This article, "Who Is the 'Real' Engineer?" refers to the obsolete 2 January 2004 edition of Field Manual (FM) 3-34, *Engineer Operations*. The current edition of FM 3-34 was published on 2 April 2009. Some of the information contained in this article may no longer be applicable. We apologize for this error.

Who Is the "Real" Engineer?

By First Lieutenant Claude E. Barron

In a combined arms battalion tactical operations center in Mosul, Iraq, two engineer captains discussed their duties as task force engineers. One captain told the other, "Man, you're like a real engineer!"

"No," replied the second captain, pointing to a nearby second lieutenant. "He's the real engineer." The second lieutenant, an earthmoving construction platoon leader, was responsible for improving force protection measures at the task force checkpoints. He was planning a 100-mile movement of equipment and personnel across northern Iraq to the next jobsite. He also denied being the real engineer, arguing that his responsibilities merely included planning and overseeing the filling of HESCO Bastion Concertainer® barriers and grading gravel parking lots. These were nothing near the kind of calculations and analyses he expected real engineers to do.

These three officers represent many characteristics typically associated with United States Army engineers. Two held civil engineering degrees, two had conducted route clearance missions as platoon leaders on previous deployments, one had completed force protection and drainage improvement missions in northern Iraq, and one had a

Early on in the mission, a D7G bulldozer operator completes a rough leveling of the ground.

To swiftly construct a protective perimeter wall, an operator uses a hydraulic excavator to fill HESCO Bastion barriers.

Sapper tab. Despite these qualifications, none of them felt they deserved the title of real engineer. If they don't deserve the title, who does?

Finding Commonality

Field Manual 3-34, *Engineer Operations*, states the Engineer Regiment's mission-essential task list (METL) as—

- Shape the security environment.
- Respond promptly to crisis.
- Mobilize engineer forces.
- Support forcible entry operations.
- Support assured mobility to dominate land operations.
- Provide support to civil authorities.
- Provide quality, responsive engineering services to the nation.

This broad scope requires the Regiment to distribute various aspects of its mission among its many diverse types of units and personnel, all with their own focused tasks and purposes. This inherent diversity creates a challenge when trying to find commonality among all the units in the Regiment. Despite the varying qualifications and characteristics of the engineers in the Regiment—like the three described above—it is likely that many would deny being the real engineers. If a diver, a heavy equipment operator, and a geodetic surveyor discussed their roles, they would probably have the same difficulty in connecting their diverse skills to explain why they all wear the same engineer castle. The Regiment's METL—the *what*—is so broad that many engineers find it hard to relate to all of the tasks collectively. However, if engineers look at *how* they carry out those tasks, they will find it is possible to define who they are. Real engineers, no matter their role, professionally execute the Regiment's METL with problem solving as the core attribute. Real engineers are professional problem solvers.

The Professional

In his book, *The Future of the Army Profession*, Don M. Snider proposes three attributes of a profession: expertise, jurisdiction, and legitimacy. Applying this model to the individual professional, we can see there are specific obligations that engineers have to fulfill. They must—

- Demonstrate expert knowledge within their field and engage in lifelong learning to constantly update and maintain their expertise as the world changes.
- Take ownership of their assigned tasks—their jurisdiction.
- Maintain legitimacy in the eyes of the customer they serve.

Twin D9 bulldozers work side by side to push an earthen berm during a base expansion mission.

These three obligations must be supported by a solid foundation defined by strong character, living the Army values, maintaining and enforcing the standards of the profession, self policing, and developing and growing other professionals within the engineer profession. The professional behavior demonstrated by real engineers forms the foundation of how they carry out their mission. However, engineers must possess another attribute that uniquely defines them—the technical knowledge and operational proficiency to serve as the Army's problem solver.

The Problem Solver

Army engineers solve problems. They are not asked to simply analyze and report but to analyze, plan, organize, build, and deliver solutions using the materials, people, and equipment available. To do this, engineers must not only demonstrate professional attributes but also be able to solve hard problems. Engineers must understand and employ a problem-solving method, whether it is one prescribed in introductory engineering textbooks; the military decisionmaking process (MDMP); John Boyd's observation–orientation–decision–action loop; or a combination of multiple processes. They must be able to clearly define problems, accurately identify the facts, intelligently make assumptions, apply principles and theories as necessary, use their ingenuity and resourcefulness to solve the problems, and organize and implement the available resources so that the end product satisfies the requirements of the customer. Technical knowledge and proficiency in solving hard problems uniquely defines them as the real engineers.

Creating More Real Engineers

Understanding the attributes that define the real engineer can help develop more of them and improve the Regiment's ability to accomplish its METL. To develop the professional, engineers must continue to maintain and improve their expert knowledge, encourage ownership of their jurisdiction, and continue to improve their legitimacy. To develop the problem solver, the Regiment must continue to maintain and improve its search for problem-solving individuals and conduct training that forces creative thought and the use of a problem-solving method.

