

Emergency Management Training and Exercises for Transportation Agency Operations



MTI Report 09-17



MINETA TRANSPORTATION INSTITUTE

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EMERGENCY MANAGEMENT TRAINING AND EXERCISES FOR TRANSPORTATION AGENCY OPERATIONS

June 2010

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The initial impetus for this work was the exercise design work that the researchers did with Santa Clara Valley Transit Agency (VTA), the Altamont Commuter Express (ACE) and Caltrain for the San Jose Metropolitan Medical Response System (MMRS), from 2000 through 2009. The researchers collaborated with transit agencies to develop tabletop and facilitated exercises as part of the MMRS' grant mandate. In working with transit agency staff it became clear that they did not have guidance documents, but were relying on past experience in developing the transit elements of the exercises. When key staff began retiring the exercise programs were affected. We are especially grateful to Mark Bugna of VTA for being our partner in the MMRS' first facilitated exercise, and to Steve Walker and Doug Honn for including us in their full-scale exercises.

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EXECUTIVE SUMMARY

Training and exercises are an important part of emergency management. Plans are developed based on threat assessment, but they are not useful unless staff members are trained on how to use the plan, and then practice that training. Exercises are also essential for ensuring that the plan is effective, and outcomes from exercises are used to improve the plan. Exercises have been an important part of gauging the preparedness of response organizations since Civil Defense days when full-scale exercises often included the community. Today there are various types of exercises that can be used to evaluate the preparedness of public agencies and communities: seminars, drills, tabletop exercises, functional exercises, facilitated exercises and full-scale exercises.

Police and fire agencies have long used drills and full-scale exercises to evaluate the ability of staff to use equipment, protocols and plans. Transit and transportation agencies have seldom been included in these plans, and have little guidance for their participation in the exercises.

A research plan was designed to determine whether urban transit systems are holding exercises, and whether they have the training and guidance documents that they need to be successful. The main research question was whether there was a need for a practical handbook to guide the development of transit system exercises. It is important to note that transit systems receiving federal grants for counter terrorism and terrorism planning are mandated to hold periodic exercises, as are heavy rail systems.

The research started with a review of websites and databases to determine if a practical handbook for transit system emergency exercises already existed, or if some other form of practical guidance were available. The Homeland Security Exercise Evaluation Program (HSEEP) offers a nationwide system of exercise types and reporting structures, but does not include a simple practical exercise development guide for local transit entities.

Next, interviews were held with experts to determine if exercise documentation for transit systems existed or was being developed. The Transportation Research Board had developed an explanatory guide for the HSEEP materials, but this did not include practical guidance for the development of transit-based exercises.

The researchers attempted to contact ten transit agencies. Over an eight-month period, calls were made to transit systems in medium and large cities, often without ever finding the person responsible for exercise design and implementation. The seven agencies that did participate in the survey provided useful findings, and a consensus that a practical guide with checklists and guidance, not mandates, would be useful across all types (bus, light rail, subway and heavy rail) of transit agencies. Other findings of note are the retirements of long-time staff members, the rotation in office among existing staff members, and the lack of knowledge of the exercise program and its requirements among the senior management of many transit agencies.

INTRODUCTION: EMERGENCY RESPONSE TRAINING AND EXERCISE HISTORY

The Department of Homeland Security (DHS) has a long history of developing and delivering training and exercise courses. The Federal Emergency Management Agency (FEMA) developed a series of courses designed to train local government officials in developing Cold War and natural hazards-oriented training and exercises. These were mostly oriented toward preparing local government officials to work in an emergency operations organization and emergency operations center. Field level training for police and fire personnel was generally guided by state-level plans and training, and was inconsistent across the nation. While professional fire departments in large cities held regular exercises, volunteer departments and departments in smaller cities seldom did.

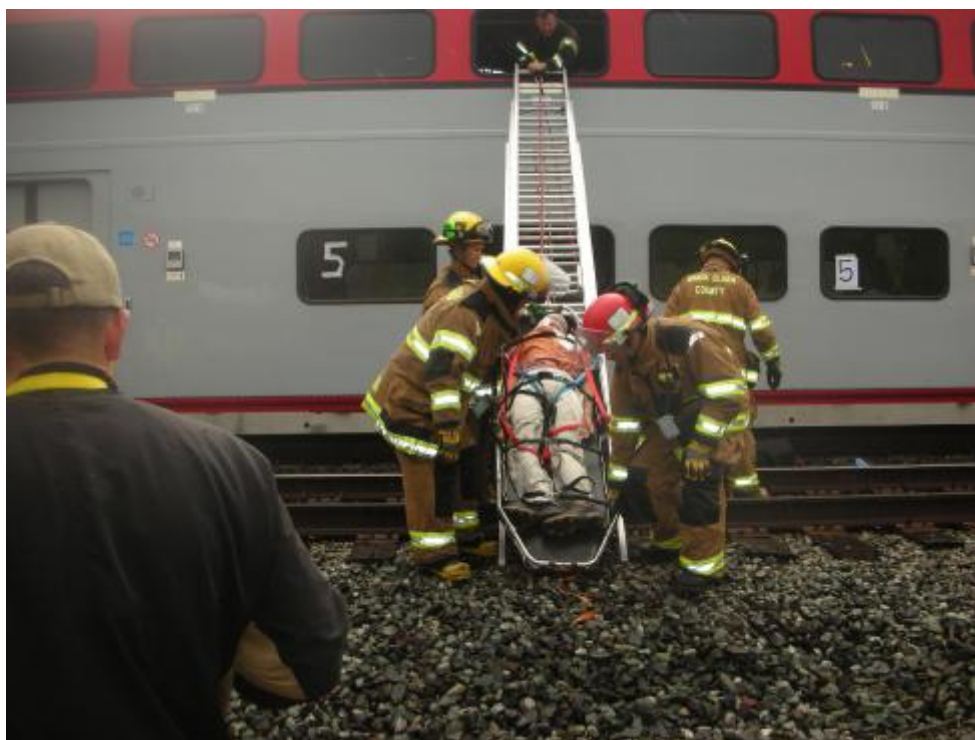


Figure 1 An Example of a Full-Scale Multi-Agency Disaster Preparedness Exercise in San José, California

INNOVATION: DOMESTIC PREPAREDNESS PROGRAM

In 1996 the Domestic Preparedness Program created a new field level training and exercise system for the newly created Metropolitan Medical Strike Team/Response System, which included emergency services, police, fire and emergency medical services personnel at the field level (GAO 1998).¹ The system was based on Department of Defense (DOD)

1. Because California has long been Incident Command System (ICS) compliant, the title of the teams in California had to be changed to Metropolitan Medical "Task Force" (MMTF), because a strike team is defined in ICS as a group of the same resources, such as an engine strike team, while a task force is made up of

training and exercises.² While the concepts for coping with weapons of mass destruction/ nuclear, biological, chemical (WMD/NBC) were well-received, the training cycles were not supportable for civilian agencies that were dependent on overtime personnel to receive the training and participate in the exercises (Winslow and Walmsley 2001). While military evolutions are based on the division of personnel time between fighting in the field and training in garrison, civilian public safety agencies do not have lengthy training and exercise times built into normal staff scheduling. In addition, some training is already mandated by other agencies, such as the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) at the federal level, and similar state agencies, as well as the Attorney General's Office and Fire Marshal's Office. In the past public safety agencies staffed to include the required training within the annual allotment of personnel hours, but the financial stresses of the last ten years for local government have required that staffing be lowered to meet response needs, with training and exercises relegated to overtime when they can afford it, or eliminated.

