

Transportation Research Board

Transportation Security Education & Training E-Circular

It is impossible to make the nation's transportation system completely secure. The amount of investment needed and disruption to our transportation system would be too onerous. However, transportation agency and industry workers, *when trained properly*, can prevent incidents by being vigilant and identifying suspicious people and packages; when an incident does occur, they are at the front lines and can quickly respond to and manage an emergency situation. In order to perform these important duties effectively, they should be given the best possible education and training.

This e-circular summarizes the Transportation Security Education and Training initiatives organized by the Subcommittee on Training, Education and Technology Transfer chaired by Yuko Nakanishi and the full committee, Critical Transportation Infrastructure Protection Committee chaired by Dr. Daniel O'Neil.

Transportation Security Education and Training Best Practices Session

TRB Session 240 on *Transportation Security Education and Training Best Practices* was held on Tuesday, January 13, 2004 during the 83rd Annual Meeting at the Omni Shoreham. The session, presided by Yuko Nakanishi and Dr. Daniel O'Neil, featured the following speakers and topics:

- *Dennis Hunter*, National Domestic Preparedness Consortium (NDPC) Training Programs, discussed the training programs offered by the National Domestic Preparedness Consortium.
- *Dr. Vic Maconachy & Christine Nickell*, National Information Assurance Education and Training Program (NIETP), informed the audience about the National Information Assurance Education & Training Program and the Centers of Academic Excellence in Information Assurance Education, which are a part of the National Security Agency.
- *Reuben Goldblatt*, KLD Associates, explained how simulation programs can be used for emergency planning & training purposes.
- *Whitefield Mayes*, Wilbur Smith Associates, presented on the design & deployment of secure entry control for facilities

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The National Domestic Preparedness Consortium (NDPC) was formed in response to the Oklahoma City Bombing and delivers weapons of mass destruction training. NDPC is the principal vehicle through which the Department of Homeland Security's Office of Domestic Preparedness (ODP) identifies, develops, tests, and delivers training to state and local emergency responders.

Each of the NDPC members brings a unique set of assets to the domestic preparedness program.

- *Energetic Materials Research & Testing Center – New Mexico Tech:* EMRTC offers live explosive training including the use of field exercises and classroom instruction. EMRTC offers the Incident Response to Terrorist Bombing and the Prevention and Response to Suicide Bombings courses and is the lead NDPC partner for explosives and firearms, live explosives, and incendiary devices training. Website: www.emrtc.nmt.edu
- *National Center for Biomedical Research and Training (NCBRT) at Louisiana State University:* The National Center for Biomedical Research and Training (NCBRT) located at Louisiana State University helps prevent, prepare for, respond to, and recover from national and international acts of terrorism, mass casualty incidents, and weapons of mass destruction incidents through teaching, research, and evaluative services. Website: www.ncbrt.lsu.edu
- *U.S. Department of Energy's Nevada Test Site (National Exercise, Test, and Training Center):* The NTS conducts large scale field exercises using a wide range of live agent stimulants as well as explosives. NTS develops and delivers a Radiological/ Nuclear Agents Course. NTS, in coordination with ODP, is establishing the Center for Exercise Excellence. The Center allows NTS to train jurisdictions in the planning and conduct of exercises, tailored to the unique threats faced by participating jurisdictions. The Center will provide a critically needed new component of the overall exercise training program, meeting those special exercise needs as the state and local jurisdictions define their exercise

priorities. Website: www.nv.doe.gov/nts

- *Emergency Response & Rescue Training Center Texas A&M University System:* Texas A&M delivers a set of courses to prepare public officials, emergency medical services, law enforcement, fire protection, and public works for the threat posed by weapons of mass destruction. Courses are developed and designed to provide each specific segment of the emergency response community with the tools needed to accomplish its role in the event of a WMD incident. Additionally, Texas A&M has developed an Interactive Internet WMD Awareness Course for emergency responders. Texas A&M also provides technical assistance to state and local jurisdictions in the development of WMD assessment plans. TEEX offers the following courses of instruction: WMD Threat and Risk Assessment, WMD Incident Management/Unified Command, Emergency Response to Terrorism Basic Concepts, Emergency Medical Operations, and WMD Awareness (Internet Course). Website: teexweb.tamu.edu/nerrtc
- *Center for Domestic Preparedness (CDP):* The CDP provides hands-on specialized training to state and local emergency responders in the management and remediation of WMD incidents. Located at Fort McClellan, the CDP conducts live chemical agent training for the nation's civilian emergency response community. The training emergency provides a valid method for ensuring high levels of confidence in equipment, procedures, and individual capabilities.

