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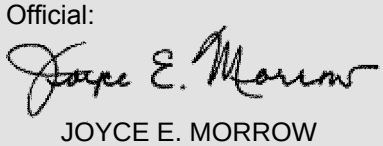

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DEPARTMENTS

FEATURES

Clear The Way

By Brigadier General (P) Gregg F. Martin
Commandant, United States Army Engineer School

Teammates: On 8 October 2008—a gorgeous Fall day in the Ozarks—the MANSCEN CG, MG McCoy, passed the Engineer Commandant Colors from me to COL Bob Tipton. It has been the greatest of honors to have served as your Commandant for the past year. This has been an awesome endeavor for Maggie and me, and we have loved every minute of serving with and for you all!

While fighting in two theaters and conducting full spectrum operations worldwide, our Regiment has been magnificent! From tip-of-the-spear Sapper and counter-IED missions, across the total range of our many engineer roles and functions throughout the depth and space of the operational environment, to national-level reconstruction operations, our Regiment provides an absolutely critical capability for our Army, Joint Force and Nation. Simultaneously, we have TRAINED, educated and helped develop more than 20,000 new engineer Soldiers and leaders; SUPPORTED our deploying and deployed forces; continued TRANSFORMING ourselves into the Modular Engineer Force; CARED for each other and our Families; and ENGAGED key stakeholders—all for the good of our Army!

We are One Engineer Regimental Team of Teams, comprised of more than 70,000 uniformed engineer Soldiers and more than 30,000 DA Civilians, as well as academic colleagues, alumni, contractors, Families, and more… We are in great demand around the world—everyone wants more engineers and the capabilities we provide so well. Yet, in our resource-constrained environment, it is unlikely that we will see any significant increase in resources, if any at all, in the foreseeable future...Thus, it is encumbent upon us to innovate and adapt across all the DOTMLPF domains—developing new ways to team with each other, as well as our joint, interagency, intergovernmental, and multinational (JIIM) partners—leveraging each others' strengths and capabilities in order to mitigate and overcome our gaps and shortfalls. A great example of this is the development of our Field Force Engineering concept over the past decade and the unprecedented level of collaboration between the troop and USACE elements of the Regiment. Another example is our Joint Engineer Operations Course (JEOC) and the unprecedented level of Joint Engineering we have seen develop over the past several years. There is much untapped potential that we must explore and develop.

The recently completed Collection and Analysis Team (CAAT) project in Iraq will be a great help in validating our requirements. Thanks to COLs Tipton and DeLuca and teams for orchestrating and executing this critical mission so well. The officially sanctioned CALL report should be published soon.

On the Building Great Engineers (BGE) front, we've had an awesome run since the last Engineer Bulletin. We've executed significant Stratcomms/Engagement events at USMA, both the Engineer Expo (to encourage underclassmen to major in engineering) and the Combat Leader Seminar and Branch Day (to inform, educate, and encourage senior cadets to consider choosing our branch); the USACE Leaders Emeritus conference, where we updated and informed the grey beards and senior leaders; the Army War College; Tufts University; and MIT AROTC.

Many of you have been conducting similar events as well. Special thanks and a big Hooah to MG Bo Temple, who has been a one-man, bone-crushing force at numerous schools and events throughout Virginia!!! I encourage you all to get engaged and go tell your and our engineer story. We have a comprehensive Stratcomms push package available on our website for your use.

I also had the great opportunity to travel to Iraq with the Chief and see a number of you. Although I would like to have stayed longer and to have seen every one of you, it was a great visit, and I was extremely impressed with what you are doing and achieving.

Although it was with a heavy heart that I passed the Engineer Colors, I am thrilled that COL Bob Tipton is now our Engineer Commandant. Bob is a combat-hardened, seasoned professional, with enormous full spectrum engineer experience—in short, a Great Engineer!!! Bob and Carol are the perfect command team to continue the momentum and lead our Regiment to the next level. I know you will give COL Tipton and our world-class team at the Engineer School the same enthusiastic, passionate, candid, and professional support that you gave me.

(Continued on page 14)

Clear The Way

By Colonel Robert A. Tipton
Commandant, United States Army Engineer School

What an unbelievable honor to serve as the Engineer School Commandant and to lead our Regiment's efforts in so many areas. In late August, we were given the great news that BG Martin had been selected for promotion and would take over as the Commanding General of the Maneuver Support Center (MANSCEN). While it is tough for the Regiment to lose this "Great Engineer" as our Commandant, it is good news for MANSCEN because the passion and energy that he brought to our Regiment will certainly take MANSCEN to the next level. These will be tough boots to fill!

However, the new CG is not the only change that has occurred here in the past year. There have been a lot of changes at the school house and MANSCEN that have had a huge impact on our Regiment. Last year, MANSCEN converted to the TRADOC Center of Excellence model that transformed the way we develop capabilities for the Regiment. During the early stages of this transformation, the Engineer School and MANSCEN had to overcome a lot of obstacles to establish the systems to support this new way of doing business. I am happy to report to you that new systems and processes are beginning to take hold that will help shape the Regiment to better support our Army.

The Center of Excellence model calls for MANSCEN to be the lead for capabilities development (doctrine, organizations, and materiel) and for the Engineer School to focus on training and leader development. The missing piece for the school was that while MANSCEN is responsible for capabilities development, the Engineer School still has a tremendous role to play in shaping capabilities development as the subject matter expert for the Engineer Regiment and to be the link between MANSCEN and the engineers in the operational Army—a role we were not staffed to do after the transition of our combat developers to MANSCEN. As a result of this shortcoming, we developed a new position in the school to address this gap and hired Mr. Jim Rowan, who many of you know, as our new civilian Deputy Assistant Commandant. Jim is no stranger to the Regiment or the Engineer School, and he made an instant impact and is the field's direct link to engineer-related capabilities development within MANSCEN. In addition to bringing on Mr. Rowan, we have formalized the collaboration between the school house, the Office of the Chief of Engineers in the Pentagon, and our engineer integrators in the G-3 and G-8, along with other key engineer positions at the Army level. This increased collaboration will ensure that we articulate our engineer equities to better support our Regiment, the maneuver support community, and the Army.

We have also improved our collaboration tools to allow you to better connect with the school house. See Mr. Doug Fowler's article on the Engineer School Knowledge Network (ESKN) <*https://www.us.army.mil/suite/page/126*> on page 21. Please understand that the public website is intended for our external stakeholders and will be much less dynamic than ESKN and will not contain products for downloading. We will, however, use the public website to post all information on ENFORCE (more on that later).

In September, I was indeed fortunate to lead a great team of engineers into Iraq as part of the Center for Army Lessons Learned (CALL) to conduct an Engineer and Base Camp Collection and Analysis Team (CAAT). As a result of this trip, we collected a tremendous amount of great feedback that was recently published online by CALL. We specifically looked at the challenges we are facing as a Regiment in the areas of engineer command and control, engineer leader technical competencies, the engineer role in building capacity in support of stability operations, route clearance, and an in-depth look at base camps in the Iraqi theater. We are using the results of this document to support ongoing and new solutions being worked by MANSCEN and others to address the identified gaps. The team outbriefed the CAC leadership in October and also provided an outbrief at the 20th Engineer Brigade Lessons Learned Conference in December. Many thanks to the 20th Engineer Brigade, 926th Engineer Brigade, 18th Engineer Brigade, the MNC-I C7 Staff and all the phenomenal engineers working in-theater for supporting this very important effort.

The past few months have also seen some significant changes to the regiment as well. In October, the 4th Maneuver Enhancement Brigade (MEB) uncased it colors and assumed training and readiness oversight (TRO) responsibilities for the 94th and 5th Engineer Battalions at Fort Leonard Wood.

(Continued on page 19)

Lead The Way

By Command Sergeant Major Robert J. Wells
United States Army Engineer School

Developing junior NCOs is the number one priority for senior NCOs in our formation. First of all, we owe it to the newly inducted NCOs, and it begins with telling them what our expectations are. One of the first things we should say to them is "As the newest member of the NCO Corps, I expect you to be, know, and enforce the following standards we've laid out in our unit. These standards will help you maintain discipline in your team. This is what right looks like."

The young NCOs will already have a good idea of what's expected of them, just from observing the NCOs in the platoon. But now we have to show them the art behind the science of leading Soldiers in garrison and in combat. And it's a long process that can't be completed in a simple counseling session. The senior NCO's responsibility goes way beyond that. I tell newly graduated Soldiers from the Warrior Leaders Course that I don't expect them to be the masters of all facets in leading a team or a squad right away, but I do expect them to be the masters one year from now. There's a lot of paddling going on under the water that first year, and it takes the squad leader, platoon sergeant, and first sergeant to keep them on the right path.

I can't say it any better than our own Sergeant Major of the Army, CSM Kenneth O. Preston.

"To understand how standards and discipline are related, you have to start with the basic premise of how we grow sergeants in the Army. This is a basic three-step process:"

"Step One is to establish a standard. The items we wear on the uniform or carry with us is a standard, usually according to a unit SOP. The preventive maintenance checks and services (PMCS) we perform on our HMMWV in the motor pool are done to a standard outlined in the operator's manual. A patrol of Soldiers coming off mission in Baghdad, Iraq, clear their weapons upon entering their base camp according to the standard published in the weapons handling procedures developed by the Safety Center."

"Now with an understanding of standards, Step Two is to put someone in charge of enforcing the standards. This is where the sergeant is now responsible for his or her piece of the Army—those three or four Soldiers. It is the sergeant who conducts daily inspections of Soldiers' uniforms. It is the sergeant who conducts precombat checks (PCC) of his or her Soldiers' arms and equipment before going out on patrol. . . ."

"Step Three in growing our leaders is to hold the sergeant accountable. This is where the more senior leaders above the sergeant have their responsibility. To see what is being done to standard, senior leaders have to inspect."

Okay, now why don't our senior NCOs help develop the junior NCOs? Here's an example: I was watching a PFC in the gunner's hatch of an M1151, obviously having problems with his M2 machine gun. I watched him struggle with it for about 10 minutes. In those 10 minutes, three NCOs walked right by the Soldier and ignored him. So I went over to the PFC and asked him what the problem was, and he said he couldn't get through the function check. I climbed up on the HMMWV, looked at it, and found that the timing was off. He said he didn't know anything about the timing and asked if I could fix it for him. I yelled out for his team leader, got him behind the machine gun, and told him to fix the timing. He fumbled around a few minutes before giving up. I went through the squad leader, platoon sergeant, and first sergeant and couldn't find anyone that knew how to adjust the timing. So I excused the Soldier and we NCOs had a little class on setting the head space and timing on a .50 caliber machine gun.

I think our senior NCOs have lost their basic combat skills. And we expect them to also be proficient at small-unit tactics and MOS proficiency? Some NCOs have said that we spend too much time training tactics and not enough time on MOS proficiency. We should remember that a lot of stuff happens between the FOB and the Objective. It's the world we live and fight in, and all that technical proficiency doesn't do anyone any good if you can't even make your way to the dance.

A holistic approach to training in garrison and in combat is possible, even with the predeployment timelines we have today. The Schoolhouse has a limited amount of time with Soldiers and can't train them on everything. I see the year after OSUT, BNCOC, and ANCOC as the critical times in an NCO's development. The field has to pick up the ball and carry the NCO's technical and tactical education to an acceptable level of competency. Lives depend on it.

Hopefully this article will spark some interest, or controversy, from the field and produce articles we can share throughout the Regiment. I don't pretend to have all the answers. But I know we can find the solution if the Regiment as a whole lays hold and heaves.

BUILDING STRONG STARTS WITH GETTING THE RIGHT PEOPLE

By Lieutenant General Robert L. Van Antwerp

We are in historic (many would say "hysteric") times. The challenges are legion with military and civilian deployments, an aging infrastructure, and an unprecedented workload. The United States Army Corps of Engineers is making a difference now and positioning for the future.

That positioning requires that we grow by recruiting the right military and civilian professionals needed to deliver superior performance. It means building our organization "strong" so that it is built to last. We're doing it by hiring passionate and talented people who care about the role they play in providing the infrastructure our nation needs to strengthen our economy and keep our country, armed forces, and their Families safe and secure.

The right people make a difference, and they—more than our programs—will determine our organization's ability to succeed now and in the future. Our talented men and women plan, orchestrate, and execute our multifaceted array of engineering operations, ranging from combat engineering to general and geospatial engineering, to massive reconstruction of entire nations, such as Iraq and Afghanistan.

However, it's one thing to say that we need great people; it's another thing to critically examine what people we need and what makes them relevant to our mission. In Jim Collins' book *Good to Great*,[1] he talks about the importance of having the right people in the right seat on the bus. The individuals who work in our Regiment should demonstrate great character and values. They should be fit, tough, smart, innovative, and adaptive. They must be energetic, passionate, and truly committed to the mission. We need to be smart in how we recruit for our Regiment, which means going after the right people who want to work for us for the right reasons.

Collins also talks about being experts in our field. That starts with getting certified—your Professional Engineer (PE) license if you are an engineer, your Project Management Professional (PMP) certification if you are a project manager, your real estate license if you are a real estate professional, etc.

We are recognized around the world for our engineering expertise, construction management, and skills in many other disciplines. Our workforce possesses extraordinary experience and expertise in every one of our diverse functional areas.

But one day, our most experienced engineering professionals will leave us, and we need to build our bench now. The most effective way to grow tomorrow's experts is by giving them hands-on experience today. We are in the midst of an estimated $44 billion in military construction and Army Base Realignment and Closure (BRAC) Commission projects between now and fiscal year 2013, which translates to more than $44 billion worth of living classrooms to train new, talented, and passionate engineers. At Fort Bliss, Texas, we are completing one building a week for the next five years. In Iraq, we have $3.6 billion worth of military construction projects.

By designing and building billion dollar facilities that help improve a Soldier's quality of life and battlefield preparedness, to improving dams, levees, and other flood risk management projects, our young engineers, biologists, chemists, physicists, and architects will experience unique training opportunities that no other organization can begin to offer.

The future is bright for the Corps. There is a growing requirement to approach engineering challenges in a sustainable manner, with alternative approaches to design, construction, materials, energy development and use, water resources management, land use, and watershed planning. Engineers need the ability to work across boundaries and communicate with their diverse base of customers. They must have effective leadership skills to guide multidisciplinary and multinational teams of volunteers, contractors, and state and local officials.

These are new and exciting times, and the Corps of Engineers is blessed with a unique opportunity to lead the way and make a real difference in the lives of every American.

Building Strong!

Lieutenant General Van Antwerp is the 52d Chief of Engineers and Commander of the United States Army Corps of Engineers. Previous assignments include Commanding General, United States Army Accessions Command and Deputy Commanding General for Initial Military Training at Fort Monroe, Virginia; Commanding General, United States Army Maneuver Support Center and Fort Leonard Wood, Missouri, and Commandant, United States Army Engineer School; United States Army Corps of Engineers Los Angeles District; the United States Army Division, South Atlantic, Atlanta, Georgia; and the 326th Engineer Battalion, 101st Airborne Division (Air Assault), during Operations Desert Shield and Desert Storm.

Endnote

[1]*Good to Great* by Jim C. Collins, Harper Business: New York, 2001.

Early Engagement Strategy at Norwich University

By Lieutenant Colonel Richard A. Pratt and Brigadier General (P) Gregg F. Martin

Field Manual 3-0, *Operations*, states that the Army's operational concept is full spectrum operations:

Army forces combine offensive, defensive, and stability or civil support operations simultaneously as part of an interdependent joint force to seize, retain, and exploit the initiative, accepting prudent risk to create opportunities to achieve decisive results. They employ synchronized action—lethal and nonlethal—proportional to the mission and informed by a thorough understanding of all variables of the operational environment. Mission command that conveys intent and an appreciation of all aspects of the situation guides the adaptive use of Army forces.

The role of the engineer force is critical in all four elements of operations—offense, defense, stability, and civil support. Our current operations challenge our deployed engineer units daily with a myriad of missions across the full spectrum of operations. The need for an Engineer Corps capable of meeting these challenges and providing America's Army the engineering expertise required to defeat our enemies and build infrastructure has never been more apparent. Further, the need for young officers—capable of demonstrating the Sapper Spirit in high-intensity conflict balanced with the technical know-how required during stability and civil support operations—has never been more significant to our Regiment.

Lieutenant General Robert L. Van Antwerp, the United States Army Chief of Engineers, is investigating a theory that indicates our engineer leader technical competency has declined over the past several years. Some examples include—

- United States Army Corps of Engineers (USACE) performance prior to, and response during, the aftermath of Hurricane Katrina.
- Comments from senior military engineer leaders regarding engineer support to the War on Terrorism.
- Increased emphasis placed on construction engineering skills highlighted by a presidential directive placing stability operations on par with offensive and defensive military operations.
- Current engineer force structure that does not facilitate senior engineer mentoring of junior engineer officers.
- Known decreases in military engineering developmental assignments and a shift toward sapper (mobility and countermobility) focus in the Engineer Regiment.

Each of these contributory factors indicates that there is a possible technical competency decline that potentially crosses multiple levels of both civilian and military leadership.

The Chief of Engineers asked Brigadier General Martin, then Commandant of the United States Army Engineer School, to lead an investigation and resolution of the decline. The Commandant formed a coalition from within and outside the Department of Defense to investigate and implement solutions that reverse engineer leader technical competency decline. The intent is to develop and implement an integrated, sustainable National Engineer Leader Technical Competency Strategy that accesses, develops, employs, and retains world-class engineer leaders who are technically and tactically capable and competent to deliver full spectrum engineering in the 21st century.

LTG Van Antwerp also charged the Regiment's senior leaders to focus their strategic communications towards the concept of *Building Great Engineers*. BG Martin did some quick analysis to determine where he'd be able to make the "biggest bang for his buck." He concluded that he would engage several military colleges at the strategic level—the university president, the Dean of Academics, and the Commandant of Cadets. Further, he'd engage at the operational level—with department heads and instructors—and also at the tactical level, where he would emphasize the need for engineering students to answer the Nation's call, putting their newly acquired engineering skills to work across the full spectrum of operations in support of the Army and the Nation.

BG Martin and I visited Norwich University, a private school that houses approximately 1,900 cadets, traditional students, and commuters from more than 40 states and 20 foreign countries. The university combines nearly two centuries of military tradition and a broad range of traditional undergraduate degree programs in the rugged Green Mountains of Northfield, Vermont. Founded in 1819 by Captain Alden Partridge, it is the first private military college in the United States and is the birthplace of the nation's Reserve Officers' Training Corps (ROTC) program. The David Crawford School of Engineering (DCSE) at Norwich University is the oldest private engineering school in the nation, with undergraduate programs that include civil, environmental, computer, electrical, and

BG Martin and LTC Pratt emphasize the importance for engineering students to put their newly acquired skills to work in support of the Army and the Nation.

mechanical engineering, and Norwich also offers a master of civil engineering degree.

Norwich graduates and commissions officers through Army, Marine Corps, Navy, and Air Force officer training. Participation in ROTC, including military labs and physical training, is mandatory for all members of the Corps of Cadets and is an integral part of the Corps leadership experience.

During our visit to Norwich, we met with the staff and faculty of the university, as well as cadets (seniors) from Army, Navy, and Air Force ROTC programs. BG Martin gave them an overview of what Army engineers do and what our joint capabilities are and provided examples of where officers from different Service components can often meet on the modern battlefield—such as in assignments with the Gulf Region Division (GRD) of USACE. His personal experiences in Iraq emphasized full spectrum operations, including route clearance operations, bridging, and base camp development. He also emphasized the opportunities for cadets and students to participate in the summer hire program in USACE Districts located throughout the United States—great developmental opportunities for future officers in the Regiment.

The results of the trip indicated that there is a need for the Engineer Regiment to develop a working relationship with the Norwich University Engineering Department. This will facilitate access and information flow to current engineering students, both civilian and military, with the intent to encourage future civil service as military officers or Department of the Army civilians in USACE Districts. The trip also indicated the need for the Engineer Regiment to play an integral role during the ROTC summer training called "Warrior Forge" at Fort Lewis, Washington, where ROTC cadets get a snapshot of each of the branches prior to completing the accession packet and branch requests in the early fall. The Norwich University Professor of Military Science emphasized an early engagement strategy to ensure that the future officers were making informed selections.

A second trip was recently conducted that was designed to engage more at the operational level. The New England District Commander represented the USACE presence in the New England area—home to many Norwich cadets. We met with the Commandant of Cadets, the Dean of the Crawford Engineer School, and several Engineer School professors to further exchange ideas and develop the emerging partnership. We also conducted tactical engagements with cadets to emphasize common opportunities afforded to engineer officers including—

- Assignment opportunities ranging from tactical units assigned to brigade combat teams to USACE Districts.
- Graduate school opportunities.
- The potential to attain professional engineer certification with Army experience.
- Attendance at Sapper School.

Future meetings aim to further integrate the faculty members and students at Norwich University with the Army Corps of Engineers, including the orientation of some Norwich faculty members at the Engineer School at Fort Leonard Wood and invitations to attend the annual ENFORCE Conference.

With our need to develop the technical competency required to execute the full spectrum of operations, we must reach out to the commissioning sources and future officers to recruit the capabilities we need. What we discovered is that both the Corps of Engineers and Norwich University can benefit from an increased dialogue, and we must encourage similar relationships to develop with other academic institutions. The process starts with successful Army officers reaching back to their alma maters and opening a dialogue with the college or university administration. The process of *Building Great Engineers* for America's Army starts with us.

Lieutenant Colonel Pratt is the Commander, 31st Engineer Battalion, at Fort Leonard Wood, Missouri, and a 1990 graduate from Norwich University. He holds a bachelor's in engineering technology and a master's in education. He is a licensed professional engineer in the Commonwealth of Virginia.

Brigadier General (P) Martin is Commanding General of the United States Army Maneuver Support Center and Fort Leonard Wood. Previous assignments include Commandant, United States Army Engineer School and Regiment; Commanding General, United States Army Corps of Engineers Northern Division; and Commander, 130th Engineer Brigade, during full spectrum operations in Europe, Kuwait, and Iraq from 2002 – 2004. He holds a bachelor's from West Point, as well as a master's and a doctorate from the Massachusetts Institute of Technology.

Strengthening the Regiment:

Mentorship, Leader Development, and the Engineer Community

By Lieutenant Colonel Diana M. Holland

Developing good leaders for the future is one of the most important and professionally satisfying goals that senior officers can hope to achieve. The future of the United States Army depends on the success of that goal, and our junior officers deserve the investment of time and resources to help them reach their potential. Professional development and mentorship have become increasingly important topics of discussion in the Army over the past decade. At the same time, our junior officers face a growing number of challenges to their sense of professional commitment. The challenges have emerged Armywide but, in some respects, engineer officers are at a greater disadvantage than those in other branches. The changing force structure has decreased the size of engineer communities on many installations, and the high operational tempo has prevented smaller engineer communities from developing camaraderie and cohesiveness. Therefore, engineer leaders must find creative ways to mentor, coach, counsel, or train junior leaders, not only for the officers' individual development but also for the larger goal of strengthening the engineer community.

A Generational Divide

The Army is operating and transforming so quickly that it is difficult to predict how it will be organized ten years from now. Personnel management and career progression have become unpredictable, yet these areas will have significant long-term ramifications for the future force. To those commissioned in the 1980s and early 1990s, the career landscape facing junior officers today is unfamiliar. It may seem as though there is a generational divide.

Both generations of officers have deployed to Afghanistan and Iraq multiple times, but the deployment rigor can have greater impact on a young officer than it does on one who is more senior. The older generation was more invested in, and acclimated to, the military profession by 11 September 2001. Those officers had served ten to fifteen years by the time the War on Terrorism began, and if the strain became too much, they would be able to retire in the near future. They may already have enjoyed assignments away from the tactical Army, such as in the Advanced Civil Schooling programs and in utilization assignments in the United States Army Training and Doctrine Command or the civilian world. Families were already accustomed to the military lifestyle. These observations cannot be applied universally and are not intended to trivialize the impact of multiple deployments on older and more established military Families. However, they should be considered as we engage our younger officers.

Challenges for Junior Officers

Many junior officers had a second War on Terrorism deployment when they had just three to five years in Service. They excel at preparing to deploy and at being deployed because that is all they know. They believe it is all they will do if they stay in the Army. For officers with Families, the challenge is probably greater. Single officers may wonder if it is possible to start a Family with so little time at home station. Under these circumstances, even the most dedicated officers might question their commitment to an Army career.

The Army has long practiced the two-levels-down approach to engaging and developing junior officers. Brigade commanders receive readiness briefings from company commanders. Battalion commanders target platoon leaders for professional development. The critical component of the officer

efficiency report is the senior rater block. Yet the emerging engineer force structure increasingly is not well-served by such practices. As already mentioned, few engineer battalions will be colocated with an engineer brigade. Thus, on an installation that does not have an engineer brigade, the only engineer-pure, two-levels-down relationship will be between a battalion commander and the lieutenants. Under the two-levels-down paradigm, an engineer company commander will not be the focus of professional development by a leader of his or her branch. The same is true for a lieutenant in a sapper company organic to the modular brigade combat team (BCT).

In addition to those challenges shared by junior officers across the Army, engineers are at a greater disadvantage—we have lost much of our community. The current generation of battalion and brigade commanders remember when two or three levels of engineer headquarters were located at one installation. Almost all engineer lieutenants had an engineer company commander and most had an engineer battalion commander. Many served close to their engineer brigade commanders. That force structure was conducive to fostering a community to which engineers belonged. Of course, subordinate engineer elements were often task-organized under, formed habitual relationships with, and benefited from combined arms experiences with maneuver units. But, ultimately, they still belonged to an engineer chain of command that fostered interaction between senior and junior officers of our branch. Unfortunately, the interim and end-state force structures have reduced those opportunities.

Many of today's lieutenants and junior captains do not have an extensive and enduring engineer chain of command. If they are serving in a modular BCT, they have an engineer company commander and, in some cases, infantry or armor battalion and brigade commanders. In other cases, they are assigned to a BCT special troops battalion where they may have an engineer, military police, or military intelligence commander. None of those young officers have an engineer brigade commander. If junior engineers are assigned to one of the few installations with an engineer brigade, they may become part of an engineer family while not deployed. However, the engineer battalions and companies deploy so frequently that the officers face a constantly changing task organization and probably will not have time to develop a tight community.

The training and readiness authority (TRA) policy is a move in the right direction and has the potential to benefit the separate combat effects and construction effects battalions. These units will enjoy relationships with engineer brigades because of the latter's training, personnel, and materiel

Photo by Captain Charles Scheibe

Soldiers discuss road repair lessons learned during Operation Iraqi Freedom.

responsibilities. However, many battalions are not assigned to the same installations as their TRA brigade, and because of the distances between these headquarters, it will be difficult to maintain relationships. The geographically separated battalions will naturally develop stronger associations with the units on their own posts, and TRA brigades may be tempted to take a "hands off" approach to ease logistical and time restraints for all parties.

The point of this discussion is not to criticize the ongoing transformation of the branch. In fact, modularity has brought many benefits to the Engineer Regiment. Leaders and Soldiers have experienced worthwhile training and combat opportunities by serving closely with maneuver units. By forming sapper companies organic to a BCT, these engineers have a clear command and control (C2) relationship and are fully integrated into a combined arms team. Engineer leaders serving under infantry and armor commanders are exposed to a variety of professionally rewarding experiences. Likewise, because of the evolving C2 and support relationships in Iraq and Afghanistan, combat effects and construction effects battalions are also executing nontraditional missions that broaden their capabilities. Nonetheless, it is important that future senior engineer commanders consider how the changing force structure affects junior officers in the Regiment and develop a plan to mitigate its potential negative effects.

Recommendations

Engineer leaders should expand professional development opportunities beyond conventional boundaries and mentor, develop, and coach as many subordinate officers as possible. In engineer battalions, the commanders must assume greater responsibility for developing company commanders, in addition to their traditional focus on lieutenants. Company commanders will also have to develop platoon leaders. While a company commander is seldom more than a couple of years older than his or her lieutenants, that commander will have to demonstrate the maturity necessary to guide other company grade officers.

The responsibility for developing junior engineer officers should not be limited to the chain of command. Division engineers, brigade engineers, and other engineer staff officers should seek opportunities to interact with engineer lieutenants and captains. A division engineer can invite sappers from the BCTs to conferences that address engineer issues. Brigade engineers can interact with junior engineer officers in the BCT. Essentially, we have to find ways to be counselors, coaches, and mentors to young engineers, no matter what our position.

Leaders of TRA brigades must also take an active role in professional development. Though difficult to sustain, it is important that the engineer brigade and battalion commanders foster relationships between the officers at both levels. If the TRA brigade deploys, the brigade and rear detachment commanders must find ways to monitor and guide their battalions. One good idea circulating in the Regiment recommends that a recently retired engineer colonel be brought back to active duty and assigned as a brigade rear detachment commander. Such a move would maintain senior engineer leadership for engineer battalions that are not deployed.

Leaders of the United States Army Corps of Engineers (USACE) districts and divisions can also assist in building regional engineer communities. USACE organizations have more stability than operational Army engineer units and bring a wealth of technical expertise to the force. In many cases, relationships already exist. It is common for a deployed battalion to reach back to USACE for advice and support. When not deployed, these relationships should be strengthened. Few company grade officers know much about USACE. Exposing them to the Corps's unique missions and capabilities might inspire junior officers to seek further career opportunities beyond the operational Army. Furthermore, senior officers in the districts and divisions can serve as sources of engineer experience outside the formal chain of command. Thus, USACE and tactical engineer unit leaders should work to increase interaction to benefit junior officers.

Assessing progress is an important step in any training event, and it is just as important when measuring the effectiveness of developing engineer leaders and building cohesive engineer teams. The Army has formalized processes for measuring personnel, training, medical, and logistical readiness, but it has established only marginal guidelines for assessing our effectiveness at growing engineer leaders and teams. How do we know if we are making a difference? How do we improve if we are not meeting our goal? These are difficult questions, and the answers partly depend on the situation. Consistently high-performing units might indicate success, but the relationship of cause and effect may not be conclusive. In any case, the starting point is communication and engagement. Gather engineers together and ask them what they think.

Field Manual 6-22, *Army Leadership*, offers guidance on how to assess organizational climate and developmental needs; it also identifies the characteristics of a close team.[1] This guidance can be adapted to evaluating success in building a cohesive engineer community. For example, an engineer leader might ask, "What were your expectations of the Regiment, and is it

Photo by Captain Jonathan Gill

A company commander coaches a subordinate officer as their unit prepares for a major road repair mission in Iraq.

living up to those expectations?" Other questions might include, "Do you believe that at the conclusion of the current transformation initiative, there will be more opportunities for career progression than there are now?" or "Have you had the opportunity to discuss career progression with a senior engineer officer?" From this or a similar line of questioning, a leader will be able to gauge attitudes toward the branch and develop a plan to sustain or improve perceptions. Such an effort will strengthen the bonds not only between individuals but eventually within the larger engineer community.

Conclusion

The Army ensures that leaders train their units, maintain their equipment, and deploy their organizations to a combat zone, and it measures the progress of those tasks. However, it does not formally or aggressively enforce leader development and team building. Taking the time to focus on those two areas requires extra effort at a time when most leaders are overstretched and the evolving force structure compounds this challenge for engineers. Nonetheless, it is imperative that engineer leaders find ways to interact with as many officers as possible and strengthen engineer bonds. If successful, the Regiment will be a better community and continue to attract and retain high-caliber officers.

Lieutenant Colonel Holland is the Commander, 92d Engineer Battalion, Fort Stewart, Georgia. Previous assignments include plans officer, Operations Directorate, United States Central Command; operations officer, 92d Engineer Battalion; plans officer, 3d Infantry Division; and assistant professor, United States Military Academy (USMA). She holds a bachelor's from the USMA, a master's from Duke University, and a master's in military arts and sciences from the School of Advanced Military Studies.

The author would like to thank Colonel Dan Grey for his example of engineer mentorship and acknowledge his helpful suggestions in the final stages of this article.

Endnote

[1] Field Manual 6-22, *Army Leadership*, October 2006.

USACE Uses New Techniques to Attract Graduates

By Mr. Scott Nielsen

The United States Army Corps of Engineers (USACE) is trying new techniques such as "speed-networking," on-the-spot tentative job offers, and Facebook to attract recent college engineering graduates. They are trying to reach these graduates in new ways, to introduce them to the exciting and fulfilling work they could have with the Corps of Engineers. The South Pacific Division commander thinks that if students know about the Corps, many will choose to work with them.

A new technique that the Division tried is called speed-networking, which operates on the premise of the speed-dating model and allows multiple recruiters and students to meet for 10 minutes, introduce themselves and their organizations, and talk about what each is looking for. When the time is up, the recruiters switch and move to another table of students.

This speed-networking was part of a three-day conference in Burlingame, California—hosted by the American Society of Civil Engineer's Construction Institute and sponsored by USACE and other agencies—to meet and discuss several aspects of civil engineering, including career opportunities. These events helped to better understand what graduates are looking for so the agencies can try to tailor what they can offer the graduates.

This technique gave the students a chance to ask questions that they might not have asked otherwise, because they felt intimidated walking up to a booth and asking. This speed-networking format allowed the students to speak with representatives from each organization. Their questions ranged from the projects being worked on to vacation time, but the most common questions had to do with where they would be working, would they be able to do different things, and would they be in charge of their own projects.

A recruiter for the Corps of Engineers said that when we think we know what the students are interested in, we often are surprised. He said that typically students are interested both in traveling and the ability to work on multiple projects.

The South Pacific Division is also testing the social networking site called Facebook as part of its recruiting efforts. Facebook allows the students to upload their photos from the conference and share them with their friends who were not there. The Division hopes that other friends will learn about USACE and job opportunities from those who attended the conference. The Division plans to use this tool to provide information about jobs and opportunities in a way that is more accessible to current students.

At the American Indian Science and Engineering Society (AISES) National Conference in Anaheim, California, this year, the Corps provided pictures and videos of the event on a Facebook site dedicated to AISES, which the students could use to share their own photos and comments. The Corps hopes that this process will allow them to find a new way to let graduates know about the jobs that are available and also allow them to get feedback about what graduates are looking for.

"speed-networking...allows multiple recruiters and students to meet"

The Corps of Engineers is also testing on-the-spot tentative job offers at recruiting fairs to better fill the positions it needs and to attract the graduates who are ready to work and students interested in internships. The Corps knows what jobs it needs to fill and there are students who are ready to begin working now, so this is an effort to streamline the process of filling those positions.

USACE has a three-tier approach to recruiting at career fairs:

- Junior professionals meet with the graduates.
- Senior employees answer questions and interview.
- Someone with hiring authority coordinates getting the graduates started.

There is a lot of competition for fresh new talent graduating now, and the Corps hopes that using innovative techniques will allow them to reach the students in a way that is better suited to them. Even if the students do not sign on with USACE immediately after college, they—and perhaps their network of friends—have been exposed to the Corps's mission and what it can offer and may decide to apply for jobs there in the future.

Mr. Nielsen is a Public Affairs Specialist with the United States Army Corps of Engineers, South Pacific Division, San Francisco, California.

