Army Professional Engineer Continuing Education

By Dr. Troy L. Messer, Major Stephen M. Bert, Major Jason A. Evers, and Major Richard J. Gash

There are several reasons why the United States Army should develop its own program for continuing education instead of using one of the many commercial classes available. The *Building Great Engineers* campaign of the United States Army Engineer School has highlighted the opportunity and value of developing professional credentials, specifically the professional engineer (PE) license. Also, more states are adding continuing education requirements in order to sustain licensure. Army officers have special technical skill requirements as well as unique difficulties in sustaining professional development while deployed. Commercial courses are not developed to address specific Army-related issues. Additionally, commercial courses require units to commit funds or effectively place undue financial hardship on Soldiers to maintain proficiency for the Army's benefit. This supports the need for an Army combat engineer credential that parallels the emergency manager credential in the Federal Emergency Management Agency.

Today the Army is striving to conduct the full spectrum of operations. Engineers provide a tremendous resource for certain aspects of stability operations. PEs in particular could leverage their technical expertise along with their tactical proximity to the operations, in effect becoming a force multiplier. To increase the effectiveness of military engineers, it would be a wise investment to provide them with a professional education program that sustains technical knowledge and provides the most up-to-date training necessary to conduct reconstruction in stability operations. The Engineer Branch has a dual need to satisfy the combat engineer sapper.

Background

The Engineer School has produced more than 970 master's degree students—through University of Missouri–Rolla (now Missouri University of Science and Technology) programs in engineering management, civil engineering, and geological engineering—to build its technical competency base in support of the brigade combat team (BCT).

The Army is now, and will be for the foreseeable future, formed around the modular BCT. Therefore, decentralized execution of stability operations is inherent in today's operating environment. Brigades need access to trained PEs. It may be in the form of an engineer coordinator or an attached field engineering support team, but engineering expertise should be an integral part of the BCT staff. Field Manual (FM) 3-07, *Stability Operations and Support Operations*, provides a framework for conducting stability operations. From that FM, the authors have developed a construct for professional engineering support to stability operations. FM 3-07 outlines the following three intervention phases of stability operations:

- Initial response
- Transformation
- Fostering sustainability

Initial Response

One of the fundamentals of successful stability operations is to quickly create positive and lasting change in the environment. It is from this fundamental that the holy grail—security—is most effectively enabled. During the initial response phase, military forces will be focused on providing food, water, shelter, and medical support to the host nation. While engineers will have a crucial role in planning for, and providing support for, the initial response, it is in preparing for the subsequent phases that they have the greatest capacity to positively affect stability operations.

Transformation

The trained PE will be able to facilitate effective and rapid transition through the phases. As stability operations move from initial response to transformation, a trained engineer will be able to rapidly effect local reconstruction. This will be achieved by conducting early and effective engineer reconnaissance of reconstruction sectors such as transportation, energy, communications, hazardous waste remediation, water/wastewater, and sanitation. The expertise provided by a PE will facilitate better estimates and enable a more efficient distribution of resources during the transformation phase. Also, construction management proficiency will enable effective construction management at various echelons of the deployed force. This will also create a second-order benefit to overworked contract officers, who have neither the time nor technical expertise to properly oversee the myriad of smaller reconstruction projects in the area of operations.

Fostering Sustainability

One of the challenges of conducting effective reconstruction projects is ensuring the sustainability of the projects after stability forces depart. Army engineers are unique in

their combination of cultural understanding, experience operating in degraded or Third World environments, technical education, and (with help from the proposed continuing education program) their awareness of state-of-the-art engineering solutions. This combination of experience and education will enable engineers from BCT to theater level to develop solutions that will be sustainable within the host nation's probable educational, economic, and infrastructure capabilities.

State Requirements

The authors investigated the continuing education requirements for two states. The first was Missouri, due to the fact that a large number of engineer officers acquire their PE license there. The second state, Montana, was chosen at random. Both states currently have some sort of exemption for licensees serving on full-time active military duty. While Missouri offers a permanent exemption, Montana only exempts those on temporary active duty (United States Army National Guard and United States Army Reserve Soldiers), which seems to indicate that active duty personnel are still required to complete continuing education. Both states require 30 professional development hours in a two-year rolling renewal period. An hour is defined as "one contact hour of instruction or presentation" which should be relevant to the practice of engineering and can include technical, ethical, or managerial topics. Qualifying activities attended in another state are allowed by both states. Missouri allows engineer-related satellite downlink video and computer software courses to complete the requirement. Montana takes a stricter approach, maintaining that "it is not intended that these courses be taken in private, such as a videotaped program in one's home, but rather be conducted in a group setting." However, the Montana guidelines also state that "a qualifying correspondence course should require the participant to show evidence of achievement and completion, and include a final, graded test." Both states require the maintenance of certificates to document individual training sessions and a logbook containing a summary of the entire reporting period.