The *Consortium Review Process* is the process by which courses are identified, developed, and implemented. The process begins with the selection of an appropriate consortium member to develop a course, based upon their individual areas of expertise. It is developed based on input from subject matter experts First Responders and other agencies. The course is provided to the Office for Domestic Preparedness (ODP) for review. Pilot courses are then run with instructors and the experts to refine and improve upon the instruction of the course. The pilot course is then provided to first responders. The curriculum is reviewed and modified based upon the results of the pilot courses.

The *Consortium Course Validation Process* reviews courses by a selected Review Board of subject matter experts based on the curriculum. The experts review the materials and submit comments prior to the course review meeting during which the comments are addressed by the consortium member and ODP. Once any revisions are decided upon, they are forwarded to the curriculum developer to evaluate. Course content is continually evaluated by consortium member with a full internal audit at least once a year.

The following website offers additional information about ODP activities and additional information about NDPC -- www.ojp.usdoj.gov/odp. Dennis Hunter may be reached at the following email address: dennis@emrtc.nmt.edu.

Vic Macanochy, Ph.D. and Christine Nickell—NIAETP Centers of Academic Excellence in Information Assurance Education

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Dr. Vic Macanochy and Christine Nickell of the National Information Assurance Education and Training Program (NIAETP) informed the audience about their education and training activities and its Centers of Academic Excellence in Information Assurance Education.

The President's National Strategy to Secure Cyberspace, 14 February 2003, refers to cyberspace as the nervous system of our Nation's critical infrastructures, and indicates that the healthy functioning of cyberspace is essential to our economy and our national security. Securing cyberspace presents a difficult strategic challenge, and information assurance education is a critical component in successfully meeting that challenge.

The seriousness of PC viruses should be apparent – viruses affect all industries and sectors of the economy – transportation, finance, academia, government agencies. And, they have been attacking our PCs at an increasing rate. According to Internet Security Systems' newest report, the number of security threats climbed 9 percent in the third quarter over the previous three months (Tech Web News Nov. 18, 2003). The costs of each virus outbreak have been tremendous. In a survey of 300 organizations, 36% reported server downtime of 21 hours; additionally, more than 80% of those reporting a virus outbreak required 20 person-days to recover at an average cost of \$120,000. Hence, network protection should be perceived not just as an insurance policy but as a core business requirement for all organizations.

There are fundamentally only three countermeasures available to protect our nation's Critical Information Infrastructure – *technology, operations, and people*. The National Information Assurance Education and Training Program (NIAETP) seeks to address the human factors element by enhancing the Information Assurance knowledge and skills in the American workforce and school population via community-based education and training programs that are national in focus, future oriented, multidisciplinary and tied to technology and business.

Centers of Academic Excellence in Information Assurance Education is a partnership with 50 universities across the U.S. and seeks to reduce the vulnerability of our National

Information Infrastructure by promoting higher education in information assurance, and producing a growing number of professionals with Information Assurance expertise.

Universities designated as Centers are eligible to apply for scholarships and grants through both the federal (www.ehr.nsf.gov/duet/programs/sfs) and Department of Defense Information Assurance Scholarship Programs (www.defenselink.mil/nii/iasp).

The *DoD Scholarships for Service Program*, administered by NIAETP, provides IA professionals a chance to gain cutting edge knowledge and skills about information assurance and apply them to their current or future jobs with government agencies.