INNOVATION: FACILITATED EXERCISE

In 2000 it became clear to the San José MMTF that the DOD training and exercise model could not be sustained. In June 2000 the organization's exercise committee chair created a "facilitated exercise" format that incorporated refresher training in a modified full scale exercise. (Varley 2005) It was inaugurated at an MMTF exercise that included the local Santa Clara Valley Transit Authority personnel. The facilitated exercise model built on adult androgogy that notes that adults best remember what they do, rather than what they hear. In past full-scale exercises staff members were permitted to make faulty plans and carry out dangerous or unreasonable actions, and then they were corrected during the post-exercise debriefing. That system had two major faults. First, adults do not appreciate being corrected for mistakes in front of large numbers of their peers (Varley 2005, 11). Second, and worse, being allowed to do the wrong thing embeds the wrong behavior in the memory, and then being told what they should have done just leads to confusion. Participants in the DOD/MMST exercises had commented that they knew what they did was wrong, but they did not know why, and they did not know what was right.

The facilitated exercise format separates the full scale exercise format into segments that mimic actual field response (Varley 2005, Sequel 1, 1–2). For example, upon arrival at the scene of an actual event the first activity is "Size Up." All team members evaluate the scene for information that will drive the response plan: evidence of fire, smoke, hazardous materials; amount of people and property already involved; areas that need to be protected from the unfolding event; special needs and vulnerable populations; traffic control requirements; force protection needs of the first responders; and the presence of assets and resources. Once the Incident Commander has a clear picture of the situation, he begins giving orders for the initial response and making requests for additional resources. At that stage the responders begin following existing plans for responding to that type of

a variety of resources, such as a search and rescue task force with fire engines, search dogs, riggers and other groups. An MMTF included police, fire, emergency medical services and emergency services personnel.

2. For example, courses offered included "Domestic Preparedness/Defense Against Weapons of Mass Destruction: Technician-Hospital Provider Course," and "Domestic Preparedness/Defense Against Weapons of Mass Destruction: Technician-Hazardous Materials Course."

event: high-rise fire, hazardous materials release, medical emergency or suspected WMD/NBC attack. Victims are then triaged, decontaminated (if needed), treated at the scene, prepared for transport and turned over to the emergency medical system, while traffic management is established, staging areas are set up, and force protection is put in place. The public safety personnel are then decontaminated, treated for injuries, exposures are recorded, and they are offered rehabilitation, including critical incident stress debriefings when appropriate.

In order to closely approximate the field experience, in a facilitated exercise responders arrive at “Staging” where they review the scene of an incident (Varley 2005, Sequel 1, 3) and analyze visual and olfactory clues under the guidance of a facilitator, a respected member of the local public safety department. As a group they create a size up of the current situation, including an estimate of whether it is getting better or worse. Based on the Size Up the group acts as the general staff at an event and creates the initial Incident Action Plan (IAP) with the Incident Commander. The facilitator guides the conversation by asking questions or raising important points that may have been missed until a well rounded, safe plan is created. That plan is then documented by the Planning/Intelligence Section Chief, and the team takes it with them to the next “learning station.” This facilitated approach ensures that all the critical thinking is done by the team members, but that the final plan has no significant deficiencies that would hamper the safety or success of the response.

The next learning station is “Implementation” (Varley 2005, Sequel 1, 3–4). At this point they don appropriate personal protective equipment, abide by the safety plan, and respond to the emergency, establishing force protection, staging areas, and rescuing and caring for victims based on the IAP. Again a facilitator is present to provide coaching or answer questions about details that may not have been considered until the response was underway. Special teams like the Explosive Ordnance Disposal Team and Hazardous Materials Response Team may be “called out” as part of the plan and integrate into the response. While the team’s safety officer is responsible for the appropriate conduct of the response, the facilitator can coach the Incident Commander or safety officer to ensure that the response actions are all appropriate.

The third learning station is patient care. A paramedic is usually the facilitator here to ensure that the patient care plan is appropriate for the number and type of patients and their injuries and exposures. This station can also be used to refresh information on seldom-used medical skills or to introduce new specialized equipment, such as coagulation packs. At this point the team becomes the Medical Branch and begins to organize triage, treatment and transportation elements. Volunteer “victims” undergo the planned triage, decontamination, treatment and transport steps, and assist as evaluators of the success of the plan from the patient’s perspective. Again the facilitator can coach the responders to ensure that all activities are conducted safely from the first responder and victim perspective. Force protection services may have to be extended to medical care facilities, ambulance travel routes or decontamination areas.



Figure 2 Firefighters Remove Equipment During a Multi-Agency Full-Scale Disaster Training Exercise in San José, California

At the final learning station the teams undergo rehabilitation, including hydration and snacks. They also participate in a brief refresher training on critical incident stress debriefings, and are then led by peer debriefers in a debriefing of the exercise experience. While the debriefers take notes, the individual contributions are kept confidential, as in a real event. Several times this debriefing has brought out echo effects from previous real- world events, enabling first responders to deal with the stress, or identify the need for professional counseling.

Since the facilitated exercise takes place over the period of several days to get personnel from all shifts involved (Varley 2005, Sequel 2, 5), the After Action Debriefing is conducted serially and in writing. At each learning station the students complete a card that asks questions about learning at that station. These cards are evaluated by exercise staff during the exercise to immediately correct any deficiencies, or correct instructional methods. All cards are entered into the database to obtain overall levels of satisfaction with the learning model and its individual elements. There is also an open-ended question to get verbal feedback from participants. In six years of use, sometimes several times a year, there has never been a dissatisfied student. All respondents expressed a belief that their capabilities improved and that they learned at least one new thing during the exercise. Most important, they reflected that they learned more about the other agencies participating in the exercise and their roles and capabilities, which will be most helpful in a real world response.

The Department of Justice Executive Session on Domestic Preparedness at Harvard University's Kennedy School of Government received a presentation on the facilitated

exercise format. As a result they assigned a case writer, Pam Varley, to document the development and implementation of this innovative exercise format. The case and its supplements are used in the Kennedy School's executive training programs as an example of innovative problem solving.

9/11 AND HSEEP

After 9/11 the Department of Homeland Security (DHS) recognized that all first responder agencies across the United States needed to have a regular program of training and exercise to respond to potential future attacks against the homeland. They developed a system called the Homeland Security Exercise and Evaluation Program (HSEEP) that was aimed at first responder agencies and their field responsibilities. Again, it was based on a military model that presumes that there is substantial time available for first responder training, when in fact the number of hours available for dedicated training and exercise evolutions is shrinking. While the model works well for dedicated teams like hazardous materials and explosive ordnance disposal units, the system is too time-consuming for typical public safety first responders. Thus, the facilitated exercise format provides many of the benefits of the HSEEP model while saving on implementation time. While HSEEP full scale exercises typically consume an entire work day, the facilitated model can be tailored for 3- to 4-hour responses, enabling many first responders to remain on duty and in service during the exercise.