Educational System

Engineer School Knowledge Network

The Engineer School Knowledge Network (ESKN) module on the Army Knowledge Online (AKO) site maintained by the Engineer School provides an ideal platform for a professional continuing education program. The portal is available to anyone with AKO login credentials. It can be accessed easily from the Engineer School webpage via an unsecured Internet connection. Use of ESKN would reduce the technical overhead required for the program by leveraging AKO's existing security, server, and graphical user interface capabilities. A content manager with ESKN administrator privileges could maintain the technical aspects of the program with little effort. Furthermore, the Engineer School's Blackboard™ suite, which has successfully supported both Regular Army and Reserve Component distributed learning (dL), is well-qualified to be a successful delivery platform as another course of action.

The program could include three forms of continuing education units (CEUs): self-study courses; webinars, or Internet-based seminars; and webcasts. A requirement common to all three content types would be a certificate of completion that students can print and keep in their records.

Course Topics

Courses studied should be based on doctrine and updated to maintain currency with the state of the art in military engineering. Some examples of classes could include:

- Providing food and water
  - Finding subsurface water
  - Analyzing water treatment plants
  - Constructing wells
  - Designing irrigation systems
- Providing shelter and medical support
- Learning structural design
  - Designing wood structures
  - Designing masonry structures
- Conducting construction reconnaissance
  - Identifying critical systems nodes
  - Constructing environmental baseline assessments
- Writing a statement of work
  - Assessing requirements
  - Estimating material, manpower, and equipment costs
- Understanding nongovernmental organization (NGO) and other government agency (OGA) support to reconstruction
  - Understanding the United States Agency for International Development (USAID) organization and capabilities
- Learning fundamentals of construction management in order to oversee contract execution
- Communicating news of reconstruction progress—good and bad—to the public
- Understanding available off-the-shelf designs
- Learning well-drilling and treatment techniques for surface water sources
- Learning how to use the Red Book/Sand Book
- Planning construction education
  - Assessing host-nation level of training
  - Defining training requirements
  - Planning military/NGO/OGA

Self-Study

A great example of a self-study dL course is CE 300, Introduction to Engineering Mechanics and Design. The course is available at <*http://www.west-point.org/academy/ce300/default.htm*>. Developed by the head of the United States Military Academy (USMA) Department of Civil and Mechanical Engineering for students studying abroad, the course demonstrates the enormous potential of web-based self-study. While very effective, the course has two disadvantages: Students must have the required texts on hand, and it takes a lot of creativity, technical knowledge, and time to create. Less ambitious examples can be found in the mandatory online annual training we are all familiar with.

Webinars

In recent years, webinars have emerged within the engineering community as a popular and accepted means of attaining CEUs. They typically require students to log in at a prearranged time and involve varying degrees of teacher-student and student-student interaction. Examples of webinars tailored for civil engineering CEUs can be found at <*www.asce.org/webinar/list*>.

Webcasts

Webcasts are the least interactive—yet easiest to produce—CEU option. They are simply broadcasts of recorded content that can be accessed over the Internet, such as video recordings of classes or presentations.

Summary

The Engineer Regiment needs to establish a formal professional continuing education program to ensure that it will have competent engineers who can positively impact full spectrum operations. A joint effort between the Engineer School, USMA, and the United States Army Corps of Engineers (USACE) could provide the knowledge base and direction for the program. The Engineer School defines the course objectives and incorporates lessons learned to respond to the Army's needs. USMA and USACE could provide the technical experts to teach the classes. An online educational system could conveniently track completion of CEUs and update officer records, as well as provide officers with documentation to meet the state CEU requirements. This educational system could be developed within the framework of the Army's existing systems, while adding great benefit to the Army and individual pride and confidence among officers with PE licenses. A second-order benefit of this program would be a well-developed educational tool to enable all engineer officers to enhance their understanding of engineer solutions to problems encountered in stability operations. The Engineer School is ideally suited to act as the lifelong learning portal by offering technical reachback and managing all Engineer Captains Career Course graduates as an engineer community of practice. Finally, the systematic valuation of continuing education will undoubtedly lead to the retention of the kind of officers that the Engineer Regiment needs in order to excel in the future.

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Endnotes

[1]Missouri Division of Professional Registration, "Continuing Professional Competency for Professional Engineers Licensed in Missouri," <*http://pr.mo.gov/boards/apelsla/Continuing-Education-PE-PDH-Fact-Sheet.pdf*>, accessed 17 December 2008.

[2]Montana Board of Professional Engineers and Professional Land Surveyors, "License Information," <*http://mt.gov/dli/pel/pdf/ce_guidelines.pdf*>, accessed 16 December 2008.

[3]Ibid.