Committee on National Security Systems Community Standards – in addition, NIAETP is involved in the creation and establishment of National Training Standards through the Committee on National Security Systems. Standards have been developed for the following job titles: Information Security Professionals, Information System Security Officers, System Administrators, System Certifiers, and Risk Analyst.

Additional information about this presentation can be obtained from Christine Nickell at: c.nicke2@radium.nesc.mil.

Reuben Goldblatt, P.E.— Use of Evacuation Simulation in Emergency Planning

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A key element of emergency planning is evacuation planning. Originally a requirement of the nuclear power industry, evacuation planning has been extended to other venues: This includes chemical plants (especially after the incident in Bhopal, India) and military installations (particularly where chemical or biological weapons are to be destroyed). Now, in what is widely regarded as a changed world with much greater emphasis on emergency planning, evacuation planning is more important than ever.

Evacuation Planning – Fundamental Concepts

In talking with the general public, and indeed with some professionals, there seems to be some misunderstanding of the nature and meaning of evacuation time estimates. Therefore, it is useful to review some of the key concepts and definitions surrounding this topic.

- *Evacuation Time Estimates (ETE)* serve as one criterion for developing a *Protective Action Recommendation (PAR)*. PARs are recommendations made to

decision makers in an emergency. These recommendations generally involve three choices for public action: do nothing, shelter in place, or evacuate the area.

- ETEs are viewed by the public as an important indication of risk.
- There seems to be some confusion distinguishing between ETE, which is an aggregate measure, and evacuation travel times.
- *Mobilization Time* represents the time required by evacuees to perform all their necessary preparatory activities prior to starting the trip.
- Evacuation time (ETE) and mobilization time are both referenced to the Advisory to Evacuate.
- Mobilization and evacuation are *processes* that take place over time and space – they are not *events* that take place at a point in time.

The evacuation travel time depends primarily on the relationship between Traffic Demand and Highway Capacity (Supply). When Demand exceeds Capacity over some time period, travel speed declines and the traffic environment exhibits queuing (stop-and-go), which is characteristic of congested conditions. Traffic does move, but slowly.

Evacuation Planning Methodology

Good evacuation planning methodology involves an iterative process to identify the best evacuation routes and to estimate the time required to evacuate the area at risk. Some of the steps in this methodology are discussed here:

- Identify the region to be evacuated: keyhole or circular. Regions are defined as subsets of the entire area at risk. Usually they are comprised of groups of emergency response planning areas (ERPA). Regional configurations can be defined on the basis of wind direction and speed.
- Identify the demand (in vehicles) over the area to be evacuated and the voluntary and shadow evacuation areas. Demand population can be subdivided into permanent residents, employees who work in the area of risk, and transients who are passing through the area or staying in the area temporarily. This demand is distributed to zonal centroids which describe the changes in population density over the area.
- Estimate highway link capacities based on field survey observations and on scenario-based weather conditions.
- Apply a traffic distribution and assignment model to compute the optimal routing of evacuation trips out of the region via the specified destination nodes.

- A traffic simulation model is then applied to simulate the movement of vehicles during the course of the evacuation. The model should explicitly describe traffic conditions in the saturated flow regime to account for congestion effects.
- Introduce the traffic management tactics to the simulation and repeat the ETE analysis.

Evacuation simulation can be performed with either microscopic models or with macroscopic models. The tradeoffs between micro and macro models are generally that micro models provide a more detailed simulation at the expense of computing speed. Where large networks are involved and/or large numbers of evacuation scenarios must be studied, the macroscopic modeling approach provided reasonable accuracy at a significantly higher level of software efficiency.

Training Applications

Emergency evacuations are unique in the sense that drills or exercises involving public participation are not feasible. However, the evacuation control functions that are present in an emergency operations center can be exercised with the evacuation simulation providing the real-time feedback. Decisions on which areas are to be evacuated, how to respond to road closures and/or traffic accidents, whether to turn some roads into one-way outbound roads to assist evacuation are some of the scenarios that can be simulated during exercises. Decisions can be introduced into the exercise and the results of these decisions evaluated.