Engineers Excel at 2008 Branch Orientation Days

By Captain William E. Mohr

Reserve Officer Training Corps Branch Orientation

Fort Lewis, Washington, was once again the home of the annual Reserve Officer Training Corps (ROTC) branch orientation, but this year the engineers did something drastically different. More than one-third of engineer officers are commissioned through ROTC, but previous engineer marketing efforts were not commensurate with the importance of this summer activity. The Engineer Leader Technical Competency Study revealed that engineer officer accessions have been declining—not in numbers, but in technical proficiency. To counter this erosion of skills, the *Building Great Engineers* campaign plan identified specific methods to improve branch marketing, especially during the annual Leader Development and Assessment Course commonly known as Operation Warrior Forge.

The intent of the 2008 branch orientation was not to persuade cadets to join the engineer branch but to educate cadets about the multitude of opportunities within the Engineer Regiment. Traditionally, each of the Army's 16 branches hosts an orientation site with two to four officers as representatives for their area of expertise. In the past, this group of officers was expected to educate approximately 1,500 cadet visitors during a six-hour event. This year, the engineers decided to use a "strength in numbers" technique. More than 20 commissioned officers, warrant officers, and enlisted Soldiers from dive, dog, airborne, Special Forces, geospatial, Stryker, construction, firefighting, sapper, and clearance units were invited to explain their missions and answer questions. Other active participants included representatives from the United States Army Corps of Engineers (USACE), the United States Army Reserves, and the United States Army Engineer School (USAES). With so many site participants on hand, cadets could learn about engineer diversity and technical engineering opportunities within the Engineer Regiment.

Branch orientation marketing efforts were designed around the *Building Great Engineers* theme of improving tactical and technical competency for full spectrum operations. Promoting technical engineering within the Engineer Regiment was one major area of focus. Efforts were made not to alienate cadets with nonengineering degrees, but degreed engineers were assigned top priority and actively recruited to join the Engineer Regiment. Degreed engineers were shown how they would have the opportunity to use their education and further develop technical credentials. The Northwest Division of USACE (Seattle District) did an excellent job of explaining the many technical job opportunities available throughout an engineer's career.

Cadet feedback was very positive about the engineer branch orientation site. During the event, many cadets thanked the engineers for providing insight and answering questions to help in their upcoming branch selection decision. Communication did not end with the finale of the branch orientation. Follow-up e-mails with information about additional educational opportunities and some of the future goals of the Engineer Regiment were sent to cadets who had visited the engineer site.

West Point Branch Orientation

During the third week in September, representatives from the Army's 16 branches traveled to the United States Military Academy (USMA) at West Point, New York, to educate cadets about opportunities in their branches. Similar to ROTC cadets, West Point cadets earn their branch of service depending on their class rank. Years of studying, training, leading, and developing enable cadets to select, or in some cases be selected, for their branch. During the first week in October, cadets are required to prioritize every branch based on their personnel preference, but it is not until November that the cadets are officially notified about their new branch. USMA spends substantial resources giving cadets the opportunity to learn about the Army's different branches. Even with a complete understanding, many cadets remain undecided until the final day of branch selection. To assist cadets one final time before branch selection, the Department of Military Instruction coordinates the Junior Leader Panel and Combined Arms Tailgate Party, which focuses on resolving any remaining doubts. These final branch orientation events are designed to allow cadets to interact with personnel from the different branches in both formal and relaxed settings.

Throughout the week, the Engineer Regiment continued the marketing theme that was developed during Operation Warrior Forge—Full Spectrum Engineering. Regimental diversity was represented by engineers from more than a dozen different units, to include dive, dog, Special Forces, geospatial, construction, sapper, and USACE. Learning from Operation Warrior Forge, the greatest success during these cadet events came from small-group discussions. Simply having enough energetic engineers available for questions and

"West Point's engineer representation remains strong. The engineer branch representative is responsible for educating, training, and inspiring cadets to join the Engineer Regiment."

comments was extremely beneficial to those cadets who were still indecisive about their branch of choice.

Opening the annual West Point branch orientation events, the Junior Leader Panel is a formal question-and-answer session linking junior officers with interested cadets. Initially, the engineer panel was attended by more than 100 of the 1,000 graduating seniors. Strong initial responses revealed the historical relationship between the Engineer Regiment and West Point. Traditionally, the engineer branch is one of the top cadet selections, and a preliminary 2008 poll listed engineers as the second most desired branch. During the engineer segment of the junior leader panel, cadets divided into small groups and interacted with engineer representatives whose experiences they wished to emulate.

The Combined Arms Tailgate Party, which followed the Army football game, created a relaxed environment where cadets were given the opportunity to experience branch culture. Open to the public, the event featured food, beverages, and entertainment. Hoping to show something different and continuing with the full spectrum engineering theme, Engineer Regiment personnel conducted mine dog demonstrations throughout the party. The engineer booth also displayed the wide array of platoon leader opportunities and assignments. During the evening, cadets roamed among the different branch booths evaluating the strengths and weaknesses of each.

West Point's engineer representation remains strong. The engineer branch representative is responsible for educating, training, and inspiring cadets to join the Engineer Regiment. Her dedicated work throughout the summer and during these two events continues to increase cadet interest in the branch. The civil and mechanical engineering department also strongly markets the Engineer Regiment through coordinated luncheons, guest speakers, tailgate parties, and other social activities. Engineer support at West Point continues to educate cadets about all the opportunities within the Engineer Regiment.

Thank You

Thanks to all who participated during this summer's branch orientation events. These events would not have been successful without the positive energy and hard work of the participants. Your dedication to the future is greatly appreciated. For those who did not get the opportunity to assist with these great events, mark the calendar for the 2009 branch orientations. USAES will be actively seeking participants who are interested in representing the branch next year. Essayons!

Captain Mohr is the Building Great Engineers *action officer. He previously served as the 864th Engineer Battalion construction officer and deployed with Alpha Company, 391st Engineer Battalion, of the Army Reserves to Afghanistan in support of Operation Enduring Freedom.*

("Clear the Way," continued from page 2)

On the brilliant morning of 9 October, the TRADOC CG, GEN Wallace, passed the MANSCEN/FLW Colors from MG Bill McCoy to me. We thank and honor MG and Jill McCoy for their great leadership, friendship, and many significant achievements over the past two years. We will miss them here at FLW and wish them Godspeed as they move to their new assignment as Deputy Inspector General of the Army.

I look forward to serving with and supporting each of you and the Engineer Regiment in my new role as CG MANSCEN and FLW.

Before closing, I want to re-emphasize that as Army engineers, we are all Sappers! Regardless of your MOS, component, status, or duties—our Army and Regiment need you to adapt, innovate, and overcome, in order to get to the objective and accomplish the mission, whatever it is…And to me, that's what being a Sapper is all about: a state of mind that figures out how to get the job done—no matter what—and has the willpower, perseverance, and strength (mind, body, and spirit) to see the mission through to completion ...all the while taking great care of our People. We are all Sappers—Hooah!!!

I want to thank each of you for who you are and for what you do—I am enormously proud of you! Every one of you is a critical member of our great Team. What each of you—and we collectively—do is extremely important and really matters to our Army, Joint Force, and Nation. You all are doing a terrific job in an extremely complex, difficult, and resource-constrained environment. I encourage you to keep at it and to stay on the team!!! Many THANKS to you and your Families, and may God bless each of you!!!

Signing off the net as your Regimental Sapper-6…

Essayons!!! Army Strong!!

SAME Construction and Engineering Camps:

Building Great Engineers by Mentoring Students

By Mr. Ron Brown

In the summer of 2000, the Society of American Military Engineers (SAME) embarked on a venture that would prove to be one of its most successful tools to expose talented high school students to the excitement of engineering and construction. Several SAME members, together with officials from the United States Air Force Academy (USAFA) in Colorado Springs, Colorado, designed a one-week curriculum focused on general engineering and construction, set in a student-mentor camp environment. The camp provided specially selected students from grades 10 through 12 with a hands-on orientation to engineering as a career.

In this specially selected and environmentally beautiful setting at USAFA, students came together with new graduate engineers and seasoned engineering and construction veterans of SAME to share engineering concepts and discuss the attributes associated with an engineering career. The students were guided in their daily activities by USAFA cadets majoring in engineering and were exposed to topics such as—

- Concrete beam design.
- Materials testing.
- Paradox anomalies.
- Storage shed design and construction.
- Leadership training.

Their mentors provided guidance and counseling by answering the never-ending questions from these talented students.

The success of the first SAME-USAFA Engineering and Construction Camp provided the initial roadmap for the development of a camp cosponsored by the United States Navy at Naval Base Ventura County at Port Hueneme, California, and another cosponsored by the United States Army Engineering Research and Development Center at Vicksburg, Mississippi. The Engineering and Construction Camps bring each student closer to an understanding of what engineering careers offer and allow them to experience the camps' activities and events with student peers from the United States and around the world.

As a result of these camps, many of the student alumni have been nominated for and appointed to attend each of the military service academies. Camp alumni have now graduated from the academies and are pursuing military engineering careers. Through the excitement generated by the camps, many of the students have decided to pursue a broad range of engineering careers and are attending some of the nation's most prestigious universities and engineering colleges approved by ABET, Inc., formerly known as the Accreditation Board for Engineering and Technology.

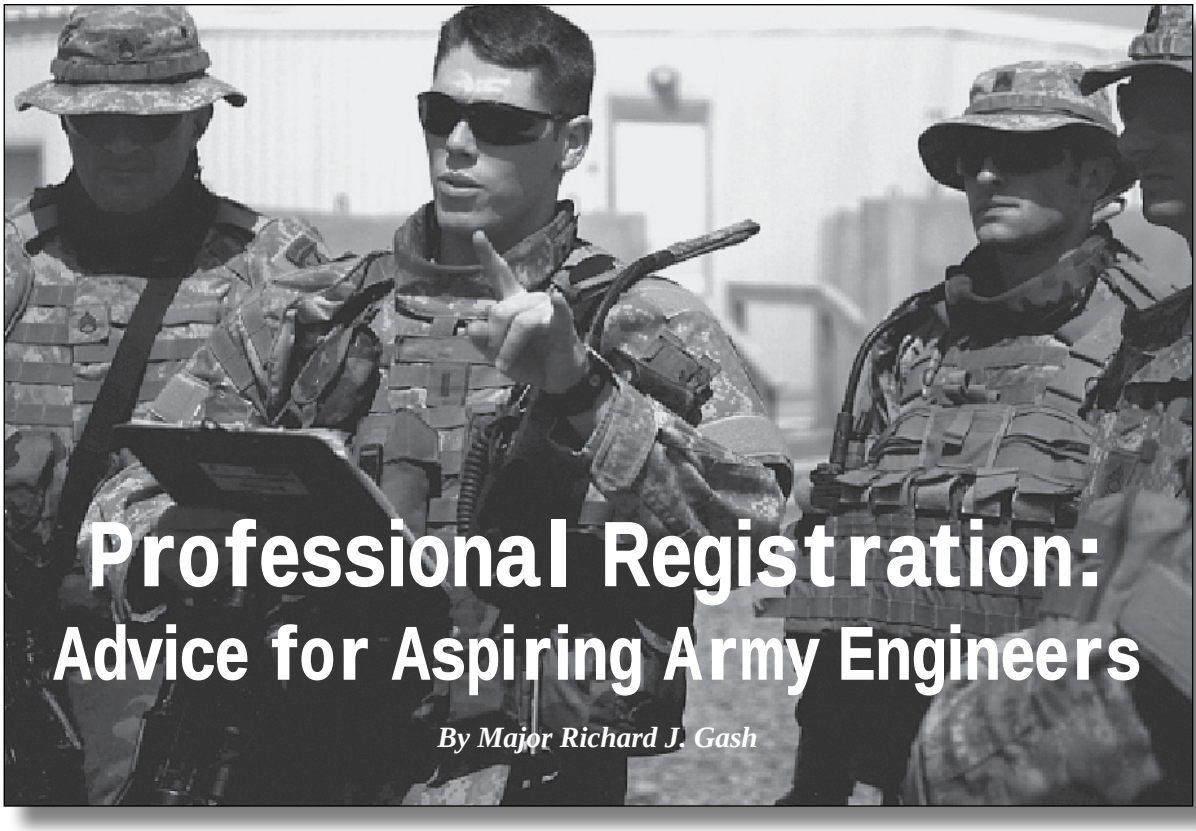
> ***"Students came together with new graduate engineers and seasoned engineering and construction veterans of SAME to share engineering concepts."***

In 2009, SAME, in concert with cosponsors from the military Services and SAME posts worldwide, will celebrate its tenth consecutive year of conducting these camps and providing a valued service to our nation and the engineering profession. SAME is truly a force multiplier in waging the "War on Talent" to ensure that students and families get the opportunity to understand and seek valued engineering careers.

Be a part of this tremendous movement and share the experience of being a valued mentor at one of the SAME Construction and Engineering Camps next summer. Make a difference by helping with *Building Great Engineers*. For more information about the SAME Engineering and Construction Camps, visit <*http://www.posts.same.org/camps*>. To sign up as a mentor for one of the camps, visit <*http://posts.same.org/camps/2008/mentors.htm*>.

Mr. Brown is a retired Army colonel and a senior executive with Sundt Construction, Inc. He is a member of the SAME national board of directors and the national chair for the SAME Engineering and Construction Camps. He also serves as the national chair of the Government Affairs Committee for the Associated General Contractors of America.

Society of SAME American Military Engineers



Professional Registration:
Advice for Aspiring Army Engineers

By Major Richard J. Gash

Author's Note: I originally wrote this article in 2002, after my peers and I had struggled through the process of preparing to take the National Council of Examiners for Engineers and Surveyor's Practices and Principles of Engineering Examination.[1] Its goal was to provide a roadmap to success for Army engineer officers seeking licensure as professional engineers. I offer both that the advice that follows is still valid and that the need for licensed engineers in our Regiment has never been greater. Current events in Iraq and Afghanistan demonstrate how today's operational environment demands great engineers. Professional registration is one way we can help ensure that we will have them in our ranks.

Several years ago, a group of Engineer Captain's Career Course (ECCC) classmates and I struggled through the professional engineer (PE) application process. After hours of toiling over experience forms, making innumerable telephone calls to the Missouri Board for Professional Engineers, and spending a small fortune on express mail, some of us met the application deadline. Many did not.

The purpose of this article is to capture the lessons we learned while applying and share them with engineer officers aspiring to do the same. In keeping with the finest of military operations, I have broken the process into four phases. The first phase involves becoming an engineer-in-training and laying a foundation for future success. The second phase is filling out the application. The third phase, which is generally everyone's favorite, is studying and preparing for the exam. The final phase is taking (and passing!) the exam itself.

Phase I: Engineer in Training

This phase begins before commissioning and continues through the Engineer Basic Officer Leader Course (BOLC) and assignments leading up to the ECCC. The first step is to become an engineer-in-training by graduating from an engineering program approved by the Accreditation Board for Engineering and Technology and passing the Fundamentals of Engineering Examination administered by the National Council of Examiners for Engineers and Surveyors. These requirements are nonnegotiable because they are written into the state laws governing registration boards. The second step is BOLC. My advice for the course is threefold. First, pay attention. Second, keep the construction handouts. Third, start a professional journal. While it may be possible to succeed without the first two pieces of advice, the journal is essential.

Your professional journal should include a record of all the engineering-related projects you work on. The BOLC practical exercises are a great place to start. This record will make filling out the experience portion of the PE application much easier. Another important aspect of the journal is contact information. The application requires the officer who was your supervisor at the time to verify your engineering work experience. While at BOLC, get a good permanent standard or e-mail address from your platoon trainer and company commander. You will have to mail one of them part of your application for signature four years later. Your journal should also include contact information for PEs you work under. You will need recommendations from three of them for the application. If anyone in your

BOLC chain of command—from platoon trainer to brigade commander to course director—is a PE, introduce yourself, state your intentions, and get good contact information.

Phase I continues with the jobs you hold as a lieutenant. Keep updating your journal with contact information for PEs and supervisors. Continue to record engineering projects you work on. While some of us are lucky enough to work in construction units or even for the United States Army Corps of Engineers, most of us are more familiar with concertina wire and C-4 than construction. *This is not a problem*. Believe it or not, much of the work done by mechanized and light engineers *is* engineering related. Route, bridge, and ford reconnaissance; bridge classification and demolition; terrain and trafficability analysis; and even combat obstacle and fighting position construction all require engineering and project-management skills. Record them in your journal. Always fight to get projects that will add to your experience. A combat engineer platoon can easily clear and construct a live-fire range or even a playground!

Phase I culminates with the transition to ECCC and the start of the Principles and Practice of Engineering Examination application process. Fortunately for most engineer officers, the engineer-in-training experience required to apply generally coincides with the move to Fort Leonard Wood, Missouri. The end state for this phase is four years of experience and good contact information for supervisors and PEs. If your experience doesn't quite add up to four years, don't panic; ECCC and postgraduate education (quite possibly at the Missouri University of Science and Technology [Missouri S&T]) will add to your time.

Phase II: Application

The application to take the Principles and Practice of Engineering examination is probably the biggest obstacle separating Army engineers from professional registration. Timing, perceived lack of engineering experience, and the inability to obtain signatures combine to discourage many officers from applying. Selecting the proper exam date and completing the application early will give you the best chance for success.

The Missouri Board for Architects, Professional Engineers, and Professional Land Surveyors and Landscape Architects administers the examination semiannually in April and October. I recommend taking it right after graduation from ECCC. Although it is tough to juggle course requirements, studying, and trips to the Lake of the Ozarks, staying on for the Missouri University of Science and Technology degree will give you a chance to take the exam a second time in Missouri if you fail. Get an application from the Missouri Board as soon as you begin ECCC. You can request one through the board's Web site at <*http://pr.mo.gov/apelsla.asp*>. Even though applications are generally due three months before each examination, complete yours as soon as possible and turn it in early. If the board finds any problems with it, you will have time to correct it. I found the board very willing to help.

Becoming a Professional Engineer

The licensure of professional engineers (PEs) is important to the public because of the significant role engineering plays in society. The profession regulates itself by setting high standards to help protect the public safety and welfare. Becoming registered as a PE increases your opportunity for promotions, pay raises, credibility, respect, and security.

The registration process involves the following steps:

- Graduating from an Accreditation Board for Engineering and Technology accredited program.
- Passing the Fundamentals of Engineering Examination.
- Gaining a minimum of four years (three years with a master's) of verified practical engineering experience.
- Passing the Principles and Practice of Engineering Examination.

Examinations are typically administered twice a year, once in April and once in October. Applications must be completed 45 to 120 days before the examination date, depending on the individual state regulations.

The Engineer School point of contact for questions pertaining to the PE registration process is Mr. Chad Morris, PE, at <*chad.alan.morris@us.army.mil*>.

The two sections of the application that cause the most headaches are Section V, *References*, and Section VI, *Engineering Experience*. Section V requires applicants to obtain character recommendations from five individuals, three of whom must be PEs. I strongly advise sending out additional recommendation requests. Since military life is transient by nature, at least one of the officers on whom you were banking will be deployed or in the middle of a PCS, or will simply not receive your request. The recommendation form is easy to fill out. A couple of completed extras will ensure that you do not get caught short. It is also very likely that you have been out of contact with many of your potential references for some time. Your BOLC brigade commander or former college professor may not remember who you are. If you fear this may be the case, include a copy of Section VI from your application and the telephone number of your last battalion commander for them to contact.

An early start should allow you plenty of time to get the recommendations you need. However, if you find yourself closing in on the application deadline and still in need of recommendations, there is one last course of action available. Start knocking on doors at the United States Army Maneuver Support Center at Fort Leonard Wood. Because it is the home of the United States Army Engineer School, it has one of the highest concentrations of PEs in the Army. With a proper introduction and the right testimonials, you should find the

recommendations you need. *(Note: The Engineer School point of contact shown in the figure maintains a list of PEs on post.)*

Section VI is the meat of the application. In it, you must account for four years of engineering experience—all accrued subsequent to baccalaureate graduation. Here is where the experience part of your professional journal will come in handy. The application requires a brief synopsis of the work you have done in each job you have held. A supervisor who oversaw your work must verify each synopsis with his or her signature. Although the application appears to imply that this supervisor must be a PE, this is not the case. Keep in mind that you cannot use the same person as a supervisor and as a reference. Remember to include BOLC and ECCC as part of your experience. *(Note: The Engineer School point of contact has examples that might be helpful.)*

If you have any questions while working on your application, the best thing to do is contact the board or the Engineer School point of contact. The end state for this phase is an accepted application and a letter back from the Missouri Board authorizing you a seat at the examination. Once you have this letter in hand, it is time to focus all your energy on studying and Phase III.

Phase III: Preparation

The question of how much effort to put into studying for the Principles and Practice of Engineering Examination is foremost on every applicant's mind. The best answer—although probably not the one you want to hear—is (of course): Enough to ensure that you pass! This can range anywhere from a few weeks to a few years. Each applicant should conduct an introspective assessment to determine how long and how hard he needs to study. I recommend erring toward longer and harder. It is important to note that for many, this period of preparation may need to start well before Phase II is completed.

The next questions most applicants have are what and how to study. Fortunately, I can offer much more explicit advice in this area. Concerning what to study, I strongly recommend that applicants purchase Michael R. Lindeburg's *Civil Engineering Reference Manual, Practice Problems for the Civil Engineering PE Examination, and Civil Engineering Sample Examination*. Used together, these three books will serve as excellent study guides. They will also function as invaluable resources during the examination. The reference manual contains detailed information about the examination, step-by-step sample problems, and a wealth of up-to-date reference material. The practice problems book includes sample problems covering engineering fundamentals and all disciplines of civil engineering. The sample examination offers a great way to gauge the progress of your preparation. All three books are well worth the cost.

How to study is a little more complicated. It is best to develop a solid plan of action that will streamline your preparation process. A good place to start is by researching the examination, which recently underwent significant revision. The new exam format has two sessions. The morning session includes 40 multiple-choice questions that encompass all disciplines of civil engineering. The afternoon session also has 40 multiple-choice questions focused on one of five disciplines. Applicants must choose from water resource, transportation, geotechnical, environmental, and structural engineering. Decide on a discipline early in your preparation, and focus your studying on that field.

After selecting an area of emphasis, the best way I found to study was to work through the practice problems in Michael Lindeburg's books. The first section in the reference manual is devoted to engineering fundamentals. Although these may seem rudimentary at first, I found them invaluable as a review of complex unit conversions and how to use my calculator. Mastering these two areas alone will greatly enhance your chances for success on the examination. The next sections are each devoted to one of the five afternoon disciplines. Don't be disheartened by the difficulty of the sample problems. With practice, answers will begin to come easily.

While you work through sample problems, take time to become familiar with your reference materials. Chances are that you have the information needed to answer all of the examination questions somewhere in your references. The trick is being able to find the right information quickly. Try to avoid always looking for answers in Michael Lindeburg's books. One slight flaw with using them as study guides is that by design, almost all the information needed to solve his sample problems can be found somewhere in his reference manual. Some of the actual exam questions may require you to dig through other references. You need to become familiar with your other manuals as well.

As examination time draws near, I recommend taking a break from studying. Take some time to relax and mentally recharge. You definitely do not want to be burned out before starting the eight-hour exam. Take the last few days to finish organizing your references and supplies and make the transition from Phase III to Phase IV. The end state for this phase is the confidence that you are ready to pass the examination.

Phase IV: Examination

Taking the Principles and Practice of Engineering Examination is the last step in the process of becoming a registered PE. This phase involves actions on the objective. I can offer advice on what to bring with you, along with some final hints. Taking the examination is up to you!

Applicants often lose sleep while trying to determine which reference books to take to the exam and which to leave behind. I can clear up any confusion. If in doubt, take it. Take every book you own that remotely relates to engineering. Go to the Maneuver Support Center library and check out any additional books you think you might need. Take a good dictionary, the thicker the better. Inevitably, questions will include obscure

words you have never seen before. Take your Engineer School handouts. They present a surprising amount of pertinent information in an easy-to-follow format. Don't worry about being overloaded. No matter how many books you take, you will see people at the exam with more. It is easy to tell the first-timers from the veterans of several examinations. The novices all struggle from their cars to the exam room, dropping books out of overflowing cardboard boxes. The veterans all have bookshelves on wheels they can push along with them. I recommend the middle ground—a collapsible luggage dolly.

In addition to your reference materials, make sure you think through the logistics involved in taking the exam. You will need a good transportation plan. This is partly to accommodate your reference materials, but mostly because of the road network in central Missouri. The board makes every effort to centralize the exam location for applicants from across the state. Unfortunately, this ensures that a direct land route will not exist between the exam site and Fort Leonard Wood. Take the time to conduct a good route recon before the examination. Struggling down unfamiliar Ozark roads in the predawn darkness will only add unneeded stress to your day. A better plan would be to spend the night before the examination in a local hotel so you won't have to worry about getting to the examination site on time.

Having the proper amount of supplies is also essential to success. Determine how many pencils, erasers, batteries, and even calculators you think you will need—and double that amount. Halfway through the afternoon session is not the best time to realize that the 7 key on your calculator has stopped working.

My final piece of advice is to stay relaxed. Don't panic or get frustrated. Stick to your plan of action. Don't try to switch afternoon disciplines at the last minute just because you overheard someone during lunch saying that transportation was easier than water resources. Trust your preparation. Keep a positive attitude. The end state for this phase is walking out of the exam site with full confidence that you passed!

Major Gash is currently a student at the United States Army Command and General Staff College at Fort Leavenworth, Kansas. His previous assignments include service as an assistant professor in the Department of Civil and Mechanical Engineering at the United States Military Academy; as a company commander in the 864th Engineer Battalion at Fort Lewis, Washington; and as a mechanized engineer platoon leader and company executive officer in the 70th Engineer Battalion at Fort Riley, Kansas. He has served in combat in both Iraq and Afghanistan. Major Gash is a graduate of the United States Military Academy and holds master's degrees in geology and geophysics from the University of Missouri-Rolla (now Missouri S&T) and civil engineering from the University of California, Los Angeles. He is a registered professional engineer in the State of Missouri.

Endnote

[1] "Professional Registration: Advice for Aspiring Army Engineers" by Captain Richard J. Gash, *Engineer*, October-December 2002, pages 48-50.

Editor's Note: On 6 November 2008, the American Society of Civil Engineers (ASCE) honored Major Gash at the 138th Annual Civil Engineering Conference in Pittsburgh, Pennsylvania, with its 2008 Young Government Civil Engineer Award. The society presents the award annually to a distinguished civil engineer under the age of thirty-five who has demonstrated significant contributions to civil engineering in the public sector.

("Clear the Way," continued from page 3)

This is the second active duty MEB to stand up and, like the 1st MEB at Fort Polk, it has become part of the maneuver support family and by extension the engineer family. Additionally, the mighty 130th Engineer Brigade once again uncased its colors –this time in Hawaii, under its new commander, COL Fabian Mendoza. CSM Wells represented the school house and reported back that the uncasing ceremony was a sight to behold—it is great to have the 130th back on active duty!

On the engineer strategic front, the *Building Great Engineers* flywheel continues to turn as we focused on officer accessions this past summer and fall and are in the midst of rewriting DA PAM 600-3, which is a big part of our employment line of operation. It was a great honor for me to attend branch night at West Point on 2 November where we pinned the castle branch insignia on 136 senior cadets. Initial analysis shows that we had another good year with the statistics very similar to those in 2007, with about 58 percent having hard engineer degrees. We still have to compile the results from our ROTC accessions. In November, we held a *Building Great Engineers* Council of Colonels where our regimental leadership developed recommendations for developmental and key developmental branch positions in support of the DA PAM 600-3 update. Additionally, the colonels set the agenda for the work group sessions at ENFORCE this year.

Speaking of ENFORCE, I ask all of you to place 20-24 April 2009 on your calendar as these are the dates of ENFORCE 2009. We are working hard here at Fort Leonard Wood and with our regimental Army Engineer Association to put on the best ENFORCE ever! We will continue the theme of *Building Great Engineers* to keep the strategic campaign plan moving forward. This year's ENFORCE is going to be an awesome event as we continue to focus on the Regiment's most important resource: the Soldiers of our Regiment. In this light, the entire conference will be held at your home—Fort Leonard Wood. As previously mentioned, registration information and agendas are published on our public website. We want to see more engineers from the operational Army attend this year's event, and we have gone out of our way to structure both the content and the cost to support your coming to this great event.

It is an indeed an exciting time for the Engineer Regiment!

Building Great Engineers:
How SAME Is Your Closest Ally

By Mr. Ben Matthews

In August 2008, I had the privilege of representing the Society of American Military Engineers (SAME) on a panel at the United States Army Corps of Engineers (USACE) Senior Leader's Conference in Pittsburgh, Pennsylvania. The panel's primary focus was to outline what the USACE divisions were doing toward *Building Great Engineers* and increasing the technical competency of the Engineer Regiment. The central point of my briefing was that professional societies, especially SAME, are there to help.

The mission of the SAME College Outreach Committee is to "promote the engineering career field at colleges and universities through student chapters, mentoring programs, scholarships, and career planning seminars." The college outreach mission supports the overall SAME mission, which is to "promote and facilitate engineering support for national security by developing and enhancing relationships and competencies among uniformed services, public and private sector engineers, and related professionals."

Those mission statements show that there is a definite synergy between the goals of SAME and the campaign plan for *Building Great Engineers* set forth at ENFORCE 2008. For example, one of the action items under the accessions section of the campaign plan is to "attract engineering talent by researching top engineering schools and concentrating marketing efforts at these institutions. Additionally, strategically assign engineer officers as Professors of Military Leadership (PML) at selected engineering schools." An item in the strategic communications section of the plan advises commanders to "develop a plan where senior engineer leaders visit local universities to promote degreed engineers and their subsequent joining of the Engineer Regiment."

SAME can definitely help the Engineer Regiment with those two items. With more than 100 posts in the United States, SAME has a presence near every major military installation. When senior leaders are ready to go out to local engineering institutions, SAME post leaders are there to help with the follow-up by maintaining contact with prospective engineer officers.

Since education and mentoring are so important to the mission of SAME, the organization's dues structure makes outreach as easy as possible: SAME membership is free for students. As engineer leaders execute the *Building Great Engineers* campaign plan, we hope you will bring your SAME cohorts along. We are there to help!

For more information, visit the SAME college outreach website at <*http://www.same.org/college*> or the SAME student membership signup website at <*https://www.same.org/i4a/forms/form.cfm?id=72*>.

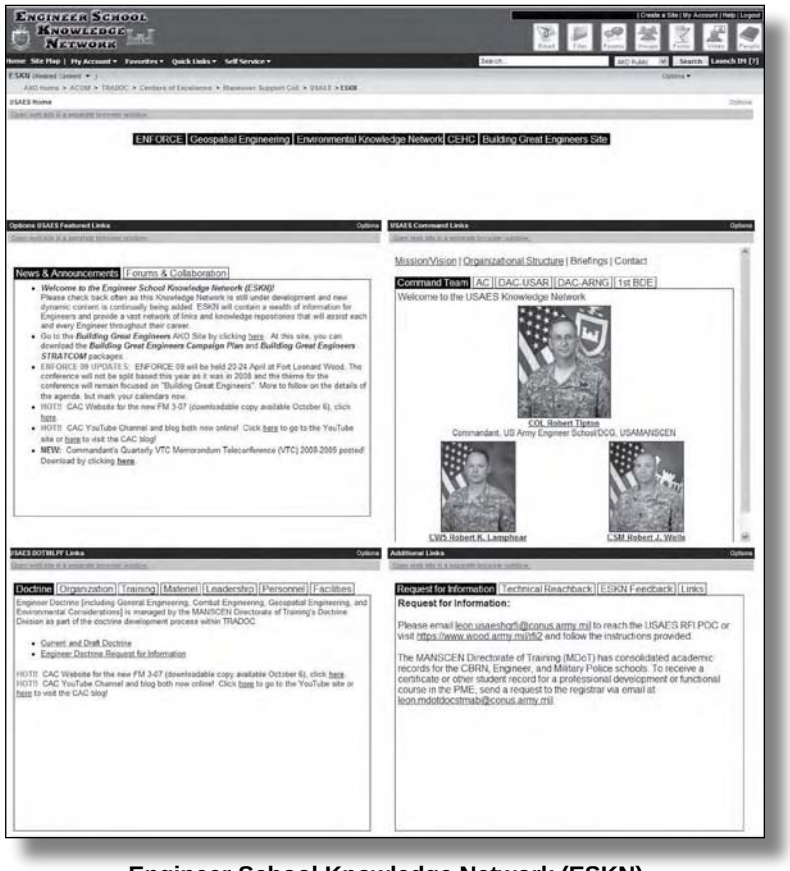
Mr. Matthews served in the United States Air Force as a civil engineer officer for eight years. He currently works for Jacobs Engineering in Dallas, Texas. He also serves as the college outreach chair of the Society of American Military Engineers. He holds a master's in construction management from the University of Texas at Austin and is a registered professional engineer.

Knowledge Management *in Action*

By Mr. Douglas D. Fowler

There are many changes underway here at the United States Army Engineer School, and knowledge management is a component of how we do business every day. To many of you, the term "knowledge management" means control, as if knowledge were something static and unchanging, but we all know that knowledge is dynamic and constantly changing.

Knowledge management means many things to many people. It can mean creating, identifying, sharing, capturing, acquiring, and leveraging knowledge. First, we need a common definition of the word *knowledge*, so we can define it as "information in context to produce actionable understanding." There are two primary forms of knowledge—explicit and tacit. Explicit knowledge encompasses things we know that we can write down, share with others, and put into a database. Tacit knowledge is what we do not know that we know, including know-how, rules of thumb, experience, insights, and intuition. Therefore, knowledge management is the systematic processes by which knowledge needed for an organization to succeed is created, captured, shared, and leveraged.[1]



Engineer School Knowledge Network (ESKN)

Undoubtedly, the people and teams here at the Engineer School and throughout the Engineer Regiment own and routinely manage both forms of knowledge and are hard at work developing better ways and means for their management. Using the power of Army Knowledge Online and its numerous tools and capabilities, the Engineer School has developed a single sign-on entry portal called the Engineer School Knowledge Network (ESKN). This portal, related to the Maneuver Support Knowledge Network, serves as the secure entry point for knowledge-sharing inside and outside of the Engineer School. Up-to-date announcements, links to communities of practice, forums, training materials, the latest doctrinal publications, the Engineer Systems Handbook, and engineer personnel proponency issues are all available directly from this site. Also, ESKN lets visitors solicit assistance or information directly from the Engineer School via a request-for-information interface. Another part of EKSN—the *Building Great Engineers* page—serves as the site for downloading the campaign plan as well as various strategic communications products.