HSEEP Guidance is contained in four volumes. Volume One, *HSEEP Overview and Exercise Program Management* is 82 pages of dense documentation of a highly programmed exercise development system. (DHS 2007a.) Volume Two, *Exercise Planning and Conduct* is 57 pages of detailed information about developing exercises. (DHS 2007b) Volume Three, *Exercise Evaluation and Improvement Planning Guidance*, is 52 pages, and includes information on structuring the After Action meetings and reports and the Improvement Matrix required by most federal grants (DHS 2007c). Volume IV *Sample Documents and Formats* is an online collection of exercise support materials. The search window yields no results for "exercise scenarios," and a verbal "overview" manual lists what is supposed to be available but not how to access it (DHS 2006). The online element at https://hseep.dhs.gov/hseep_vols/default1.aspx?url=home.aspx provides about a dozen model documents of little use to exercise planners. Originally this volume was password-protected and contained the "confidential" 15 national scenarios, which were subsequently published in several newspapers. Now the sections are mostly empty.

TRANSIT GRANTS AND EXERCISES

Grants for planning, equipment, training and exercising emergency management plans are available from the Department of Homeland Security's Transit Security Grant Program (TSGP) for the transit agencies in the nation's largest cities (DHS 2009a, 3–6). Funds for individual systems have been allocated based on risk. The "purpose of the 2010 TSGP is to promote sustainable, risk-based efforts to protect critical surface transportation infrastructure and the traveling public from acts of terrorism" (DHS 2009b, 1).

The grant guidance document specified exercises as one of the six "allowable costs"

under the TSGP for 2010 (DHS 2009c, 21). Allowable expenses include development, implementation and evaluation of exercises, hiring of staff to run the exercise program, overtime and backfill for exercise participants, travel, supplies and support equipment.

Grant guidance required that consideration be included in all exercises for special needs populations (DHS 2009c, 40). Grant funded exercises must be “capabilities and performance based” and be documented through After Action Reports and Improvement Matrices, as required through HSEEP, with guidance provided in the HSEEP manual, Volume III (DHS 2007c). The guidance remains dense and complex. Florida’s HSEEP “Mechanic’s Manual: A Handbook for Becoming HSEEP Compliant,” a condensed 36-page version of the four-volume DHS guidance, recommends that before undertaking any of the exercise work the employee take three on-line courses and the HSEEP training, which is a several-day classroom experience (FLDOH 2007, 4–5).

Transit systems desiring to develop meaningful multi-discipline exercises will need better and simpler guidance than that provided in the HSEEP materials. This void in guidance was reported by most of the agencies surveyed, a significant number of whom were unaware of the existence of the HSEEP guidance or the requirements for compliance embodied in the grants.

LITERATURE REVIEW

Books

Adams, R.J., McTernan, T.M., and Remsberg, C. *Street Survival: Tactics for Armed Encounters*. Northbrook, IL: Calibre Press, 1980.

This book deals with immediate encounters, situational awareness and tactical positioning for police officers. It provides real world explanations of actual police thought processes when resolving situations. This book provides a background knowledge base for incorporating law enforcement behavior into transportation exercises, and a basis of training for transportation personnel on personal safety measures.

Doss, W. *Train to Win*. No city: 1st Books Press, 2003.

This book provides information on tactical response from a police and military perspective. The benefit to transit exercise designers is in understanding the police and military mentality and tactics in attack situations.

Howe, MSG P.R. *Leadership and Training for the Fight*. Bloomington, IN: AuthorHouse, 2005.

This book provides insight into the tactics used by military response units with an emphasis on developing real life scenarios and tactics development. This book would assist transportation emergency planners to develop defensive tactics for transit facilities and individual personnel.

Mroz, R. *Tactical Defensive Training for Real-Life Encounters*. Boulder, CO: Paladin Press, 2003.

This book describes law enforcement response to dangerous situations, concentrating on the individual response. This is useful for developing training and exercise scenarios based on real-world response to an incident.

Murray, K. R. *Training at the Speed of Life*. Gotha, FL: Armiger Publications, 2004.

The book focuses on the role of stress in real world response to danger, and the need to incorporate stress into the training and exercise plan for a transit agency. Exercises have to induce enough stress to adequately test the individual reaction to a dangerous event.

Remsberg, C. *The Tactical Edge: Surviving High Risk Patrol*. Northbrook, IL: Calibre Press, 1990.

This book is an updated version of *Street Survival* with updated information on street tactics. It again offers insight into police response in dangerous situations so that transportation emergency planners and exercise designers have real-world strategies in mind when they design response plans and exercises for transportation facilities.

Shaw, E. *The Six Pillars of Reality-Based Training*. Amherst, MA: HRD Press, 1997.

This book describes typical civilian training in a low stress, corporate setting, which is the existing type of emergency response training found in most transit organizations. It will help training and exercise designers understand the transition that must be made between this corporate model and the police model for success in responding to catastrophic events.

Courses

IS120.A: An Introduction to Exercises, FEMA, n.d.

The course is designed to introduce the student to basic exercise concepts, including designing, managing, and evaluating an exercise and creating an improvement plan. This course is the introductory level to the HSEEP process. This along with courses IS-130 and 139 are intended to provide baseline knowledge for participation in formal HSEEP exercise training. These three courses are the prerequisites for taking the HSEEP training.

IS 130: Exercise Evaluation and Improvement Planning, FEMA, 2008.

The purpose of this course is to build on the information in IS 120 with a focus specifically on the exercise evaluation elements. It includes methods for analyzing data from the exercise, creating the After Action Report and the Improvement Plan. This is useful to all civilian agencies as an adjunct to 120. It focuses on terminology and processes required for administering an exercise.

IS/G 139:Exercise Design Course, FEMA, 2007.

This is the basic civilian exercise design course that is offered to all government agencies. It covers tabletops, functional, and full-scale exercises, exercise evaluation, and exercise enhancements. The primary focus is on designing the functional exercise, which takes place in an emergency operations center (EOC) with a simulation cell providing the outside information and stimulation of response actions by EOC personnel.

IS-801 Transportation, FEMA, 2008.

This Independent Study course provides an introduction to the meaning and function of ESF 1- Transportation within the Emergency Response Framework. It lays out the relationships between levels of government in the requesting of and provision of transportation assets and services. As such it is a useful guide for the development of exercises in local and state transportation agencies by making clear the types of assistance that can be expected and planned for.

S-BELT, DHS, Office of National Preparedness Training and Exercise Integration, Western Community Policing Institute, and Virginia Center for Policing Innovation.

The course focuses on delivering information to senior executives from multiple disciplines, emphasizing executive leadership skills for homeland security. The program specifically includes public works organizations, as well as private sector partners. The multidisciplinary nature of the training again points to the importance of cross-agency training and exercise programs.

Guidance

Department of Energy. *Transportation Emergency Preparedness Program. Guidance for Planning, Conducting and Evaluating Transportation Emergency Preparedness, Tabletops, Drills and Exercises.* Department of Energy Office of Transportation and Emergency Management, 2002.

This manual pre-dates the HSEEP program, and was prepared specifically for radiological issues anticipated to occur by the Department of Energy. It is radiological-centric. The terminology is inconsistent with current usage, a violation of ICS/NIMS requirements. It does provide a good reference for radiological transportation issues, with possible application for other hazardous materials transportation issues.

