safety and security practices.

Pennsylvania could develop a formal intelligence collection and analysis center, similar to the center established by New Jersey, which would maintain direct contact among Pennsylvania law enforcement, the federal government, local communities, and system operators, perhaps employing the CSX Network Operations Workstation (NOW) terminal and the car-location data offered by Norfolk Southern.