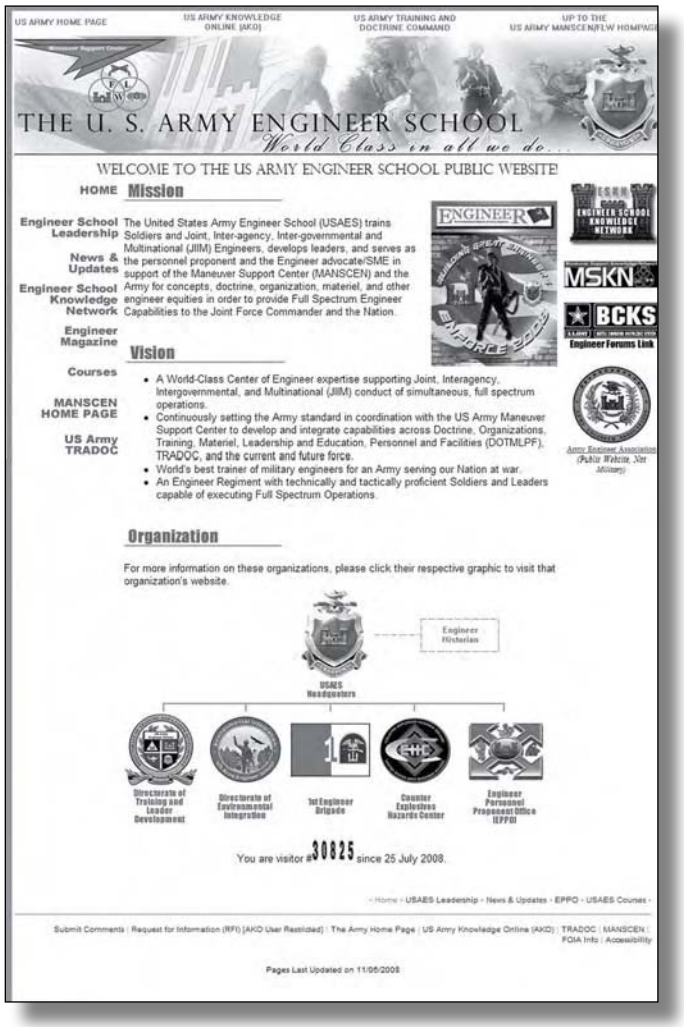
Soon, all of the directorates within the Engineer School will have individual sites set up and linked to ESKN, with information and tools tailored specifically to their core missions. Lastly, efforts are underway to develop and post a secured version of ESKN on the Secret Internet Protocol Router Network (SIPRNET) for use by deployed members of the Engineer Regiment. This secured portal—ESKN-S—will help to facilitate the management of classified knowledge to include lessons learned; observations; best practices; and tactics, techniques, and procedures generated within each of the combatant commands. The direct link to ESKN is available on the Engineer School homepage at <*http://www.wood.army.mil/usaes*>.

We have also leveraged the power of the Battle Command Knowledge System under the Protection.Net forums to facilitate the exchange of knowledge and information in a forum-oriented environment. Within Protection.Net, we've created two initial topic areas—combat engineering and construction engineering—under the *Engineer Profession* heading. There are also useful discussions under the *Environmental* heading. These forums will help facilitate dynamic collaboration among members of the Engineer Regiment across the

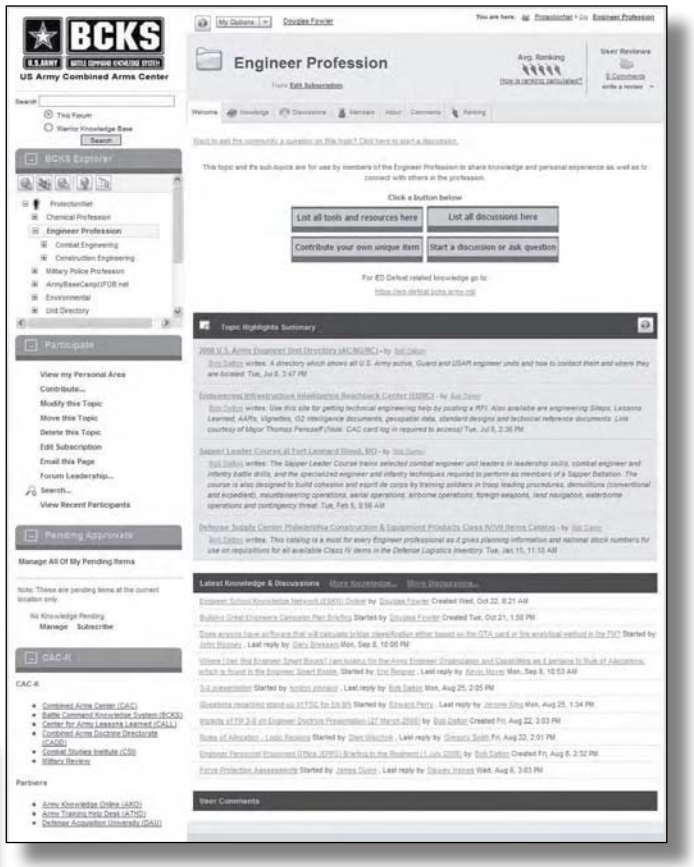
globe by generating immediate feedback, soliciting input and expertise, and sharing the knowledge of Engineer School subject matter experts.

Finally, we've taken great strides in completely revising our public-facing website, *<http://www.wood.army.mil/usaes>*, to a more static, content-driven interface for our external stakeholders. This site will be much less dynamic than ESKN and will not contain products for downloading. However, the site, with links to the 1st Engineer Brigade and other organizational websites, will be of vital importance to the Engineer School in providing timely information to family members about trainees, students, and key stakeholders from industry, academia, and our sister Services. This information will include graduation dates and related information.

In the very near future, all information related to ENFORCE will be published on a stand-alone public-facing website linked to the Engineer School public-facing website. This site will have a new permanent domain name—*<http://www.wood.army.mil/enforce>*—and will serve as a single-source repository for all ENFORCE information, to include agendas, schedules, key events, and registration information.



U.S. Army Engineer School Public Website



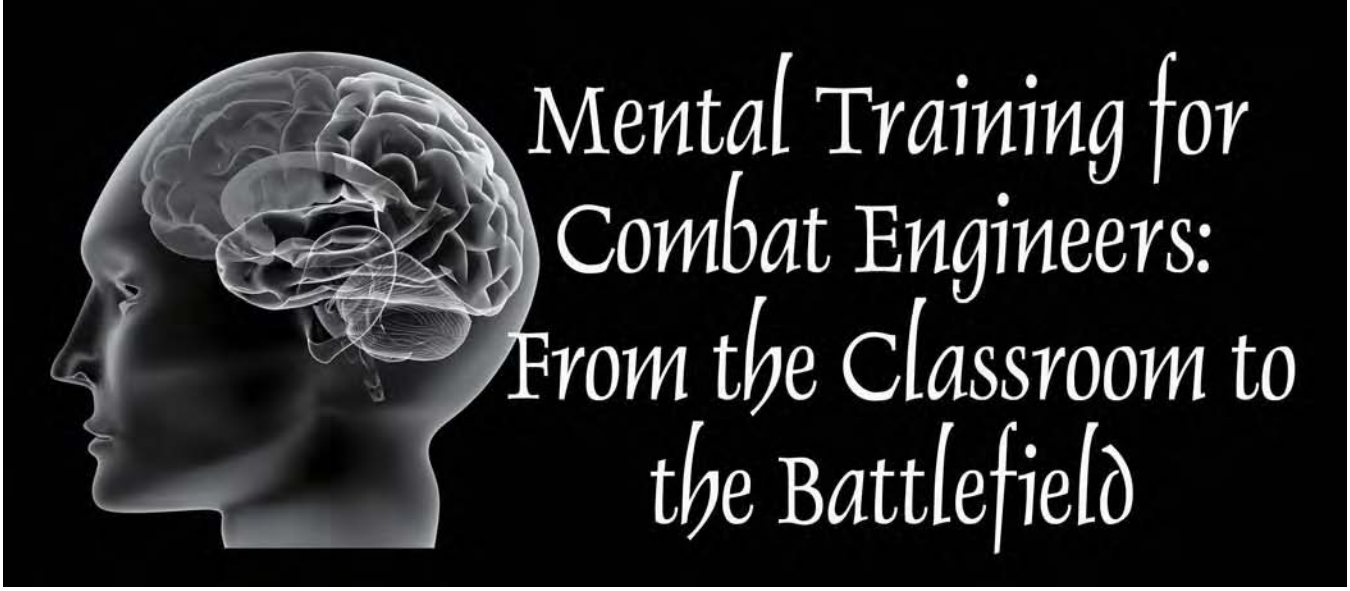
Battle Command Knowledge System (BCKS)

We encourage interested visitors and users of these sites to provide recommendations and suggestions on their content, capabilities, and functionality. Send suggestions or comments to *<leon.usaeshqrfi@conus.army.mil>*.

Mr. Fowler serves as Chief of Doctrine, Organizational Design, and Materiel at the Directorate of Environmental Integration, United States Army Engineer School, Fort Leonard Wood, Missouri. He also serves as the Engineer School's knowledge management organizational representative and senior advisor to the commandant on all knowledge management issues within the Engineer School. He is a graduate of the Army Management Staff College intermediate and advanced courses, holds a bachelor's in business administration, and is pursuing a master's in public administration.

Endnote

[1]Melissie Clemans Rumizen, *The Complete Idiot's Guide to Knowledge Management*, Penguin Group (USA) Incorporated, Madison, Wisconsin, 2002.



Mental Training for Combat Engineers: From the Classroom to the Battlefield

By Mr. Brian C. Hite

In an effort to raise the level of Soldiers' performance, the Army has introduced a program that addresses the mental and emotional aspects of their performance. The Army Center for Enhanced Performance (ACEP), an extension of the United States Military Academy's Center for Enhanced Performance (CEP), seeks to enhance Soldier performance by increasing awareness of the connection between mind and body. ACEP presents Soldiers with concepts and techniques designed to foster confidence, improve attention, manage energy levels, and facilitate learning by emphasizing how the mind and body interact to affect performance.

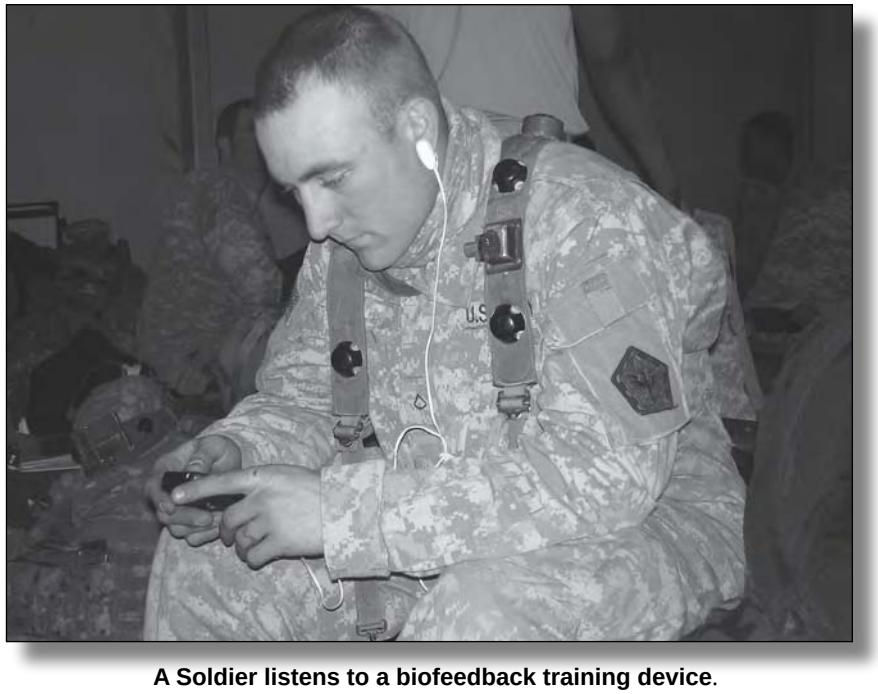
The ACEP staff, located at Fort Lewis, Washington, briefed the I Corps command group in November 2007. They described how a mental training program could be used by the various units on post. The commander of the 555th Maneuver Enhancement Brigade (Provisional) saw the potential of this program and asked that a trainer be assigned to work with one of the combat engineer units from Fort Leonard Wood, Missouri. He mentioned that the 5th Engineer Battalion had an upcoming National Training Center (NTC) rotation at Fort Irwin, California, and asked the ACEP trainer to Fort Leonard Wood to provide classroom training and accompany the unit to NTC.

In January 2008, an ACEP trainer flew to Fort Leonard Wood to provide mental training for the Soldiers of 1st Platoon, 55th Mobility Augmentation Company, 5th Engineer Battalion. The classroom training consisted of an informational brief coupled with hands-on exercises that allowed the Soldiers to put into practice the concepts they learned. The next month, the same trainer linked up with the Soldiers at NTC and conducted refresher training. Throughout the next 10 days, the trainer lived with the Soldiers and accompanied them on each mission to provide mental and emotional coaching. He was also a part of the after-action review (AAR)

Using biofeedback techniques, an ACEP trainer coaches Soldiers in the connection between mind and body.

process. Issues affecting the Soldiers' performances, such as negative thinking, lack of confidence, nervousness, anxiety, and lack of mission focus, were all discussed during the AARs and linked to aspects of the mental toughness training that address these issues.

The advice of the ACEP trainer had a profound impact on the Soldiers' performance during an urban operations training exercise. Each squad went through the exercise separately. During the first squad's initial dry-fire iteration, squad members appeared to be nervous, as evidenced by their poor communications techniques, excessively high energy levels, tendency to rush through each building, and failure to recognize potential threats. The squad proceeded through the iteration in a chaotic manner instead of performing as a smooth, controlled team. During the AAR, the observer/controller (O/C) pointed out the weaknesses and suggested a tactical pause before entering a room. The ACEP trainer repeated the O/C's comments about high energy levels and the tactical pause, but took the feedback a step further. He referred to the earlier mental toughness training and explained how having too much energy can negatively impact performance by restricting mission focus, slowing cognitive processing, and increasing muscle tension. He also noted how several of the mental training techniques the Soldiers had learned could be used to control energy levels and direct their attention.



A Soldier listens to a biofeedback training device.

The Soldiers followed the advice of the ACEP trainer and O/C, incorporating a routine during the tactical pauses before entering each building and room. The routine consisted of the squad leader saying, "Stack right [or left]. Slow is smooth; smooth is fast. Ready." The Soldiers would then inhale and exhale before the command of execution—"*Go!*" These actions addressed the issues of attention, anxiety, and nervousness by using a "cue phrase" (Slow is smooth; smooth is fast), and a calming breath that helped to direct attention to mission requirements and counter the physiological responses that accompany overly high energy levels, such as short, shallow breathing and muscle tension.

During the two hours between their first and second iterations, the Soldiers rehearsed their routine using glass house drills and mental imagery, and the improvement in their performance was amazing, according to the O/Cs. The officer in charge of the urban operations site said the Soldiers had rushed through their earlier clearance exercise, but that coaching, reiterating the cue phrase, and taking a tactical pause before clearing each area helped the Soldiers focus and regain control of their breathing and heart rate before moving to their next objective. That helped them move in a controlled manner, assess threats, and communicate more efficiently.

The ACEP mental training helped the Soldiers' performance in improvised explosive device defeat as well. One Soldier received a battalion coin after finding a piece of unexploded ordnance that an entire convoy of combat engineers had passed and missed.

Improved performance on missions, however, is not the only focus of ACEP training. It also teaches concepts and techniques to facilitate stress recovery following missions. The Soldiers engaged in stretching exercises and listened to relaxation compact disks (CDs) following missions. Many also used a biofeedback tool designed to increase their awareness of how their thoughts affect their bodies. One Soldier said the relaxation CDs helped get him calm and relaxed after a mission. Another Soldier commented that the biofeedback tool showed him which thoughts helped calm him and which thoughts were stressful. The ACEP training program provided the 5th Engineer Battalion Soldiers techniques for efficient, effective stress recovery.

Now that the Soldiers have learned how to apply the mental and emotional concepts and techniques related to peak performance and stress recovery in a training setting, the next step for ACEP is to help these Soldiers use these techniques in a combat setting. The ACEP trainer will maintain contact with the unit via regularly scheduled video teleconferences with the unit leaders to provide ongoing guidance, troubleshoot any issues that may arise in the future, and train new Soldiers when they arrive.

Mr. Hite is a performance enhancement specialist at the Army Center for Enhanced Performance at Fort Lewis, Washington. He holds a master's in sports psychology and is working on a doctorate in organizational psychology. Previously, he spent 13 years as a stuntman and stunt coordinator in movies and television.

Contracting Officer's Representative Training at the Engineer School

By Lieutenant Colonel Steven T. Wall and Major John N. Carey

More engineer officers, warrant officers, and noncommissioned officers (NCOs) are being assigned additional duties as a contracting officer's representative (COR). With an increasing reliance on private industry to perform services for the United States Army, the COR is an important part of the acquisition team.

A COR is authorized to be appointed by a contracting officer (KO) by authority of the Defense Federal Acquisitions Regulation Supplement to assist in the technical monitoring or administration of a contract. There is no certification as a COR until the KO designates a COR in a written letter that specifies the extent of the COR's authority to act on behalf of the KO. To prepare Soldiers for COR duties, the Army requires Defense Acquisition University (DAU) or equivalent courses as prerequisite training. The responsibilities of the COR vary with the type of contracting and normally include the following:

- Monitor the contractor's progress and performance, including the completion of required reports or other documentation.
- Verify that the contractor has performed the technical and management requirements of the contracting according to the contracting terms, conditions, and specifications.
- Accept for the government the supplies and services received, to include certifying receipt of the supplies and services.
- Maintain liaison and direct communications with the contractor and the KO.
- Recommend contracting modifications to the KO.
- Assist in meeting the government's contractual obligations to the contractor. This includes, but is not limited to, arranging to supply government-furnished equipment, facilities, and services called for in the contract.
- Provide technical interpretation of the contracting requirements.
- Maintain files and correspondence relating to the contracting performance.

The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

Contracting officers' technical representatives (COTRs) differ from CORs in that they have specialized technical knowledge, such as engineers and Soldiers with certain technical military occupational specialties, in overseeing a contract. Both CORs and COTRs require a KO's appointment in writing.

As of 17 November 2008, COR training with DAU must be completed before attending the Engineer Captain's Career Course (ECCC). This 20-hour block of instruction via web-based distributed learning was established in response to comments and suggestions from deployed units. The training program will require students to register and complete the following DAU online training:

- CLC 011—Contracting for the Rest of Us
- CLC 106—Contracting Officer Representative with a Mission Focus
- CLM 003—Ethics Training for the Acquisition Technology and Logistics Workforce
- CLM 024—Contracting Overview

These modules are not meant to be all-inclusive since KOs normally need further training, specific to the type and scope of the contract.

DAU COR training is available at <*http://www.atrrs.army.mil/channels/aitas*>. CORs must complete the DAU online course every three years. After successful completion, DAU provides the participant an online COR course completion certificate. As a result of finishing this activity before attending ECCC, students will now be able to complete further advanced training on contracting, acquisition, project management, joint engineering, and an appropriate language (Farsi, Pashto, Arabic, or Mandarin) during the course.

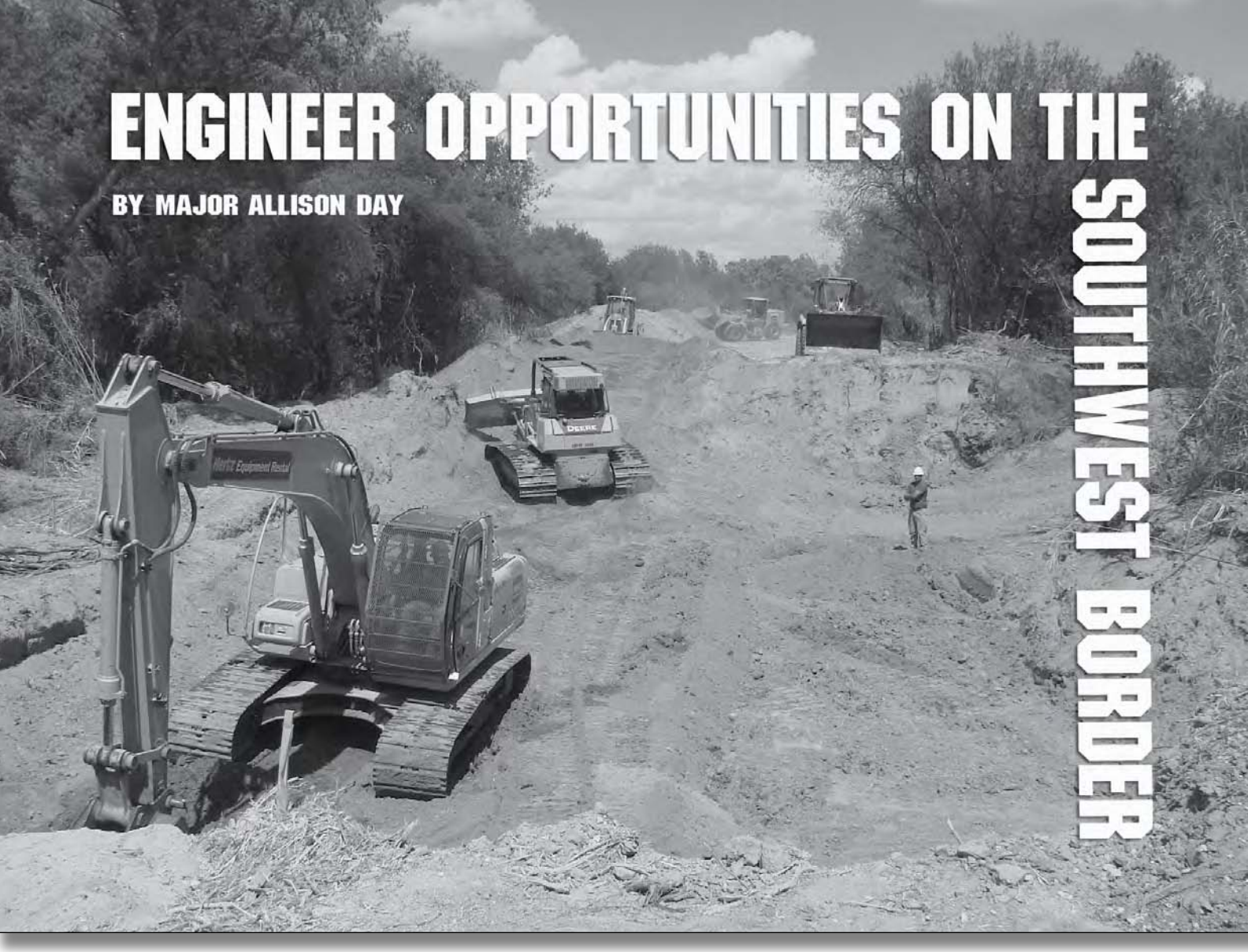
DAU COR training will be included in the Basic Officer Leader Course (BOLC) and NCO courses in the near future. The point of contact is Major Justin B. Putnam at <*justin.b.putnam@us.army.mil*>.

Lieutenant Colonel Wall is Chief, Assured Mobility Branch, Requirements Determination Division, United States Army Maneuver Support Center, Fort Leonard Wood, Missouri.

Major Carey is Division Chief, Engineer Captain's Career Course, Department of Instruction, United States Army Engineer School, Fort Leonard Wood, Missouri.

ENGINEER OPPORTUNITIES ON THE SOUTHWEST BORDER

BY MAJOR ALLISON DAY



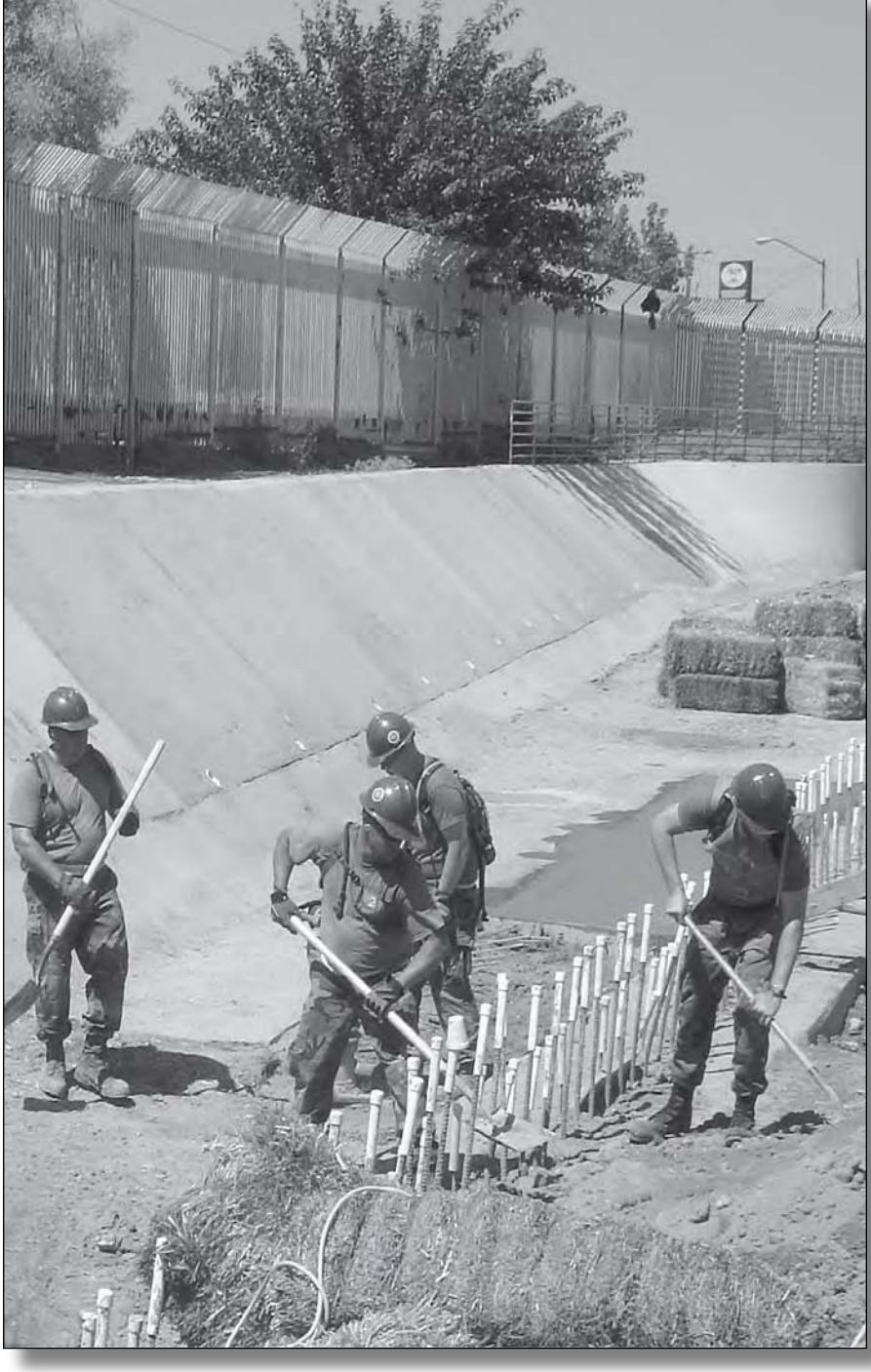
Real-world homeland security support engineer missions abound for United States Army engineer units looking for additional training opportunities that are directly related to their mission-essential task list (METL). The missions have been useful for units preparing for and returning from overseas deployments.

The homeland support missions are offered by Joint Task Force (JTF) North, the Department of Defense organization that coordinates and manages the engineering support provided to the United States Border Patrol along the Southwest border. The training missions give Regular Army and Army Reserve engineers the opportunity to plan, deploy, execute, and redeploy as platoon-, company-, or battalion-size elements to the Southwest desert via self-deployment, military or commercial airlift, or a combination of both.

Of special interest to commanders facing limited training funds is the fact that JTF North funds all mission-related costs, to include travel, per diem, and other associated expenses. All costs for materials used on engineer support missions are paid for by the supported law enforcement agencies. As an added benefit, JTF North issues contracts for—

- Most of the heavy equipment.
- Required equipment maintenance and training.
- Support vehicles.
- Billeting at local hotels or military support facilities.
- Ration support.
- Commercial air.

Engineer projects range from building personnel and vehicular barriers to installing lighting and constructing drainage structures and service roads for the Border Patrol along the U.S.-Mexico border. Depending on their scope, missions can last from two weeks to 179 days. The majority of the engineer support missions are long-term operations that the United States Army Corps of Engineers and the Border Patrol plan one to two years before execution and can consist of multiple-phase operations that may take several months or years to complete. Units generally volunteer and enter the planning process six months before deployment. JTF North executes approximately 14 engineer support missions each year.



Navy Seabees construct drainage structures for the Border Patrol.

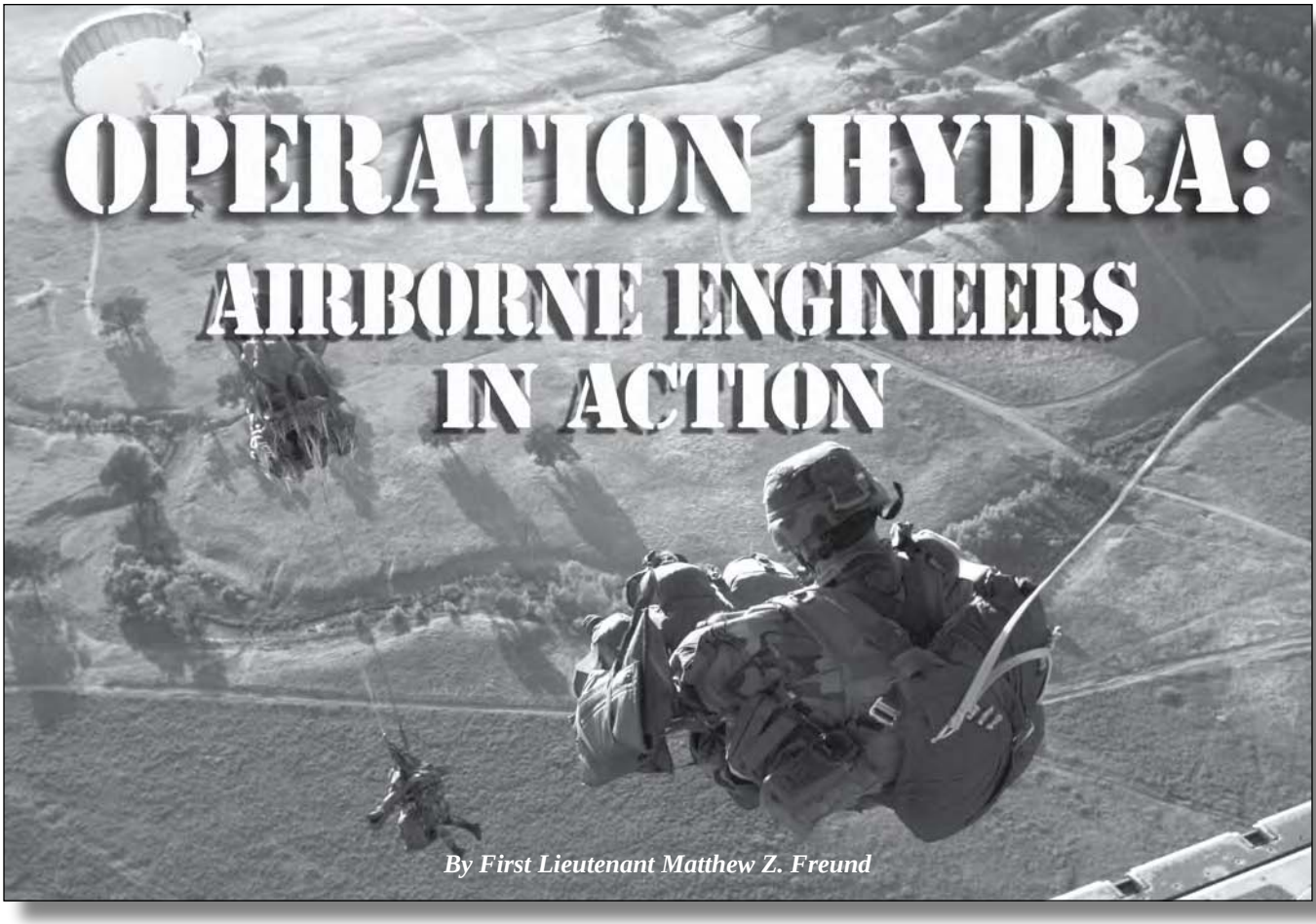
Joint Task Force North Background Information

Joint Task Force (JTF) North, based at Biggs Army Airfield, Fort Bliss, Texas, is a joint service command composed of Regular Army and Army Reserve Soldiers, as well as Sailors, Airmen, Marines, Department of Defense civilians, and contracted support personnel. All military support for homeland security is based on support requests and threat assessments submitted by the federal law enforcement agencies assigned to the Department of Homeland Security and Department of Justice. Assuming the support is appropriate and in compliance with the statutory guidelines for the domestic employment of military forces, JTF North seeks military units to volunteer to provide the requested operational support. Once a unit volunteers, JTF North facilitates mission planning and execution with the unit and the supported agency. According to Department of Defense policy, missions must have a training value to the unit or provide a significant contribution to national security.

The primary reason that units volunteer for the missions is that they typically get to train on 90 percent of their METL, to include individual and collective training. In their after-action reports, many commanders have commented that these missions resulted in the best engineer training they had ever conducted. Units also train on technical and project management skills that are difficult to practice in a combat training center environment. Overall, JTF North helps round out unit readiness.

For more information on JTF North and its engineering support missions, visit the command's website at: *<http://www.jtfn.northcom.mil>*, or contact the JTF North engineer planners at (915) 313-7787/7688 or DSN 666-7787/7688.

Major Day is an engineer planner with JTF-North. She has had command and staff experience in topographic and combat mechanized engineer battalions. Her most recent assignment was teaching in the Department of Geography and Environmental Engineering at the United States Military Academy at West Point, New York. She holds a bachelor's in forestry from the University of Missouri-Columbia and a master's in remote sensing and geospatial information management from the University of Wisconsin-Madison. She can be contacted at JTF North, Building 11603, Staff Sergeant Sims Street, Fort Bliss, Texas 79918-0058; by phone at (915) 313-7787; or fax at (915) 313-7687.



OPERATION HYDRA: AIRBORNE ENGINEERS IN ACTION

By First Lieutenant Matthew Z. Freund

For an airborne engineer unit like the 27th Engineer Battalion (Combat) (Airborne), trained to deploy tailored engineer packages anywhere in the world within 18 hours, readiness is the watchword. So when an emergency deployment readiness exercise (EDRE) sequence began on 7 July 2008, the battalion organized its equipment and personnel in less than a week to execute an airborne insertion into Fort Hunter Liggett, California, as part of a larger joint exercise named Operation Hydra. The training mission was the largest off-post airborne deployment of heavy equipment platforms projected from Fort Bragg, North Carolina, for a training mission since 1991. As one of only two airborne engineer battalions in the Army (both of which are stationed at Fort Bragg), the 27th Engineer Battalion has the special capability of conducting the full spectrum of combat and general engineering operations on short notice and in nearly any contingency. The battalion's mission, to upgrade Schoonover Assault Landing Zone (ALZ) at Fort Hunter Liggett, was structured around a notional humanitarian aid scenario.

Soldiers and Airmen have trained at Fort Hunter Liggett, located between the Santa Lucia Mountains and the Los Padres National Forest, since 1940. The post is used primarily for training United States Army Reserve units. The battalion's mission was to widen the crossovers and upgrade the parking apron to raise the maximum on ground (MOG) capability of the ALZ. The crossover and apron expansion increased the usable surface area by more than 25,000 square feet.

