IMPROVING SURFACE TRANSPORTATION OPERATIONS IN EMERGENCY SITUATIONS

Vincent Pearce
Federal Highway Administration
400 7th St. SW
HOTM-1, Room 3404
Washington, DC 20590
Ph (202) 366-1548
Fx (202) 366-8712
Vince.pearce@fhwa.dot.gov
SUMMARY

In the months following the terrorist acts of Sept. 11, 2001, intense effort has been focused on understanding the state of security of travel on the nation’s roadways, and on improving the existing level of security. These efforts have taken place within and across modes and between agencies that had not previously had reasons to work together. The activity has encompassed agencies at federal, state, and local levels, as well as the private sector, academia, and many associations supporting these participants. Progress has been significant but not particularly visible. This paper describes some of the effort, the findings, and the results.
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Understanding What Happened

Before Sept. 11, security of travel on the American roads received little attention. Some effort had been paid to security of transportation information systems (cyberterror), and a lot of useful experience had been gained in preparing for Y2K. Although the most visible impact of the events of 9/11 was on the nation’s air travel, the surface transportation experiences in the New York and the Washington metropolitan areas were momentous. The U.S. Department of Transportation (USDOT) was heavily involved on 9/11 and in the following days, through its metropolitan offices in New York City and its division offices in New York state and the District of Columbia. One focal point has been USDOT’s Transportation Information Operations Center in Washington, D.C., which has been operating around-the-clock since the first news of the terrorist attack arrived. The center has provided aid and assistance to those directly affected by the attack, and has not only kept the Administration informed on the state of transportation in the two metro areas, but also others around the country who responded to the potential threats on 9/11 and later.

In the days following 9/11, the Federal Highway Administration (FHWA), recognizing that a great amount could be learned from what was transpiring, commissioned the Volpe National Transportation Systems Center in Boston to prepare detailed case studies of surface transportation activity and impact in the two metro areas. Input for these studies has included material gathered from the media, internal agency assessments from participating agencies, and interviews with key participants. In the New York City case study, a detailed chronology of events was compiled to understand the flow and impact of actions during and following the attack. An article describing the findings of the case studies is being developed.

The Objective

There is great opportunity for ensuring that surface transportation operating agencies throughout the nation have the necessary tools, techniques, information, and understanding to be able to prevent, prepare for, respond to, and recover from natural and man-made disasters. Ideally, the objective would be for each agency and region should have operational policies, protocols, procedures, practices, and improvements in place that will enable people and goods to move safely and effectively during threatening situations while still enabling emergency access to the scene(s), and to facilitate re-establishment of transportation after an emergency.

In general, efforts supporting this objective seek to enhance, through awareness, guidance, and technical assistance, the roadway (highway, arterials, etc.) transportation component of new and existing state and local emergency management planning and response efforts. More specifically, such efforts:
• More fully engage transportation operators with emergency managers and public safety in regional collaboration, information sharing, and strategic planning, for the management of transportation during emergencies.

• Ensure development of a communications capability, with agreed-to protocols, standards, and messages, to enable transportation system operators to communicate with law enforcement, fire and rescue, EMS, and other emergency management officials.

• Ensure that transportation operation is an integral part of emergency management planning.

• Ensure that communications to the public, through media and advanced traveler information services such as 511 systems, regarding the demands and conditions of the highways are an essential component of emergency management planning.

• Facilitate full information sharing and data exchange capabilities of the transportation system, including ITS, to support emergency management planning and operations.

• Ensure that planning for emergency management addresses issues surrounding the movement of freight, including the flow of supplies and materials to the emergency area(s) or site(s), and the restoration of the routine flow of goods and supplies to the general public.

Working In Stages

Related activity is most easily understood if viewed in stages, based on the structure in use by the Office of Homeland Security (OHS). This structure divides an emergency into six stages, chronologically:

• Detection
• Preparedness
• Prevention
• Protection
• Response
• Recovery

Detection

Detection most commonly involves collection and distribution of intelligence information. USDOT has been active in this area, particularly in assuring that intelligence moves between federal agencies and state/local ones, as well as “bridging the gap” between transportation agencies and those in law enforcement and emergency management.

Transportation agencies themselves have a role in detection. FHWA is engaged with the American Association of State Highway and Transportation Officials (AASHTO) in support of efforts by the Washington State Department of Transportation to develop materials that would be helpful to highway maintenance workers, whose alert observations
can provide critical and timely detection of possible wrongdoing. Similarly, the other modes at USDOT have been working with their state and local partners to identify how each employee involved in transportation can be an effective observer, and how to work with other state and local agencies (such as Highway Patrols) whose personnel are in a position to constantly observe the transportation infrastructure.