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Whitefield Mayes, P.E.-- Design and Deployment of Secure Entry Control for Facilities

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Whitefield Mayes of Wilbur Smith Associates, part of a Department of Defense and consultant team, produced guidelines for the Design and Deployment of Secure Entry Control for Facilities which were developed into the content of a training course for military personnel. While the primary focus is on entry control at military installations, these guidelines would be applicable to transportation facilities such as bus depots and rail yards.

Prior to Sept.11, 2001, the security level at military installations varied greatly, and no comprehensive design guide for entry control existed. Immediately after Sept. 11, all

military installations increased security at access points: all vehicle occupants were checked; decal vehicles were randomly searched; all non-decal and visitor vehicles were searched; and all commercial trucks were searched. Many installations experienced major congestion due to the inadequate number of ID check lanes, insufficient and untrained security personnel, limited vehicular turnaround capability, lack of off-street inspection areas, and insufficient equipment and dogs.

It was clear that a comprehensive set of entry control design guidelines were needed. A team of engineers, planners, and security personnel developed guidelines in order to provide access control, maximize personnel safety, provide adequate capacity to meet the daily peak demand, address the primary threat (a vehicle-borne bomb), and provide all required functional components.

It was determined that a secure entry control can be implemented by instituting the following:

- Direct all visitors to one highly-accessible gate with off-street parking,
- Direct all commercial vehicles to a single, truck-only gate away from the population,
- Provide a turnaround at each potential rejection location, establish sufficient clear zones and screens, and
- Provide quality-of-life features.

The team developed detailed design guidelines for the following five elements of entry control – lane requirements, geometrics/design, lighting, signing, and speed control.

Lane requirements: it was determined that 2 ID checkers per lane provide maximum efficiency; they are able to process 500 vehicles per hour.

Geometrics/design: optimal approach lane width, access road width, center grassed median width, ID checker median, lane width at checkpoint, curb heights, and shoulder specs were identified and recommended. Pavement surface, transition tapers, lateral obstructions, corner radii, and visitor parking spaces were addressed as well.

Lighting: the guidelines recommended the use of transitional lighting, 5' candles near the checkpoint area and a minimum of 10' candles at the ID check positions, color retention index > 50, metal halide lighting, focused low-level lighting for ID processing, higher candle power for under vehicle search, and high and low positioned lighting at the truck inspection area.

Signing: for off-post directional signs, the guidelines developed recommended that they be located at critical approach junctions, be presented in as simple and legible manner as possible, they adhere to standards (e.g., MUTCD), and be coordinated with local transportation authorities. Near the checkpoint, the following guidelines were suggested – only essential signs such as standard speed control signs should be installed within 250'

of the checkpoint; no electronic signs and banners should be installed in that area; and outbound traffic speeds should be restricted.

Speed control: in order to reduce speeds to safe levels, speed reduction signing, reduced lane widths, stamping/coloration of pavement, traffic circles, speed humps, flashing warning devices, rumble strips, message boards, and serpentine with jersey barriers were recommended.

Additional information about the design and deployment of entry control for facilities can be obtained from Whitefield Mayes at wmayes@wilbursmith.com.

Subcommittee Meeting Presentations

The Transportation Security Subcommittee on Training, Education, and Technology Transfer was held on Monday, January 12, 2004 at the Omni Shoreham.

Eva Lerner-Lam, President of Palisades Consulting Group, Inc. and *Douglas B. Ham*, Area Manager for PB Farradyne's Mid-Atlantic Business Unit, presented training strategies and needs of transit agencies and state DOTs. *Chris Krusa* of MARAD apprised the Subcommittee members regarding MARAD's training programs for its personnel.

Eva Lerner-Lam--Transit Security Training and Education Overview

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This presentation described the current transit security training and education strategies, the future outlook and challenges for transit security and recommendations for addressing those challenges.

Prior to September 11, 2001, transit security training and education focused primarily on localized, non-suicidal, petty crimes: graffiti, vandalism, robberies, assault and battery. After 9/11, they expanded to include large-scale, suicide attacks and weapons of mass destruction and cyber-terrorism.