The airborne operation consisted of a drop of 127 paratroopers preceded by 10 heavy drop platforms totaling more than 300,000 pounds of engineer construction equipment. The heavy drops included a 950B wheel loader, two 130G motor graders, a deployable universal combat earthmover (DEUCE), a small emplacement excavator (SEE) truck, a 613B water distributor, and an equipment box. Within an hour of parachuting onto the ALZ, two sapper platoons had secured it with a 4-kilometer perimeter, allowing light equipment (LE) Soldiers to retrieve and remove the harnesses from dropped vehicles and equipment. The equipment box—packed with oils, lubricants, and tool boxes—was dropped so that LE Soldiers and mechanics could repair any damaged equipment on the drop zone. Only one of the ten heavy drop platforms—a dump truck—failed to land upright. However, a DEUCE soon arrived at the scene and an operator used its winch to pull the dump truck upright. The wheel loader's bucket and tines quickly moved the platforms from the ALZ centerline, clearing an unobstructed path for aircraft, which landed on the ALZ just a few hours after the jump.

Requirements for the ALZ repair and improvement were varied. First, two taxiways had to be widened by 30 feet. The apron required a 25,000-square-foot extension to increase its MOG. In addition, the apron and crossovers required resurfacing after 6 inches of soil were removed. Working in shifts, three LE platoons completed the mission after 60 hours of continuous operations. As surveyors plotted the dimensions,

A roller operator works on the apron of Schoonover Assault Landing Zone.

two scrapers hauled away 6 inches of soil (a total of 2,082 cubic yards) from the apron and crossovers, which covered 112,387 square feet. The apron's grade was designed to engineer technical letter standards of 1.0 percent to 3.0 percent to account for water runoff. After grading and scraping, the crossovers, apron, and shoulders were resurfaced with approximately 4,000 cubic yards of fill. An Air Force REDHORSE (rapid engineers deployable heavy operation repair squadron, engineer) civil engineering team from Nellis Air Force Base, Nevada, contributed to the mission by surveying, directing troops, and operating equipment.

The notional host nation, which received humanitarian assistance from the joint task force in the scenario, provided round-the-clock fuel and water resupply, allowing the battalion to conduct 24-hour operations throughout the mission. Host nation support units at Fort Hunter Liggett also provided additional graders, scrapers, vibratory rollers, and water distributors that allowed the unit to accomplish its mission in less than three days. Supply officers, who arranged for additional food, fuel, and equipment to be pre-positioned onsite, also located a maintenance contact truck that helped unit mechanics repair broken equipment. During the mission, mechanics repaired one grader and one roller, keeping operators at the wheel and preventing delays in the construction project.

While equipment operators repaired and improved the ALZ, crossovers, and apron, two sapper platoons conducted route reconnaissance and route clearance missions to ensure that the surrounding ground lines of communication were viable. After certification of the ALZ construction by an Air Force special tactics squadron, the engineers were airlifted by C-17 and C-130 aircraft to Castle Airport, a former Strategic Air Command base located just south of Merced, California. In short order, riggers from Fort Bragg's 612th and 647th Quartermaster Companies and 27th Engineer Battalion Soldiers prepared the unit's equipment for the trip back to Fort Bragg.

Earning the title "Tiger Battalion" in the 1960s for its reputation for executing demanding training, the 27th Engineer Battalion lived up to its name during Operation Hydra. Less than a week after notification, the battalion conducted an airborne assault with paratroopers and heavy equipment. In less than 72 hours, the battalion had improved and expanded Fort Hunter Liggett's landing zone, greatly increasing its maximum capacity. The successful execution of all missions displayed the battalion's ability to respond quickly to any call that requires its specialized skills.

First Lieutenant Freund is the executive officer of Charlie Company, 27th Engineer Battalion (Combat) (Airborne), Fort Bragg, North Carolina. Commissioned through the Army Reserve Officer Training Corps at the University of North Carolina at Chapel Hill, he is a graduate of the Ranger School at Fort Benning, Georgia, and the Advanced Airborne School's jumpmaster course at Fort Bragg.

Before Equipment and Training, There Must Be Engineering

By Major Thomas D. Heinold

The Multinational Security Transition Command–Iraq (MNSTC–I) has the mission "to assist the Iraqi government in the development, organization, training, equipping, and sustaining of Iraqi Security Forces (ISF) and ministries capable of defeating terrorism and providing a stable environment in which representative government, individual freedom, the rule of law, and the free market economy can evolve and which, in time, will contribute to Iraq's external security and the security of the Gulf Region." [1] None of this would be possible without facilities and the engineers it takes to plan, design, and construct them.

Fortunately, MNSTC–I has thought about that, even if it's only implied in the mission statement above. The engineer staff (J-7) is ready to provide the facilities needed to stand up a national defense system for Iraq. Two separate sides of the J-7 execute these programs: the Ministry of the Interior (MOI), which is focused on the Iraqi Police (IP), and the Ministry of Defense (MOD), which is focused on the armed forces. Headquartered at Phoenix Base in Baghdad's International Zone, the J-7 facilitates a program that builds everything from ablution facilities to ranges. The MNSTC–I J-7 supports the headquarters and subordinate transition teams by providing suitable and lasting infrastructure for the ISF by planning, budgeting, and executing an infrastructure program with coalition and Iraqi funding. The J-7 also supports the ISF ministerial transition team mission with mentorship in the following areas:

- Infrastructure
- Long-term programming
- Policies
- Budgeting
- Execution
- Accountability
- Recapitalization programs
- Maintenance programs

The MOI section is primarily in charge of facilities for the IP, which involves police stations, training academies, ranges, and border forts. Iraq shares borders with Saudi Arabia, Jordan, Syria, Turkey, Iran, and Kuwait, so the IP have their hands full patrolling and manning border checkpoints. They ensure that no weapons of mass destruction are transported to support Al Qaeda or other terrorists, maintain order, and enforce trade and transportation laws. In addition to the facilities at road and pipeline crossings at the borders,

Facilities for an Iraqi army infantry brigade include billeting, dining facilities, headquarters and administration buildings, maintenance bays, and a fuel station.

This obstacle course for an Iraqi army infantry division is under contract to an all-Iraqi construction company.

internal security is also required. As the Iraqis stand up additional police forces and are issued new equipment, they need places to train, maintain, and operate those forces. The J-7 MOI is delivering on all counts.

The MOD section services the needs of the Iraqi armed forces, to include the following:

- Iraqi Ground Forces Command
- Director General of Intelligence Services
- Iraqi MOD
- Iraq's 13 Army divisions
- Iraqi Air Force
- Regional training centers
- Divisional training centers
- Iraqi Army Service Support Institute
- National maintenance and supply depots
- Besmaya Range Complex
- Other facilities required to build a trained, equipped, and sustainable armed force.

Once a requirement is identified—whether for billeting space, maintenance facilities, offices and administrative buildings, or training areas—the J-7 MOD works with the requesting organization to develop the requirement. This includes examining whether the Iraqis can use existing facilities, deciding if it would be more economical to renovate existing facilities or build new ones, answering questions about what the Iraqis will be able to operate and maintain in the long term once the project is completed, and determining the delivery date required.

There is such a staggering volume of effort required to provide facilities for all of the Iraqi security elements that very often the required delivery date has passed and there are already Iraqi units that need the facilities. In these cases, the J-7 has to prioritize work and request the shortest possible contract periods of performance while still providing a safe, quality project that will provide years of service. In a high operating tempo environment, the process is quicker than similar processes back home. Projects that would normally take months or even years to authorize and fund in a peacetime stateside environment may take only days in Iraq. Similarly, military construction projects that would take years on American soil may only take months in Iraq.

Between the MOI and MOD sections, the J-7 engineers have completed more than 520 construction projects valued at more than $1.5 billion. To deliver all of the requirements not yet met, they are now managing the ongoing development, acquisition, and construction of more than 220 projects. MNSTC–I is helping to build up the Iraqi capability for future construction contracting. More and more work is being done by Iraqi firms that have been working alongside U.S. contractors in Iraq, and the unskilled laborers hired for many projects obtain valuable on-the-job training that can qualify them as skilled laborers.

As the skilled labor base develops, Iraqi firms are beginning to assemble capable workforces that can deliver construction projects. Although it takes extra effort to overcome the language barrier and enforce contract standards that are new to the Iraqis, the effort will pay off in the long run. The Iraqi government will develop a contracting system, Iraqi contractors will become more capable, and U.S. forces will be able to step out of the picture and hand over the J-7 functions of the MNSTC–I to the Iraqis. One such success story is a Joint Contracting Command–Iraq/Afghanistan project that was awarded to an all-Iraqi company. Although most people thought the period of performance given to the contractor was practically unattainable, the J-7 established effective communication with the contractor and helped him through a new submittal process. After 60 days, the contractor was nearly finished constructing an obstacle course for divisional unit training at the Besmaya Range Complex, which is akin to the United States Army's National Training Center.

The contract development cell (CDC) is a J-7 section dedicated to tracking new requirements, developing contract documents to meet those requirements, deciding upon the contract

vehicle, coordinating with other MNSTC–I sections to ensure that they have provided authorization and funding for the requirements, and executing the contracting process to deliver the facilities needed by the Iraqis. The cell is a team of senior engineers and technicians working with elements within the MNSTC–I, which in turn works with the Iraqis and identifies what their facilities needs are. Those elements include the following:

- MNSTC–I supply/logistics
- Coalition Army, Air Force, and Navy transition teams
- Intelligence Transition Team
- MOD Advisory Team
- Coalition Police Assistance Transition Team
- Other advisory groups to the ISF that work to develop force generation plans, training plans, and schedules for equipping troops
- Any agency that requires facilities or infrastructure

The next step is approval by a program, budget, and acquisition council, a senior-level working group that meets within MNSTC–I to ensure that funds are spent appropriately. Once the element that originated the requirement gets council approval, it requests funding and provides an approved funding document to the finance section, which then funds the appropriate contracting agency. Then the cell goes to work, developing the statement of requirements or plans and specifications as appropriate, choosing the most appropriate or efficient contracting method, and following through with the contracting agency to get the project out for bids.

Keeping track of requirements is increasingly difficult as Iraqi forces stand up, identify new needs, and deploy to the front lines to fight the War on Terrorism. The J-7 works closely with the Coalition Air Force Training Team and the Coalition Army Advisory Training Team to provide facilities that support Iraqi force generation and force sustainment. As the Iraqis increase their capabilities, they constantly change or update their missions and often deploy to take on the counterinsurgency and counterterrorism fights. At times, this leaves vacant some of their basing infrastructure, so there is a constant need to reutilize or rehabilitate existing facilities, or construct new facilities to enhance the flexibility of those who will soon assume the security mission here.

MNSTC–I uses three main contracting vehicles: the United States Army Corps of Engineers Gulf Region Division, the Joint Contracting Command–Iraq/Afghanistan, and the Air Force Center for Engineering and the Environment. The J-7 works closely with all three to ensure that—

- Contracts are solicited and bids submitted in a timely manner.
- Delivery dates are coordinated with the needs of the Iraqi forces using the projects.
- Projects are supervised and administered closely to meet the specifications and deadlines in the contracts.

Ever since the invasion in 2003 decimated Saddam's armed forces, coalition forces have been in Iraq fighting terrorism, keeping the peace, and rebuilding the country. Not all of the construction is funded with U.S. dollars though. As the Iraqi government becomes more capable, more Iraqi money is funding projects, and U.S. funding is falling off. For the first few years of Operation Iraqi Freedom, U.S. funding constituted nearly 100 percent of the projects built for Iraq. However, there are no new requirements now being delivered with U.S. dollars. More and more, the Iraqi MOI and MOD are authorizing cases for the Foreign Military Sales program. These cases begin with a letter of request that identifies a requirement, which leads to the actual authorizing document, a letter of offer and acceptance. After that letter is signed, the Iraqi government provides funding to the American government, and MNSTC–I executes the requirement.

Although the government of Iraq is starting to develop capabilities for its own construction contracting, coalition forces still possess a unique capability that the Iraqis do not yet have up and running. Although U.S. expenditures are starting to shrink for MNSTC–I, the J-7's task will remain the same—to deliver the facilities the Iraqi forces need. Until the Iraqi forces have the facilities they need, the J-7 will remain poised to deliver them so that Iraq can equip and train its forces to assume full responsibility for the security mission in their country.

Major Heinold serves with the MNSTC–I J-7 (Engineer) Coalition/Joint Staff. He has been a mechanized engineer platoon leader and company executive officer with the 10th Engineer Battalion in Schweinfurt, Germany; an assistant battalion operations officer and engineer company commander with the 44th Engineer Battalion at Camp Howze, Korea; a project engineer and program manager with the Rock Island District of the United States Army Corps of Engineers Rock Island District; a task force engineer with Joint Task Force Shining Hope in Kosovo; a battalion operations officer with 13th Battalion (Combined Arms and Services Staff School); a battalion detachment commander of 11th Battalion (Command and General Staff College); a facility engineer with the United States Army Facility Engineer Group; and a Command and General Staff College instructor. He holds a bachelor's from the United States Military Academy at West Point, New York, and a master's from the University of Missouri–Rolla (now Missouri University of Science and Technology). He is a registered professional engineer in Illinois.

Endnote

[1]Multinational Security Transition Command–Iraq mission statement, "Multinational Security Transition Command–Iraq directorate pages**,"** <*http://www.mnstci.iraq.centcom.mil*>.

Letter To The Editor

Fueling the Front Lines: Army Pipeline Units

I recently finished reading the article "Fueling the Front Lines: Army Pipeline Units" by Mr. Thomas J. Petty in the January–March 2008 issue of *Engineer*. I just wanted to let you know that the active Army did stand up another pipeline company, although it was only briefly. The 585th Engineer Company (Pipeline) "Roughnecks" was stood up in late 2005, originally under the 23d Chemical Battalion at Fort Lewis, Washington.

In 2006, the 585th completed a joint training exercise that involved constructing aluminum pipe. The company also transferred to the 864th Engineer Battalion (Heavy) in the spring of 2006. In November 2006, the 585th deployed to Afghanistan in support of Operation Enduring Freedom. The Roughnecks successfully completed a 15-month tour and returned to Fort Lewis in February 2008. In September 2008, the 864th Engineer Battalion transformed from a combat heavy battalion to the new combat effects battalion. As part of the transformation, the 585th was transformed from a pipeline company to a vertical construction company. To the best of my knowledge, the active Army is once again left without a pipeline company. I only had the privilege of serving in the 585th for a few months as a second lieutenant before I transferred to another company in the 864th.

I thoroughly enjoyed the article on the history of the pipeline companies, and I commend Mr. Petty on his service.

Captain Robert W. Green
Battalion Construction Officer
864th Engineer Battalion

Dedication

The following members of the Engineer Regiment have been lost in the War on Terrorism since the last issue of *Engineer.* We dedicate this issue to them.

Alfonso, Specialist Carlo E.	40th Engineer Battalion, 2d Brigade Combat Team	Baumholder, Germany
Badie, Private First Class David J.	Special Troops Battalion, 3d Brigade Combat Team	Fort Hood, Texas
Barnett, Private Charles Y.	12th Cavalry Regiment, 4th Brigade Combat Team	Fort Hood, Texas
Bryant, Private First Class Jamel A.	40th Engineer Battalion, 2d Brigade Combat Team	Baumholder, Germany
Bull, Sergeant Douglas J.	Special Troops Battalion, 3d Brigade Combat Team	Fort Hood, Texas
Girdano, Second Lieutenant Michael R.	Special Troops Battalion, 3d Brigade Combat Team	Fort Hood, Texas
Gulczynski, Private First Class Leonard I.	14th Engineer Battalion, 555th Engineer Brigade	Fort Lewis, Washington
Hutton, Private Timothy J.	54th Engineer Battalion, 18th Engineer Brigade	Bamberg, Germany
Jackson, Private James	14th Engineer Battalion, 555th Engineer Brigade	Fort Lewis, Washington
Johnson, Specialist Geoffrey G.	Division Special Troops Battalion, 4th Infantry Division	Fort Hood, Texas
McHale, Sergeant James A.	40th Engineer Battalion, 2d Brigade Combat Team	Baumholder, Germany
Setzler, Private First Class Tavarus D.	7th Cavalry Regiment, 4th Brigade Combat Team	Fort Hood, Texas
Smith, Sergeant Timothy M.	4th Brigade Special Troops Battalion, 4th Brigade Combat Team	Fort Polk, Louisiana
Smith, Private First Class Tyler J.	3d Battalion, 7th Infantry Regiment, 4th Brigade Combat Team	Fort Stewart, Georgia
Stanciel, Sergeant First Class George	54th Engineer Battalion, 18th Engineer Brigade	Bamberg, Germany
Wright, Captain Darrick D.	Headquarters and Headquarters Company, 926th Engineer Brigade	Montgomery, Alabama

2008 Army Deployment Excellence Awards

By Mr. Henry H. Johnson

The 2008 Chief of Staff, Army Combined Logistics Excellence Award ceremony and banquet was held at the Hilton Alexandria Mark Center Hotel in Alexandria, Virginia, on 3 June 2008. Lieutenant General (LTG) Ann E. Dunwoody, Deputy Chief of Staff, G-4, hosted the event and recognized winners and runners-up in the areas of maintenance, supply, and deployment excellence. The Deployment Excellence Award (DEA) recognizes Army units and installations (Active Army, Army Reserve, and Army National Guard) for outstanding accomplishments that meet or exceed Army deployment standards (see table on page 35). The program is meant to enhance unit and installation deployment skills and proficiency, share innovative deployment initiatives, and capture deployment training trends.

LTG Stephen M. Speakes, Deputy Chief of Staff, G-8, congratulated the awardees on behalf of General George W. Casey, Army Chief of Staff. He delivered the keynote address to an audience of congressional dignitaries, senior Army generals, senior executive civilians, and a host of Soldiers, Family members, and friends. LTG Speakes thanked LTG Dunwoody for the opportunity to address the lifeblood of the Army, "the logistical community and our partners in the industry."

He said that "Logistics is a noble profession that dates back to Roman times, where early efforts at logistics transformed armed mobs to a sustained military capability. Since then, wars have been won and lost based on the ability to support the force. Since those times, we refined those procedures for the warfighter in Operation Iraqi Freedom and Operation Enduring Freedom. Behind every operation is a sea of human faces making the impossible happen—the men and women who are my heroes."

Winning units and installations received a personalized note from the Army Chief of Staff, the Combined Logistics Excellence Award program commemorating the unit's accomplishment, a plaque, and a coin set that included coins from the Army Chief of Staff; Sergeant Major of the Army; Deputy Chief of Staff, G-3; and Deputy Chief of Staff, G-4. Winners and runners-up received a three-night stay at the luxury Hilton Alexandria Mark Center Hotel and toured the Pentagon, the Capitol Building, the National Mall, and other places of interest in Washington, D.C. In addition, they attended the "Twilight Tattoo," a colorful military pageant held at the Jefferson Memorial.

The awardees' celebration concluded with a banquet in their honor, hosted by Army Deputy Chief of Staff, G-4, which included congratulations from keynote speaker General Benjamin Griffin, Commanding General, United States Army Materiel Command, and entertainment by the Army's Down Range Chorale.

The 2009 Deployment Excellence Award competition is now open to Active Army, Army Reserve, and Army National Guard units and installations that execute or support a training or contingency deployment or redeployment during the competition year. All units and installations are encouraged to plan now to compete in this elite contest.

The significant dates for the 2009 competition are as follows:

- 1 December 2007–30 November 2008: Competition period.
- 1 December 2008 - 25 January 2009: Submit unit packets to higher headquarters.
- 31 January 2009: Army Command, Army Service Component Command, and Direct Reporting Unit-selected nomination packets are due to the DEA evaluation board.
- 9-20 February 2009: DEA board.
- 4-27 March 2009: Validation team visits.
- 13 April 2009: Winners announced.
- 2 June 2009: Awards ceremony and banquet.

The DEA letter of instruction contains detailed guidance/instructions for competing units and installations and is available at *<https://www.eustis.army.mil/deploy>*. For additional information, contact the DEA Program Manager, ATTN: Mr. Henry Johnson, Building 705, Room 215, Fort Eustis, Virginia 23604, DSN 826-1833 or commercial 757-878-1833.

Mr. Johnson, a retired command sergeant major, is the Deployment Excellence Award Program Manager at the Deployment Process Modernization Office, Fort Eustis, Virginia.

2008 Deployment Excellence Award Recipients		
Category	**Winner**	**Runner-Up**
Active Large Unit	44th Expeditionary Signal Battalion 7th Signal Brigade Mannheim, Germany	1st Special Troops Battalion 1st Sustainment Command Fort Bragg, North Carolina
Active Small Unit	497th Transportation Company 57th Transportation Battalion Fort Lewis, Washington	89th Transportation Company 6th Transportation Battalion Fort Eustis, Virginia
Active Support Unit	180th Transportation Battalion Fort Hood, Texas	838th Transportation Battalion Rotterdam, the Netherlands
Army Reserve Large Unit	1185th Transportation Terminal Brigade Lancaster, Pennsylvania	3d Medical Command Third Army Forest Park, Georgia
Army Reserve Small Unit	322d Maintenance Company Arden Hills, Minnesota	828th Quartermaster Company Wilkes-Barre, Pennsylvania
Army Reserve Support Unit	Headquarters, Headquarters Company Civil Affairs Command Fort Bragg, North Carolina	1394th Deployment Support Brigade Camp Pendleton, California
National Guard Large Unit	41st Infantry Brigade Combat Team Tigard, Oregon	141st Brigade Support Battalion Portland, Oregon
National Guard Small Unit	730th Quartermaster Battalion Ahoskie, North Carolina	Headquarters, Headquarters Detachment 1144th Transportation Battalion Delavan, Illinois
National Guard Support Unit	Joint Forces Headquarters-Minnesota Little Falls, Minnesota	Joint Forces Headquarters-South Carolina Columbia, South Carolina
All Army Installation (Tie)	Fort Stewart, Georgia Fort Hood, Texas	NA
Operational Deployment	3d Armored Cavalry Regiment Fort Hood, Texas	NA
Operational Deployment	66th Engineer Company 2-25th Brigade Combat Team Schofield Barracks, Hawaii	NA

Illustration by Mica Angela Hendricks

Power Surge:

249th Engineer Battalion Conducts Electrical Inspections and Repairs

By Lieutenant Colonel Paul B. Olsen

During the summer of 2008, national news outlets were not covering the civil engineering successes being achieved by the United States Army Corps of Engineers (USACE) and units of the Engineer Regiment throughout Iraq, but rather a troubling electrical engineering situation emerging within the base camps housing U.S. forces. Since the beginning of Operation Iraqi Freedom, 16 U.S. personnel had been fatally electrocuted in Iraq, including 10 Soldiers, 5 Marines, and a Defense Department contractor.

In response to these tragic fatalities, Multinational Force–Iraq (MNF–I) stood up and now leads Task Force Safe Actions for Fire and Electricity (TF SAFE) to mitigate the risk of accidental electrocution of deployed personnel. Today, TF SAFE is proving to be a unique partnership between MNF–I, the Defense Contract Management Agency (DCMA), and USACE. This partnership highlights the technical skills of its first responders, the noncommissioned officers (NCOs) of the 249th Engineer Battalion (Prime Power).

Scoping the Problem

The electrical problems in Iraq are enormous in their number and complexity. Engineers and planners for TF SAFE, USACE, and the 249th Engineer Battalion (known as the "Black Lions") continue to tackle this theaterwide problem, which includes hundreds of contingency operating locations, thousands of buildings, and tens of thousands of temporary facilities. All of these facilities require electrical safety inspections. To immediately establish a safety mindset among Soldiers in-theater, the commander of TF SAFE initiated a theaterwide awareness program to halt the use of unauthorized electrical equipment usage such as daisy-chained power strips and illegal hot plates. Additionally, TF SAFE purchased tens of thousands of certified pieces of equipment, such as fuse-protected power strips and outlet adaptors, to exchange at no cost with Soldiers for noncertified equipment previously available for purchase in-theater.

Senior leaders understood that electrical hazard awareness and equipment exchange programs can only do so much. They felt that the root cause for the accidental shocks and electrocutions could be traced to the improper electrical wiring of temporary U.S. facilities. Recent statistics support their conclusion, indicating that the majority of reported electrical shocks occurred while Soldiers conducted daily tasks in container express (CONEX) units, containerized housing units (CHUs), and ablution (AB) or hygiene units.

Electrical shocks in facilities are avoidable. In certain cases in-theater, improperly wired CONEX, CHU, and AB units—combined with equipment failures—resulted in electrocutions. This could have been avoided in certain cases through the emplacement of proper electrical bonding and grounding systems. The proper electrical wiring of CONEX, CHU, and AB units mitigates the risk of future accidental electrocutions. A safely wired facility is considered "bonded and grounded" with the presence of a wiring system that permanently joins all metallic parts within a facility or unit and provides a safe path for electrical current to travel back to its source, or to the ground. Before bonding and grounding inspections and repairs could commence, a theaterwide electric code was needed to determine the inspection and repair standards, and that code would be the National Electric Code (NEC). With this standard in place, TF SAFE and USACE leaders focused training on NEC bonding and grounding compliance to inspect, report, and repair the wiring problems.

Providing Technical Competence

The 249th is a versatile power generation battalion assigned to USACE to provide commercial-level power to military units and federal relief organizations during full spectrum operations. When ordered to deploy to TF SAFE, the battalion and its eight active platoons were experiencing an extremely high operations tempo. The equivalent of one platoon was supporting Operation Enduring Freedom,

including an emergency power plant installation. Two platoons were already deployed to support Operation Iraqi Freedom, with two more platoons replacing them. The equivalent of one platoon was preparing to deploy on a separate overseas mission and other missions all over the world. With Hurricanes Gustav, Hanna, and Ike brewing, one platoon was being held in reserve in case it was needed stateside. The battalion had one remaining platoon available for duty with TF SAFE.

The deployment of this platoon signaled the initial USACE support response to TF SAFE. On 6 September 2008, the platoon of 14 NCOs from Alpha Company, 249th Engineer Battalion, traveled from Schofield Barracks, Hawaii, to Winchester, Virginia, to attend a week-long deployment preparation course, as well as initial bonding and grounding instruction. The platoon arrived in Kuwait by 14 September to certify on theater-required Warrior Tasks and reported to TF SAFE in Baghdad on 19 September, one day ahead of schedule. Two senior NCOs from Bravo Company, 249th Engineer Battalion, augmented TF SAFE to form its operations cell.

Electricians from across USACE followed the 249th Engineer Battalion Soldiers. Under a refined deployment plan, all inspectors first travel to the USACE Deployment Center at Winchester, Virginia. There they get uniforms, equipment, and refresher training on bonding and grounding before deploying to Victory Base. The USACE plan is to send approximately 125 electricians and 37 fire protection personnel to TF SAFE by December 2008.

Providing Organizational Competence

While the platoon from Alpha Company and the initial USACE electricians were deploying, TF SAFE wasted no time in its preparations to begin NEC compliance inspections. Although the inbound inspectors were current with the bonding and grounding requirements of the NEC, additional theater-specific training was required. A second one-week training course under the instruction of a master electrician/certified inspector and a DCMA electrical engineer prepared the inspectors for what they would soon see in-theater. On 25 September 2008, TF SAFE graduated its first class of 14 inspectors from the 249th Engineer Battalion. These 14 Black Lions were divided into two groups to better address the two categories of TF SAFE inspections. Ten Soldiers would respond to the facilities under the Logistics Civil Augmentation Program (LOGCAP) contract to ensure contractor compliance with the NEC, and four would respond to facilities not under LOGCAP contract to oversee the repair of noncompliant electrical systems. The command and control task was overseen by the 249th Engineer Battalion's liaison officer and two NCOs.

Using a 21-point inspection checklist, the 249th Engineer Battalion NCOs inspected a large group of CHUs on Victory Base. They found that the majority of the units were not properly bonded because they were missing a bonding jumper wire common to most NEC-compliant distribution panels. Although this fault only requires a 10-minute fix, it may be a common problem throughout the thousands of CHUs in-theater.

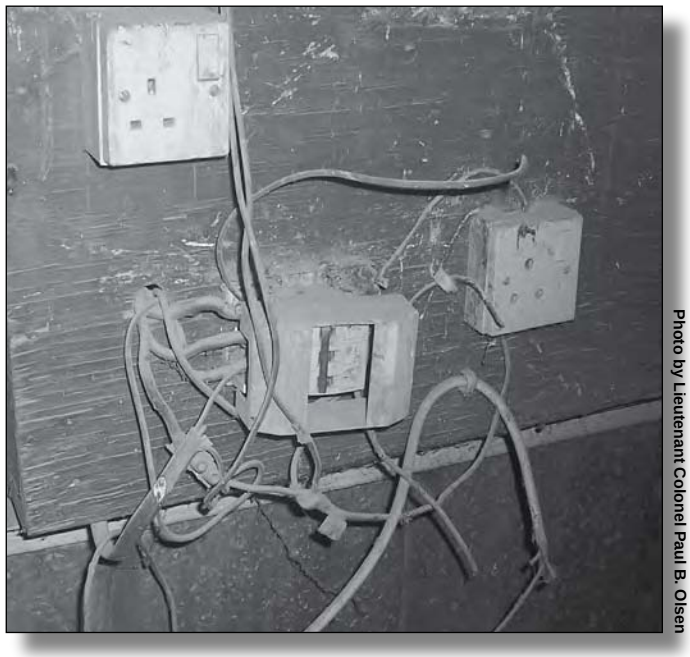


Photo by Lieutenant Colonel Paul B. Olsen

Haphazard wiring at a former Iraqi army facility

Early inspection results from contingency operating locations (non-LOGCAP facilities) suggested a more serious problem. Some electrical work at these small, strategic bases was not in compliance with the NEC, or with any code for that matter. In defense of the commanders of the area of operations, the noncompliant electrical work was often the result of a successful counterinsurgency tactic: to support emerging Iraqi micro-economies, the Commander's Emergency Reconstruction Program allows local contractors to do electrical work. In the case of all inspections, when severe faults (those that pose a dire threat to life) are identified, the 249th Engineer Battalion NCOs and USACE electricians immediately repair them. Lower risk faults are prioritized and repaired by contracted electricians or, in the case of area of operation commanders, directed to be repaired by qualified military electricians.

Conclusion

Although TF SAFE cannot reverse the tragic electrocutions of 16 U.S. personnel, its work highlights the ability of USACE and DCMA to successfully cooperate to counter the significant theaterwide challenge posed by accidental electrocutions. Soldiers in the grade of specialist and sergeant interested in joining the 249th Engineer Battalion should contact Command Sergeant Major Clint Pearson at *<clinton.pearson@us.army.mil>*.

Lieutenant Colonel Olsen commands the 249th Engineer Battalion (Prime Power). He holds masters' in business management and civil engineering and is a licensed professional engineer in Virginia.

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publications Currently Under Revision

Publication Number	Title	Date	Description (and Current Status)
FM 3-34	*Engineer Operations*	Jan 04	This is the engineer keystone manual. It encompasses all engineer doctrine; integrates the three engineer functions of combat, general, and geospatial engineering; and addresses engineer operations across the entire spectrum of operations. **Status:** The estimated date for posting to Army Knowledge Online (AKO) is Winter 2008/2009.
FM 3-34.22 (FM 3-34.221) (FM 5-71-2) (FM 5-71-3) (FM 5-7-30)	*Engineer Operations – Brigade Combat Team and Below*	Pending (Jan 05) (Jun 96) (Oct 95) (Dec 94)	This new manual will encompass engineer operations in support of brigade combat teams (BCTs) (heavy, infantry, and Stryker–the armored cavalry regiment) and their primary subordinate units (infantry battalion, Stryker battalion, combined arms battalion, and the reconnaissance squadron). This manual will supersede FM 3-34.221, FM 5-7-30, FM 5-71-2, and FM 5-71-3. **Status:** The estimated date for posting to AKO is Spring 2009.
FM 3-34.23 (FM 5-116) (FM 5-100-15) (FM 5-71-100)	*Engineer Operations – Echelons Above Brigade Combat Team*	Pending (Feb 99) (Jun 95) (Apr 93)	This is a new manual that will encompass engineer operations in support of all engineer operations above the BCTs (division, corps, and theater). The intent is to consolidate and revise three engineer FMs that provide doctrinal guidance for the entire spectrum of engineer operations supporting echelons above the BCT level. This manual will supersede FM 5-71-100, FM 5-100-15 and FM 5-116. **Status:** Preparing the final draft for staffing.
	Combat Engineering		
FM 3-90.11 (FM 3-34.2)	*Combined Arms Mobility Operations*	Aug 00	This is a full revision, to include renaming and renumbering of FM 3-34.2, *Combined Arms Breaching Operations*. Changes in the force structure have required adjustment of the tactics, techniques, and procedures (TTP) associated with breaching and clearance operations. **Status:** On hold for release of FM 3-90, *Tactics*.
FM 3-90.13 (FM 5-102) (FM 90-7)	*Combined Arms Obstacle Integration*	Sept 94 Mar 85	This revised manual will contain the basic fundamentals associated with countermobility operations and will incorporate aspects of the contemporary operating environment (COE). **Status:** On hold for release of FM 3-90, *Tactics*.
FM 3-34.300 (FM 5-103)	*Survivability*	Jun 85	This manual provides survivability information needed by commanders and staff at the tactical level. It includes guidance on integrating survivability into planning and order production and creation of the engineer running estimate. It provides examples of a survivability capabilities card, matrix, and timeline to assist with the planning, revision, and conduct of specific survivability tasks. **Status:** On hold for release of FM 3-10, *Protection*.

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publication Number	Title	Date	Description (and Current Status)
Combat Engineering (continued)			
FM 3-34.281 (FM 20-11)	*Military Diving*	Jan 99	This manual, formerly an adaptation of the Navy diving manual, will support one of the modular units of the MEF. Within the Army, it is used by special operations forces, as well as engineer divers. The entire Navy diving manual will not be adopted; instead, the targeted sections applying to Army diving use will be adopted with other Army-specific considerations being added. **Status:** Final draft; expect publication in Spring 2009.
General Engineering			
FM 3-34.400 (FM 5-104)	*General Engineering*	Nov 86	This manual describes the operational environment (OE) and how to apply and integrate general engineering principals in support of full spectrum operations. It focuses on the establishment and maintenance of lines of communications and engineer support to sustainment operations throughout the area of operation. Although not designated as a multi-Service publication, it is intended to inform all Service components of the types of general engineering tasks, planning considerations, the variety of units available to perform them, and the capabilities of Army engineers to accomplish them. **Status:** The estimated posting to AKO is Spring 2009.
FM 3-34.410 Volumes I & II (FM 5-430-00-1 & 5-430-00-2)	*Design of Theater of Operations Roads, Airfields, and Helipads*	Aug 94; Sep 94	This manual will serve as a reference for engineer planners in support of joint and theater operations in the design of roads, airfields, and helipads. This manual is currently dual-designated with the Air Force. The Navy plans to adopt it as well. **Status:** Adjudicating comments on the final draft.
FM 3-34.451 (FM 5-472)	*Materials Testing*	Dec 92	This manual will provide technical information for obtaining samples and performing engineering tests and calculations on soils, bituminous paving mixtures, and concrete. For use in military construction. The test procedures and terminology will conform to the latest methods and specifications of the American Society for Testing and Materials (ASTM), the American Concrete Institute (ACI), and the Portland Cement Association (PCA), with alternate field testing methods and sampling techniques when complete lab facilities are unavailable or impractical to use. **Status:** Adjudicating comments on the final draft.
FM 3-34.465 (FM 3-34.465 & FM 3-34.468)	*Quarry Operations*	Mar 05; Dec 03 (Apr 94)	This manual outlines the methods and procedures used in the exploration for and operation of pits and quarries. It provides information on equipment required for operating pits and quarries and for supplying crushed mineral products, but does not cover the operation of the stated types of equipment. This is a collaborative effort with the Navy and includes the newest technologies and current practices. **Status:** Preparing the final draft for staffing to the force.
FM 3-34.469 (FM 5-484)	*Multi-Service Well Drilling Operations*	Mar 94	This manual is a guide for planning, designing, and drilling wells. It focuses on techniques and procedures for installing wells and includes expedient methods for digging shallow water wells, such as hand-dug wells. This is a collaborative effort with the Navy and includes the newest technologies, current practices, and revised formulas. **Status:** The estimated date for posting to AKO is Spring 2009.