Federal Transit Administration. *Disaster Response and Recovery Resource for Transit Agencies*. Washington DC: FTA, August 21, 2006.

This document provides an overview of the federal perception of transportation's role in disaster settings. It provides baseline expectations of areas to be addressed in planning for region-wide disasters and includes recommended practices. Although it focuses on the role of transit exclusively it offers information that makes it clear that coordination with first responders and special needs community groups will be essential for a successful implementation of the plan.

———. *Rail Transit Safety Action Plan*. Washington DC: FTA, September 2006.

This document systematically identifies the emergency events most likely to occur on transit systems, including accidental events, and offers guidance on best practices response mechanisms for each. This document would provide excellent detail information for the development of exercises as it provides a good understanding of the ramifications of various elements of a disaster.

———. *Standard Protocols for Managing Security Incidents Involving Surface Transit Vehicles*. Washington DC: Federal Transit Administration, August 2002.

The guidance was developed in response to the anthrax attacks of October 2001. It covers operator and administrative procedures for responding to a potential attack against the transit system. It provides good information for both system emergency planning and exercise design, and identifying objectives for an exercise.

———. *The Public Transportation System Security and Emergency Preparedness Planning Guide*. Washington DC: FTA. DOT-FTA-MA-26-5019-03-01, January 2003.

The guide supports planning activities for transit system for security and emergency incidents. "It emphasizes the importance of developing critical relationships, preparing strategies and policies, and setting training and funding priorities" (p. 1). It emphasizes the importance of developing a Security and Emergency Preparedness Program (SEPP), and integrating the SEPP into local emergency planning. It includes a section on developing training and exercise plans and implementing them.

———. *Transit Agency Security and Emergency Management Protective Measures*. Washington DC: FTA., November 2006.

The document provides guidance for transit agencies in planning to respond to the five level color-code of homeland security threat conditions. It lists appropriate protective measures during terrorist or criminal enterprise threat conditions, which would need to be incorporated into training and exercises.

Field Operations Guide, ICS 420-1. FIREScope, 2007.

This manual provides a comprehensive view and generic template of ICS. It is applicable to any organization operating at the field level. ICS is the NIMS-mandated method for organizing all field response in the country. This manual explains the relationships of various actors at a disaster or emergency event.

HSEEP Volume 1 through 3, DHS, Feb 2007.

This serves as the base document for exercise design and evaluation in the United States. It is based on a military training model that does not translate well into civilian training programs. Most mass transit agencies view the requirements as onerous. Its principal purpose is to provide a common framework for exercise development for multiple disciplines. It fulfills the ICS/NIMS requirement for clear common terminology, and offers a framework for the development of an exercise program, but it requires formal training to understand the overall process. Personnel with prior military experience will find the material very familiar. The program is in a continuous state of development. Its main application is to fulfill requirements for federal grants to various public agencies. FEMA exercise guidance that preceded it and is still in use is more user friendly for civilian agencies.

Volume Four functions as a library with sample exercise materials, such as documents, format and policy guidance. After years of being password-protected, the volume is now Internet-accessible to anyone.

U.S. Fire Administration. Traffic Incident Management Systems. FEMA. 2008.

This document is not directly related to exercises. It does, however, provide the critical framework necessary to understand the Incident Command System as it related to transit assets. It enables tracking of information flow and decision-making, so that monitoring at critical points for evaluation purposes can be established.

Reports

DHS. Lessons Learned Information System. www.llis.gov.

The DHS LLIS includes reports of exercises that have occurred. This information may be useful in the development of event-specific transportation exercises by providing tested scenarios for specific locations. Some exercises have integrated elements of transit, usually exclusively as a logistics support asset. Unfortunately this site is password-protected. Although all public agency employees may register to obtain a password, the frequency with which the passwords expire make accessing the site cumbersome.

FEMA. NIMS Standards Case Study: Houston Regional Information Sharing, August 2008. Accessed April 3, 2010 from [http://www.fema.gov/pdf/emergency/nims/Houston TranStar IEEE 1512.pdf](http://www.fema.gov/pdf/emergency/nims/Houston%20TranStar%20IEEE%201512.pdf).

This case study demonstrates how the Houston metropolitan region agencies have developed a plan to integrate smart transportation assets, such as cameras, into emergency response management. The integration of transportation, police and emergency medical services agencies demonstrates the type of coordination that should be incorporated into transportation agency emergency planning and exercises.

Federal Transit Administration. Security and Emergency Management Technical Assistance for the Top Fifty Transit Agencies. Washington DC: FTA, April 2007.

The report documents the Security and Emergency Management Technical Assistance Program (SEMTAP) provided for four years to the nation's largest transit systems. After developing a threat analysis the SEMTAP team provided evaluation and advice on emergency and security planning, training and exercise programs. The report documents these efforts. The report emphasizes the need for regular tabletop and functional exercises for transit agencies and local emergency agencies across disciplines to ensure response capability in a real event. A major deficiency noted was the lack of ICS and NIMS training for transit personnel, which is crucial for transit employees and management to understand both their role and the expectations of the first responder community.

———. *Transit Security in the '90s*. Washington DC: FTA. FTA-MA-26-9009-97-01, October 1996.

This is the report of a multi-discipline conference designed to assist transit systems to prepare for terrorist attacks. The conference is contemporary with the development of the Domestic Preparedness Program and emphasizes the interconnectedness of transit and emergency response elements in a community. Threat assessment, planning, training and exercising are all discussed, including examples from Europe and Israel. The report concludes that joint exercises are crucial to success in response to real events.

Government Accountability Office. *Homeland Defense: U.S. Northern Command Has a Strong Exercise Program, but Involvement of Interagency Partners and States Can Be Improved*. Washington, DC: GAO. GAO-09-849, September 2009.

After reviewing Northern Command's compliance with National Exercise Program requirements, the GAO noted the importance of cross-agency participation in exercises. Noting that NORTHCOM and the states need better integration, GAO stated that this lack of integration will "impact the seamless exercise of all levels of government, and potentially affect NORTHCOM's ability to provide civil support capabilities." This emphasizes the importance of cross agency exercises at all levels, including having transit agencies exercise with local public safety and medical first responders.

NCHRP Report 525, *Surface Transportation Security, Vol. 14: Security 101: A Physical Security Primer for Transportation Agencies*.

While this document does not directly address exercises, it does explain overall security structure of an organization, including facets of exercises needed to test security capability by penetration testing.

RAND. *Local Level Civilian and Military Disaster Preparedness Activities*. Santa Monica, CA: RAND, 2010.

This report describes the steps toward the development of a common planning tool for use by civilian and military emergency planners. Exercises are noted as critical communication tools between parties to a planning process. "Plans are fluid and can be modified with data from exercises. Plans are typically drafted and modified via stakeholder input, then further refined following exercises. Thus, exercises are a critical process for ensuring that plans are logically sound" (p. 31). This report documents interviews with civilian and military emergency planners, confirming the need for more joint planning, training and exercising, an outcome that mirrors the transit agency response to community level exercises.

TCRP Report 86, Public Transportation Security, Vol. 9, and NCHRP Report 525, Surface Transportation Security, Vol. 9: Guidelines for Transportation Emergency Training Exercises.