ITS America has been keenly aware of the potential value of the existing and planned “information infrastructure,” or “infostructure” created through ITS deployment, and the role it can play in monitoring activity on and around critical transportation infrastructure. The value of the infostructure extends well beyond monitoring, as it can serve as a critical information resource during both response and recovery phases as well. FHWA has defined and published desirable levels of infostructure, based on various fundamental transportation characteristics. Each state and local agency is responsible for implementing and operating/maintaining its information infrastructure, potentially supported through the use of its Federal-aid funds. FHWA has also advertised for agencies interested in participating in a field operational test of how the information infrastructure can be applied to enhancing security.

Preparedness

Preparedness begins with effective and thorough planning, but it does not end there. Unless the plans are understood by participants, and practiced regularly, and unless the resources those participants need are available when and where they are needed, full preparedness cannot be achieved. To accomplish this, AASHTO conducted a survey the state of emergency management plans and has developed and distributed technical guidance on “state of the art” emergency planning for the new and emerging threat scenarios. There is a solid foundation on which this is being built, including the expertise at federal and state emergency management agencies, as well as the experience that transportation agencies have had in planning for emergencies such as hurricanes and earthquakes, and huge special events like Olympic Games.

FHWA is taking this activity one step further, looking at how transportation has been incorporated into regional and statewide emergency management plans. Once this assessment is completed, it is anticipated that conclusions and guidance will be prepared regarding best practices that lead toward effective integration of transportation into these plans.

FHWA, in support of regional emergency planning, is conducting three series of workshops in 2002. One series focuses on hurricane preparedness, a second on transportation supporting military mobilization, and a third on response to and recovery from unpredicted events such as acts of terror. In the last of the series, FHWA is working with 10 metro areas and regions to bring together the many organizations involved in (or dependent upon) transportation at the time of an emergency, and working through two “tabletop exercises” to identify areas in which preparedness can be strengthened. The types of agencies involved include:
Transportation (all modes)
Public safety (law enforcement, fire fighting, and emergency medical)
Emergency management
Military (active and National Guard)
Public health
Homeland security
Special venues

One of the outputs of the workshops will be a “lessons learned” document, compiled based on the interactions during the workshops.

The Federal Transit Administration (FTA) is carrying out a comparable transit-oriented program in 15 additional locations around the country.

The role of the traditional transportation planning community in homeland security has been researched and well documented in a paper prepared by FHWA’s office of policy. This paper is available on their Metropolitan Capacity Building website.

Another key element in preparedness is training. As with detection, training starts with those workers who are involved in daily field operations, but the training need extends considerably further. For example, FHWA provides emergency management training to the emergency coordinators in each of its offices around the country, and is developing training in a variety of topics (shown below) related to homeland security for a broader set of its headquarters and field personnel.

- Federal Response Plan
- Continuity of operations planning
- Incident Command System and Unified Command System
- Homeland Security Advisory System
- Planning, prevention, preparedness, response, and recovery
- Basics of terrorism: Weapons of Mass Destruction
- A case study of transportation following a terrorist act (9/11/2001)
- Basics of evacuation
- Intelligent Transportation Systems in Homeland Security
- Special needs for military deployment

Prevention

Efforts in preventing further acts of terrorism are quite visible in areas such as freight movement and border crossings. FHWA’s Office of Freight Management and Operations, in cooperation with the Federal Motor Carrier Administration, USDOT’s ITS Joint Program Office, and the Departments of Justice and Treasury, is working on three high-impact projects: Air Cargo Electronic Supply Chain Manifest, Electronic Seal System for
Container Movement, and Asset Cargo Tracking. All three projects were originally designed to improve various aspects of freight mobility and efficiency. However, all three have as part of their design the ability to pinpoint location of freight assets and cargo based upon the latest reporting point.

The air cargo project, led by the American Trucking Associations Foundation, is designed to handle the chain of custody of cargo from its origination at a manufacturer/shipper to its end destination at the receiving air cargo facility or at the end destination customer. En route, the originator, carrier and receiver of the goods use a smart card to hand off the freight between custodians. The smart card contains the biometric identifier of a thumbprint, the electronic manifest, and an image of the driver’s commercial driver license. All data is stored in a central server and is accessible through the Internet.

The electronic seal project is designed to track containers in-bond from the point of inspection to the destination of the container, through seaports and across land border crossings. The e-seal is a radio frequency device that emits a signal as it passes reader devices, and will display information as to whether or not the container has been tampered with.

The asset cargo tracking project, led by the American President Lines in partnership with Union Pacific Railroad, PAR Government Systems and Transcend, is designed primarily to track the chassis that containers ride on, anywhere in the United States. It also is designed for the chassis to know when a container is on it, and when it is tethered to a truck tractor. The information on location of chassis can be sent to a central data processing point by way of radio frequency identification (transponder), cellular signal or global positioning system signal (satellite). If the container is equipped with a transponder, the chassis-tracking device will read the tag and can convey cargo information to a central data processing point.