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publication Number	Title	Date	Description (and Current Status)
General Engineering (continued)			
FM 3-34.485 (FM 5-415)	*Firefighting Operations*	Feb 99	This manual gives directions on deploying and using engineer firefighting teams. These teams provide fire prevention/protection, aircraft crash/rescue, natural cover, and hazardous material (HAZMAT) (incident) responses within a theater of operation (TO). This is a parallel effort with the revision of the firefighting Army regulation (AR) to bring both policy and doctrine current with required certifications, newest technologies, and current practices. **Status:** Initiating the program directive and developing the initial draft.
FM 3-34.500 (FM 3-100.4)	*Environmental Considerations in Military Operations*	Jun 00	This manual provides environmental protection procedures during all types of operations. It states the purposes of military environmental protection, a description of legal requirements, and a summary of current military programs. It also describes how to apply risk management methods to identify actions that may harm the environment and appropriate steps to prevent or mitigate damage. **Status:** The estimated date for posting to AKO is Spring 2009
Geospatial Engineering			
FM 3-34.600 (FM 3-34-230)	*Geospatial Operations*	3 Aug 00	This full revision of FM 3-34.230, *Geospatial Operations*, will incorporate changes as a result of FM 3-34, Engineer Operations, and FM 3-0, *Operations*. Geospatial engineering consists of those engineer capabilities and activities that contribute to a clear understanding of the physical environment by providing geospatial information and service to commanders and staffs. **Status:** Preparing the initial draft.

NOTE: Current engineer publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil*> or the MSKN website at <*https://www.us.army.mil/suite/page/500629*>. The manuals discussed in this article are currently under development. Drafts may be obtained during the staffing process or by contacting the engineer doctrine branch at: Commercial 573-563-0003, DSN 676-0003, or <*douglas.merrill@us.army.mil*>. The development status of these manuals was current as of 5 November 2008.

Engineer Doctrine Contact Update

The Engineer Doctrine team would like to introduce to the Regiment its newest member, Mr. Doug Merrill, who is taking over from Mr. Jeff Beacham as the Engineer Senior Doctrine Analyst. Doug's Army Knowledge Online (AKO) contact information is <*douglas.merrill@us.army.mil*>. If you haven't already, you will soon begin to see the staffing of draft doctrine coming to you from Doug.

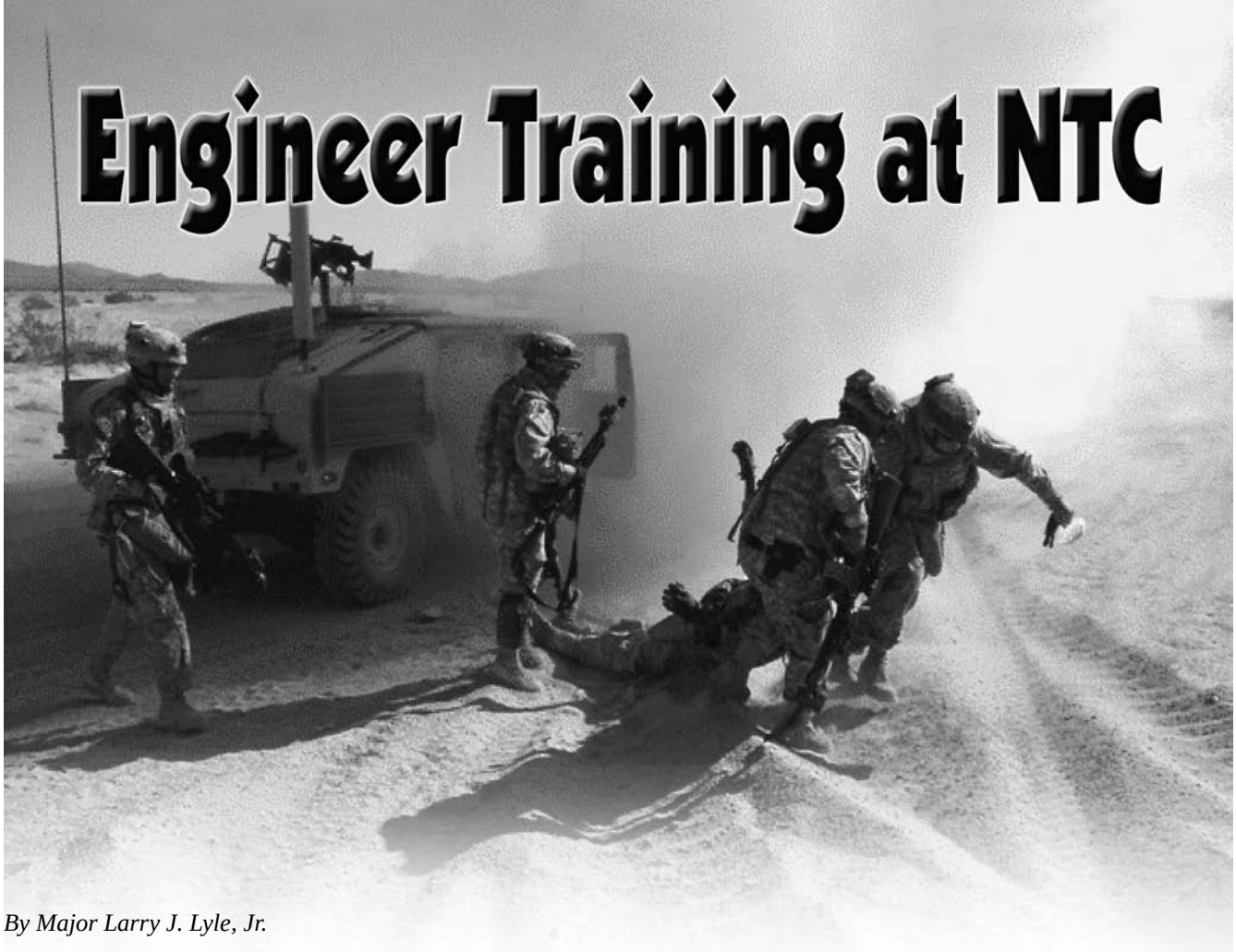
A new Maneuver Support Knowledge Network (MSKN) website has been established for Engineer Doctrine. There you can download the current manuals in the Engineer Doctrinal Hierarchy, as well as drafts of the various manuals under revision, and can stay updated on the status of those revisions and view the final comment matrices on each draft. The page may be reached through the MSKN homepage or via this link, which goes directly to the Engineer page vice the MSKN homepage after AKO login: <*https://www.us.army.mil/suite/page/500629*>.

The Engineer Doctrine element is the lead for the Regiment's doctrine. The Engineer School's Doctrine Division is consolidated at the MANSCEN level within the MANSCEN Directorate of Training (MDoT) Doctrine Division. The telephone numbers for Engineer Doctrine are—Doctrine Chief, (573) 563-7537; Senior Doctrine Analyst, (573) 563-0003 (DSN prefix, 676-).

The mailing address for written correspondence is: Commandant, United States Army Engineer School, ATTN: ATZT-TDD-E, 320 MANSCEN Loop, Suite 220, Fort Leonard Wood, Missouri 65473-8929.

For electronic correspondence, the generic NIPR e-mail address has changed to <*leon.mdottddengdoc@conus.army.mil*>.

Engineer Training at NTC



By Major Larry J. Lyle, Jr.

The National Training Center (NTC) at Fort Irwin, California, remains at the forefront of training for the War on Terrorism. Rotational unit training is conducted in conjunction with the latest tactics, techniques, and procedures (TTP) from the Iraq and Afghanistan theaters, as well as current and emerging doctrine using situational training exercises (STXs) and full spectrum operations mission rehearsal exercises (MREs). The training is now embedded with a set of counterinsurgency (COIN) fundamentals based on Field Manual 3-24, *Counterinsurgency*. NTC can train all types of engineer units, to include the following:

- Mobility augmentation companies
- Horizontal/vertical construction companies
- Organic maneuver brigade engineer companies

The purpose of the training at NTC remains focused on helping the unit see its strengths and weaknesses and get better each day. This article focuses on the training NTC offers to engineer units.

Reception, Staging, Onward Movement, and Integration

A rotation at NTC begins with a 5-day stage of building combat power called reception, staging, onward movement, and integration (RSOI), followed by a 14-day MRE. The MRE is typically divided into a 6- to 8-day STX followed by full spectrum training for the remainder of the rotation, culminating in a brigade-level operation. The engineer units that train here continue to remain as flexible and adaptive as ever, whether conducting route clearance operations, constructing entry control points (ECPs), or supporting maneuver forces for an out-of-sector mission. Engineers continue to be at the tip of the spear in both lethal and nonlethal missions.

The RSOI process continues to evolve and change with an ever more robust schedule of training events and equipment distribution for the rotational unit. The engineer units that come to NTC find this is a time of fast-paced training with new equipment drawn from the Army Center of Excellence (ACOE). The equipment listing from ACOE is not all-encompassing and continues to evolve as NTC receives new equipment that not only enhances training but also helps improve a unit's combat readiness. Now engineer units must balance the prerequisites of rail download operations, Multiple Integrated Laser Engagement System (MILES) installation, negotiations training, and vehicle and equipment preparation while simultaneously training on the aforementioned list of equipment. ACOE training includes many different focuses: robotics, route clearance equipment such as the Buffalo and Husky, and tools such as the Biometric Automated Toolset and Handheld Interagency Identity Detection Equipment. Training on intelligence-gathering equipment for intelligence section personnel will assist them in the fight against

An engineer element conducts route clearance operations.

improvised explosive devices (IEDs). After 5 days, RSOI training transitions to a combined arms operation with a tactical road march into "The Box" and the occupation of forward operating bases (FOBs) to begin conducting company-level STX lanes and the battalion/brigade relief in place (RIP)/transfer of authority (TOA) process.

Situational Training Exercises

The STX lane training at NTC drills down to the Soldier and company team levels. A full rotation of STX lane training is executed throughout NTC with a specified level of enemy personnel, civilians on the battlefield (to include Iraqi-American role players), and real-time after-action review (AAR) capability for the most realistic training available. Possible STX missions include the following:

- Area clearance
- Route clearance
- Mounted combat patrol
- Dismounted combat patrol
- FOB/ECP security
- Medical trauma
- COIN classes
- Personnel recovery

STX lanes focus on collective training based on the individual Soldier skill sets gained during RSOI. Each lane is executed using an observer/controller script that is standard throughout the operations group. Battalions and companies can tailor lane specifics to meet their training objectives. STX lanes execution is normally conducted at the platoon level for route clearance and FOB/ECP security, and at the company level when conducting mounted and dismounted combat patrol. Additionally, units can request lanes that are tailored to other training if they request it at least 90 days out. Feedback on the STX lanes is immediate, with AARs after every iteration. Units can retrain multiple times on a lane if leaders want to increase readiness or train on different TTP related to the lane.

"Engineers continue to be at the tip of the spear in both lethal and nonlethal missions."

Live-fire training such as convoy operations, urban operations, and air-ground integration can also be conducted during STX lane training when coordinated through the higher unit headquarters of the brigade conducting the rotation. Soldiers and crews must be qualified on their individual weapons or must have conducted crew qualification to standard to participate in live-fire training. Engineer units have also conducted live demolitions training at NTC, to include dynamic breaching charges in the urban environment.

Full Spectrum Operations

Full spectrum operations begin after the RIP/TOA has been conducted and the rotational unit assumes control of the battlefield. Full spectrum missions for engineer units may include route clearance/sanitation, counter-IED working group, and division-directed construction or

A Buffalo mine-protected vehicle interrogates an IED.

improvement operations at FOBs, ECPs, combat outposts, or joint coordination centers. The counter-IED fight encompasses a significant amount of the full spectrum operations effort as engineers work in conjunction with the land-owning unit. Route clearance operations training teaches units to incorporate route clearance team efforts with the intelligence, surveillance, and reconnaissance planning of the maneuver unit and the historical pattern analysis of IED attacks within the area of operations. The counter-IED fight incorporates all elements—to include battalion and brigade staff integration—as well as the planning, preparation, and subsequent execution of the patrol matrices.

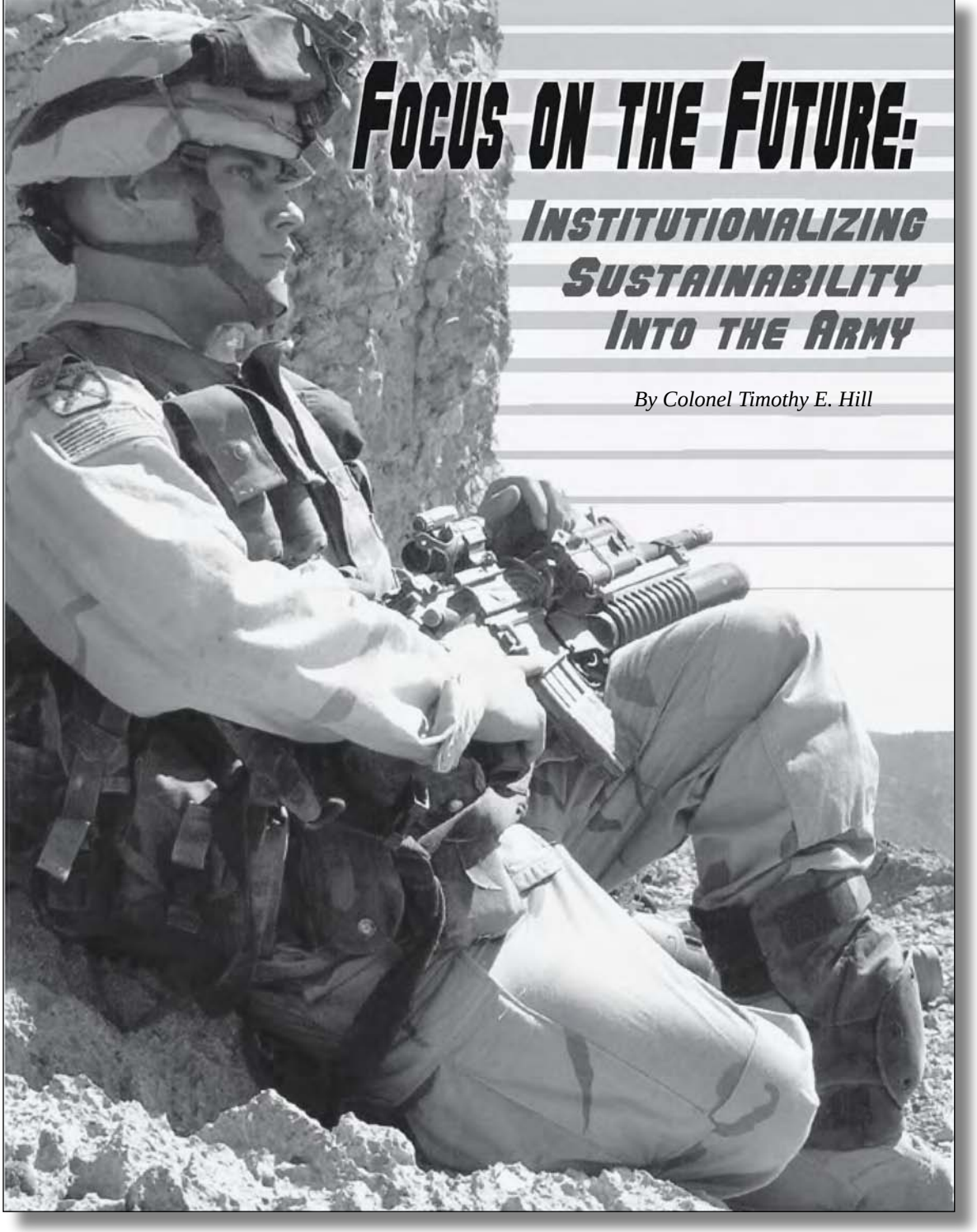
The IEDs replicated at NTC represent the latest emerging threats of anti-Iraqi forces from the Iraq and Afghanistan theaters. Units are continually challenged by a well-rehearsed enemy in a realistic environment.

NTC continues to give the rotational unit as many TTP as possible to "add to their kit bag," and while not all may pertain to the unit's assigned area of responsibility in-theater, they nevertheless increase the knowledge base of the Soldiers and the unit. Also, Soldiers are encouraged to use skills gleaned from United States Army schools as part of their training.

Conclusion

NTC continues to offer engineer units the same world-class training that it has since its inception in 1982. The War on Terrorism and the rapidly changing pace of the United States Army mandates the need for the combat training centers to design and conduct training as current as the fight in-theater. Training at NTC will continue to reflect the need for intensely focused, mission-specific training for this fight, and provide the Army's Soldiers and leaders with the best training in the world.

Major Lyle is an observer/controller with the Sidewinder Team, Operations Group, at NTC. He is the assistant division engineer for the Operations Group and has previously served as a battalion task force engineer trainer, senior engineer company primary, senior armor company primary, and senior infantry company primary on the light infantry task force team (Tarantula) while assigned to NTC.



Focus on the Future:

Institutionalizing Sustainability Into the Army

By Colonel Timothy E. Hill

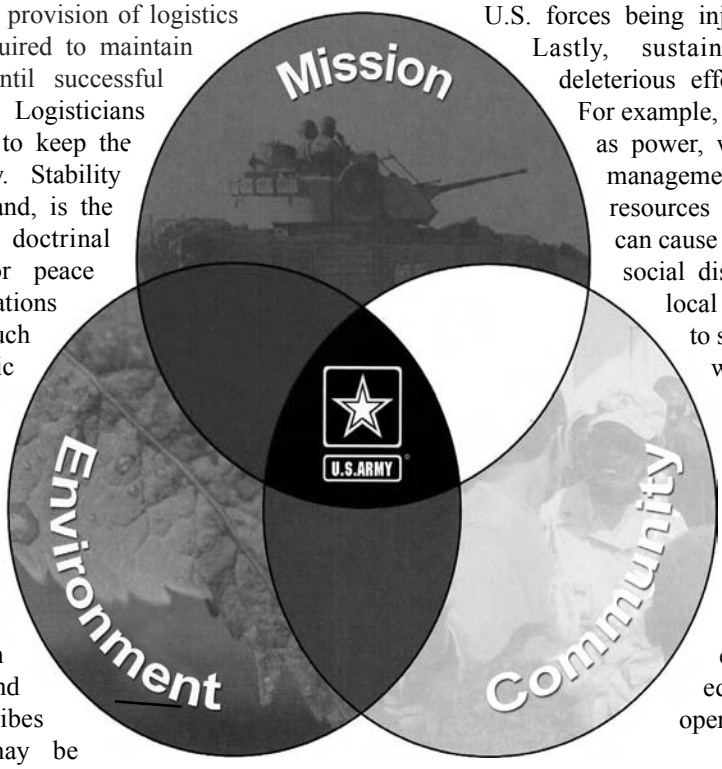
One hundred years from now, when the Army's senior leaders reflect on how well the Army of 2008 coped with its challenges across the globe, will they conclude that the Army succeeded by adopting a strategic vision that included sustainable development?[1] The answer should be in the affirmative.

Sustainable development owes its understanding to the concept of sustainability, which is defined as meeting present needs without compromising the ability of future generations to meet their own needs.[2] In other words, it means not squandering, depleting, or abusing the earth and its resources, but enhancing, enriching, and preserving them.[3] An Army that focuses on sustainability is an institution that seeks to maintain its organizational vitality and recognizes and values its stewardship responsibilities. Thus, institutionalizing sustainability through education and making it an integral feature of military operations will not only facilitate its introduction into Army culture but makes eminent sense for mission success as well.

Defining Sustainability

The term *sustainability* can be confusing to some in the Army because it sounds similar to other frequently used Army terms such as *sustainment* or

stability. Sustainment is the provision of logistics and personnel services required to maintain and prolong operations until successful mission accomplishment.[4] Logisticians discuss sustainment issues to keep the force supplied and ready. Stability operations, on the other hand, is the Army's all-encompassing doctrinal term for peacekeeping or peace enforcement. Stability operations are related to missions such as humanitarian and civic assistance, counterterrorism, counterinsurgency, and counterdrug efforts.[5] The Department of Defense defines stability operations as the military and civilian activities conducted across the spectrum from peace to conflict in order to establish or maintain order in states and regions.[6] This term describes where military forces may be employed to restore order and stability within a state or region where competent civil authority has ceased to function. These forces may also be called upon to assist in the maintenance of order and stability in areas where they are threatened, where the loss of order and stability threatens international stability, or where human rights are endangered.[7] Sustainment and stability operations produce results in the short-term while sustainability, in contrast, requires future thinking and a systems approach to provide long-term strategies and solutions for current and future challenges.



The Army defines sustainability as a comprehensive systems approach to planning and decision-making designed to sustain the natural infrastructure, which includes the land, water, air, and energy resources required to conduct our mission.[8] The Army Strategy for the Environment notes that sustainability benefits from the interrelationships of the triple bottom line of mission, environment, and community.[9] Yet, sustainability has other salutary features.

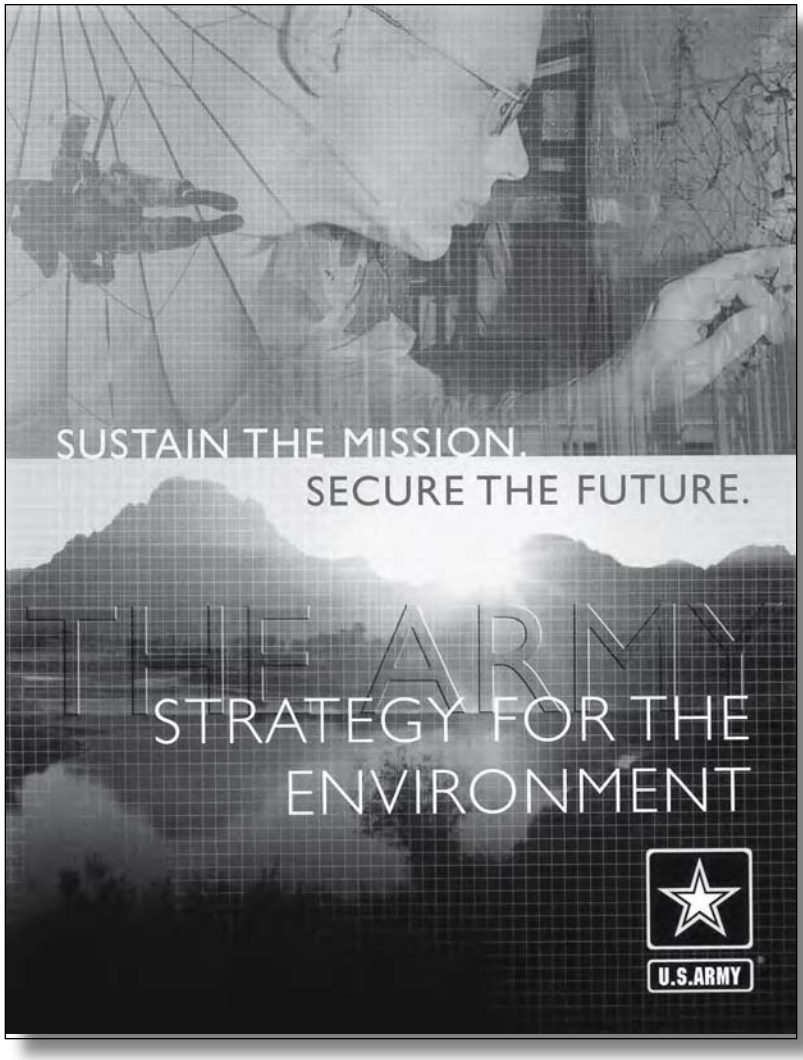
Sustainability, for example, expands the traditional military concept of stability[10] by requiring planners and operators to consider societal and environmental factors[11] during stability operations. Sustainability also can enhance military operations through base operations by providing more flexibility, reducing the logistics tail, and providing greater freedom for independent action for U.S. forces.[12] Additionally, reducing the logistics tail can reduce reliance on contractors by eliminating demands on the local infrastructure and environment. In overseas operations, reducing the number of contractors and logistics requirements reduces overall operational security requirements, thereby lessening costs and the likelihood of U.S. forces being injured, killed, or kidnapped. Lastly, sustainability addresses other deleterious effects of military operations. For example, drawing utility services such as power, water, sanitation, and waste management; labor; materials; or other resources from the local environment can cause resource shortages, inflation, social dislocation, and disruption of local economies.[13] Thus, attention to sustainability is the means by which the Army can enhance its capabilities in several mission dimensions—facilities management, combat operations, and nation building. So how does the Army get there? There are numerous paths, but one area to consider is education in both the formal education system and the operational environment.

Educating the Force

Educating the force can originate in the Army education system, but this is not the only place a Soldier will learn about sustainability. For example, the use of operations orders can help a Soldier learn about sustainability by the tasks the commander implies or specifies within the mission. The application of the officer evaluation report (OER) system is another method to enhance learning about sustainability, because the Soldier will be evaluated on the task. Soldiers can also learn about sustainability through the conservation and recycling practices of the garrison installation.

Nonetheless, institutionalizing sustainability into the Army is the first step to producing a culture that embraces sustainability practices, but this cannot be attained unless changes in strategy and doctrine are examined. "As the Army transforms to a future force with new systems, organizational structures, and new doctrine to achieve full-spectrum operational capability, our training enablers and infrastructure, along with realistic and relevant training venues, must continue to be readily available to match the timelines we have established to field the future force—one comprised of highly trained Soldiers poised to fight new and different kinds of conflicts while maintaining traditional warfighting skills."[14] This statement represents a rallying cry for the Army to address sustainability as a way forward. Training, training venues, and infrastructure changes are but a piece of how sustainability can be managed within the framework of education.

Institutionalizing sustainability into the Army requires the efforts of the Army Training and Doctrine Command



Cover of The Army Strategy for the Environment

(TRADOC). TRADOC states that it is the architect of the Army and that it "thinks for the Army" to meet the demands of a nation at war while simultaneously anticipating solutions to the challenges of tomorrow.[15] TRADOC can integrate sustainability education throughout its Noncommissioned Officer Education System and its Officer Education System. The curricula associated with these systems would introduce sustainability through maintenance training programs, weapons systems training, and training environments that simulate combat conditions to instruct students how to use sustainability practices within base camps. The school environment itself could help teach sustainability practices. As an example, the United States Army Engineer School can educate its students in sustainability by teaching them how best to use the land and natural resources where operations and training occur, thereby minimizing damage to the environment while protecting the land and its resources for the future. Another potential mode is to use training scenarios that include societal and environmental drivers and variables, such as the impact of prolonged regional drought on social stability and well-being, the possible destabilization of society through human migration, and the preventive measures that could forestall adverse results.

Sustainability could be institutionalized the way risk management was institutionalized into the Army. Risk management was introduced as a safety program to reduce the number of accidents that Soldiers experienced during training and military operations. It accomplished this aim by helping Soldiers understand how an accident could occur and instructing them on ways to minimize the probability of an accident or prevent it altogether. Risk management is the process of identifying, assessing, and controlling risks arising from operational factors and making decisions that balance risk costs with mission benefits.[16] Army leaders integrate risk management into their mission planning to anticipate safety hazards, establish preventive control measures, and require annual training.

Education on sustainability can be included in mission planning for both training and operations, as was the case for risk management. Commanders at every level can introduce sustainability considerations into their planning process to mitigate potential hazards, minimize destruction to the land and other natural resources, and reduce risks to animal and human life. Also, a specific annex can be incorporated into the operations order to implement and enforce sustainability measures. As commanders prepare their operations orders, they would use the sustainability annex to help subordinates prepare individual solutions for sustainability, based on their situations.

Another way to educate the force is through the after-action review (AAR) process. The AAR can incorporate sustainability lessons learned from the event so that the participants can learn the positive and negative effects of the operation on the environment. Identifying these effects allows commanders to determine how to change their standing operating procedures to incorporate sustainability practices into future operations.

Another avenue to educating the force regarding sustainability is by addressing it in the OER system. The evaluation requires that the commander conduct face-to-face counseling with subordinate officers as a way to monitor the subordinates' performance. If sustainability is included as a feature of the OER, this will force change within the ranks. At a minimum, the officers and their subordinates will learn about sustainability and figure out ways that produce results. The OER system is an excellent tool for commanders to document innovative ideas that subordinates develop on sustainability. Once the ideas begin to emerge and flow up the chain of command, sustainability practices will be more than just an idea and will be truly instilled into the Army culture.

Conclusion

The Army is transforming its formations to address current and future national security obligations. As the Army transforms, it should educate its Soldiers to incorporate sustainability practices and concepts to fulfill those obligations without undermining the environment or causing unnecessary harm to the societies it is charged to safeguard. Instilling sustainability into Army culture will require constant training, incorporating sustainability practices and concepts into—

- The Army School System.
- Mission training environments.
- Installations, through development of sustainable training areas and resident programs.
- OER system.

Taking such steps will instill the processes needed to educate Soldiers about their responsibility for sustainability. Further, promoting this training will help Soldiers in the future because the demands on them will be even greater as climate change, human migration, and burdens on dwindling natural resources forecast future regional conflict in places where the Army will be deployed to protect our national interests. Thus, Soldiers who are aware of these future demands, conscious of the critical nature of sustainability, and educated to take a systems approach to problem solving will "sustain the mission and secure the future" for the United States Army.[17]

Colonel Hill joined the United States Marine Corps in 1977 and served as an automotive mechanic until 1982, when he joined the Marine Corps Reserves. In 1984 he joined the West Virginia Army National Guard, went to officer candidate school, and received a commission. His experience includes assignments with the Engineer and Military Police Branches. He served in Operation Iraqi Freedom as base defense commander and provost marshal for Camp Anaconda in Balad. In 2005, Colonel Hill was provost marshal during Operation Katrina after Hurricanes Katrina and Rita devastated Louisiana and Mississippi. He is a graduate of the Command and General Staff Officers Course, Combined Arms and Services Staff School, Military Police Officer Advanced Course, and the Engineer Officer Basic and Advanced Courses. He holds a bachelor's in military leadership from the University of Charleston and a master's in adult and technical education from Marshall University. He is a graduate of the Army War College and serves with the West Virginia Army National Guard as Commander, 197th Regiment (Regional Training Institute), Camp Dawson, West Virginia.

Endnotes

[1]"President's Council on Sustainable Development: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century, May 1999," <*http://clinton4.nara.gov/PCSD/Publications/index.html,*> accessed 12 December 2007.

[2]Report on the Brundtland Commission, "Our Common Future," published by Oxford University Press, 1987.

[3]Manette Messenger, "So What IS this Thing called Sustainability?" Background paper for the Department of Defense Southeast Regional Planning and Sustainability Workshop, March 2007.

[4]Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, page 526, <*http://www.dtic.mil/doctrine/jel/new_pubs/jp1_02.pdf*>, accessed 26 December 2007.

[5]Nina M. Serafino, "Peacekeeping and Related Stability Operations: Issues of U.S. Military Involvement," Congressional Research Service-3.

[6]Department of Defense Directive 3000.05, "Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations," 28 November 2005, <*http://www.dtic.mil/whs/directives/corres/pdf/300005p.pdf*>, accessed 21 December 2007.

[7]James T. Quinlivan, "Force Requirements in Stability Operations," *Parameters*, Winter 1995, pp. 59-69.

[8]United States Army Posture Statement, "Addendum K, Army Sustainability Strategy," <*http://www.army.mil/aps/07/addendum_print/k.html*>, accessed 5 September 2007.

[9]The Army Strategy for the Environment, "Sustain the Mission, Secure the Future," 1 October 2004, <*http://www.asaie.army.mil/Public/ESOH/doc/ArmyEnvStrategy.pdf*>, accessed 10 September 2007.

[10]CRS Issue Brief for Congress, "Peacekeeping and Related Stability Operations: Issues of U.S. Military Involvement," 18 May 2006, *http://www.fas.org/sgp/crs/natsec/IB94040.pdf*>, accessed 11 October 2007.

[11]United States Army Posture Statement, "Addendum K, Army Sustainability Strategy," <*http://www.army.mil/aps/07/addendum_print/k.html*>, accessed 5 September 2007.

[12]Kurt J. Kinnevan, Chief, Directorate of Environmental Integration, United States Army Engineer School, e-mail message to author, 20 November 2007.

[13]Kurt J. Kinnevan, telephone interview by author, 20 November 2007.

[14]Army Public Affairs, "Army Announces Comprehensive Strategy," <*http://www.sustainability.army.mil/function/training_readiness.cfm*>, accessed 10 September 2007.

[15]Training and Doctrine Commanding General Vision Statement, <*http://www.tradoc.army.mil/about.htm,*> 15 October 2007.

[16]Field Manual 100-14, *Risk Management*, 23 April 1998.

[17]United States Army Posture Statement, "Addendum K, Army Sustainability Strategy," <*http://www.army.mil/aps/07/addendum_print/k.html*>, accessed 5 September 2007.

This article is reprinted from the Summer 2008 issue of *Maneuver Support Magazine*.

Wildfire Maps Aid FEMA Mission

By Dr. JoAnne Castagna

Photo courtesy of FEMA Joint Field Office

In October 2007, a series of wildfires began burning across Southern California, leaving death and destruction in their path. Twenty raging brush fires were fanned by strong winds that quickly spread to seven counties. At least 1,500 homes were destroyed, leaving thousands homeless, and more than 500,000 acres of land burned from Santa Barbara County to the United States–Mexico border. Nine people died as a direct result of the fire; 85 others were injured, including at least 61 firefighters. More than 6,000 firefighters fought the blazes, aided by United States Army units, almost 3,000 prisoners convicted of nonviolent crimes, and 60 firefighters from the Mexican cities of Tijuana and Tecate. Major contributing factors to the extreme fire conditions were drought, hot weather, and unusually strong Santa Ana winds with gusts reaching 85 miles per hour. The fires had numerous sources.

A precise method to help locate and assist displaced people was needed. In response, the Federal Emergency Management Agency (FEMA) sought the expertise and capability of the United States Army Corps of Engineers Geographic Information System (GIS). The Corps had used its GIS expertise on several past missions, including during response to Hurricane Katrina and 9/11 at the World Trade Center. In California, the GIS maps helped FEMA identify the affected areas in the scorched counties and locate displaced people requiring assistance. The maps will also help to protect the state from potential safety hazards that can result from wildfires in the future.