This was a contracted effort to develop a document that would allow transportation agencies to use earlier versions of the HSEEP documentation, and merge the Incident Command System (ICS) into transportation, as well. Unfortunately, the document contains a considerable amount of boiler plate from ICS materials and HSEEP materials without adequate explanation of the application of the information to transit and transportation agencies.

TR News. No. 238. Transportation Research Board, May–June 2005.

The focus is on transportation security training and education. This issue covers regional exercises and “emergency management simulation systems,” which is a type of exercise. Computer based virtual environments are discussed as an asset for trainees.

Transportation Research Circular No. E-C065. Transportation Research Board, June 2004.

This includes the summaries and presentations at TRB’s 83rd annual meeting. Topics include the “Use of Evacuation Simulation and Emergency Planning.” The article describes the use of a simulation cell as a means to evaluate the effectiveness of plans that cannot be field tested, such as evacuation exercises. This document was developed when the first HSEEP materials became available.

METHODOLOGY

Various methodologies were used in the four research tasks.

- Task One was an inventory of websites, searching for relevant homeland security transportation training and exercise guidance documents. Websites connected to transportation research centers, Transportation Security Administration, and Transportation Research Board were reviewed for training and exercise guidance materials.
- Task Two was a review of databases, searching for guidance documents for exercise development for transit and transportation agencies. The San José State University Library database set was used to query for appropriate materials.
- Task Three was interviewing Dr. Wayne Blanchard, Stephan Parker, and Curry Mayer, who in turn referred the researchers to other sources of information on emergency and homeland security training and exercise guidance. A set of standard questions was used to start the interviews, but each person had his or her own expertise, so researchers let the interviewee guide the conversation.
- Task Four was a survey of transit agencies. Initially it was planned to interview the exercise manager for five selected transit and ten selected state-level transportation agencies. It was difficult to find the exercise manager in most of the agencies, and in some cases the agencies were not cooperative. Planned surveys turned into telephone interviews when exercise managers could be found. This process required five months of calls, inquiries with other resources, and the assistance of other researchers who had personal contacts in transit agencies where they had worked or collaborated. Even with the extension of time it was impossible to get ten agencies to reply to the survey questions.

FINDINGS

TASK ONE: INVENTORY WEBSITES

Internet search engines were used to look for websites that had information about training and exercises specifically for transit and transportation agencies. The Volpe National Transportation Systems Center site (<http://www.volpe.dot.gov/>) had several Federal Transit Administration documents that are listed in the Literature Review above, but none that provided complete guidance for exercise development, although several emphasized the importance of training and exercise programs. The website included a description of the center's participation in hurricane preparedness exercises, <http://www.volpe.dot.gov/infosrc/highlts/06/septoct/security.html>, but did not include any guidance documents for use by emergency exercise developers. The Transportation Safety Institute also offers courses on a wide range of transportation-related topics, including Transit Safety and Security (<https://www.tsi.dot.gov/tsilms/classlisting.aspx?AOE=9>). No course materials are available on the website.

The Transit Safety segment of the Volpe website includes a list of publications on safety and security that includes emergency preparedness. Available at <http://transit-safety.volpe.dot.gov/Emergency/Preparedness/default.asp> and <http://transit-safety.fta.dot.gov/Publications/order/default.asp>, the website provides a list of publications covering many aspects of emergency management and security planning and implementation. There is no handbook or guidance document to assist transit or transportation agencies in developing exercises.

The Alan M. Voorhees Transportation Center at Rutgers University (<http://policy.rutgers.edu/vtc/>) states that they have a specialty in transportation security and evacuation planning, but no guidance documents were found on the site. They do have reports on *Jersey City/Newark Urban Area Security Initiative Evacuation Planning Study* and *Non-UASI County Evacuation Planning Study*, which include surveys and plan development, but no exercise components.

The related National Transportation Institute (NTI) holds an annual Transit Trainer's Workshop, which in 2009 included a segment on TSA and mass transit that included "the unique I-STEP exercise program," and "the field-based Bomb Squad Response to Transportation Systems exercise," but written materials for these exercise models were not available at that website (<http://www.ntionline.com/products.asp>). An additional segment on "scenario-based training" was also offered, but it did not state whether any aspect of safety or security was included in the training formats being taught. Finally, a session was offered on "Bus Rapid Transit Safety and Security Certification," using Cleveland's experience as a model. However, guidance materials were not found at the Rutgers website. The NTI website does include a list of training products with a security and emergency management focus that would be useful in transit security training programs, available at <http://www.ntionline.com/products.asp>. These include FTA-Transit Agency Security and Emergency Management Protective Measures, System Security Awareness for Transit Employees (in English and Spanish), and a set of Employee Guide to System Security publications with a focus on different modes of transportation.

Online information on the I-STEP program was available at the TSA website “what we do portion” (http://www.tsa.gov/what_we_do/index.shtm), which includes materials on security operations, layers of security and law enforcement. I-STEP details are found at http://www.tsa.gov/what_we_do/layers/istep/index.shtm. The Intermodal Security Exercise Training Program (I-STEP) is based on HSEEP and NIMS. Its purpose is to have various forms of surface transportation exercise together to prepare for a transportation terrorist-related incident. “The tools include advanced software for exercise design, evaluation and tracking for a mix of tabletop, advanced tabletop and functional exercises.” Information about the EXIS software is available at http://www.tsa.gov/assets/pdf/012908_exis_technical_sheet.pdf. The guidance depends on the user having the suite of HSEEP-related training, and the skill to use a software based exercise development tool.



Figure 3 An Example of a Tabletop Exercise

Rutgers also has the Center for Advanced Infrastructure and Transportation (CAIT) that focuses on “safer, more durable and more efficient infrastructure and transportation systems” is available at <http://cait.rutgers.edu/>. The Security element, <http://cait.rutgers.edu/cait/security>, focuses on planning and training for emergency response and homeland security. Security reports include bridge security inspection, hospital emergency management, and related topics, available at <http://cait.rutgers.edu/cait/research/results/taxonomy%3A420>. Transportation related training and exercises are not mentioned in the summaries. The Laboratory for Port Security element (<http://cait.rutgers.edu/lps>) focuses on security of

port operations and adjacent roads, bridges, tunnels and coastal waters that support the commercial supply chain. Research projects focus on risk to maritime activity in the New York metro area, Istanbul Strait in Turkey, and post inspection operations. These are available at <http://cait.rutgers.edu/lps/research>. Training and exercises are not mentioned in the research summaries. The Pipeline Safety and Security program focuses on oil and gas transmission pipelines (<http://cait.rutgers.edu/pssp>). Training and technology transfer are one focus of the pipeline safety element of CAIT (<http://cait.rutgers.edu/pssp/pssp-depth>). Risk and vulnerability assessments are conducted, and training is offered on security plans and public awareness efforts. No guidance documents are offered at the website.

The University of Tennessee's Law Enforcement Innovation Center offers two courses for transit security (<http://www.leic.tennessee.edu/chst/>). Transit Terrorist Tools and Tactics (T4) (<http://www.leic.tennessee.edu/chst/t4/>) is a three day classroom and field training and exercise program that includes demonstrations of equipment used for transportation security. They also cover behavioral profiling. They use gaming as one training method, and scenario-based attacks against local transportation assets as another. No training materials, which are official use only/need to know, are available at the website. The Transit Oriented Screening of Passengers by Observational Techniques course (TO-SPOT) (<http://www.leic.tennessee.edu/chst/tospot/>) is also described on the website. The surveillance detection course is a two-day sequence. Again, no materials are on the website.