Transit responded quickly and in a united way to security threats after 9/11. Only a few weeks after the attacks, the Federal Transit Administration launched a highly successful "Connecting Communities" program <http://transit-safety.volpe.dot.gov/training/Archived/EPSSeminarReg/Seminar.pdf>, which brought transit personnel together with first responders so they could explore ways in which they could work more closely in the future. "Empowered" transit staff began engaging with other first responders in training, tabletop and field exercises and practice drills. Importantly, transit agencies around the country began involving the customer in terms of vigilance and emergency procedures.

Many organizations quickly engaged in activities geared toward enhancing transit security training and education, including:

- Department of Homeland Security/Transportation Security Administration
- Centers for Risk and Economic Analysis of Terrorist Events
- Federal Transit Administration
- National Transit Institute

- Web resources at <http://transit-safety.volpe.dot.gov/Security/Default.asp>
- Transportation Research Board
- Trade and Professional Associations
 - American Public Transportation Association
 - American Society of Civil Engineers
 - Institute of Transportation Engineers
- Labor Unions/Amalgamated Transit Union
- USDOT Joint Program for ITS Teleconference Technical Training T3

Today, there is still a pressing urgency to conduct frequent drills and exercises--and indeed, to explore “the unthinkable” in terms of scenarios. However, funding for such drills and exercises is quite limited, and the economic downturn of the past several years has resulted in fewer employees handling greater responsibilities, so it is increasingly difficult for employees to take the time to participate. Furthermore, many professional training curricula are still in development, and the demand is far greater than the supply of accredited courses and programs.

In moving forward, security education and training should be integrated into standard operating procedures, in the same manner as “Safety First” was integrated into industrial and commercial venues three decades ago. Partnerships at all levels, both existing and potential, and across relevant disciplines, should be pursued to conserve scarce personnel and funding resources. Finally, the use of “Best Practices” using traditional training venues as well as distance-learning platforms should be encouraged.

Chris Krusa—MARAD’s Training Program

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Chris Krusa of the U.S. Maritime Administration presented the following summary of MARAD’s training program.

The Secretary of Transportation delegated to the Maritime Administration (MARAD) the requirement of Section 109 of the Maritime Transportation Security Act of 2002 (MTSA) to develop standards and curricula to allow for the training and certification of maritime security professionals. The international maritime security mandate, IMO's International Ship and Port Facility Code of 2002 (ISPS), contains duties and responsibilities of maritime security personnel and training is indicated to ensure maritime security effectiveness. At the present time there are no formal required international or domestic training standards; however, this is currently under consideration by the IMO. In the

interim, to be in compliance with ISPS, implementers must provide evidence of relevant maritime security training in their ISPS response plans.

- Concurrently, MARAD is aggressively promoting implementation of standardized maritime security training in a voluntary context.
- The MTSA Section 109 standards and curricula were completed at the U.S. Merchant Marine Academy (USMMA), and a Report to Congress was signed by DOTSEC and submitted to Congress in May 2003. The report contains seven course frameworks that target maritime security personnel inclusive of ship, port, and company venues and the Report also provides recommendations for broadly implementing maritime security training. (The Report is available via www.marad.dot.gov.)
- As a natural follow on to the development of the standards, three model courses designed to train designated vessel security officers, company security officers, and port facility officers were created by MARAD at USMMA in cooperation with the government of India, submitted by the Coast Guard to the International Maritime Organization (IMO) and after a validation/editing process became available in September 2003 for use by training providers. The model courses are available via the IMO at www.imo.org. Maryland Nautical Supply in Baltimore is a U.S. distributor and they cost about \$46 apiece. Several course providers such as DNV, ABS, and industry schools such as MITAGS and Calhoun MEBA have implemented training that appears to track well with these model courses.
- MARAD is developing additional model courses to cover four remaining categories of maritime security personnel, including land-based military and law enforcement officers, and is coordinating development of these model courses with the USCG, TSA, Information Analysis and Infrastructure Protection Bureau, and the Federal Law Enforcement Training Center of the Department of Homeland Security and other relevant government agencies.
- A joint MARAD/USCG committee chaired by MARAD is refining the system of certification and course approval proposed in the Report to Congress and is addressing interagency issues. An interagency government team, possibly a subset of the MARAD/USCG Joint Committee, is forming to provide better organization of government resources and to promote continuity in training.
- A MARAD notice will be publicized soon to provide non-mandatory guidance to course providers who may wish to obtain course approval from MARAD. The Coast Guard's National Maritime Center will approve courses for vessel personnel. The purpose of the non-mandatory course approvals is to promote use of the standardized model courses and to encourage consistency in training. It must be emphasized that this will be on a voluntary basis; the IMO model courses MARAD created are by definition, just that they are not mandatory. Courses will be assessed for conformance to the model courses. MARAD plans to have a