The GIS is a computer-based information system and tool for analyzing spatial data. It takes information from various sources, such as aerial photographs (pre- and postevent), drawings, satellite imagery, commercial data sources, and vector data from field sources such as fire perimeters, ignition points, and burn intensity data, and combines these layers of information in various ways as overlays to perform spatial analysis and produce an electronic map that depicts the results of that analysis.

There are several types of GIS maps:

- County and damaged structure maps
- FEMA individual assistance application maps
- Demographic maps
- Flood plain maps
- Soil burn severity maps

County and damaged structure maps identify counties adversely affected and damaged homes and businesses. The information shows FEMA where to set up Disaster Recovery Centers (DRCs) to enable residents to obtain FEMA assistance applications. Maps of the DRC locations were also created to direct the public to the nearest DRC. When FEMA receives assistance applications from residents, they contact them to verify the location of their damaged structure. FEMA then uses the Corps's GIS maps to verify that the county they live in was badly burned and that structures were damaged.

FEMA individual assistance application maps are used to locate where clusters of residents are submitting applications

Photo courtesy of FEMA Joint Field Office

An area of southern California engulfed in flames from wildfires that made their way across the region last fall.

for FEMA assistance, where damage may have occurred, and where a DRC may need to be set up.

Demographic maps locate where economically challenged individuals live who don't have transportation to get to the nearest DRC. Once identified, FEMA sends a mobile DRC to the area.

Flood plain maps identify areas that border rivers that are prone to flooding. In order for FEMA to set up temporary trailer parks for residents, it needs to know where flood plains are located in order to avoid those areas.

Soil burn severity maps show where the wildfires burned the most and where there is the most soil erosion. This is important for FEMA to know because when fire "cooks" the soil, it eventually breaks it up, leaving chunks of soil that are like pottery. When the rainy season comes, these large pieces of hard earth can cause mud slides on hills, injuring people and damaging property.

These GIS maps are also being used by groups other than FEMA. For example, the Environmental Protection Agency looked at the burned areas to see what environmental impacts had occurred, and emergency responders used them to identify where they needed to evacuate people. The geospatial information and data products provide disaster emergency managers and responders at all levels of government with information to help them make more informed decisions, ultimately reducing the risk to life, property, and the environment.

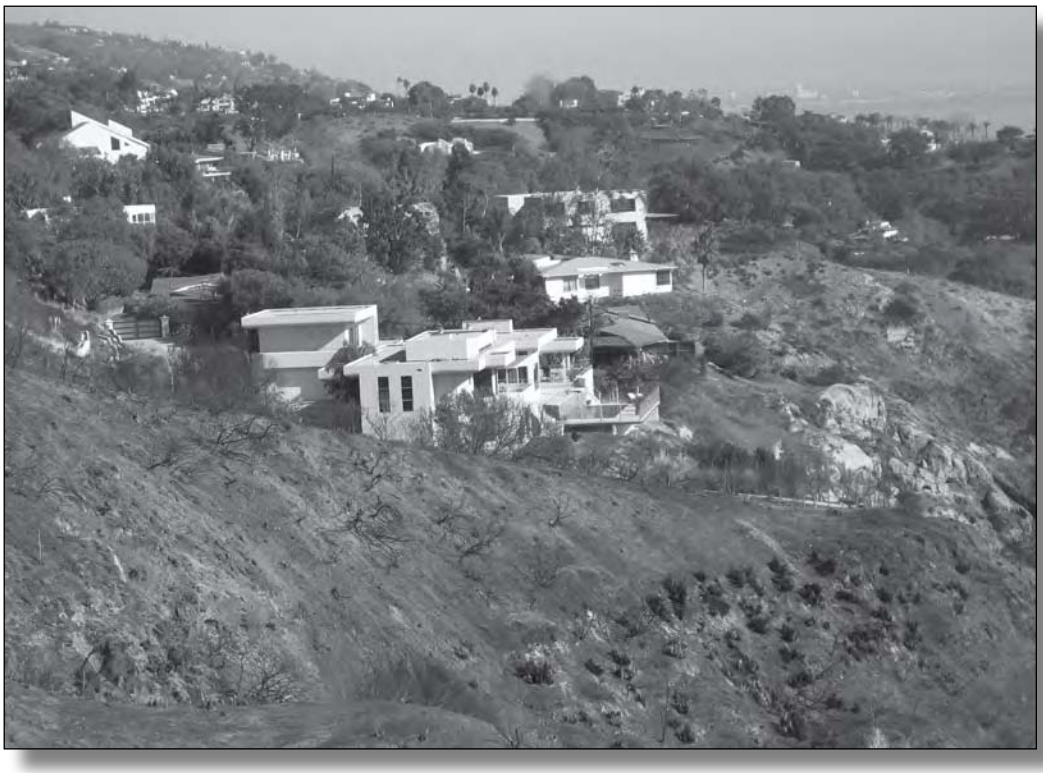


Photo courtesy of Chad Markin, USACE, Rock Island District

An area of southern California that was badly burned by devastating wildfires.

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The Battle of Shiloh

By Captain John T. Shelton

Each session of the Engineer Captain's Career Course (ECCC) is required to write an article analyzing a historical battle, and the best overall professional article receives the Thomas Jefferson Writing Excellence Award. This article was judged the best article of ECCC 1-08.

The two-day Battle of Shiloh was fought between the Union and the Confederacy on Sunday and Monday, 6 and 7 April 1862. On the first day, the Union force was composed of the Army of the Tennessee, commanded by Major General Ulysses S. Grant. On the second day, the Army of the Ohio, commanded by Major General Don Carlos Buell,[1] joined Grant's force. Most of the roughly 45,000 Union troops were from Regular Army units and included 19 infantry regiments, 5 artillery regiments, and 6 cavalry regiments.[2] The Confederate Army of Mississippi, under General Albert Sidney Johnston and General P.G.T. Beauregard, consisted of 4 corps, 16 artillery regiments, and 6 cavalry regiments. There were also 10 legions, or combined arms teams,[3] for a total of about 40,000 Confederate troops.[4] Few of the Confederate Soldiers were as well equipped or battle-tested as their opponents.

Major General Ulysses S. Grant

Major General Don Carlos Buell

Although the battle was fought over a two-day period, the focus of this article is on the second day, between 0700 and 1600. The Union forces that day consisted of the remnants of Grant's force from the previous day plus late-arriving reinforcements led by Buell and Major General Lew Wallace, which brought Union totals back to about 45,000 troops. Beauregard, who took command of the Confederate side when Johnston died during the first day's fighting, had only the remnants of his force from the day before, totaling less than 30,000 troops.[5]

Analyzing Day Two

There is no dispute that the Army of the Tennessee under Grant won the Battle of Shiloh. However, through the lens of modern doctrine and tactics, the events of the battle can be scrutinized and analyzed. Most of the decisions made by Grant and Beauregard are clearly supported by current United States Army doctrine and show both good and bad examples of how to apply its concepts.

Current doctrine supports Grant's offensive tactics, although he not did plan properly to exploit his success and

thus allowed the Army of Mississippi to escape. The battle on 7 April can be divided into three distinct phases:

- Phase I: Grant transitions to the offense
- Phase II: Beauregard retrogrades to Shiloh Church
- Phase III: Beauregard orders a retreat

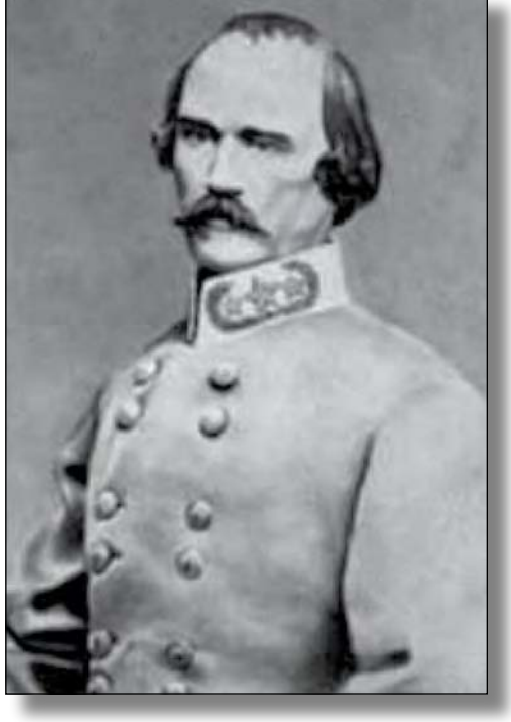
This article will address the current Army doctrine that applies to the actions—resulting in positive and negative outcomes—taken by both sides during these three phases. It also will analyze the implementation of the doctrine.

Phase I

After the fierce fighting on 6 April, both the Union and Confederate Armies needed resupplies of men, food, water, ammunition, and artillery.[6] The Union received reinforcements in the early morning of 7 April, and this marked the beginning of Phase I. The Army of Mississippi did not receive reinforcements, and many of the Confederate forces had no command and control higher than the company or platoon level. Grant saw this as an opportunity to retake ground lost the day before and transition into an offense. Beauregard was not aware of Grant's reinforcements and resupply and so did not act fast enough to reconsolidate his command and control. Beauregard still believed he was fighting an offensive battle against Grant. This lack of knowledge allowed Grant to seize, almost unopposed, two landmarks—the Hornet's Nest and Peach Orchard—that had been hotly contested the previous day.

Doctrine states that the purpose of defensive operations is to "buy time, economize forces, or develop conditions favorable to offensive operations."[8] Grant made this transition from a defensive to an offensive posture flawlessly. He used tactical patience to wait until the conditions were favorable to seize terrain that his forces had lost the day before. His scouts informed him that the Confederates were unable to mass any effects to slow his advance. Grant understood the purpose of the offense (which is to defeat the enemy), evaluated the best way to apply the characteristics of the offense,[9] and used every one of them to secure his success:

- *Surprise.* Grant used surprise, which in this attack was the most important characteristic, to keep the enemy from knowing he had gained additional men and supplies and launched a frontal assault against unprepared and under-equipped Confederate forces. Surprise allowed him to seize terrain he had lost on 6 April and to do so with little resistance.
- *Concentration.* Grant concentrated his forces and set the conditions to have a much larger force than the Confederates.
- *Tempo.* Grant synchronized the tempo of his forces to allow all subordinate commanders to attack at the same time and at a set speed in order to mass his effects.

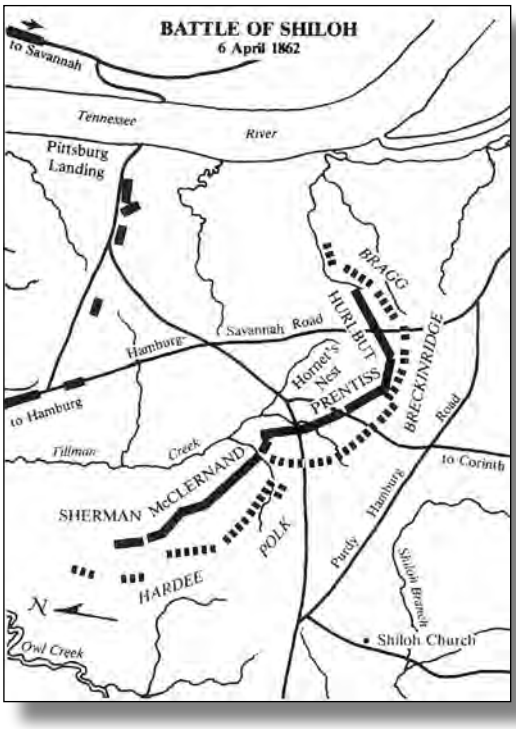


General Albert Sydney Johnston

- *Audacity.* Grant used audacity "to execute violently and without hesitation," rendering any Confederate resistance futile since they could not apply the elements of the defense or consolidate their command.[10]

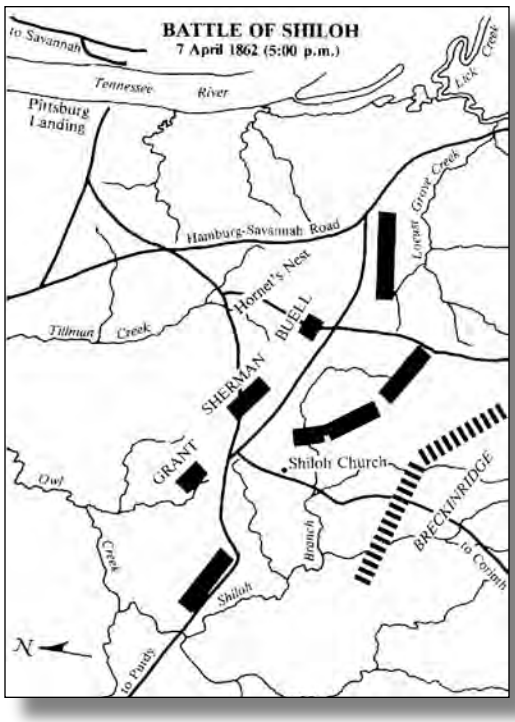
During Phase I, the Army of the Tennessee executed a perfect transition from the defense to the offense. This fact is clearly supported by Grant's use of the characteristics of the offense and his understanding of the purpose of the defense. Further, Grant's choice of a frontal assault, usually the least-preferred method of attack, produced a decisive result. Beauregard was unaware of the success of Grant's attack, illustrating Grant's successful use of surprise. Grant's effective

General P.G.T. Beauregard



use of his reconnaissance elements let him understand how and when to exploit Confederate weaknesses. Beauregard's lack of command and control and his inability to use his reconnaissance assets to get situational awareness caused his forces to fail in Phase I.

The tactical lesson here is to always have situational awareness as a commander and always use reconnaissance assets. Beauregard demonstrated that operating on an outdated and inaccurate common operating picture can have catastrophic results. His reconnaissance assets could have



let him know that the Union forces had been resupplied and repositioned. However, since he didn't know this, Beauregard thought he had plenty of time to reconsolidate his forces and even believed he was still on the offensive. This lesson directly affected everything that happened during the rest of the battle.

Phase II

Beauregard started receiving reports of Grant's success at about 1000 hours and now understood that he was conducting a failed defense. Further, his commanders were following orders that were 24 hours old and no longer applied to what was happening on the battlefield. Beauregard needed to coordinate his actions and prepare a defense. Confederate scouts reported that Grant had split his forces into three elements, each advancing independently but well synchronized. Beauregard analyzed the terrain that he still held and saw an advantage at Water Oak Pond, a hotly contested water feature on the battlefield. He decided to reconsolidate his forces and used some of them to stall Grant's advances and ordered the rest to retrograde to Shiloh Church. This plan succeeded in disrupting the tempo of Grant's advance.

Beauregard used his knowledge of the defense to buy time, economize his forces, and set up conditions to resume offensive operations. His plan was to—

- Retain decisive terrain, which in Beauregard's mind was forward of Shiloh Church and up to Water Oak Pond. This terrain left him a sizable footprint on the Shiloh battlefield.
- Fix Grant's forces using Water Oak Pond and nearby swamps. This would slow the tempo of the Union forces and perhaps desynchronize their efforts.
- Concentrate Grant's forces by getting him to commit his left flank at Water Oak Pond.

The Army of Mississippi executed defensive principles well, but Beauregard's plan failed in its use of surprise. Grant knew where Beauregard put his forces and understood what the Confederate forces were being used for. Grant could clearly see that Beauregard was trying to execute a retrograde, "a type of defensive operation that involves organized movement away from the enemy."[11] Grant believed he had forced Beauregard to initiate this action, but Beauregard believed he had done this on his own accord, so his confidence in his plan was still intact. Grant recognized the Confederate force as a rear guard, so he acted accordingly to reestablish the Union tempo. Beauregard thought he had slowed the Union force enough to accomplish his reorganization. The biggest problem Beauregard had in his plan to retrograde to Shiloh Church was in the determination of the Confederate main battle area. His forces did not concentrate their efforts enough to slow Union advances to buy the time needed.

The tactical lesson here is that communications make or break an operation. This lesson came from the Confederate Army's inability to employ all the aspects of a defense and its failed attempt to use a retrograde movement as the means

to regain the offensive. Beauregard understood how to execute the retrograde and his plan was solid, but his lack of coordination with subordinate units cost him the ability to use the retrograde properly. Beauregard's intent changed from a retrograde as a way to reestablish an offense to a retrograde as a way to withdraw. Because his intent changed in the middle of the battle, his forces were slow to react to his new plan. Beauregard knew how to do a lot of things well; he just did not do enough to regain the initiative and transition back to an offense.

Phase III

Reports continued that Grant's push was extremely successful, and Beauregard was shocked that his common operating picture was not accurate—again. However, Beauregard's scouts reported that Grant's men would not be able to pursue because Grant had stretched his lines too thin to maintain his tempo.[12] Once again, Beauregard analyzed his position and decided his best option to retain combat power was to withdraw from Shiloh. This effort would be a lot easier to coordinate since the Confederate communication lines were no longer stretched out, and what was left of his force was in the vicinity of Shiloh Church. Further, the Army of Mississippi's remaining artillery could cover the withdrawal. Beauregard positioned his rear guard in plain sight of the Union Army and began his withdrawal from Shiloh. Grant recognized what the enemy was doing and knew that by letting them retire from the field he had met his intent. The Union Army made no effort to pursue Beauregard's withdrawal and set up camp in the area around Shiloh Church. This ended the Battle of Shiloh.

Today's doctrine supports both Beauregard's and Grant's decisions in Phase III. However, neither the Confederate nor the Union leader executed their plan well. Beauregard's plan never put him in a position to destroy the enemy's ability to synchronize or stall his will to fight.[13] As before, Beauregard did not have good situational awareness. It would have been better to execute the Confederate withdrawal from Shiloh at the end of Phase II, but Beauregard continued to try to retake the initiative. His execution was weak; he only minimally met the criteria for a defense and could not synchronize his efforts with his subordinate commanders. The Confederate withdrawal worked well, but this owed more to Grant's weakness than to Beauregard's plan. Beauregard used his fire support well, not so much by inflicting casualties but as an effective means to give his withdrawal support by fire. The coordination during the Confederate disengagement was strong and the only reason his rear guard was not defeated. But ultimately, Beauregard met his last intent—to preserve his combat power.

Grant's weakness in Phase III was based on stretching his supply lines too thin and exhausting his troops. If he had attached his resupply assets to his units in direct contact with the Confederates, they could have made sure those units did not run out of ammunition, and so could have continued their pursuit. Also, Grant's infantry and cavalry moved too fast to integrate the Union artillery, keeping Grant from using one of his key battle systems. Grant did not set phase lines to control his tempo in Phase III, so Union troops pursued the Confederates until they were unable to continue. Stopping pursuit when they had the Confederates on the run was a direct result of this poor planning. Grant had the opportunity to destroy the Army of Mississippi but failed to do so—not for lack of mass but for lack of planning.

The tactical lesson learned here is at the expense of the Union. Failure in the combat, service, and support fight will stall an attack just as thoroughly as defeat by an enemy force. The end result of outrunning supply lines is a halt to the battle. When the enemy is conducting a retrograde with the intent to retire, it means the enemy was not defeated. In addition, Grant did not use his combat multiplier because his artillery could not keep up with his infantry and cavalry. The artillery could have destroyed Beauregard's rear guard and laid counter-battery fire on the Confederate guns.

Summary

The history books report that Grant was satisfied with the results of the Battle of Shiloh, but failing to defeat the enemy is not acceptable in today's Army, and it was not acceptable in the Civil War.

Captain Shelton was commissioned through the Army Reserve Officer Training Corps, served with the 36th Engineer Group and the 11th Engineer Battalion at Fort Benning, Georgia. He deployed to Iraq with the 36th Engineer Group in 2005. He graduated from the Engineer Captain's Career Course in April.

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[10] Ibid, p. 3-1.

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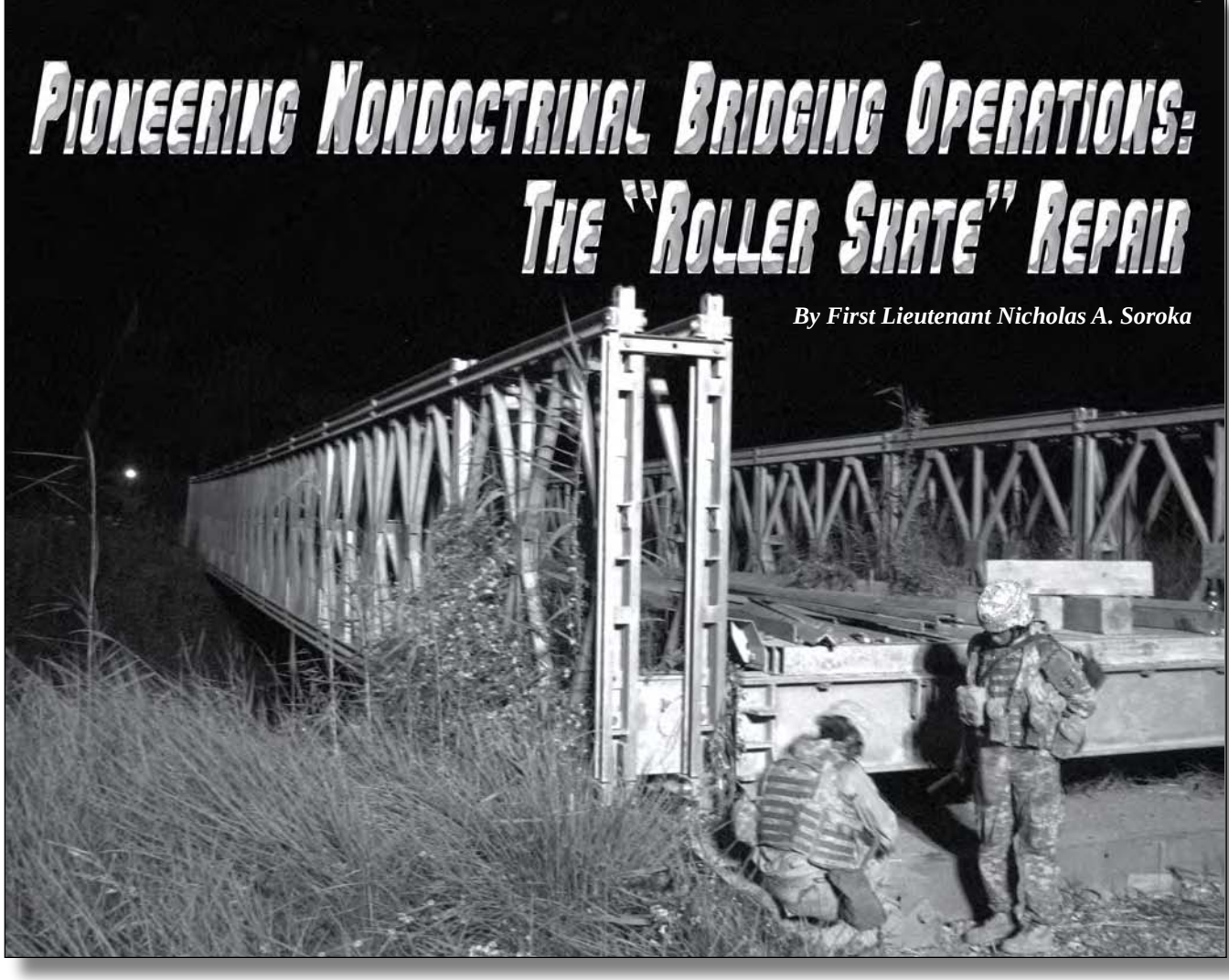
Pioneering Nondoctrinal Bridging Operations: The "Roller Skate" Repair

By First Lieutenant Nicholas A. Soroka



Engineers are fundamentally problem solvers. Whether the problem is getting people to their destination or shaping the battlefield, odds are that an engineer can and will solve the problem. Engineers can usually adapt tested, doctrinal methods to fit a given situation. But sometimes tested, doctrinal methods aren't enough. As the 502d Engineer Company learned while repairing a bridge near Baghdad, when engineers can't adapt doctrine, they must pioneer it.

The problem started with erosion cutting away the bank of a river. The edges of the bank were coming closer, day by day, to the ends of the bridge. The doctrinal approach would have engineers stop the erosion of the bank or extend the length of the bridge so its ends could rest a safe distance away from the precarious edge. But halting the erosion wouldn't solve the problem in this case, because the bridge already rested dangerously close to the river's edge. And the bridge was already at its maximum safe length. The bridge company would need another solution.

The Soldiers of the 502d continued to brainstorm for a new idea, but nearly everyone reluctantly agreed that the solution was going to be difficult. Because the bridge was

The roller skate sections, fabricated from damaged bridge parts, are ready to be transported to their destination.

Soldiers unpack one roller skate section that will be used to move the bridge.

originally emplaced at an angle, removing the entire bridge and building a new one at the correct angle would solve the problem. This would require a lot of resources, close the bridge for several days, and make it difficult to resupply Soldiers in some combat outposts. While some people would have accepted this difficult plan and its corresponding risk, one noncommissioned officer devised a nondoctrinal solution that would save manpower, resources, and perhaps lives—simply rotate the bridge.

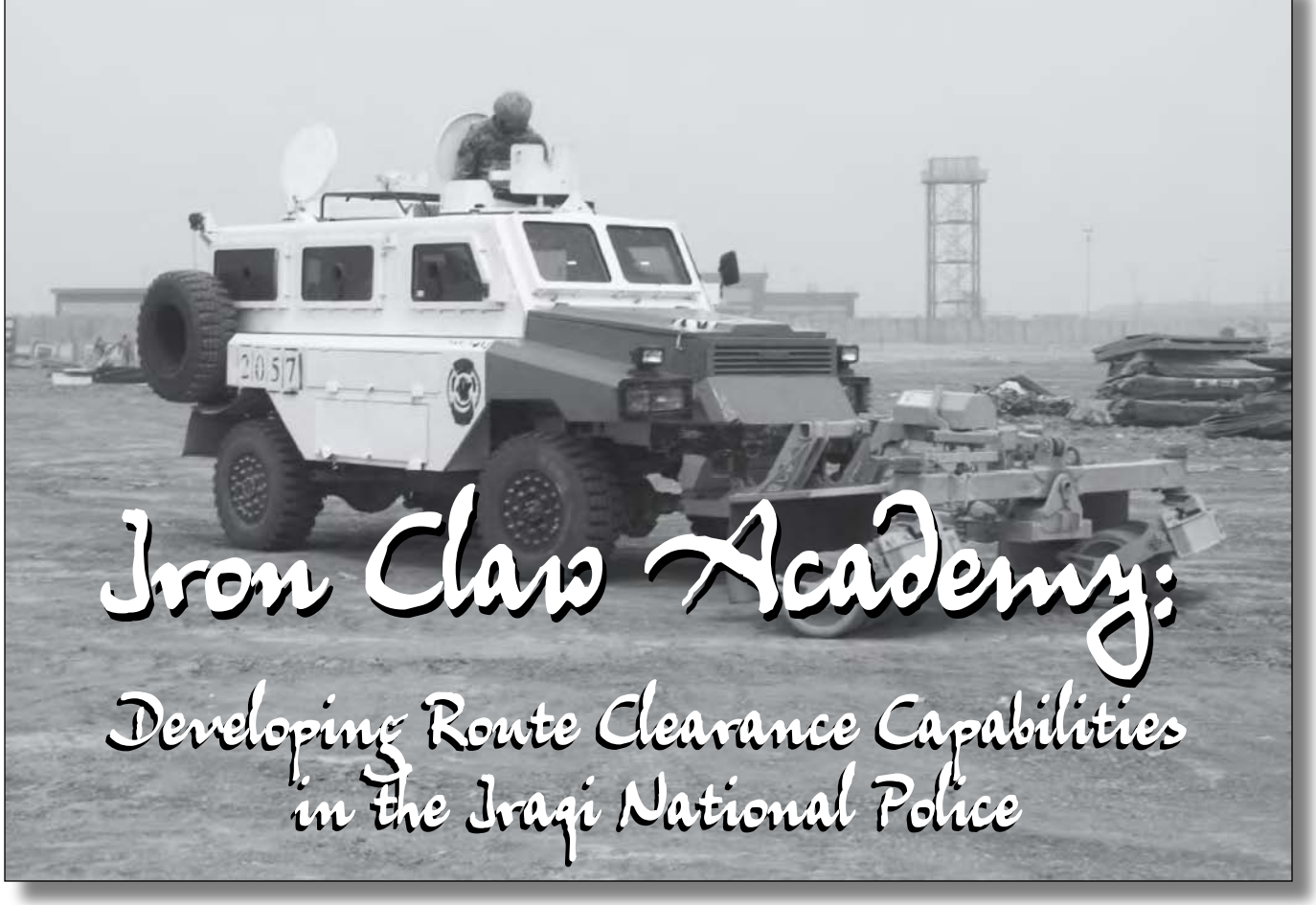
While the concept may seem elementary, rotating a 90-ton, million dollar bridge is anything but simple. Any such attempt would be nondoctrinal, unorthodox, and unprecedented. In short, the 502d needed to risk pioneering a new technique. Members from the company's maintenance platoon fabricated two pairs of enormous "roller skates" from damaged parts of older bridges. Sliding on these roller skates, both ends of the bridge could simultaneously swing into their new locations. But would the proposed solution work? While back-of-the-envelope calculations supported the design, no one could be sure without testing. Unfortunately, there wasn't enough time for testing. Even if the proposed solution were sound, dozens of other factors could easily lead to catastrophic failure.

Arriving on site, the 502d engineers quickly established security, removed the bridge's on-ramps, lifted the ends of the bridge, and attached the roller skates. Once the engineers connected the roller skates, they hooked up a system of winches to pull the bridge into its new position. Next came the moment of truth. The engineers paused and awaited the final command to start pulling. In a few short moments, the uncertainty surrounding this nondoctrinal solution would be settled. A loud "Pull" crackled over the radio, and the winches began to tighten. With an audible metallic groan, the bridge began to roll and rotated without a problem into its final position.

The plan worked. Engineers had solved the problem. Because the Soldiers of the 502d couldn't adapt old doctrine to solve a problem, they engineered a solution of their own. While some may consider this process risky, it's ultimately how new doctrine starts. By designing, implementing, and pioneering a nondoctrinal solution, the members of the 502d proved themselves worthy of the title "Engineers"—problem solvers.

First Lieutenant Soroka is a platoon leader for the 502d Engineer Company (Multirole Bridge), Hanau, Germany. He completed the Engineer Officer Basic Course in January 2007, and the Sapper Leader Course in February 2008 at Fort Leonard Wood, Missouri. He holds a bachelor's in civil engineering from the United States Military Academy at West Point, New York.

Photographs by First Lieutenant Nicholas A. Soroka.



Iron Claw Academy:

Developing Route Clearance Capabilities in the Iraqi National Police

By Captain Scott F. Swilley

Five years into Operation Iraqi Freedom, improvised explosive devices (IEDs) continue to pose a significant threat to coalition forces, Iraqi Security Forces (ISF), and the Iraqi population. The United States Army has invested a great deal of money in fielding vehicles with significantly improved survivability, and this equipment has unquestionably saved countless lives in Iraq. Nevertheless, most coalition forces adjust their patrol schedules and routes to avoid likely IED engagement areas. This is not true for the route clearance teams (RCTs) that patrol the streets of Iraq every day. These teams, affectionately known as "Iron Claw," continually patrol the neighborhoods and streets to find IEDs and keep the routes safe for travel.

While route clearance has traditionally been a primary mission for coalition forces, the development of an Iraqi route clearance capability will help the transition to tactical overwatch. Across Iraq, senior coalition force leaders are aggressively moving toward putting the ISF in the lead and developing additional ISF capabilities. An independent ISF route clearance capability would reduce Iraqi reliance on coalition forces and enable coalition force brigade combat teams (BCTs) to expand their route clearance efforts as unit boundaries shift over time or to mass coalition force route clearance teams in remaining security problem areas.

Recently, Soldiers attached to the 4th Infantry Division (Mechanized) took an important first step in building a future ISF route clearance capability. Through partnership, training, and certification, they dedicated their time and energy to creating an Iraqi RCT within an Iraqi National Police (NP) brigade. The brigade is a uniquely equipped unit that is responsible for securing a main arterial route in Baghdad.

Establishing a Partnership, Sharing a Vision

Developing a close partnership with the NP brigade was an essential step in developing the Iraqi Iron Claw team. Close coordination with the brigade's transition team opened the door for this relationship. The NP brigade commander was extremely receptive to the concept of developing the route clearance capability within his unit and training with U.S. Army engineers. The NP transition team served as an effective agent, negotiating numerous manning, equipping, training objective, and certification standards agreements with the NP brigade commander. Beginning in May 2008, Phoenix Iron Claw, the U.S. route clearance team, developed grassroots partnerships and began conducting combined patrols with the NP brigade. The NP brigade integrated armored security vehicles into Phoenix Iron Claw patrols and embedded ISF leadership in Phoenix Iron Claw command and control vehicles with a coalition force patrol leader and interpreter.

RCT Training

By June 2008, encouraged by the grassroots partnership efforts and the success of combined patrols, the NP brigade commander agreed to establish a dedicated

RCT called *Shurta*. Subsequently, the U.S. Soldiers began earnest preparations of the Phoenix ISF Iron Claw Academy. Modeled after the Task Force Iron Claw Academy used to certify coalition force RCTs upon arrival in the Iraqi theater of operations, the Phoenix ISF Iron Claw Academy trained and certified the NP brigade's RCT through a 10-day program of instruction that included individual, crew, leader, and collective training. The course outline consisted of three compounding phases: route clearance equipment training, tactics instruction, and practical exercises, plus a certification lane.

The U.S. Soldiers prepared training support materials in English and Arabic and vetted the translated training materials through several U.S. and Iraqi agencies for content, accuracy, and cultural sensitivities. The NP brigade delivered ISF vehicles a week in advance of the course start date in order to mount a mine roller and blower to the vehicles for additional counter-IED capabilities. The U.S. Soldiers certified trainers and rehearsed the use of translators for presentation of training materials.