The U.S. Department of Transportation and the Federal Law Enforcement Training Center have developed the Land Transportation Antiterrorism Training Program, which pre-dates DHS. Details on this course may be found at the DHS website at <http://www.fletc.gov/training/programs/counterterrorism-division/land-transportation-antiterrorism-training-program-ltatp>. This is a five-day classroom course that covers multi-modal land transportation systems. DHS has a variety of transportation-related courses, a few of which are noted in the Literature Review above.

The Transportation Research Board website segment on TRB publications on security and emergencies (<http://www.trb.org/SecurityEmergencies/Public/TRBPublications.aspx>) includes some items cited in the Literature Review. There is one report that is a guide for exercise design, http://www.trb.org/SecurityEmergencies/Blurbs/Guidelines_for_Transportation_Emergency_Training_E_157158.aspx. *Guidelines for Transportation Emergency Training Exercises* was developed to provide guidance to transit agencies in the first year of the Department of Homeland Security transit grants. While it attempts to make the HSEEP requirements more easily understood, it is a compilation of early HSEEP and NIMS materials, but without much clarifying information. While useful to someone assigned to create exercises that comply with federal requirements, it does not provide step-by-step guidance in the development of a transit emergency exercise. Other materials cover various aspects of emergency management and homeland security that would be useful for emergency managers or homeland security managers in transit agencies.

TASK TWO: ONLINE DATABASES

Seven databases were queried in the search for guidance documents or handbooks for use in developing homeland security-related transportation exercises. These were Academic Search Premier, ABI/Inform Global, Web of Science, Civil Engineering Database, Google Scholar, JSTOR, and Social Sciences Full Text. Although thousands of articles included the search terms “homeland security,” “transportation,” and “exercises,” none had any exercise designs or guidance documents.

TASK THREE: EXPERT INTERVIEWS

Expert interviews were held with leaders in emergency management. An extended telephone interview was conducted with Stephan Parker. Email interviews were held with Dr. Wayne Blanchard of FEMA and Curry Mayer of California Specialized Training Institute (CSTI), each of whom referred the researchers on to other staff members.

Parker highlighted the work of the Transportation Research Board (TRB) on assisting transit and transportation agencies to prepare for disasters. He noted that TRB funded the development of *TCRP Report 86: Guidelines for Transportation Emergency Training Exercises* when the federal transit grants for counterterrorism training and exercises were first issued. He noted that the HSEEP model was difficult for transit agency personnel to understand and apply, so this document was intended to explain and simplify the process. It was not intended as a comprehensive “how to” manual for the creation of transit agency exercises.

Dr. Blanchard and Ms. Mayer both highlighted training courses available through FEMA, including Independent Study courses, which are listed in the Literature Review starting on page 9. These courses provide an education in the design and implementation of emergency management exercises, which can be applied to any public agency or organization. All of the courses referenced above are practical, offering specific guidance for developing different types of exercises. Transit personnel assigned to develop exercises should take all of these courses. When possible they would benefit by attending an instructor-based version of FEMA’s Exercise Design course to broaden their knowledge of various types of exercises and scenario development in a multi-disciplinary environment. The instructor-based classroom Exercise Design courses are offered at the FEMA Emergency Management Institute at Emmitsburg, Maryland, and at state training agencies such as CSTI. The courses at Emmitsburg are usually tuition free for public agency employees, but state-level courses may have tuition requirements. However, the State Homeland Security Grant Program training funds would normally cover the expense of developing trainers for grant-mandated exercise programs. The Transit Security Grant Program requires the development and implementation of exercises (DHS 2009a).

TASK FOUR: SURVEY 10 TRANSIT AGENCIES

Researchers developed a list of transit agencies that represented different locations and sizes of agencies nationally. Originally the goal was to contact Santa Clara Valley Transit Agency (VTA), Bay Area Rapid Transit (BART), Port Authority Trans Hudson (PATH), South East Pennsylvania Transit Authority (SEPTA), and New York City Transit. In addition, five of ten large state transportation agencies were going to be surveyed. The goal of the survey was to determine whether there was an audience for a transportation-based exercise development guide.

The literature review and website search revealed that there is no transportation-oriented exercise guide or handbook currently available. The FEMA courses are written with cities and states in mind. Although multi-agency exercise development is a key teaching point in the FEMA courses, there is no exercise course currently listed that has transportation as the focal point. Currently transportation is listed within NIMS as part of the Logistics Section, functioning in support of the Incident Commander (FEMA 2008a, 57).

It should be noted that it was very difficult to get contact information for transit agency exercise staff members. Many transit and transportation agency senior staff did not return calls. Using the network of emergency managers some better contacts were developed. However, over four months of intensive calling only seven transit agencies were responsive and could be interviewed. As a result of the interviews with Parker and the California Department of Transportation (Caltrans) staff, the decision was made to drop the transportation agencies from the survey, since their exercise development issues mirrored the transit agency concerns, but each state has its own approach to ICS/NIMS federal mandates, and transportation agencies do not currently get separate terrorism funding that mandates specific exercises, which the largest transit agencies do.

The overall findings were instructive. Across most agencies it was very difficult to find the person responsible for the exercise program. The calls generally started with either the director's office or a known party within the agency. In most cases it required multiple calls through the organization to locate the responsible party who could discuss the issue of exercise design and development.

Part of the difficulty in locating the exercise staff was due to regular staff turnover and a recent spate of retirements by "Baby Boomers" who have begun to reach 65 years of age. This points to a concern regarding the loss of "race memory" within transit agencies. The federal government's emergency management programs have developed from civil defense through natural hazards to terrorism, as noted in the history section above. In many cases exercise staff and emergency managers had been in the job for ten or more years and evolved their understanding of emergency management with the federal changes. Having lived through fire, floods, earthquakes and the impact of 9/11 they were attune to the need for collaboration in emergency management. However, as these people have retired, the newly appointed personnel are not familiar with the roots of the emergency management profession, and have viewed the federal mandates as "punching a ticket." The necessity for cross-agency emergency planning has not yet been incorporated into their understanding of emergency management.

Furthermore, in the 1990s there was a series of major wildland interface fires, multi-state floods and west coast earthquakes that forced the creation of regional emergency planning organizations. After 9/11 fusion centers and regional emergency planning organizations were created that focused on terrorism response. After Hurricane Katrina a natural hazards focus was re-captured. However, after the financial collapse of 2007–2008, and the loss of sales and real estate tax revenues, many public agencies have had to drop out of regional emergency planning organizations and cut back on non-federally funded emergency management activities. Thus, the transit agencies often had difficulty sustaining a robust emergency management and exercise program.

When the exercise designer was located, the consistent message was that the HSEEP documentation is not an adequate practical guide for exercise development. While it provides a nationally consistent framework for the development of various exercise types, there is a need for more assistance with the development of realistic scenarios and appropriate stakeholder groups to invite to the exercise design process.

Transit agency exercise staff also expressed a need for better guidance in finding the existing materials and training courses. Few of the exercise staff members with whom the researchers spoke were aware of the Independent Study courses that can be done for free online in the workplace during the work day. These courses would provide a groundwork for developing exercises, if staff members were aware of them. This points to the need for the handbook to include a course and resource list as the starting point for exercise design.

