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U.S. Army Engineer School

(573) 563-8080/DSN 676-8080

COMMANDANT
BG Anthony C. Funkhouser
563-6192
<anthony.c.funkhouser.mil@mail.mil>

ASSISTANT COMMANDANT
COL David Theisen
563-6192
<david.t.theisen.mil@mail.mil>

DEPUTY COMMANDANT
Mr. James R. Rowan
563-8080
<james.r.rowan4.civ@mail.mil>

REGIMENTAL COMMAND SERGEANT MAJOR
CSM Butler J. Kendrick, Jr.
563-8060
<butler.j.kendrick.mil@mail.mil>

REGIMENTAL CHIEF WARRANT OFFICER
CW5 Scott R. Owens
563-4088
<scott.r.owens.mil@mail.mil>

DEPUTY ASSISTANT COMMANDANT–USAR
COL Ricardo A. Javier
563-8045
<ricardo.a.javier.mil@mail.mil>

DEPUTY ASSISTANT COMMANDANT–ARNG
LTC Adam M. Calderon
563-8046
<adam.m.calderon3.mil@mail.mil>

CHIEF OF STAFF
COL Philip M. Secrist III
563-7116
<philip.m.secrist.mil@mail.mil>

COMMANDER, 1ST ENGINEER BRIGADE
COL Daniel S. Larsen
596-0224, DSN 581-0224
<daniel.s.larsen.mil@mail.mil>

DIRECTOR OF TRAINING AND LEADER DEVELOPMENT
COL Jason L. Smallfield
563-4093
<jason.l.smallfield.mil@mail.mil>

DIRECTOR OF ENVIRONMENTAL INTEGRATION
Mr. Robert F. Danner
563-2845
<robert.f.danner.civ@mail.mil>

COUNTER EXPLOSIVE HAZARDS CENTER
COL Darryl McDowell
563-8142
<darryl.d.mcdowell.mil@mail.mil>

HUMANITARIAN DEMINING TRAINING CENTER
Mr. Jonathan D. Green
563-6199
<jonathan.d.green.civ@mail.mil>

ENGINEER DOCTRINE, MSCoE CDID, CODDD
LTC John C. Morrow
563-2717
<john.c.morrow2.mil@mail.mil>

By Order of the Secretary of the Army:

RAYMOND T. ODIERNO
General, United States Army
Chief of Staff

Official:



GERALD B. O'KEEFE
Administrative Assistant to the
Secretary of the Army
1333801

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U.S. ARMY ENGINEER SCHOOL

COMMANDANT

Brigadier General Anthony C. Funkhouser

MANAGING EDITOR

Diane E. Eidson

EDITOR

Rick Brunk

GRAPHIC DESIGNER

Jennifer Morgan

Front and back covers: U.S. Army photos

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Clear the Way

Brigadier General Anthony C. Funkhouser
Commandant, U.S. Army Engineer School



Happy New Year! I hope that everyone had a safe and enjoyable holiday season with their Families or, if deployed, that you were able to phone Family and friends. After 4 months in the position of commandant, I can honestly say that the Regiment is off and running in this new year and that there is a lot going on across the force. I used the recent Fall 2013 Engineer Regimental Command Council to update the field on our doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) efforts for Army 2020. If you were not able to participate, you can find the transcripts and slides on the Engineer School Knowledge Network, Fort Leonard Wood Web site, <http://www.wood.army.mil/usaes/>.

In this issue of *Engineer*, I want to focus on a topic that has been the centerpiece at recent warfighter, maneuver, and Association of the U.S. Army conferences. If you have heard General Robert W. Cone, commander of U.S. Army Training and Doctrine Command (TRADOC), speak recently, you may have heard him talking about the Army's focus on strategic landpower and its relevance to the world in which we live. If not, I want to ensure that you are aware of what our senior leaders are discussing and what it means to our Regiment. Landpower is defined by Army Doctrine Reference Publication (ADRP) 3-0, *Unified Land Operations*, as the ability—by threat, force, or occupation—to gain, sustain, and exploit control over land, resources, and people.[1] General Cone said, "There are times in our Nation's interest where boots on the ground are absolutely essential to those outcomes."[2] There are many outside the Army and U.S. Marine Corps who believe that wars can potentially be decided through technology without involving land forces. U.S. Marine General James N. Mattis has said, "The enduring nature of war as a human endeavor will remain largely unchanged."[3]

Historically, we have seen that it takes Soldiers and Marines engaged on the ground with an understanding of the human dimension to affect the will of the enemy and the affected population. We have repeatedly learned the benefit of understanding the region, culture, language, beliefs, and the human network, which all contribute to building relationships and trust. This on-the-ground understanding has a long-term, direct relationship to our potential success. General Cone also said, "Working on strategies like regionally aligned forces will be what young Soldiers and leaders do to maintain their wartime intellectual acuity and their desire to be engaged when they are back on U.S. soil. Our young generation is used to solving real-world problems. They are not interested in coming back to a training environment that washes away all that complexity and focuses on a handful of tasks."[4] Please take the time to read General Cone's article in this issue of *Engineer* (see page 7).