Equipment Training

When the NP brigade route clearance platoon arrived for the first day of training, there were many familiar faces in the group from the combined patrolling and IED awareness training conducted in the preceding months. Upon arrival, the trainees moved to the local training area for three days of training on the following equipment:

- Buffalo
- Husky with ferret arm
- REVA (Reliable, Effective, Versatile, and Affordable), a South African wheeled armored vehicle

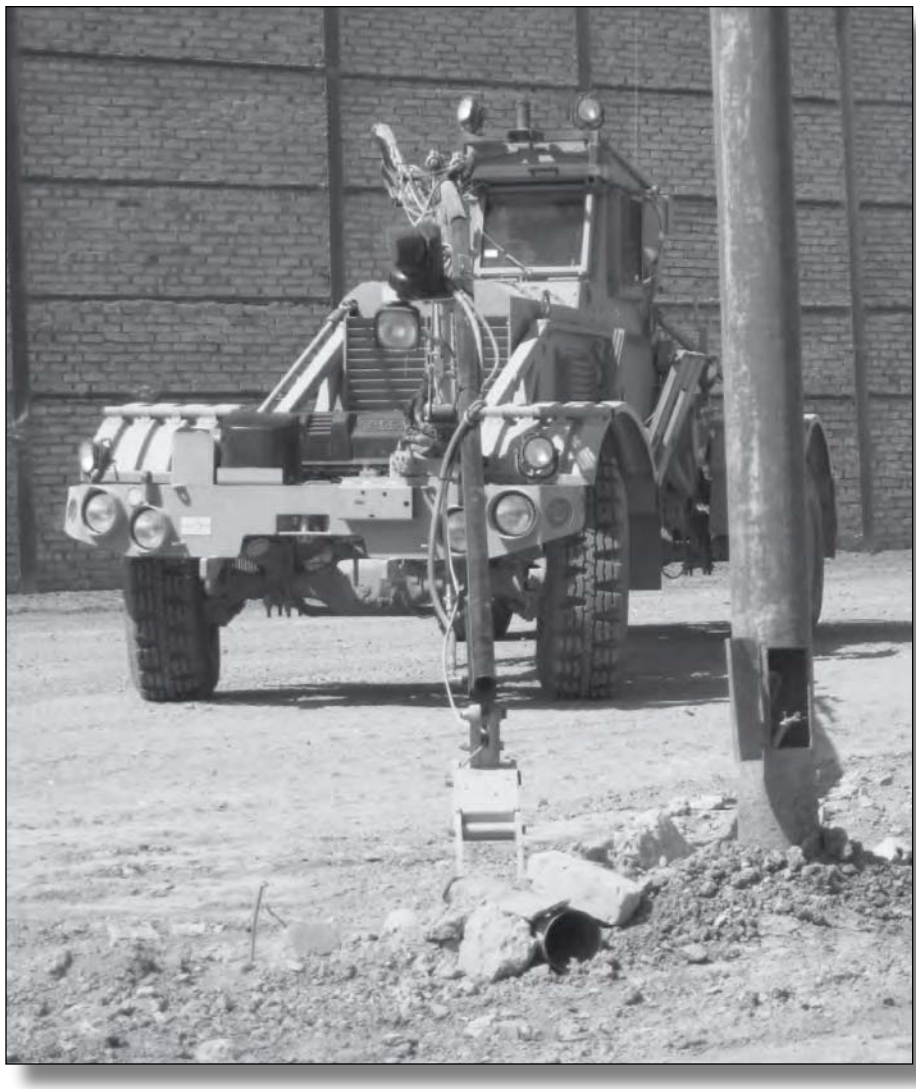
Equipment training mirrored U.S. Army standards for new equipment training, progressing from familiarization to preventive maintenance and finally to driver training. The driver's course included a ground-guiding lane, a closed half-mile course, and a serpentine course that allowed the drivers to better judge mine roller clearance and turn radius, critical skills while negotiating security checkpoints.

Tactics Instruction

As with the majority of training, the company noncommissioned officers (NCOs) took the lead and presented tactics instruction, through interpreters, to the students. To set conditions for effective practical exercises, the tactics instruction focused on the following:

- Mission preparation for a route clearance patrol
- IED indicators
- Battle drills
- Vehicle recovery
- Patrol formations

The classroom instruction also served two ulterior objectives: it provided a reprieve from 110-degree temperatures and highlighted the expertise and leadership role of United States Army NCOs. The opportunity to demonstrate the potential of the U.S. Army's NCO Corps encouraged the Iraqi RCT officers to empower their subordinates and foster initiative within the ranks. Several of the tactics classes focused on troop-leading procedures and the importance of participation by all members of the team during patrol preparation.



A Husky operator from the 1st National Police Brigade interrogates an inert IED with the ferret arm during the certification lane.

"Iron Claw teams continually patrol the neighborhoods and streets [of Iraq] to find IEDs and keep the routes safe for travel."

RCT patrol leaders reviewed material with U.S. instructors before presenting a block of instruction, so they entered the classroom with a solid understanding of tactics and a willingness to consider alternative patrolling techniques. The U.S. instructors encouraged the NP leaders to apply all available resources, most notably a mastery of the terrain and insight into enemy behaviors, to critical steps such as reconnaissance and surveillance.

Practical Exercises

The Iraqi RCT members exited the classroom eager for the opportunity to display their newfound IED defeat training. Throughout the training, they displayed marked improvement and their leaders willingly accepted advice. The practical exercises included an IED indicators lane, self-recovery of RCT vehicles, movement formations, and actions on IED battle drills.

An explosive ordnance disposal company and a weapons intelligence team supported the U.S. instructors and enhanced training during practical exercises by producing realistic training aids. Students negotiated the IED indicators lane one vehicle at a time, focusing on identifying as many indicators as possible. During the practical exercises, the Iraqi RCT leaders took over patrol preparation. The practical exercises included emphasis on deliberate rehearsals, to include the following:

- Rock drills on sand tables
- Walk-through rehearsals
- Radio rehearsals
- Mounted rehearsals
- Recovery operations exercises to reinforce the importance of precombat checks

Certification

The certification lane was the capstone event for the Phoenix ISF Iron Claw Academy. The Iraqi RCT leaders were assigned a typical main supply route clearance mission. U.S. instructors provided mock intelligence assessments with leading questions to provoke the tactical problem-solving techniques discussed during tactics instruction. The U.S. instructors evaluated the RCT patrol leader and his unit on the following:

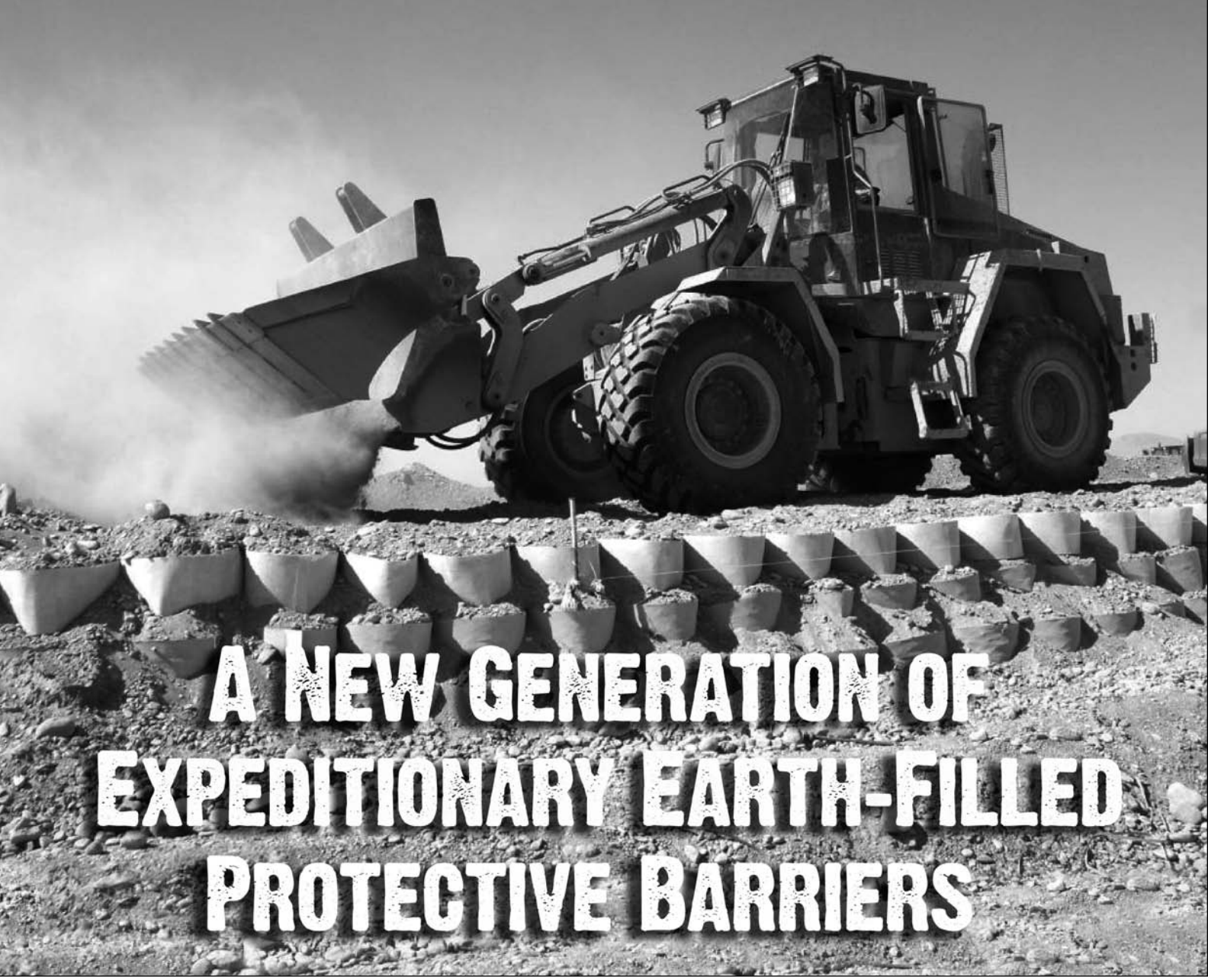
- Patrol preparation
- Use of visual aids
- Patrol briefs
- Rehearsals
- Conduct of the route clearance patrol
- Actions on contact
- Recovery
- Post-combat operations

The Iraqi RCT conducted two iterations of the certification lane. The first scenario focused on actions taken when an IED is found, while the second scenario involved a complex attack. Both iterations revealed areas that needed improvement, but overall the team met the standard for progression to combined route clearance operations.

Keys to Success

With the first cycle of Iron Claw training completed successfully, U.S. leaders identified several keys to success as takeaways to support future training and operations. Developing partnerships and obtaining Iraqi buy-in to form a dedicated RCT opens the door. Training Iraqi forces to perform the route clearance mission does not require the creation of a new training methodology; using the standard eight-step training model and the existing Phoenix Iron Claw Academy program of instruction worked well. Emphasizing patrol preparation is just as important as resourcing the RCT with special counter-IED equipment. Finally, a deliberate sustainment training plan, maintenance plan, and continued combined patrolling will enhance performance as the ISF moves forward. Transition requires willingness, patience, and training for both coalition forces and the ISF. As a result of this training, in a few short weeks Iraqi citizens will see their own security forces clearing important roads and recognize the willingness, patience, skill, and dedication of ISF and coalition forces in partnership together.

Captain Swilley has commanded Echo Company, 4th Battalion, 64th Armor Regiment, for two years as part of 4th Brigade, 3d Infantry Division. His past assignments include project manager, Division Engineers, 3d Infantry Division; operations and training (S-3) officer, 2d Battalion, 10th Infantry Regiment; training developer, United States Army Engineer School; and platoon leader, assistant S-3, and company executive officer, 16th Engineer Battalion. He holds a bachelor's from Louisiana State University and masters' in civil engineering and engineering management from the University of Missouri-Rolla (now Missouri University of Science and Technology), and is licensed as a professional engineer in Missouri.



A New Generation of Expeditionary Earth-Filled Protective Barriers

By Warrant Officer 2 Matt A. Graves

First there were sandbags, then came gabion baskets, and now a new element in field fortifications is emerging that could give sappers an enhanced, multifaceted capability for force protection. Since deploying to the Balkans more than 15 years ago, the Corps of Royal Engineers has become increasingly involved with the construction of static physical force protection in the form of blast walls, protective berms, *sangars* (fortified observation posts), and explosive ordnance disposal (EOD) protective works. We also continue to assist with infrastructure construction such as building roads, culverts, and flood protection measures.

DefenCell is a relatively new military innovation that will provide additional options when undertaking all of these tasks. It has been successfully used in Afghanistan by the British Army's 39 Engineer Regiment (Air Support) to construct protective berms and ground stabilization structures at several locations and at the Defence Explosive Ordnance Disposal School in Britain to improve its EOD training area. DefenCell is a geotextile polymer structure that has great strength, not just because of the textile's properties, but because of the cellular form of each unit. The cells confine the fill material and give it such load-bearing strength that it can be driven on or even compacted with heavy rollers. This in turn enhances its ballistic protection properties and aids the stability of the structures. Walls of substantial heights can be achieved by field engineers, and DefenCell engineers can help in the design of even higher structures.

Afghanistan Case Study

The 39 Engineer Regiment (Air Support) began construction of ammunition supply points (ASPs) that could securely contain large amounts of ordnance ranging from air-dropped weapons to trip flares. Among their goals, the engineers sought to—

- Eliminate the huge footprint a standard earthen berm would require.
- Reduce the logistical burden presented by a construction of this size.
- Develop a "metal-free" solution to reduce the danger of secondary fragmentation from possible explosions.

The higher headquarters of 39 Engineer Regiment (Air Support), 12 Engineer Brigade, approached Terram Ltd., a sister company of the U.S. firm Fiberweb™, because of the company's expertise in constructing geotextile cell berms for the oil and gas industry. Terram Ltd. provided a design that fulfilled all the requirements and, within four weeks of being contracted, manufactured the geotextile cells required to construct the berms for both ASPs and delivered 20 kilometers of geotextile cells. The reduction in the logistical requirement over alternate systems was a huge benefit when supplies had to travel thousands of miles, including passage through the Khyber Pass. And for Soldiers and commanders alike, the reduction of even one vehicle in a convoy is a real morale booster.

During the project, more than 16 kilometers of geotextile cells were laid until the required height was achieved. Approximately 20,000 cubic meters of sand were used to fill the cells, which were then compacted using plate compactors and heavy rollers. As the berms gained height, a crane lifted rollers atop the cells to allow compaction of the upper layers, adding to the stability and longevity of the design. A patented stacking system allows strong vertical walls to be constructed. This means that standard blast walls and compartments can be constructed, providing a realistic alternative to existing systems for the first time. This innovative product is emerging as a new generation in force protection systems that can provide additional capabilities or complement existing systems.

Comprehensive blast tests showed superior protection and revealed the design's ability to sustain damage to the outer cells while still retaining structural integrity overall. During these trials, another significant benefit of the cellular design was tested: its ability to sustain damage to the outer cells of a barrier while still retaining structural integrity overall. As a result of these tests, DefenCell has been specified as a barrier system for a number of security applications. As a ground stabilization product DefenCell is supplied in cells of two different sizes. In wet or unstable conditions, the cells are simply deployed, filled, and compacted to provide vehicle hardstand areas. Helicopter landing areas can also be established, with stabilizers added to the fill materials to prevent dust and downdraft erosion.

Additional Benefits

A key benefit of the DefenCell system is that it is very lightweight, nonmetallic, and compact. The individual units can be easily cut to shape and size and could be split down and readily man-packed. The system is packed on standard North Atlantic Treaty Organization (NATO) pallets and is readily air-droppable. The geotextile polymer has an ultraviolet (UV)-resistant additive, and barriers can be

DefenCell units form a protective barrier around a container.

An ammunition supply point is constructed from DefenCell units.

painted to suit local conditions or can be specially treated to meet specific requirements.

The deconstruction and disposal of temporary or semipermanent sites that the Corps constructed over the years has become a major issue recently. The large number of blast walls and other structures create a huge ecological problem and represent a vast amount of metal and other materials to dispose of. Because DefenCell units contain no metal, they are very easily dismantled and the geotextile material can be reused by the local population in civil engineering projects such as the construction of roads.

Summary

DefenCell is an innovative wall, barrier, and ground stabilization system that can provide a complement or alternative to current force protection resources while providing some significant additional benefits:

- Reduction of logistical footprint by more than 40 percent, which maximizes transport in-loads, reduces hazardous convoys, and cuts costs.
- Lightweight and air-droppable.
- Reduction of secondary fragmentation risk.
- Ease of dismantling in an environmentally sympathetic fashion.
- Simplicity of quickly building strong, load-bearing structures.
- Durability due to built-in UV protection.
- Ability to absorb damage while retaining structural integrity.
- Blast resistant.

More information on DefenCell can be found at <*www.defencell.com*>.

Warrant Officer 2 Graves serves in the Royal Engineers (RE), British Army. He began his career as a combat engineer and has deployed to Northern Ireland, Belize, Cyprus, Kenya, the Falkland Islands, and South Georgia in the Antarctic. He has deployed twice to the Balkans as part of the Mine Awareness Training Team. As a bomb disposal officer in 33 Engineer Regiment (EOD), he conducted EOD operations in the United Kingdom, Sierra Leone, and Kenya. He was selected in 2005 as sergeant major of 37 Armoured Engineer Squadron in Germany and deployed to Iraq on Operation Telic. WO2 Graves holds a master's in business administration and has completed more than 22 years service with the British Army.

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18th Engineer Brigade's Mission Rehearsal Exercise at JMRC

By Lieutenant Colonel Hank Thomsen

The Joint Multinational Readiness Center (JMRC) in Hohenfels, Germany, has been a combat training center for the U.S. Army for decades. JMRC is structured and resourced primarily to train and validate the U.S. Army, Europe's (USAREUR's) brigade combat teams (BCTs). Not until February-March 2008 had JMRC validated a functional engineer brigade for its mission in Operation Iraqi Freedom. With the recent restationing of the 130th Engineer Brigade to Hawaii, the 18th Engineer Brigade became USAREUR's only engineer brigade. As part of V Corps, the brigade coordinates and directs the full range of engineer activities in support of USAREUR operations. For its pending mission in Iraq, the brigade traveled to Hohenfels and Grafenwoehr to conduct gunnery training, platoon- and company-level situational training exercises (STXs), and a brigade mission rehearsal exercise (MRE).

A route clearance team interrogates a suspected IED with a surrogate Buffalo mine-protected vehicle.

Scenario Design Challenges

The scenario design for the brigade's MRE presented JMRC with numerous challenges. As a functional brigade, the 18th must be prepared to operate as a subordinate unit to a corps or division, without overall responsibility for any terrain or populace. Because of this, one of the most difficult challenges in designing the MRE was the replication of adjacent units—to include BCT and maneuver task force headquarters—and their area of operations for the 18th to coordinate with and operate within.

JMRC was also challenged by the need to replicate a command subordinate to the 18th Engineer Brigade. The battalions that were to make up the brigade's task organization in Iraq were not available for the MRE. The 54th Engineer Battalion, a unit subordinate to the 18th in USAREUR, was also validated as part of this exercise, and JMRC replicated the 94th Engineer Battalion (Construction Effects) to round out the brigade. Because replication of a brigade's subordinate battalion was a first for the training center, JMRC prepared as follows:

- Designated an engineer observer/controller (O/C) as the battalion operations and training (S-3) officer to plan and execute the simulated battalion's missions and prepare a steady state operational schedule or story line.
- Coordinated directly with the 94th Engineer Battalion to ensure that the replicated headquarters directed realistic mission sets, problems, and issues to the engineer brigade.
- Coordinated with the United States Army Engineer School, Fort Leonard Wood, Missouri, for personnel to round out the replicated headquarters, because the training center does not have many O/Cs experienced in construction engineering. These personnel provided much-needed expertise in replicating the construction effects battalion during the exercise.

- Simulated the 94th Engineer Battalion during the MRE. This included providing a full-time liaison officer in the 18th Engineer Brigade operations center who reported, conducted update and shift-change briefs, planned, and attended various working groups. Physically adjacent to the higher command headquarters, the simulated 94th Engineer Battalion operations center produced daily reports, answered requests for information, and ensured a coherent story line to challenge the 18th Engineer Brigade staff.

Along with augmentation from V Corps, JMRC replicated a division headquarters as a higher command. It recreated many of the functions of a division headquarters, to include typical battle rhythm events and orders production. The portrayal of a division improvised explosive device defeat (IEDD) working group, which included representatives from all the division's units, gave the 18th Engineer Brigade staff the opportunity to prepare for and participate in a division-level working group.

Ideally, the 18th Engineer Brigade would have conducted an MRE at JMRC simultaneously with a BCT. This would have forced the 18th to interact with a maneuver element that controlled terrain as the engineers conducted assured mobility and general engineering missions throughout the division area of operations. But because of deployment timelines and other USAREUR training events, this was not possible. To make up for this, JMRC simulated BCT headquarters to interact with the 18th Engineer Brigade headquarters and to populate the division operations with daily significant activities. Along with the brigade headquarters, JMRC scripted daily events in the Joint Conflict and Tactical Simulation (JCATS) system that populated the 18th's common operational picture. To ensure that the engineer brigade had a maneuver unit to interact with during route clearance missions on the ground, JMRC used an Army National Guard infantry company. This company was controlled by exercise control (EXCON) and the O/C team working with the 54th Engineer Battalion, conducting missions such as raids or cordon-and-search operations supported by the 54th's route clearance teams.

Establishing Objectives and a Timeline

In coordination with V Corps, the 18th Engineer Brigade and JMRC developed a set of training objectives and validation tasks that guided the development of the exercise. The validation tasks are those tasks that the brigade's senior trainer reviews upon completion of the exercise to ensure that the brigade is ready to deploy. JMRC exercise planners used these validation tasks to develop the exercise scenarios and brigade training missions.

Based on the unit's deployment timeline, JMRC and the engineer brigade developed an exercise timeline. The first portion of the training was the leader training program (LTP) for the brigade staff, conducted at JMRC. This training included classes on the military decision-making process, theater-specific briefings, and observation of the engineer brigade planning process. The engineer brigade LTP culminated with the brigade's orders briefing to subordinate battalions. The 54th Engineer Battalion then began its LTP at Grafenwoehr Training Area, followed closely by an STX at the platoon level, also conducted at Grafenwoehr. Following the platoon-level STX, the brigade moved to Hohenfels and executed a company-level STX and a command post exercise for the battalion and brigade headquarters.

Replicating the Environment

To properly portray the environment of the 18th Engineer Brigade's upcoming deployment, JMRC used numerous assets in the training area, to include civilians on the battlefield (COB), roving traffic jams, and simulated IEDs. As with any brigade MRE at JMRC, the training area was populated with hundreds of COBs, many of them Arabic-speaking, who populated the towns in the training area and served as role players. Each of the towns and its leaders had a background or storyline that has been developed

Opposing Force Soldiers train on replica IED construction and emplacement.

over the past few years during numerous counterinsurgency-based training exercises.

Most of the 18th Engineer Brigade's missions in the training area were based on route clearance. One of the many challenges facing units conducting route clearance in Iraq is the ability to perform their mission in the midst of mostly benign, but cumbersome, traffic. To replicate this traffic, JMRC used roving traffic jams consisting of groups of up to 30 nontactical vehicles controlled by EXCON and designed to cause congestion and confusion during the route clearance missions. The missions for these traffic jams were based on the 54th Engineer Battalion's route clearance schedule and were coordinated at the daily EXCON synchronization meeting. EXCON also made last-minute adjustments to the traffic jam missions with input from O/Cs and COBs.

A Soldier from the 18th Engineer Brigade conducts a survey of the JMRC short takeoff and landing strip.

Over the past few years, JMRC has developed a system to properly replicate IEDs. Because the 18th Engineer Brigade MRE involved units directly involved in neutralizing these devices, JMRC made a concerted effort to have realistic training IEDs on the ground. These devices consisted of initiation systems, training munitions or explosive devices, and effects simulators. The devices were based on systems found in the current theater of operations and were emplaced and controlled by Opposing Force Soldiers from the 1st Battalion, 4th Infantry Regiment, and supervised by JMRC fire markers, the Dragons.

Brigade Missions During the MRE

The 18th Engineer Brigade focused on two main types of missions during their MRE—assured mobility missions in the form of route clearance and numerous general engineering missions.

Assured Mobility

The brigade was tasked by the division to ensure that priority supply routes were routinely cleared by its subordinate unit, the 54th Engineer Battalion. The brigade also received orders to support named operations with route clearance assets. Before executing route clearance missions, the engineer brigade and battalion had to coordinate boundary crossings and any needed support with the appropriate maneuver units, such as quick reaction force, recovery, or air support units. JMRC replicated these maneuver brigade and battalion headquarters with the task force analyst staff.

JMRC provided replicated maneuver units as terrain owners, not only to feed significant actions and operational information to the 18th Engineer Brigade but also to act as response cells to route clearance teams moving throughout the area of operations. Platoon leaders coordinated with landowning units for cross-boundary coordination and for quick reaction force and maintenance recovery assets when overwhelmed by enemy activity. This forced the leader on the ground to initiate contact with the maneuver unit and conduct on-site linkup.

General Engineering

To stimulate the brigade's construction planning, the division tasked the brigade to plan numerous construction projects. These projects included the design of a joint security site, a forward operating base upgrade, and a short takeoff and landing airstrip for unmanned aircraft system operations. The airstrip design was directed during the brigade's LTP, and the planning carried through the entire MRE. It culminated in a back-brief to the division commander.

Gleaning the Lessons Learned

In the War on Terrorism, JMRC must not only train BCTs but also functional brigades before their deployments to Operation Iraqi Freedom or Operation Enduring Freedom. The Army's combat training centers must be flexible in their preparation for any training exercise. The use of all available assets, to include contact with deployed engineer battalions and brigades, support from V Corps engineers, the Engineer School, and the joint IEDD organization ensured that the 18th Engineer Brigade received a quality training event in preparation for deployment.

Lieutenant Colonel Thomsen is currently serving as the chief of engineer doctrine at the United States Army Maneuver Support Center, Fort Leonard Wood, Missouri. His past assignments include service as an engineer observer-controller at the Joint Multinational Readiness Center in Hohenfels, Germany, duties with engineer battalions in Germany and at Fort Bragg, North Carolina, and as an assistant professor in the Department of Civil and Mechanical Engineering at the United States Military Academy (USMA) at West Point, New York.

A QUICK INTRODUCTION TO NATO ENGINEERING

Lieutenant Colonel David L. Knellinger

Throughout the 20th and into the 21st century, the United States Army has been involved with multinational—or combined—operations. The majority of time during deployments is spent not in support of kinetic operations, but rather stability operations and civil support operations, such as those in Bosnia, Kosovo, Afghanistan, and Iraq. All are examples of combined operations with a relatively short warfighting period (less than a year), followed by longer periods of stability operations. These may last several years—or even decades—in Afghanistan and Iraq. For some of our allies—including most of our North Atlantic Treaty Organization (NATO) partners—it is politically easier to support these stability operations than traditional warfighting. These combined stabilization missions, which tend to need more engineer effort, mean that more and more engineer units will operate in a combined environment. This article describes how NATO headquarters view engineers, specifically noting the differences in organization and function inside the headquarters itself. It also describes lessons learned through a tour of the International Security Assistance Force (ISAF) headquarters and a tour with the NATO Allied Rapid Reaction Corps (ARRC) headquarters.

Organization of a NATO Engineer Branch

Most NATO engineer branches are divided into four sections:

- Plans
- Operations
- Infrastructure
- Intelligence

For the purpose of this article, the term "NATO headquarters" is used to describe headquarters for joint

A NATO convoy patrols in Afghanistan.

forces, a land component, or a corps. Because headquarters at division and lower levels are nationally pure, they conduct engineer planning according to their own national structures.

The multinational engineer brigade improves a road outside Kabul.

Plans and Operations Sections

The plans and operations sections in a NATO headquarters are similar to their U.S. counterparts. Their mission is to support the planning process in the headquarters. However, delivering against this mission is more challenging than in a U.S. headquarters. There are numerous engineer units with different structures and capabilities in each country's army. Having a true understanding of what engineering capability is present inside each nation's formations is a precise and demanding job. This process has become harder since deployments now include Partnership for Peace (PfP) countries. The engineer plans and operations sections must now know the equipment and capabilities of both NATO and former Warsaw Pact nations to accurately describe engineer capabilities and efforts to the higher commander.

When writing orders, the engineer plans section must focus subordinate engineer effort as precisely as possible, but not to the point of limiting the ability of subordinate engineer formations to operate on the battlefield. A limiting order will deny the subordinate engineer commanders the ability to conduct their missions according to their own national priorities. This conflict can lead to a stalemate in engineer activity or to engineer efforts dedicated exclusively to national missions rather than attempts to achieve the higher commander's desired effects.

Infrastructure Section

The engineer infrastructure section has a very limited range in its support of NATO infrastructure. The country that has responsibility for a particular area of operations also has responsibility for building the infrastructure to support that mission; costs lie where they fall. Therefore, countries will build what they think they need, but to their own national standards. There are no NATO standards for individual buildings or bases. NATO infrastructure engineers only have proponency for a few common-use items. Airfield runways and the NATO headquarters itself are the primary examples of items that fall into this section's purview. This limits the scope and capabilities of the infrastructure branch and makes it dependent upon outside agencies such as the United States Army Corps of Engineers for technical advice and quality control.

Intelligence Section

The engineer intelligence section's mission depends on the commander's main effort. The section's original mission is to understand the enemy engineer's capability and doctrine. With that mission, it would coordinate directly with the all-source cell in the corps intelligence (G-2) section, providing subject matter expertise to the G-2 section's analysis of the enemy. With the ending of the Cold War, the branch has a more varied mission set. Now the branch may be responsible for supporting improvised explosive device defeat (IEDD), analyzing host nation infrastructure for intelligence preparation of the battlefield, or monitoring current and future planned reconstruction and development projects. All of these missions require the engineer intelligence officer to coordinate with numerous branches in the headquarters.

Geographic Section

It is important to note that the geographic section was not mentioned as being part of the engineer branch. This section is located in the G-2 section in most NATO headquarters. While this organization helps the intelligence community with its mission, it limits the ability of the engineer branch to maintain positive control of all engineers in the headquarters.

Engineer Branch Within the Headquarters

Subordinate formations must understand the true abilities of a NATO headquarters to support engineer operations throughout the theater. The engineer branch in the typical headquarters is limited in both personnel and

location. Subordinate formations must note these constraints and tailor their requests to the engineer branch.

In most cases, the engineer branch is part of a larger logistics branch and is controlled by the Deputy Chief of Staff for Combat Service Support (DCOS CSS). This is different from a U.S. headquarters, where the engineer branch is numbered—G-7—and works directly for the chief of staff. (In NATO, G-7 designates training.) In addition, the headquarters plans and operations branches will not have dedicated engineers. Any engineer analysis or input required for orders has to come from the engineer branch itself. This is different from U.S. engineer manning, which has a separate engineer section in the plans and operations (G-3) branch.

Where the engineer branch is located in the headquarters limits its scope. While the plans and operations sections should be concerned with all aspects of engineers on the battlefield, they may be limited by their DCOS CSS to looking only at sustainability and infrastructure operations. The DCOS CSS also may limit the scope of work for the intelligence and infrastructure sections to looking at sustainment issues, rather than engineer effects across the entire battlefield.

Within the headquarters, NATO engineers must always be proactive in communicating with other branches, no matter where the engineers are in the headquarters. Specifically, the engineer branch must maintain constant liaison with the headquarters plans and operations sections, or the engineer effort can become unsynchronized with the maneuver efforts.

Lessons Learned

Language and doctrinal terms must be used precisely in a NATO headquarters. Within the engineer branch of the ARRC, there were assigned members from six different nations, speaking five languages. Across the ARRC, there were members from 16 different nations. Precise phrasing of orders and correct use of doctrinal terms are mandatory to ensure that the mission is even understood, much less accomplished. While a person may take additional measures to ensure that a product is understood by a person who does not speak English as a first language, there is also a considerable gap in language between American and British personnel. You may feel comfortable with using idioms with British (or Canadian) individuals, but your meanings or intent may be significantly distorted. When in doubt, ask for feedback for all correspondence.

A corollary to this lesson is refusal to discount an individual's capability if you do not initially understand them due to a language difference. This dovetails with the lesson that you cannot walk into a multinational headquarters with any cultural biases or preconceived notions about the capabilities of a particular country's armed forces. All armies have good and bad individuals, so all-encompassing statements about groups of people are rarely accurate. Once you are assigned to the unit, you must make the time to talk to all individuals to understand their strengths and weaknesses. Failure to understand your surroundings may cause you to discount a potential resource.

Within NATO, there are preconceived notions about the United States Army. The size and funding of our Army are well known and often discussed. Also known are U.S. policies, to include our positions concerning Afghanistan and Iraq, and our refusal to sign the Ottawa Land Mine Treaty. All of these lead to certain perceptions concerning both the United States and the members of its armed forces. Individuals must work through these perceptions to succeed in their jobs.

Communicating with nongovernmental organizations (NGOs) and the international community (IC) during deployments is essential during stabilization operations. These agencies are the principle developers in the nations where we operate. Military security and reconstruction efforts and NGO/IC development projects must be synchronized to create long-term stabilization effects. Engineers, in conjunction with the civil-military cooperation section, must create and maintain close relationships with these agencies. Specific information must include—

- Goals and objectives for particular programs.
- Limitations and flexibility of funding.
- Locations of current and planned projects.

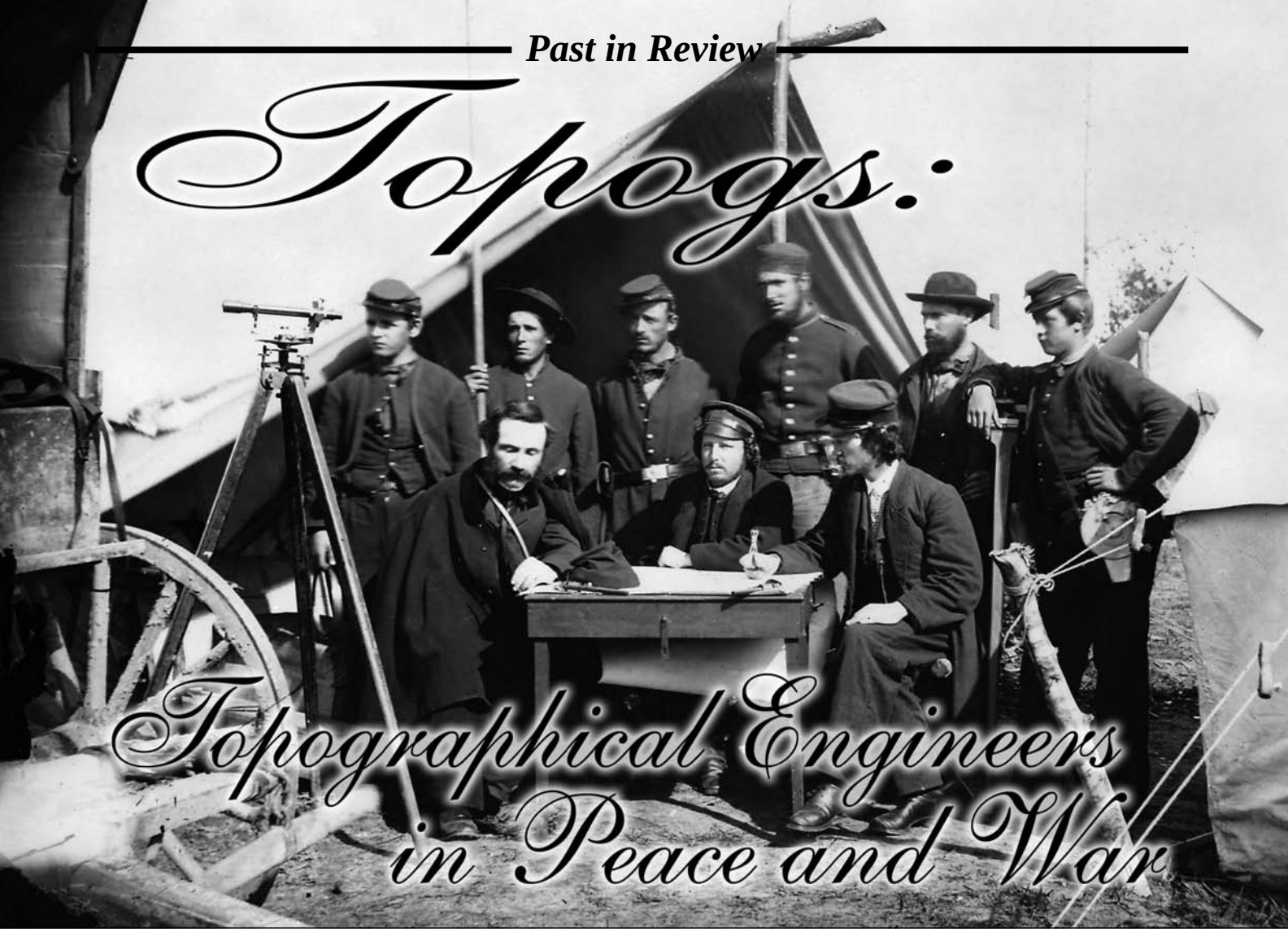
Not understanding the development situation in the area of operations limits the abilities of engineers and the commanders we work for.