Improving Expert Knowledge

Expert knowledge comes from the United States Army Engineer School at Fort Leonard Wood, Missouri; other military and civilian schools; personal development; and the training planned by Army leaders and conducted by noncommissioned officers (NCOs). The Regiment must maintain its schoolhouse training, but should continue to improve its training techniques to ensure that the best teaching methods are used. These improvements evolve from conducting after action reviews and implementing the lessons learned, leveraging effective methods from other successful institutions, and studying the human capacity for growth and development. Along with schoolhouse courses, there must be opportunities for engineers to attend other military and civilian schools and seek engineer-specific professional development. Once these professionally trained and educated engineers are developed, they must be retained in the Army through financial compensation, assignment preference, promotion, or other incentives.

Most important, there must be an emphasis on training at all unit levels. All too often, great training is planned but not conducted due to more pressing matters. Despite these pressing matters, "Maintenance Monday" always takes place because it has high command emphasis. Commanders at brigade and battalion levels need to put as much emphasis on training as they do on maintenance. When training takes a back seat to maintenance, equipment is getting a higher priority than the Regiment's most important asset—its people. Training gives leaders the opportunity to practice their expert knowledge of leadership, planning, teaching, and supervising. It also provides repetition to ensure that expert knowledge is maintained and that junior enlisted Soldiers gain the expert knowledge they do not get at advanced individual training (AIT).

Taking Ownership of Jurisdiction

The Regiment's jurisdiction comes from its METL, and ownership of these tasks must be instilled to maintain that jurisdiction. One way to instill ownership is through training. By creating competent engineers, training also creates confident engineers who want to carry out their assigned tasks. Another way to maintain jurisdiction is to keep engineers engaged in their tasks. The current operations tempo addresses this issue reasonably well, but the one- to two-year periods between deployments typically are nonproductive in terms of producing real-world results. That is time when Soldiers—and the Regiment—did not have the opportunity to own their jurisdiction. Engineers must find ways to build real deliverables for real customers operating out of their home bases; they could support the needs of other community and government activities, such as other Army units, local communities, state agencies, national parks, other military Service branches, or other national agencies like the Department of Homeland Security. By keeping engineers engaged, the Regiment will maintain their skills, achieve real-world results, demonstrate to the world that engineers take ownership of their field of work, and build pride in the Regiment itself.

Another way to instill ownership of assigned tasks is to put engineers in the positions they want and are qualified to fill. The pilot "Green Pages" program does exactly this. Engineers who are motivated because they are doing what they are passionate about will take ownership of their assigned tasks.

Improving Legitimacy

The Regiment's engineering legitimacy ultimately comes from the assessment of its performance by those it serves. As long as the Regiment maintains its clients' faith and trust, it will continue to be home to a legitimate profession. To improve trust in its ability to accomplish its tasks, the Regiment must continue to deliver the products requested and must maintain, develop, and enforce its character, values, and standards. It should continue to teach and develop

A Soldier excavates an area with a hydraulic excavator for the placement of a new culvert.

An engineer surveys a grade to ensure that it meets specifications.

the Army values at the various commissioning sources, through the NCO Education System, and Army basic and AIT. In addition, it should institute a program modeled on the United States Military Academy's Cadet Leader Development Program that works to develop cadets into leaders of character during their four years at West Point. Constant discussions and refreshers about character and the Army values all the way down to the squad level would also be beneficial. To maintain and improve legitimacy, the Regiment must continue to maintain its standards. Poor engineer work always has a way of making itself known, and it generally does so in a dramatic way. No other single event can damage legitimacy more than an ignored standard that results in electrocution, fire, structural collapse, failed force protection measure, or any other engineering project failure.

Developing the Problem Solver

Given the difficulty of altering a person's mindset and thought processes, the easiest way to increase the number of critical problem solvers in the Regiment involves recruiting people who already possess the skill. Through its engagements with universities, the Regiment's effort to seek out candidates with engineering and technical degrees seems to be doing well. A second method to develop problem solvers is through training. Leaders at all levels must conduct training that forces the use of the problem solving thought process. Some methods include demanding the written use of troop-leading procedures, the MDMP, or other problem-solving method; providing only vague instructions (such as supplying only the commander's intent); and developing scenarios without stark black-and-white solutions. Such training not only develops problem solvers and real engineers, it instills the confidence necessary for Soldiers to take the initiative when they see an advantage, which is the foundation of mission command and the heart of how our Army operates.

Conclusion

The three officers in Mosul, despite their qualifications, felt they didn't deserve the title of real engineer and did not know how to define such a person. The confusion about which of the units wearing the castle best represents the real engineer is likely shared throughout the Regiment because of its broad METL. However, by examining how engineers carry out their missions, it is possible to define who they are. The real engineer is a professional problem solver. When the Regiment focuses its efforts on improving the ability to solve problems at all levels, it can and will develop more real engineers. That will improve the Regiment's ability to achieve its METL, meet its customers' needs, and serve the nation.

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Endnotes

[1]Field Manual 3-34, *Engineer Operations*, 2 January 2004.

[2]Don M. Snider and Gayle L. Watkins, *The Future of the Army Profession*, McGraw-Hill, Boston, 2005, p. 43.

[3]Grant T. Hammond, *The Mind of War: John Boyd and American Security*, Smithsonian Institution, Washington, D.C., 2001.

[4]*<https://www.greenpages.army.mil>*, accessed 26 November 2010.

[5]*<http://www.usma.edu/opa/clds/index.html>*, accessed 26 November 2010.