system in place that will allow acceptance of course proposals starting in early spring 2004 via a web link to the MARAD web.

- MARAD is planning to implement training opportunities for any federal, state, local, and private law enforcement or maritime security personnel in coordination with the state maritime academies, the U.S. Merchant Marine Academy, the Appalachian Transportation Institute and other non-profit training schools that conduct approved maritime security training courses in order to facilitate and expedite this training. To be eligible for assistance in the form of grant or subsidy, course providers will have to commit to compliance with the voluntary course approval standard.
- To administer this program a National Maritime Security Education Center (NMSEC) is under consideration by MARAD. Its location may be at the U.S. Merchant Marine Academy, as a stand alone project office.

Douglas Ham – Training and Education Needs of State DOTs

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The following were the major points made in Douglas Ham's presentation on the training and education needs of state DOTs.

- Pre-9/11
 - Security not main consideration
 - Emergency preparedness uneven
 - Few state DOTs had considered terrorism
 - Many emergency operations plans did not address
 - Few if any vulnerability assessments
 - Minimal training & exercising
- Post-9/11
 - Security more important
 - "Fostering a security-conscious workforce"
 - Some emergency operations plans updated or created
 - Threat level warning procedures developed in some DOTs
 - Some vulnerability assessments
 - Some additional training & exercising
- DOT Needs Summary

- Terrorism awareness (for many or all employees)
- Responder skills (for subset of employees)
 - ICS/UC (reflecting changes resulting from likely NIMS implementation)
 - Hazardous materials
 - Weapons of mass destruction
 - Personal protection
- Other
 - Operational regimes
 - DOT & other agency/private sector roles
 - Information dissemination to public
 - Criticality/vulnerability/consequence assessment
 - Asset security including sensitive information
- General E&T Recommendations
 - Review and inventory terrorism and related training to date, identify what additional training is needed, and provide that training on a continuing basis as necessary.
 - Coordinate with other emergency management agencies and the private sector on ways to develop more and/or improved multi-agency exercises.
- Recommendation for E&T Subcommittee
 - Draft a white paper with perhaps a page per mode (transit, aviation, maritime, rail, and highway; also, freight) on what is perceived to be the training needs for that given mode.

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Current E&T Initiatives

A number of initiatives were proposed during the Subcommittee meeting and during subsequent discussions with Subcommittee members and the parent committee. Some of them are currently underway. The proposed initiatives are described below:

- Development of a website and an electronic Inventory of Resources with links to relevant E&T documents, manuals, university training sites, and other educational and training websites
- Development of a 2005 TRB session on Education and Training Needs of Transportation Agencies and Best Practices which Address those Needs
- Development of an inventory of threat level color-codes
- Development of templates for a variety of E&T courses
- Co-sponsorship of the ASCE Transportation Security 101 course
- Co-sponsorship of Workshop on Education and Training Needs of Transportation Agencies in the NY/NJ Region with Rutgers University

Conclusion

There is no way to completely eliminate the possibility of terrorism and criminal acts against our transportation system...*without* depleting all of our time and resources...*without* shutting down the system completely...*without* shutting down our way of life. However, we should be vigilant and alert.

*Let us not bow down to terrorism. But, let us be smart, and let us be prepared. **Training and education** is one of the least expensive yet effective ways to enhance our Nation's transportation system. Let us make the most use of it...Y. J. Nakanishi*