Conclusion

Engineer branches in a NATO headquarters are configured differently from those in U.S. headquarters. They are limited in capability and reach compared to American engineers. All engineers who will work in a NATO environment must understand the capabilities and limitations of these branches. There are also some key lessons that engineers must understand before working in a NATO environment. These include precise phrasing of orders and correct use of doctrinal terms, the rejection of cultural bias, and understanding of perceptions of the United States among NATO personnel. Finally, engineers working in a deployed environment must understand the whole stabilization environment in order to create long-lasting effects.

Lieutenant Colonel Knellinger is the Engineer Branch plans officer for the Allied Rapid Reaction Corps in Rheindahlen, Germany. He has served as the Afghan Development Officer for the International Security Assistance Force IX in Kabul, Afghanistan. Before that, he served in the 1st Infantry Division as the operations and training officer of the Engineer Brigade and executive officer of the 82d Engineer Battalion during Operation Iraqi Freedom. He holds a bachelor's in systems engineering from West Point and a master's in operations research from Georgia Institute of Technology.

Topogs: Topographical Engineers in Peace and War



Photograph by James Gibson (Library of Congress)

By Mr. Gustav Person

Although the topographical engineers only served the United States Army as a separate branch for a relatively short period of time, their accomplishments were considerable. They achieved significant geographic and scientific discoveries, broadened our knowledge of unexplored areas, and contributed to the nation's desire to achieve its Manifest Destiny. Their wartime surveying techniques provided the most up-to-date and accurate maps, and during periods of peace they labored extensively on civil works projects authorized by Congress. This article examines the origins and the significant roles of the topographical engineers in the early 19th century and many of the important officers and their accomplishments, and it will end with their service during the Civil War.

Origins

Unlike the Corps of Engineers, the *topogs*, as they were usually known, lacked a central office or branch as a separate corps for much of their existence. For example, in the first quarter of the 19th century, the War Department generally assigned them as individual staff officers to the two military departments.[1]

During the War of Independence, at least three men had performed topographical and geographical duties for the Continental Army. Topogs were first appointed officially during the War of 1812. An act of Congress on 2 March 1813 authorized the appointment, as part of the general staff, of eight topogs with the brevet rank, pay, and emoluments of majors of cavalry and eight assistants with the brevet rank, pay, and emoluments of captains of infantry. As prescribed in the later 1841 regulations, the duties of the topogs "shall consist, in surveys for the defense of the frontier, inland and the Atlantic, and of positions for fortifications; in reconnoissances [sic] of the country through which an army has to pass, or in which it has to operate; in the examination of all routes of communication by land or by water, both for supplies and military movements; in the construction of military roads and permanent bridges connected with them and, in the absence of an officer or officers of the Corps of Engineers, of military bridges, and of field-works, for the defense of encampments, fords, ferries and bridges. For which purposes, officers of the Corps of Topographical Engineers shall always accompany armies in the field."[2]

The topogs were disbanded in 1815 by the act of 3 March that reduced most of the Army. In spite of the 1815 housecleaning, some continuity was maintained as two of the topographers, Majors John Anderson and Isaac Roberdeau were kept on active duty to complete surveys of the northern frontier and Lake Champlain. The following year, topogs were again authorized to assist the Board of Engineers for Fortifications. In 1818, the regulations assigned them fully to the Engineer Department, along with the United States Military Academy at West Point and the Board of Engineers for Fortifications, and made them subject to the orders of its chief. Thereafter, a few topogs usually found themselves assigned to fortifications work. In August, a further regulation of the War Department established a Topographical Bureau in the Engineer Department. Located in Washington, D.C., the Bureau's main duties consisted of housekeeping tasks but not control over programs or personnel. The Bureau collected and preserved the specimens brought back by scientific expeditions, compiled maps, and stored and cared for the topogs' survey instruments.[3]

The partnership between officers of the Corps of Engineers and the topographers was uneasy. The competition for work and influence between the engineer and topographical officers resulted in substantial bitterness and tension. An additional reason for the animosity was that regular engineer officers were chosen from the top ranks of graduating West Point classes; topographical engineers were normally chosen from the second rank or from civilian life.[4]

Civil Works

By 1824, the importance of waterways, canals, roads, and bridges in the young nation was clear. These were the paths of commerce and westward expansion. On 30 April 1824, Congress passed the General Survey Act, which sought "to procure the necessary surveys, plans, and estimates upon the subject of roads and canals." It authorized the president to direct work on routes considered of national importance for commercial, military, or postal service purposes. Congress provided $30,000 to cover expenses. To carry out the surveys, the president was authorized to hire additional civil engineers to augment the topogs. A further act on 24 May appropriated $75,000 to improve navigation on the Ohio and Mississippi Rivers. Within a week, President James Monroe appointed a Board of Engineers for Internal Improvements to administer the General Survey Act. By the end of 1824, all ten topogs had been assigned to internal improvement projects. During 1826, Major Stephen H. Long supervised the construction of a wing dam on the Ohio River, as well as supervised commercially developed steam-powered snagboats to clear the river of hazardous limbs and debris to improve navigation. Long had graduated from Dartmouth College in 1809. He joined the topogs in 1816 and taught mathematics at West Point for two years. Thereafter, he had a wide-ranging career as an explorer, railroad and river engineer, and inventor. His duties at this time also involved ensuring the navigability of the Mississippi River. By 1830, topogs led 10 of the 13 surveys for canals, roads, and railroads, while civilians headed the other three.[5]

Meanwhile, the Engineer Corps officers began to shoulder the major tasks of designing and building the fortifications that would guard the eastern seaboard and the Gulf of Mexico. The topogs actually transferred to the Corps of Engineers all their plans and drawings of fortifications.

Throughout the 1830s, the topogs carried out internal improvements to the country, both governmental and private. After surveys had been completed, all governmental projects were carried out on contracts superintended by the Corps of Engineers and the Quartermaster Department. Major Long gained a reputation as a railroad engineer during this time and was employed on such projects in New England and the South. Upon the reestablishment of the United States Coast Survey as part of the Treasury Department in 1836, the topogs again became associated with this work. Thereafter, until 1863, one or two officers were always assigned to this duty.

Beginning in 1834, the topogs were employed with the construction of lighthouses. These were turned over to the Treasury Department for administration upon their completion. When the United States Lighthouse Board was established in 1852, two topogs were appointed as members.[6]

Colonel Stephen H. Long, last Chief of Topographic Engineers, 1861-1863 (Office of History, U.S. Army Corps of Engineers)

Colonel John J. Abert, Chief of Topographic Engineers, 1838-1861, Engraving by J.C. Buttre (Office of History, U.S. Army Corps of Engineers)

In January 1829, Lieutenant Colonel Isaac Roberdeau suddenly died and, after some deliberation, Major John J. Abert took over as the head of the Topographical Bureau. During the following year, he succeeded in gaining representation on the Board of Engineers for Internal Improvements; however, the Secretary of War abolished that board in 1831.[7]

Abert had graduated from West Point in 1811, but resigned from the Army to become a lawyer. He reentered the service in 1814 as a private soldier in the District of Columbia Militia and fought in the Battle of Bladensburg in August of that year. He became a topog in November and served until his retirement in 1861. Abert recognized that he needed immediate help. His two additional sources of assistance each year were 20 to 30 officers from other branches of the Army and 10 to 15 civilian engineers. He also began work to establish a separate Corps of Topographical Engineers, a project that would take almost ten years. Meanwhile, Abert began to consolidate and increase his responsibilities. For example, up until 1836 the Corps of Engineers had handled all river and harbor construction projects, but in that year the War Department transferred several Great Lakes and Lake Champlain projects to the Topographical Bureau.[8]

With so many plans for the future, and his officers thoroughly engaged in a variety of civil projects, Abert was unprepared to meet the cartographic needs of the Army during the Second Seminole War. The first war in 1818 had only required the assistance of one of the Army's ten topogs. The second war in 1836 placed a much greater demand on them. The lack of data relating to Florida seriously impeded operations against the Seminoles who sought refuge in the Everglades. By the end of that year, eight topogs—diverted from civil works projects—were in the field with various forces, performing reconnaissance, collecting topographical information, and drawing maps. Topographers later stayed in Florida through the 1840s, building and maintaining roads, as well as collecting data, making surveys, and updating maps.[9]

Throughout the 1830s, Abert continued to urge the formation of a Corps of Topographical Engineers. He based his arguments on the solid premise that the work of the topogs was vital to the country's military security and of great benefit to its economic progress. He pointed out that this move would be less expensive than the continual hiring of civil engineers to perform the work that had been too extensive for the few topogs. He also noted that efficiency would be promoted by ending the practice of detailing line officers, for much time had to be spent in training them—usually two years. Abert's efforts were energetically supported by Secretaries of War Lewis Cass and Joel R. Poinsett and resulted in the organization of the Corps on 5 July 1838. A provision was included to increase the size of the new organization to consist of one colonel (Abert), one lieutenant colonel, four majors, ten captains, ten first lieutenants, and ten second lieutenants—a total of 36 officers. As before, no enlisted personnel were assigned to the topogs. In a further move, Secretary Poinsett ordered—on 1 August 1838—the assignment to the topogs of "all new works of improvement, not of a military character, [and] not connected with the fortifications." Therefore, between 1838 and 1841, the Engineer Department transferred more than 70 civil works projects to the topogs. Chief among those projects was the construction by Major Long of a number of inland Marine Hospital Service facilities around the country for disabled seamen.[10]

Western Expansion

During the late 1830s and 1840s, a number of topogs conducted widespread explorations of the West. Beginning in 1838, John C. Fremont, a newly appointed second lieutenant (but not a West Pointer), conducted a reconnaissance of the Upper Mississippi and Missouri Rivers. Fremont explored the Oregon Trail to the Columbia River and California in 1842-45. His reports became guidebooks for the many emigrants flowing toward the new lands. Upon his third and last expedition for the government, he detached Lieutenants James W. Abert, the colonel's son, and William G. Peck—in August 1845 at Bent's Fort on the Arkansas River—to survey the Canadian and Washita Rivers. In the same year, Lieutenant William B.

Franklin accompanied Colonel Stephen W. Kearney's military expedition along the Oregon Trail. On his march to Santa Fe and San Diego in 1846, Kearney's route was sketched and described by Lieutenants William H. Emory and William H. Warner.[11]

In 1846-48, many of the topogs were withdrawn from civil projects to participate in the war with Mexico. Two-thirds of the 36 men of the Corps served in the field with various tactical commands, independent of the bureau. In California, Fremont became involved in the Bear Flag revolt and the overthrow of Mexican rule. Captain Joseph E. Johnston accepted a promotion to lieutenant colonel and became second in command of the Regiment of Voltigeurs and Foot Riflemen, a new unit of mixed cavalry and infantry. Captain George Hughes became military governor of the area around Jalapa and Perote, northwest of Vera Cruz, with Emory as his lieutenant governor. Major Long built steamships for the Quartermaster Department in Texas. Topogs played important roles in all the major battles along the road to Mexico City, engaged in reconnaissance, scouting, and combat operations. Throughout the war, the majority of the topogs kept their technical lines of communication open to the Bureau and Colonel Abert. He had reason to speak proudly of his officers. The topogs, he said, showed "the versatility of talent in the Corps and its ability to fulfill any military duties which it may be found necessary or proper to assign to it."[12]

The acquisition of the vast Southwest from Mexico, as a result of the war, and the settlement of the Oregon controversy with Britain, opened up the Far West for further exploration by the topogs and the undertaking of numerous boundary surveys. Before and after 1853, Captain Emory successfully surveyed the difficult and complex boundary of the Gadsden Purchase separating Mexico and the Southwest. The creation of new states and territories provided further boundary work for the topogs. For several years after 1853, Lieutenant Gouverneur K. Warren and other topogs were chiefly engaged in surveys of four routes for railroads from the Mississippi to the Pacific coast. As part of this work, Warren actually went on three expeditions to the northern plains during 1855-57. Unfortunately, Secretary of War Jefferson Davis later took the Pacific Railroad surveys from Abert's control and placed them under a new Office of Exploration and Survey that reported directly to him. Although these explorations demonstrated the practicability of spanning the continent with railroads along various routes, none was completed until after the Civil War.[13]

During the two decades prior to the 1850s, the topogs had flourished. They had achieved independence from the Engineer Department; acquired an elite corps of 40 capable, experienced, and dedicated officers; created and preserved an invaluable collection of maps, charts, and reports; expanded its range of duties and activities; established a number of field offices; and appeared capable of handling the kind of engineering tasks that the President, Congress, or the War Department might assign to it. During the 1850s, however, the Corps declined. It lost the services of several of its best officers, and the others were overworked. It lost completely, or in part, some of its most important functions, including lighthouse construction. Its prestige diminished, and favoritism and

The staff of Topographic Engineers, Headquarters, Army of the Cumberland

intrigue replaced purposefulness and direction. The decline began slowly after 1850, but picked up speed as the decade progressed. By 1861, the Corps was foundering badly.[14]

Yet, during this period, the Corps achieved some remarkable results. On and off for the entire decade of the 1850s, Captain Andrew A. Humphreys, assisted by Lieutenant Henry L. Abbot, conducted a major hydrographic study of the Mississippi River Delta. A chief objective was the best means of securing a wide navigation channel at the river's mouth. Their 1861, 500-page report entitled, "Report upon the Physics and Hydraulics of the Mississippi River," and later translated into a number of foreign languages, is still regarded as a model scientific study.

Some 6,000 miles of Great Lakes shoreline required surveying and exploration. The Great Lakes Survey had actually started in 1823. From 1841-60, Congress appropriated a total of $640,000 for the survey. Major James Graham and Captain George G. Meade were the chief topogs engaged in these duties throughout the 1850s. Despite those successes, other science-oriented federal agencies were being established, and they began to assume some of the duties of the topogs. The existence of the Smithsonian Institution, the Naval Observatory, the Office of the United States Coast Survey, and the Pacific Wagon Road Office in the Department of the Interior reduced the prestige of the topogs from the levels prevalent in the previous decades.[15]

Civil War

Colonel Abert's leadership abilities had declined with age and failing health. In 1861, just three days before the firing on Fort Sumter, the 73-year-old colonel was involuntarily retired because of physical disability. He was temporarily succeeded by Lieutenant Colonel Hartman Bache, and then by Colonel Stephen Long, himself a septuagenarian. Long would only serve as chief for less than one year, and a good part of that time was spent on leave. He has been described by historian Garry D. Ryan as "old, tired, uninspiring, and uninterested." With the coming of war, the few civil works under the direction of the topogs were suspended. Only the Great Lakes Survey survived the war.[16]

In two acts of Congress passed on 3 and 6 August 1861, the Corps of Engineers and the topogs were each authorized an additional 12 officers. From a total of 45 officers at the beginning of 1861, the topogs were reduced a year later to 28 as a result of seven officers resigning to join the Confederacy, four forced retirements, and others who accepted senior promotions in the volunteer forces. The War Department also gradually assigned the remaining topogs to duties that placed them under the directions of some authority other than the chief of the Corps. Twenty-four topogs were eventually promoted to general officer rank, an impressive number indeed. Four others lost their lives during the struggle.[17]

The question of rank was of particular importance to both Corps. The members simply held grades too low to serve efficiently in the field. Rarely did anyone above the rank of major serve as an engineer in the field; most were lieutenants and captains. Because they were prevented from accepting regimental volunteer commissions at the beginning of the war, these officers were frustrated that they, considered the elite of the army, were not sharing in the opportunities and benefits of wartime expansion. It is not surprising that those who could quickly accepted promotions in the volunteer forces outside their own Corps.[18]

The topogs were also authorized to organize a company of enlisted men. In 1845, as tensions with Mexico mounted, Abert had sought authorization to raise a company of 100 men to assist in making maps and surveys. Congress ignored his request, so the topogs had to find their own assistants who were mainly civilians. In September 1861, two lieutenants were ordered to Boston to begin recruiting duties. This effort was notably unsuccessful. The Corps lacked a central depot, officers for instruction, and experienced sergeants. It also had to compete with volunteer units. Finally, since only a handful of recruits had come forward, these men were later transferred to the Corps of Engineers. The topogs never did field a company.[19]

By May 1862, the topogs had sent 24 of their remaining 30 officers to the war on active field duty. The relationship of these officers to the various headquarters was not entirely clear. During the Peninsula Campaign, the chief engineer of the Army of the Potomac diverted members of the topographical engineer staff to ordinary engineer duties, and one member, Lieutenant Henry Abbot, was assigned as his personal aide. During the later Atlanta Campaign, the chief topog of the Army of the Cumberland discovered that two of the three Army corps commanders had countermanded his instructions and were refusing to allow their topographical officers to pass on information to Army headquarters.[20]

In the Western Theater at the beginning of the war, the armies operated with few resources. Only two topogs were available to map the entire region from the Appalachians to the Trans-Mississippi. Yet, the experience of the Army of the Cumberland was quite notable. In November 1862, Major General William S. Rosecrans immediately ordered the expansion of the topog staffs at brigade, division, and corps headquarters. The information, compiled and supplemented at each echelon, would travel up the chain of command to the topographical office at army headquarters, where it was turned into finished maps and published. "Skeleton" maps were continually updated, and this operation developed into a high state of efficiency.

Among the most important advances made during the war were the techniques of map reproduction. Before 1861, the Topographical Bureau at the War Department possessed no presses of its own and was compelled to use commercial printers. This practice continued during the war. During 1864, for example, 20,938 commercial maps sheets were issued to the armies. The printing presses of the Coast Survey were also used to supply 42,000 sheets in 1862 alone. In the field, armies

organized their own lithographic press operations to publish maps. Photography was also applied to map reproduction with excellent results. The most effective topographical section in the field was that of the Army of the Cumberland. Captain William Merrill took an inefficient section and boosted its productivity. He obtained lithographic presses and cameras and staffed the section with 38 draftsmen, printers, and photographers under a volunteer officer, Captain William Margedant. Captain Margedant had invented a new technique of rapid map reproduction using black tracing paper set over special photographic paper and exposed directly to sunlight. Using all these reproduction techniques, the topographical section of that Army followed closely behind the front lines in Georgia in 1864, printing map after map. During the Atlanta Campaign, the section issued at least 4,000 campaign maps. In July alone, the section published more than 1,000 sheets of 14 different maps.[21]

The Corps of Topographical Engineers remained a separate branch of the Army until 1863, primarily because of the abilities of its former chief, Colonel Abert. However, the attempt to abolish the Corps and the Topographical Bureau went back to Secretary of War Davis' report of December 1854 in which he asserted his conviction that the continuation of a separate Corps of Topographical Engineers was "inexpedient." In 1861, the Chief of Engineers, Colonel Joseph G. Totten, opposed the move, although a number of junior officers of both Corps favored an amalgamation of the two organizations. Colonel Long, however, made no attempt to stop it. By 1863, the exigencies of war had largely broken down the artificial barriers that separated the duties of the two Corps. Younger topogs, as well as engineers, were now engaged in the construction of bridges, blockhouses, entrenchments, and other permanent works. They also harbored a common grievance against the War Department's promotion policies. Major General George McClellan, himself a former engineer officer, sent a petition to Secretary of War Edwin Stanton recommending the merger in June 1862. Congress considered the resulting bill during the following months, with a number of changes made to the original proposal. On 2 March 1863, the Senate approved the bill by a 26 to 10 vote. The House accepted the Senate's amendments with little argument, and the bill became law on the following day. The unification of the two Corps, announced to the Army in War Department General Orders No. 73, dated 24 March 1863, was finally completed in fact as well as law on 8 August 1866, with the appointment of Andrew A. Humphreys, a former topographical engineer, as Chief of Engineers.[22]

Summary

For nearly two decades, the topographical engineers had functioned as a major scientific agency of the federal government. At a time when the Corps of Engineers was primarily involved in the coastal fortifications program, the topogs led the way in exploration, internal development, and other civil works. It was only declining fortunes and forces beyond their control that brought the extinction of the Corps of Topographical Engineers as a distinct branch of the Army. Their services within the Corps of Engineers, however, continue to this day.

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Operation Sand Castle 2008:
Taking It to the Next Level and Beyond

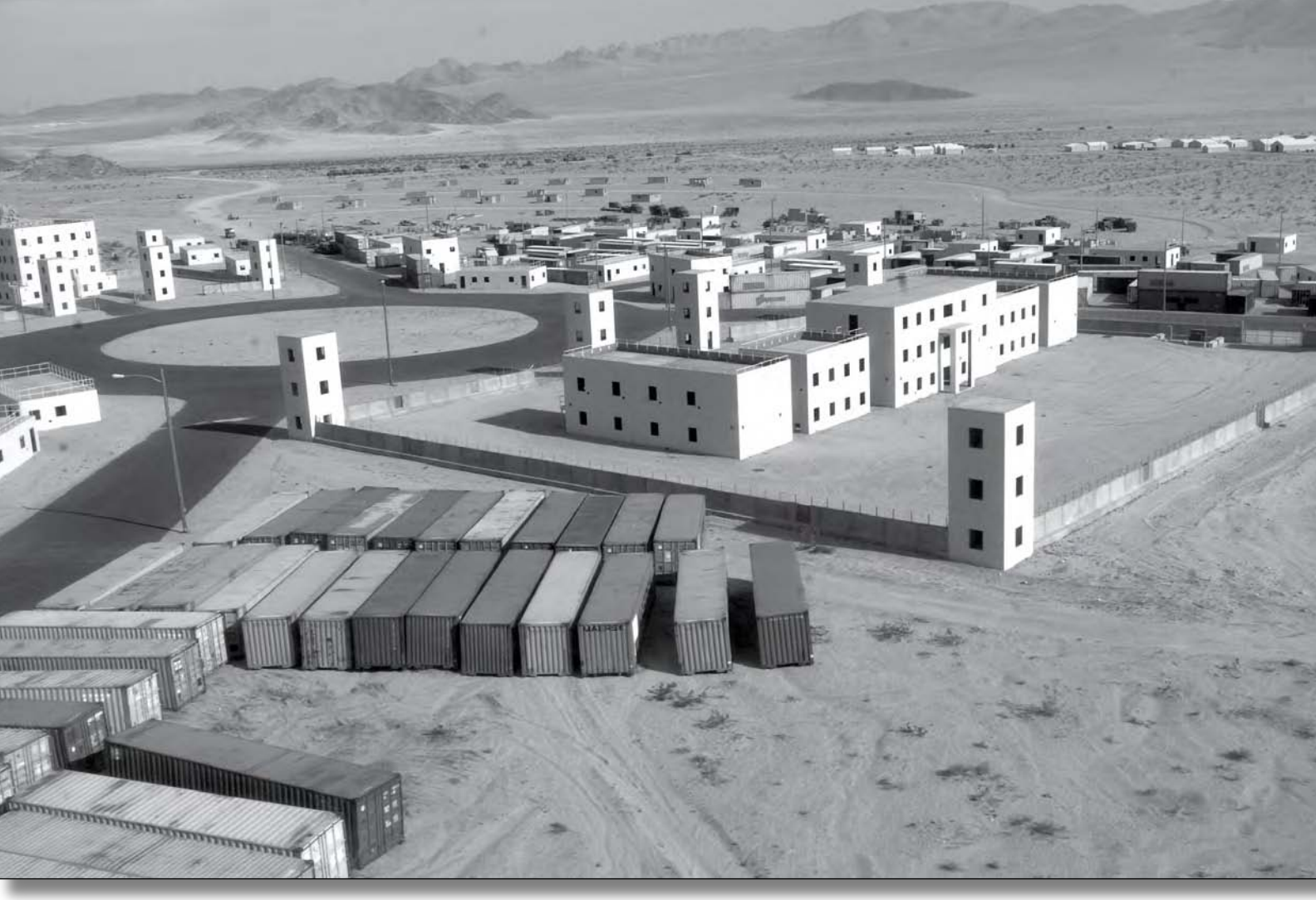
By Major Jon A. Brierton

The sun rises over Forward Operating Base (FOB) Santa Fe, located in "The Box" at the National Training Center (NTC), Fort Irwin, California, for another rotation of Operation Sand Castle, where the 412th Engineer Command serves as the action agent for the United States Army Reserve Command's current Army Force Generation exercise. A unique feature of this exercise is the requirement that the Active Army brigade combat team (BCT) and the Army Reserve brigade coexist in the same operational environment as they would in-theater. Each component has to adapt to the other, thus creating a mutually supporting relationship that yields an overall stronger fighting force.

However, the training that occurs between the two components is just the beginning. In addition to training individual Soldiers, Operation Sand Castle gives the Army a chance to exercise its newest operational structure. The 301st Maneuver Enhancement Brigade (MEB) from Fort Lewis, Washington, and the 210th Regional Support Group (RSG) from Fort Buchanan, Puerto Rico, are two new structures in the Army. This year's operation focused on emerging MEB and RSG doctrine and the dynamics that take place between the senior-level commands within a BCT's operational environment, executing full spectrum counterinsurgency operations. NTC provides the opportunity to test these structures as new doctrine is still being developed.

The 301st MEB and 210th RSG catapulted the exercise to the next level by planning, coordinating, and executing a robust training plan which, coupled with the desert environment and the NTC rotational scenario, resulted in conditions that resemble those in Iraq and Afghanistan. The 301st MEB—consisting of engineer, military police, and chemical battalions—coordinated with the 2d Heavy Brigade Combat Team, 1st Infantry Division (2/1 HBCT), from Fort Riley, Kansas, and controlled all operations off the FOB, while the 210th RSG controlled all operations on the FOB.

The 301st MEB operated in "The Box," coordinating and supporting 2/1 HBCT with mobility through its gap-crossing and route clearance capabilities and with horizontal and vertical engineer capabilities not resident in the BCT command structure. During an attack on the National Urban Warfare Complex (NUWC), known as *Medina Jabal*, the 301st MEB exercised its air space management and fires control capability by coordinating with the BCT close-air and fire support assets to mitigate the Opposing Force (OPFOR) attack. Within minutes, Apache helicopters were over the site, providing relief to the Operation Sand Castle units, and unmanned aerial vehicles circled the area to keep the OPFOR away.



The mock village of *Medina Jabal* gives Soldiers a realistic taste of duty in Iraq.

Throughout the operation, the 301st MEB directed mounted combat patrols, route reconnaissance, route security, and mobility operations in a competitive environment while directing simultaneous construction operations at the NUWC, the mock village of *Medina Wasl* at Four Corners, the rock quarry, and the southeast corner of Area of Operation Bronco, along Alternate Supply Route Long Island. The mission at Four Corners was an extra project assigned when the 301st MEB hit the ground. This complex project consisted of constructing a 90-foot concrete traffic circle near *Medina Wasl*. The 365th Engineer Battalion tackled the project and when it was finished, the 301st, 2/1 HBCT, and the village mayor conducted a ribbon-cutting ceremony with townspeople attending the event as they would in Iraq.

NTC's mission is to prepare Soldiers, Sailors, Airmen, and Marines for deployment in support of the War on Terrorism. The main focus of Operation Sand Castle is to prepare Army Reserve Soldiers for potential deployments, and the operational mission is to provide upgrades to NTC facilities and the NUWC, the premier training area for BCTs. Operation Sand Castle, now entering the fourth year of a planned ten-year operation, is improving the infrastructure of the NUWC to replicate conditions in Iraq and Afghanistan more accurately, so Soldiers have a better idea of what to expect when they deploy. This creates a two-fold effect that provides Army Reserve Soldiers a training opportunity that greatly improves their tactical and technical skills, while simultaneously improving the infrastructure of the installation and enhancing the post's ability to train the total force for the future. This is made possible by having Operation Sand Castle units written into the rotational scenario under the watchful oversight of observer/controller-trainers (O/C-Ts). The 120th Infantry Brigade, 1st Army Division West, provided 58 O/C-Ts for the operation, helping to stage all the training events normally conducted by a BCT, to include situational training exercises and center of excellence training opportunities. The O/C-Ts coordinated for OPFOR and ran the mounted combat patrol and convoy live-fire lanes for the participating units.

Operation Sand Castle units experienced many indirect-fire attacks and civil disturbances not only at the FOB but also at the NUWC. While the units traversed the main supply routes, combat patrols were engaged by improvised explosive devices (IEDs) and vehicle-borne IEDs. Snipers attacked both the FOB and the various project sites. These key OPFOR engagements not only added to the realism of the exercise but also tested the units' battle drills and standing operating procedures (SOPs). The units are taking the lessons learned and improving their SOPs for use in-theater.

Soldiers and performers pose after the first USO show presented in "The Box" at NTC during a rotation.

The Army Reserve is not the strategic force of the past but has transformed into an operational force. The number of units participating in Operation Sand Castle has tripled since its beginnings four years ago. This year the operation had more than 54 separate units, with more than 2,500 Soldiers on the ground experiencing the best training the Army has to offer. These motivated Soldiers established an FOB that provided all life support and sustainment requirements. For example, in addition to its measure-of-training-effectiveness mission to provide level one medical care to the task force at FOB Santa Fe, medical personnel from the 328th Combat Support Hospital also trained and certified 408 Soldiers as combat lifesavers and 17 as combat lifesaver instructors.

The Operation Sand Castle task force conducted more than 55 missions, encompassing force protection, route clearance and dry-gap-crossing mobility operations, quarry operations, and vertical and horizontal construction operations. The construction effort netted more than 26,000 tons of gravel and railroad ballast used in the construction of 11 pre-engineered buildings, 14 concrete masonry unit buildings, 8,900 feet of railroad bed, and more than 10,600 feet of roads. In addition, the 655th Asphalt Detachment repaired more than 400 meters of damage to the main supply route and helped resurface two parking lots in the cantonment area.

Operation Sand Castle units also conducted 29 individual and crew-served weapons, live hand grenade and live demolitions range sessions, and 30 situational training exercise lanes that covered mounted combat patrol; convoy live-fire; medical trauma; and chemical, biological, radiological, and nuclear tasks. The Soldiers have access to a myriad of outstanding training opportunities, such as the Joint Center of Excellence for IED Defeat. More than 180 Soldiers were trained on the latest tactics, techniques, and procedures for IED defeat; electronic countermeasures; route clearance; robotics; and entry control point and escalation-of-force operations.

Another notable first was the United Service Organizations (USO) show conducted at the midpoint of the exercise by a Hollywood comedian and two Los Angeles-area bands. This was the first time that a USO show was presented in "The Box" at NTC during a rotation. The show gave the troops a few hours of downtime to regenerate as they prepared to finish their aggressive combat and construction operational tempo and replicated the FOB experience.

This year, the Army National Guard was integrated into the training. As Operation Sand Castle continues to increase in size and magnitude, there are plans to invite the other branches of the Service for joint training. The way ahead is to eventually train with armed forces from other countries in an effort to fully match conditions in-theater. The 412th Engineer Command continues to raise the bar and take training to the next level in an effort to help our Service members survive and win the War on Terrorism.

Major Brierton is the chief of operations for the 412th Engineer Command. He has been the lead action officer for Operation Sand Castle for the last two years. He has deployed to Iraq as the assistant operations and training officer and battle captain of the 983d Engineer Battalion and has commanded a light engineer equipment company. He is a graduate of the Combined Arms and Services Staff School and holds a master's in organizational management from the University of Phoenix.

Engineer Update

Engineer Crane Training. Crane accidents are one of the leading causes of death and injury in the construction industry today. These accidents are attributed to rigging failure, improper positioning, falls, dropped loads and improper outrigger use. Often, crane accidents are also the result of inadequate training and the lack of preventive maintenance, experience and supervision, and required inspections. Crane operators and supervisors must know the capability of their equipment to prevent rollovers and navigate properly to avoid striking overhead obstructions. Several documented crane accidents have occurred in the theater of operations over the past few years to include the death of a Soldier due to electrocution when a crane boom struck an overhead power line.

To address the safety and technical training needs of crane operations, the Engineer School has made changes in the way Soldiers are trained and qualified to operate the All-Terrain Crane AT422-T. Beginning in FY09, the Engineer Crane Operator Course, currently being taught as part of the 21J Course, will become an Additional Skill Identifier (ASI), coded C4. The new 3-week course is a week longer than the former course, with the first week introducing a Crane Safety block of instruction based on Occupational Safety and Health Administration (OSHA) standards. This 40-hour block of training consists of (1) Introduction, (2) Math, (3) History, Evolution, and Types of Cranes, (4) Fundamentals of Cranes and Lifting Operations, (5) Rules, Regulations, and Agencies, (6) Rigging, (7) Determine Lifting Requirements, (8) Types of Lifts, (9) Inspections and Standards, (10) Communication, and (11) Additional Safety Devices.

The new block of instruction is math-intensive and requires students to be able to complete basic and intermediate math calculations without the aid of a calculator. The remaining 80 hours of the course will consist of equipment operating time, to include (1) Introduction to AT-422-T Crane, (2) Maneuvering Operations, (3) Set-Up Procedures, (4) Procedures for Moving Various Types of Loads, (5) Clamshell Operations, and (6) Control Manipulation Practical Exercise.

Currently, the Engineer School is working to input the C4 ASI into ATTRS for scheduling. Once courses are loaded into ATRRS, unit ATRRS managers can request seats for training. Until that time, units requiring crane operator training should contact the Fort Leonard Wood Directorate of Plans, Training, and Mobilization at (573) 563-4052. For specific questions about the course contact 1LT Vance C. Flowers at A Company, 554th Engineer Battalion, Horizontal Skills Division, at (573) 596-0131, Ext. 6-0996/7435.

News and Notes

Korea's 2009 Peninsula Engineer Conference. The Combined Forces Command (CFC) and US Forces Korea (USFK) announce the 2009 Peninsula Engineer Conference (PEC) to be held from 4 through 6 February 2009 in Seoul, South Korea. Hosted by the Society of American Military Engineers (SAME), registration will be open soon for 300 participants on a first-come, first-served basis.

This year's theme is "Transforming Korea." USFK is presenting speakers with the latest updates on Transformation to US Korea Command (USKORCOM) and the Korea Relocation Plan. The 2009 PEC will feature a tour to the site of the future USKORCOM Headquarters and "Humphreys Hub" near Pyeongtaek. Participants will view engineer updates on the USFK Theater Master Plan, KRP Construction, and Combat Engineering. The 2009 PEC will also include an Engineer Ball and other traditional military and social events.

Those interested in attending may contact Mr. Tom Brady at USFK Engineers, e-mail <*thomas.m.brady@korea.army.mil*>, or call commercial +82-2-2791-3260 (DSN 315-723-3260). For more details, see <*www.same.org/pec*>.

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