Table 1 is a list of transportation agencies who participated in this study. Table 2 is a list of the survey questions, and Table 3 summarizes survey results.

Table 1 Responding Agencies

Agency	State	Population Served	Type
Bay Area Rapid Transit	CA	Large	Heavy rail
Caltrain	CA	Large	Heavy rail
L.A. Metropolitan Transportation Authority	CA	Large	Light rail, buses, subway
Minneapolis Metropolitan Transit	MN	Medium	Bus, light rail, heavy rail
Orange County Transit Authority	CA	Large	Bus and light rail
Santa Clara Valley Transportation Authority	CA	Large	Bus and light rail
Veolia Transportation: East Valley RPTA	AZ	Large	Bus and light rail

Table 2 Survey Questionnaire

1. Does your organization conduct exercises?
2. If yes, what type of exercises have been conducted? *Tabletop, drill, functional, full scale?
3. How frequently are the exercises conducted? * Monthly, quarterly, six months. Yearly, two years?
4. Do you exercise with any other disciplines? * Law, fire, medical, public works, utilities, private sector?
5. What references do you use when designing exercises?
6. Would an exercise guidebook be of assistance to your agency's exercise program?

Table 3 Survey Results

Responders	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6
A	Initially said, "no," but after discussion they realized that they do	Functional only	At least twice a year, as requested by law or fire agency partners	Fire and law	None	Yes
B	Yes	TTX and functional	Once a quarter with fire and several times a year with law enforcement	Fire, law, public works, EMS, private	In-house experience	Perhaps as long as just guidelines and not mandates
C	Yes	TTX and drills	Two a year minimum, try for once a month	Health, law, fire, public works and private	HSEEP, and rely on historical in-house knowledge	Perhaps if easy to use, transit-focused, which type? Light rail, heavy rail?
D	Yes	TTX and functional	Every 2 years (federal requirement)	Fire, law, public works, DOD, ACE	Unknown/none	Yes
E	Yes	TTX, drills functional and full scale	Six times a year minimum, up to 30 in one year	Fire, EMS, law (state and local), public works, other transit agencies	Personal experience	Yes, if in included checklists that could be adjusted
F	Yes	3 TTX, 1 full scale	Every 18 months	Operational Area, fire, law, EMS	HSEEP, some internal documentation from previous exercises	Yes. Should include information on TSGP funds.
G	Yes	3 TTX, 1 operational	Annually	Law, fire and medical	HSEEP, but do not register results	Yes. Include resource guide, example AAR, SMART objectives, Correction Action Matrix, other exercise tactics

Note: Results are presented in randomized order to prevent attribution to specific agencies. Responding agencies are listed in alphabetical order in Table 1.



Figure 4 IED in a Rail Wheel During a Facilitated Exercise



Figure 5 Participants in Facilitated Exercise Looking Under Railway Carriage

ANALYSIS AND CONCLUSIONS

Analysis

The consensus across all transit agencies interviewed was that there is a need to augment the HSEEP documents with practical guidance on exercise design, and exercise documentation development. Many agencies noted that the exercise staff changes frequently, so written materials are essential for compliance with HSEEP into the future.

Exercises must also be viewed as an extension of training, and need to be designed to test employee readiness and inform the organization on the need for the type and frequency of training to maintain response capability at an acceptable level.

Exercises are crucial to the verification of existing plans and protocols, and the refinement and creation of new materials.

To achieve these objectives there is a consensus that a simple step-by-step guide is needed that makes the role of transit agencies clear *vis a vis* first responders. Transit is understood as the provider of logistical support, but when transit is the target, the agency has to be included in the Operations element, or even in a Joint Command configuration. Few transit agencies have people on staff who understand the various non-Logistics roles of transit, and the exercise handbook would provide some guidance regarding exercising the Operations, Joint Command and Logistics roles.

Furthermore, there is some confusion over the terms used to identify the responders at the scene of an event. Transportation has historically been an emergency responder, whether moving resources or providing buses as shelters. However, the events of 9/11 at the World Trade Center clearly identified transit workers as first responders, as they cut steel, operated heavy equipment and created pathways into the burning pile to effect rescue and body recovery (Jenkins and Edwards-Winslow 2003, 31). Yet at the field level other agencies may not recognize the key role of transit in a community's response in life saving activities, like evacuation and rescue. The scenarios and guidance in the handbook need to be created to exercise the various roles of transit with other professions to build up field level relationships for real world disasters.

Similarly, state-level and local transportation departments have a key role in roadway management. The California Highway Patrol has a motto for its operations: "all roads, all codes." However, without debris free, inspected, passable roadways that will be "no roads means no codes." This points to the importance of transportation agencies in restoring road service so that bus transit and all first responders can access the disaster sites to help the victims. As was pointed out in the Houston regional information collaboration (FEMA 2008b), data from Smart Transportation Centers can be entered into computer-aided dispatch systems (CAD) used to manage police, fire and emergency medical services (EMS) response to emergencies and disasters, providing information about open routes, types of vehicles involved and numbers of bystanders at a scene.

The importance of roadways during disaster response cannot be overstated. The failure of the Cypress Structure and the Bay Bridge, and the loss of the Route 1 bridge in Watsonville, CA in the Loma Prieta Earthquake, and the failure of the Minneapolis bridge have all demonstrated that loss of life from transportation facility failures is a challenge in any disaster. Rapid restoration or creation of “work arounds” is critical for the movement of first responders, emergency response equipment and victims. Heavy load permits from state-level agencies are crucial for the delivery of truckloads of water and other rescue supplies. Recovery depends on heavy equipment traveling over roads and highway bridges. The Association of Bay Area Governments has a study of the likely impact of the next Bay Area earthquake on transportation assets, and estimates the loss of 1,700 road segments. They have created an extensive checklist for pre-event actions by all segments of the community—including transit and transportation—to minimize the damage to the community from the loss of these road segments. These lists clearly demonstrate the many ways that the whole community depends on transit and transportation for its day to day functioning (ABAG 2003).

Conclusion

A well-run disaster planning exercise program can lead to better trained employees, better developed plans, and more robust relationships with partner agencies. The research demonstrates that there is a need for a practical handbook to guide transit agencies in developing the knowledge needed to create good exercises, to implement appropriate types of exercises, and to document the exercise outcomes for future planning and training. The consistency of the message across three states, and medium and large transit agencies makes the small number of responses less important.