Our emphasis in TRADOC and within the Engineer Regiment is on developing young leaders and ensuring that we accentuate the importance of continued leadership development and the capabilities that good leaders bring to their units. I have heard Army Chief of Staff General Raymond T. Odierno stress the importance of leader development often, saying that it is one of his top priorities and the greatest asymmetric advantage our Army brings to the fight. He wants to return the combat training centers as venues for leader development as opposed to a resource that has been focused on generating unit readiness to support Army force generation requirements. Our very own Chief of Engineers, Lieutenant General Thomas P. Bostick, also sees building professionals and proactively managing our most talented leaders as a top priority. Within the Regiment, we are ready to launch a credentialing program for our noncommissioned officers, warrant officers, and commissioned officers. We are proactively informing our best officers of opportunities to expand their skills via the Army's advanced civil schooling, training with industry, and broadening programs.

"Within the Regiment, we are ready to launch a credentialing program for our noncommissioned officers, warrant officers, and commissioned officers."

Focused talent management and leader development at all levels are essential during this era of resource constraints to ensure that our Army is postured to overcome future challenges.

The future force will need to prepare for a wide range of capabilities, to include decisive action, stability operations, and domestic response. Our armor and Stryker forces will need to think of themselves as more expeditionary—deploying on short notice, building a lodgment from scratch, and expanding and moving out for decisive operations. We will have to execute all this with a fiscally constrained budget in the field and in the schoolhouse. We are looking at ways to prepare the Regiment and our leaders for the future.

In the operational Army, across the Regular Army and the Army National Guard, we are transitioning the Engineer Regiment through brigade engineer battalions (BEBs) inside the brigade combat teams (BCTs). The personnel, organization, and materiel efforts are moving forward. But now we are looking at retraining the force with updated doctrine, updated battle drills, and reeducation on the role of the task force engineer. BEB commanders have an increased responsibility to the BCT with the military intelligence company; the signal company; and the chemical, biological, radiological, and nuclear reconnaissance platoon (and the antitank company in the Stryker BCT). We've started to address some of the additional training requirements in our precommand course and will continue to improve our partnership with these other branches. Major General Leslie C. Smith, Maneuver Support Center of Excellence commanding general, and I recently sent out a BEB Executive Summary to educate the Army's senior leaders on the BEB and its capabilities.[5] The feedback was very positive and appreciated as our Army prepares to refocus on decisive actions to dominate in unified land operations. As I noted during the Regimental Command Council, the Army is excited about the BEB and it's our job to execute violently and implement this change as quickly and professionally as possible.

In the institution, we will publish the new Field Manual 3-34, *Engineer Operations*,[6] and ensure that the doctrine is disseminated in the classroom and throughout the Army. I am convinced that our boxtop provides us with a clear and relevant doctrinal framework and that the four lines of engineer support are in synch with the strategic landpower construct. We are focusing on being more adaptive as a school and are linking in our Directorate of Training and Leader Development with the combat training centers and the centers of excellence to ensure that we are teaching the most current doctrine, tactics, techniques, and procedures.

General Cone views the importance of individual Soldier preparedness, coupled with leader development, as critical to the overall success of our organizations. Our Soldiers on the ground need to be able to use all of the organization's capabilities to meet mission requirements. We are working to educate and train in support of the strategic landpower effort to ensure that, as General Cone said, "We are the best Army in the world, and when you put people on the ground somewhere, they need to be prepared."[7]

The Regiment is here to prepare you and your units in this time of transition. We are doing our part; now we need our junior and senior leaders to take advantage of the opportunities we are providing so that they can be problem solvers and also leaders of strategic landpower.

As I close this column, I want to recognize the loss of four giants of our Regiment who have recently passed away. Lieutenant General Elvin R. Heiberg III, Lieutenant General John (Jack) W. Morris II, Command Sergeant Major Micheal L. Buxbaum, and Command Sergeant Major Arthur L. Laughlin. These leaders all had significant impacts on our Regiment and the Army. This year, our Army theme is America's Army—Our Profession "Stand Strong," and it is important that we remember their contributions to our profession as we soldier on in their absence. We plan to have a tribute to these gentlemen at our annual Engineer Week in April.

