

Field Force and Facility Engineer Training

By Major Erik C. Backus

Today's counterinsurgency (COIN) operations require engineer leaders to have knowledge of both the lethal and nonlethal effects that can be used on the battlefield. In Iraq and Afghanistan, engineer officers and noncommissioned officers are being asked to provide technical expertise some of them are ill-equipped to give based on the engineering educations they have received through the Officer Education System (OES) and Noncommissioned Officer Education System (NCOES), not to mention the nonengineering-related civilian-source degrees they possess. Conjuring up a bill of materials (BOM), writing a concise yet complete and understandable scope or statement of work (SOW) for construction, and pushing the requests of the

maneuver commander through the contracting and tasking processes are skills our leaders need to improve. This kind of training needs to be inserted immediately.

Further, engineer leaders at all levels are being asked to provide oversight and assistance for the life support of our Soldiers through base camp and life support construction. The mission of quickly establishing and maintaining safe and secure contingency operating locations of all sizes is a task that is dumped into the engineer's lap in our current contingency operation. Facilities engineering skills—to include environmental assessments, master planning, life-cycle costing, and maintenance oversight—are skills that have not been stressed in our professional force. Because of the overwhelming use of and need for these skills as we continue the War on Terrorism, the United States Army Engineer School (USAES) should develop a cell that can ensure the development and maintenance of certain core competencies that our engineer leaders need to meet the challenges of this war.



Personnel from the 243d Construction Management Team set up a surveying beacon near Patrol Base Dragon in Iraq.

Core Competencies for the Future

Five core engineer competencies for the required future of COIN operations, based on lessons learned in the War on Terrorism, are—

- Construction project development.
- Contracting and funding.
- Field force engineering.
- Facility engineer planning.
- Executing the total quality management process.

Each of these has unique attributes that must be considered in the implementation of any future training program.

Construction Project Development

Construction project development consists of three primary elements that every engineer needs to be able to perform:

- **Project scoping.** Our engineers must be able to site-adapt a pre-engineered design, develop limited independent contingency designs, write indigenously understandable construction specifications, and write a clear and concise SOW.

- **Project estimation.** Our engineers must be able to develop reasonable project schedules using either government or commercial software, do construction plan and specification take-offs in order to develop a BOM, and develop an order-of-magnitude estimate with the application of estimating tools and sources.
- **Project package development.** Our engineers must be able to compile the SOW, drawings, and specifications; review documents to ensure that they meet required life-safety, regulatory, and code provisions; and gain the applicable endorsements and buy-ins through the staff process.

All of these skills are required on and off the forward operating base (FOB) in order to provide the maneuver commander with an effective way to shape the terrain by developing well-planned and well-executed construction projects.

Contracting and Funding

Contracting and funding requires an understanding of both these separate yet interrelated processes. The contracting process includes—

- Coordination with the applicable contracting agency.
- An understanding of the roles and responsibilities of the contracting officer (KO), the contracting officer's representative (COR), and the contracting officer's technical representative (COTR).
- Bid selection processes and rules.
- Construction contract administration.

The funding process includes—

- An understanding of construction fiscal law and limitations.
- An understanding of contingency funding processes such as the Joint Facilities Utilization Board, Joint Acquisition Review Board, Logistics Civil Augmentation Program, and military construction.
- The development of funding packets.

While easy to describe, this skill set is enormous in its implications on the battlefield. Without it, our engineers can quickly become stymied in their ability to make their project packages achieve the results intended.

Field Force Engineering

Field force engineering (FFE) links engineer components to provide a seamless capability. Its elements center on—

- **Force protection.** Engineers have much to do with developing appropriate force protection elements, including—
 - Development and enforcement of antiterrorism and security engineering criteria, including their integration into project design.

- Execution of indirect-fire mitigation and risk analysis.
- Fostering an understanding of the relationship between base-centered force protection and lethal operations.

- **Life support.** Providing life support takes the form of—

- Facility development and facility program requirement identification.
- Development of, and connections to, necessary systems such as electricity, sanitation, water, and solid waste disposal.
- Critical analysis of programming requirements and regulations on life support.

- **Infrastructure.** Engineers play a large role in any facility's infrastructure, including—

- Development of base and localized infrastructure systems.
- Coordination with local support structures.
- Maintenance and crisis-resolution planning.