ABBREVIATIONS AND ACRONYMS

ABAG	Association of Bay Area Governments
BART	Bay Area Rapid Transit
CAD	Computer Aided Dispatch (Systems)
CAIT	Center for Advanced Infrastructure and Transportation
Caltrans	California Department of Transportation
CSTI	California Specialized Training Institute
DHS	Department of Homeland Security
DOD	Department of Defense
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
GAO	Government Accountability Office
HSEEP	Homeland Security Exercise Evaluation Program
IAP	Incident Action Plan
ICS	Incident Command System
I-STEP	Intermodal Security Training Exercise Program
LLIS	Lessons Learned Information System
MMTF	Metropolitan Medical Task Force
NIMS	National Incident Management System
OSHA	Occupational Safety and Health Administration
PATH	Port Authority Trans Hudson
SEMTAP	Security and Emergency Management Technical Assistance Program
SEPTA	South East Pennsylvania Transit Authority
TCRP	Transit Cooperative Research Program
TO-SPOT	Transit Oriented Screening of Passengers by Observational Techniques
TRB	Transportation Research Board
TSA	Transportation Safety Authority
TSGP	Transit Security Grant Program
VTA	Valley Transit Authority
WMD/NBC	Weapons of Mass Destruction/Nuclear, Biological, Chemical

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Frances L. Edwards, PhD, CEM, is the director of the Master of Public Administration program and professor of political science at San José State University. She is also the Deputy Director of M.T.I National Transportation Security Center of Excellence and a Research Associate of the Mineta Transportation Institute at SJSU, and teaches emergency management in the Master of Transportation Management program. In 2009 she was appointed U.S. chair for the European Union CAST Project for the development of unified training for first responders. Her most recent research has been in global supply chain security, resulting in a chapter co-authored with Dan Goodrich, "Supply Chain Security and the Need for Continuous Assessment," to be published in *Supply Chain Security: International Innovations and Practices for Moving Goods Safely and Efficiently* by Praeger. In 2009 she delivered papers at the Department of Homeland Security Center of Excellence conference on MTI's research agenda, and at the American Society for Public Administration on "Legacy of Hurricane Katrina: The Challenges of International Goodwill." In 2008 she delivered papers at the American Society for Public Administration on the financial impacts of Hurricane Katrina, and at the Stevenson Disaster Institute at Louisiana State University on cross-border issues in disaster response. Her paper was published in 2009 in the *Journal of Contingency and Crisis Management*. In June 2007 she was a guest of the Turkish government at the Second Istanbul Conference on Democracy and Global Security where she delivered a paper titled "Police in Catastrophic Response: Lessons Learned from Hurricane Katrina." She also presented a paper at the American Society for Public Administration (ASPA) on "Collaborative Leadership in Dynamic Environments of Disasters and Crises: Collaboration at the Local Level," and she received the Petak Award for the best paper in emergency management delivered at the 2006 conference.

Dr. Edwards was a 2006 Fellow of the Foundation for Defense of Democracies, and spent part of June 2006 in Israel at Tel Aviv University studying Middle Eastern terrorism. She chaired the 2006 NATO STS-CNAD meeting for 20 nations in Portugal, and presented a paper there on the evolution of American emergency management. The book, *NATO and Terrorism: On Scene! Emergency Management after a Major Terror Attack*, co-authored with Professor Friedrich Steinhausler of Salzburg University, grew out of the March 2006 NATO workshop. She was guest editor for the Winter 2007, Winter 2008 and Winter 2009 editions of *The Public Manager*, in which she published articles on Hurricane Katrina. Her most recent articles include, "Federal Intervention in Local Emergency Planning: Nightmare on Main Street," in the Spring 2007 issue of *State and Local Government Review*, and "An Ounce of Prevention Is Worth a Pound of Cure: Improving Communication to Reduce Mortality During Bioterrorism Responses," with Margaret L. Brandeau and other colleagues from Stanford University, in *American Journal of Disaster Medicine*, March/April 2008.

Previously, Dr. Edwards was director of the Office of Emergency Services in San José, California for 14 years, including one year as acting assistant chief, San José Fire Department. She was director of San Jose's Metropolitan Medical Task Force (MMTF), a CBRNE terrorism response unit, and head of the four-county "San José Urban Area Security Initiative." In 2004 she co-chaired the NATO Advanced Research Workshop in

Germany where she delivered a paper on research needs to support first responders to CBRNE terrorism. In October 2001, while Dr. Edwards was director of the Office of Emergency Services, the *Wall Street Journal* called San José the “best prepared city in the United States” for disasters. She represented emergency management on the five night “Bio-War” series on ABC’s “Nightline with Ted Koppel” in October 1999. She has been a member of the Stanford University Working Group on Chemical and Biological Warfare, the Department of Justice’s Executive Session on Domestic Preparedness at the Kennedy School of Government at Harvard University, the National Academy of Sciences Institute of Medicine MMRS Review Committee, and the California Seismic Safety Commission.

Dr. Edward’s publications include *Mercury News* op-eds on homeland security, *NATO and Terrorism: Catastrophic Terrorism and First Responders* with Dr. Steinhausler, *Saving City Lifelines* with Brian Jenkins, and chapters in ICMA’s *Emergency Management, Homeland Security Law and Policy, First to Arrive, Handbook of Crisis and Disaster Management, The New Terror*; entries in *WMD Encyclopedia*, over 25 articles in journals, and professional papers at more than 35 conferences. She was named Public Official of the Year 2002 by *Governing* magazine, and one of the “Power 100 of Silicon Valley” by *San José Magazine*.

She has a PhD in public administration, a Master of Urban Planning, an MA in Political Science (International Relations) and a Certificate in Hazardous Materials Management.

DANIEL C. GOODRICH, MPA, CEM

Daniel C. Goodrich, MPA, CEM is an emergency preparedness coordinator for Lockheed Martin Corporation. He is an instructor and research associate for the Mineta Transportation Institute at the San José State University’s College of Business, where he also teaches Security for Transportation Managers. He was selected as a 2006 Fellow of the Foundation for Defense of Democracies, and spent part of June 2006 in Israel at Tel Aviv University studying Muslim terrorism. He has been an active member of the San José Metropolitan Medical Task Force, a CBRNE response unit, since 1999, where he has served as exercise director for eight facilitated exercises, a model of exercise that he developed. Harvard University’s Kennedy School of Government has selected the creation of this exercise style for a case study in its executive management series. His most recent publication is a chapter, “Supply Chain Security and the Need for Continuous Assessment,” to be published in *Supply Chain Security: International Innovations and Practices for Moving Goods Safely and Efficiently* by Praeger in 2010, and “Improvised Explosive Devices,” in *Handbook of Emergency and Crisis Management*, to be published by Marcel Dekker in 2010, both co-authored with Dr. Frances L. Edwards. He delivered a paper on maritime security at the American Society for Public Administration in 2007, and on Fourth Generation Warfare at the 2006 NATO STS-CNAD meeting for 20 nations in Portugal, which was adopted as an annex for *NATO and Terrorism: On Scene!*, the book developed from the workshop by Dr. Edwards and Dr. Friedrich Steinhausler, published by Springer in 2007. In 2004 he chaired a session on “First Responders” at the NATO Advanced Research Workshop in Germany that focused on the research needs to support

first responders to CBRNE terrorism.

Mr. Goodrich serves as a consultant to the California Department of Transportation, and has provided training services for NASA/Ames Research Center staff in emergency management. He has delivered professional papers at eight conferences, and with Dr. Edwards he has co-authored a chapter, “Organizing for Emergency Management” in the ICMA textbook *Emergency Management*, and has 3 entries on nuclear topics in *The WMD Encyclopedia*.

Mr. Goodrich served in the United States Marine Corps for ten years, including leadership positions in Security Forces. He is distinguished with both rifle and pistol, and a member of the President’s Hundred. He also served for six years in the Army Reserve Military Police as a small arms instructor and a member of the U.S. Army Reserve shooting team. He was recalled to active duty in 2003 to train reservists being deployed to Iraq and Iraqi civilian officials.

Mr. Goodrich has a Master of Public Administration degree from San José State University and is a Certified Emergency Manager.

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