To assess benefits associated with employing these security elements, USDOT is using Border Wizard Pro as a tool. Border Wizard Pro was developed as a simulation tool for assessing border crossing improvements. The long-term objective is to link it to traffic management tools, like TRANSIMS, and assess the benefits of improvements along the highway that connect to marine ports as well as to land border crossings.

Protection

Protection activities have several different components. One area has been protecting the information systems upon which transportation agencies depend to carry out their duties. USDOT has been active in implementing additional appropriate levels of security in its own information systems, based on guidance coming from, among other sources, the Critical Infrastructure Assurance Office in the Department of Commerce.

FHWA has initiated a study of how to provide optimal protection to the telecommunications networks that have been implemented by agencies in support of their
information infrastructure. The outcome of this activity will be a set of recommendations for increasing the level of security of such systems.

Another major focal area has been protection during special events. USDOT has been an active partner and provider of expertise, most visibly in preparation for the 2002 Olympic Games in Salt Lake City. Although details have not been released regarding the specific measures implemented, transportation security was at heightened levels, and accomplished in ways designed to minimize impact on transportation effectiveness and assure that those affected had ample warning so that they could make appropriate travel provisions.

USDOT has developed and distributed to state DOTs a process that will enable state and local agencies to assess the threats to their critical infrastructure, and to take preventive measures. FHWA worked with AASHTO to develop and distribute a comprehensive survey of techniques to identify, assess threats, and to develop protection plans for critical transportation infrastructure. FTA has also developed a technique specialized for transit agencies, and is funding its use at 33 of the largest transit agencies around the United States. FHWA also is working with AASHTO to create a team of nationally recognized experts in bridge technology to assist states in answering specific questions about critical infrastructure.

Response

Response is typically defined as what is done starting at the moment of the emergency, for the remainder of that day, or for the following 24-hour period. Effective response is the core of the learning and exercises on the first of the two days of the FHWA response and recovery workshops mentioned earlier. Also, FHWA worked with AASHTO to develop and distribute a guide to help state and local agencies better prepare for response.

FHWA has been working with organizations involved in developing and deploying “511” telephone traveler information systems to understand how 511 (and other traveler information tools) support getting information to citizens at the time of an emergency, and how these systems are “stressed” by the extremely high demands for information under those circumstances.

The American Traffic Safety Services Association (ATSSA) has been promoting standards and deployment of signing supporting evacuation in major metropolitan areas. Both Washington, D.C. and Baltimore, Maryland have implemented such signing, typically along routes that had already been identified and improved in support of travel during snow emergencies.

One particularly critical element in response is the ability of agencies to communicate with one another. FHWA’s Incident Management workshop, implemented through the National Highway Institute, is offered around the country to assist in bringing transportation and public safety (police, fire, and emergency medical) responders together to discuss and work on how to address incidents that occur on or that affect the transportation network.
USDOT's ITS Public Safety Program is sponsoring two national demonstrations of the integration of voice, data, and video communications between transportation agencies, fire and rescue agencies, law enforcement agencies, 9-1-1 call takers and dispatchers, emergency medical service providers and the towing and recovery industry.

**Recovery**

Recovery starts on the day following an emergency but can extend days and months afterward. During recovery, agencies work to re-establish safe, reliable, and secure transportation on the region’s roads despite whatever damage may have occurred. Recovery is the focus of the second day of the FHWA response and recovery workshops.

FHWA has taken an active recovery role in support of those areas affected by the events of 9/11. One example was FHWA’s actions to facilitate special size/weight permitting of the large equipment needed for recovery efforts in New York, as that equipment often traveled across several states to reach its destination. FHWA Division offices play a key part in processing state requests for emergency relief funds, a special category of federal-aid highway funding that can be available following a catastrophic failure of highway infrastructure due to an external cause.

FHWA also is active in improving how transportation is carried out when areas, such as those contaminated by hazardous materials, must be avoided for an extended period.

FHWA has also performed preliminary investigation into the special needs that both response and recovery may create for transportation modeling and microsimulation. At the core of recovery is that the transportation network is constantly changing as the network is restored to its full capacity, and as special transportation needs (such as for movement of emergency response vehicles) and limitations (such as the single occupant vehicle ban in New York City) are reduced. In this effort, FHWA’s operations security team is working closely with teams addressing defense preparedness and weather disasters to ensure that all needs are clearly identified and that mutually beneficial progress is achieved.

**CONCLUSION**

Although, as is clear from the descriptions above, significant improvements are in process or have already been made in securing roadway transportation, much more remains to be accomplished. Each agency must carry out its own activities, and must work with partner agencies to achieve optimal effectiveness. The nation’s highway network is extensive, and highly exposed, but measures such as those described above (and others) can significantly reduce the vulnerability of the network, and can improve its ability to serve its critical role in response to and recovery from attacks not focused directly on transportation facilities.

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