- **Life, health, and fire safety.** It is critical that engineers understand life, health, and fire safety requirements, including—

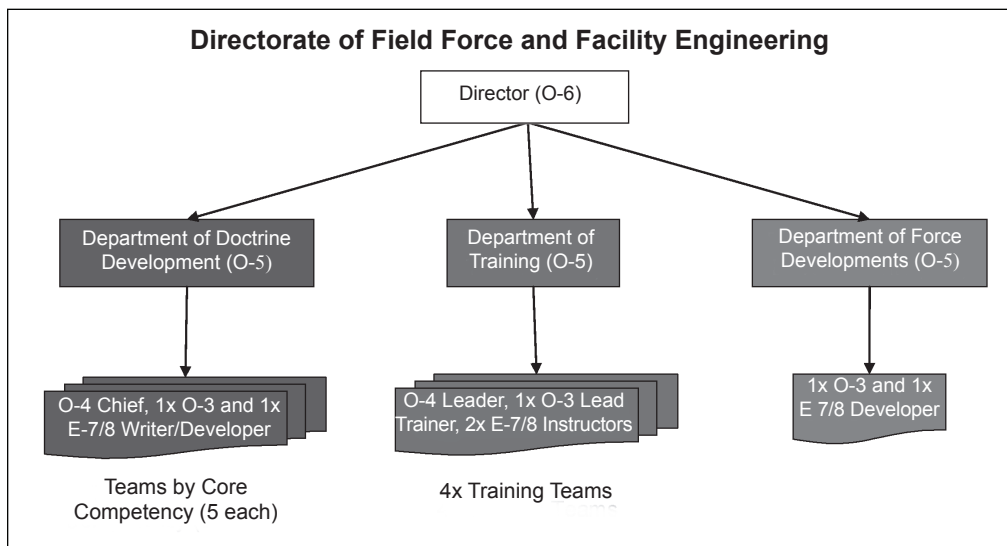
- Code compliance, egress, and inspections.
- Prioritization of efforts.
- Building siting and dig permit/safety program development.
- Construction site safety marking and safety plan implementation.

“Protect the force” has been rendered on many a mission-essential task list by unit commanders, but it is critical that we empower engineer leaders with the skills listed above to enable that protection to happen.

Facility Engineer Planning

To execute the long-term engineer fight, our leaders need to be educated in master planning, facility management, and operational planning and have an understanding of economic battlefield effects.

- Master planning involves—
 - Long-range facility planning.
 - Base alignment (opening and closure).
 - Facility requirement identification.
- Facility management/operational planning include—
 - Supporting the maneuver commander by planning for pre-positioned BOM.
 - Assisting with operations and maintenance takeover.
 - Transitioning to Installation Management Authority/ Department of Public Works control of installations.



- Economic battlefield effects include—
 - Local Commander’s Emergency Response Program (CERP) efforts.
 - Installation effects on the local economy.
 - Development of micro-industries and employment as a part of COIN.

Engineers have a key piece in the nonlethal fight and can use these planning skills to provide the combatant commander with much more bang for his buck.

Total Quality Management Processes

Mastery of total quality management processes includes an understanding of—

- **Quality assurance (QA) and quality control (QC) systems.** QA/QC education must teach leaders to integrate QC into all projects, develop a QA program with planned oversight, and develop corrective action plans in case quality does not meet standards.
- **Project tracking and work order system management.** Project tracking and work order system management needs leaders who can execute database management, use geographical imaging software, and provide real property management. This last skill set not only ensures that the commander gets what he wants; it ensures that he doesn’t get a lemon.

Future Education Leader

The Facility Engineer Group (FEG), the headquarters for facility engineer detachments and teams, is transitioning and preparing to hand over its functions to the 412th and 416th Theater Engineer Commands. Up until now, the skill sets and core competencies listed in the previous paragraphs have resided within the personnel and organization of the FEG. With its loss, some organization is needed to ensure that the education systems of tomorrow integrate these skill sets and core competencies and ensure their development

during practical assignments. Ultimately, USAES must be the education leader with an organization such as a Directorate of Field Force and Facility Engineering (see figure above) to apply these skills to practical Army challenges, followed by developmental assignments that enable leaders to refine these skills and gain invaluable experience. I recommend that this directorate include departments of doctrine development, training, and force developments. With this structure, and the integration of training in the above core competencies into our engineer OES and NCOES, this directorate could enable the collection and dissemination of the knowledge engineer leaders will need to win the construction and facility engineer fight for the future.

Hard lessons learned in Afghanistan and Iraq have taught us to change our tactics and remember some lost lessons learned. The COIN fight in Iraq requires that today’s engineer leaders equip tomorrow’s engineer leaders with the skills to provide world-class military engineering capability to combatant commanders in the contemporary operating environment. These core competencies are even more important as we continue to engage in environments like the Middle East, where political and economic operations are the essential elements that enable us to consolidate military successes and achieve national objectives. Construction, field force, and facility engineering skills are the critical missing link to prevent failure in these kinds of operations in the future. We must act now, while we are meeting success in the breach, to ensure that we are not bogged down by the obstacles our enemies have tried to place around us.



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