Essayons!

Endnotes:

[1]ADRP 3-0, *Unified Land Operations*, 16 May 2013.

[2]Nicole Randall, "Strategic Landpower Must Remain Focus," 18 September 2013, <http://www.army.mil/article/111590/Strategic_landpower_must_remain_focus/>, accessed on 17 January 2014.

[3]James N. Mattis, "Address to House Armed Services Committee, Washington, D.C., 18 March 2009.

[4]Nicole Randall, "Strategic Landpower Must Remain Focus for Army," 11 September 2013, <http://www.army.mil/article/111125/Strategic_Landpower_must_remain_focus_for_Army/>, accessed on 17 January 2014.

[5]"BEB Executive Summary," 3 October 2013, <https://www.us.army.mil/suite/doc/41366026>, accessed on 22 January 2014.

[6]Field Manual 3-34, *Engineer Operations*, 4 August 2011.

[7]Nicole Randall, "Strategic Landpower Must Remain Focus for Army," 11 September 2013.



Lead the Way

Command Sergeant Major Butler J. Kendrick, Jr.
Regimental Command Sergeant Major



Greetings to the best regiment in the U. S. Army as we continue to be Engineer Strong. The last few months of 2013 definitely provided the Army with multiple challenges and uncertainty about our forces: How many Soldiers will be cut, how many will remain, and what opportunities will we have in the future?

The 1st Engineer Brigade consistently leads the Army as the predominant force for training. On average, the brigade trains more than 2,000 Soldiers at Fort Leonard Wood, Missouri, every week, including commissioned officers, warrant officers, NCOs, Soldiers in training, counter explosive hazards classes, and Sapper Leader Course attendees. Despite the hectic schedule, the organization still finds the time, personnel, and resources to conduct training outside Fort Leonard Wood. The Urban Master Breacher Course mobile training team from the 35th Engineer Battalion is training Soldiers from the U.S. Army Special Operations Command and the 27th Engineer Battalion at Fort Bragg, North Carolina. We continue to receive excellent feedback on the training.

Due to budget constraints, I have not been able to visit as many units as I'd like, but what a great visit the commandant, Brigadier General Anthony C. Funkhouser, and I had as we spent time with the Sapper Eagles of the 326th Engineer Battalion (Air Assault) at Fort Campbell, Kentucky. Transitioning to the recently implemented brigade engineer battalion (BEB), newly assigned Screaming Eagles conducted a patch ceremony for their former—but now new—101st Airborne Division (Air Assault) patch. The morning started with an awesome session of Sapper athlete warrior physical training. The event featured fantastic team building and strenuous effort displayed by all levels of leadership. The day finished with an address to the outstanding officers and NCOs of the battalion.

It was my great pleasure to visit the U.S. Army Human Resources Command and discuss key issues about the manning of the BEB and other key components of the Regiment with the engineer team. While at Fort Knox, Kentucky, I visited the Soldiers of the 19th Engineer (Seahorse) Battalion during their deployment ceremony. It was great to see the activation of the 42d Engineer Company and the casing of the battalion colors. The 19th Engineer Battalion has always enjoyed tremendous support from its veteran population—old and new, near and far—and this extraordinary ceremony was no exception. Well done, Seahorse Battalion.

"The military organization we know today as the National Guard came into existence with a direct declaration on December 13, 1636. On this date, the Massachusetts General Court in Salem, for the first time in the history of the North American continent, established that all able-bodied men between the ages of 16 and 60 were required to join the militia. The North, South, and East Regiments were established."[1]

The Army National Guard celebrated its 377th birthday on 13 December 2013. Best wishes to the great National Guard portion of the Engineer Regiment.

The BEB is off to a great start, and the engineer leadership is embracing change as it comes. The BEB continues to be the main effort for the Regiment. As of now, the plan is to stand up 13 BEBs in 2014 and 19 in 2015. The following four Regular Army brigade combat teams (BCTs) and their respective BEBs will activate in October 2014:

- 91st BEB, 1st BCT, 1st Cavalry Division.
- 3d BEB, 3d BCT, 1st Cavalry Division.
- 127th BEB, 1st BCT, 82d Airborne Division.
- 37th BEB, 2d BCT, 82d Airborne Division.

The Army National Guard BEB implementation will occur from fiscal year 2014 to 2018. The U.S. Army Engineer School is working closely with the National Guard Bureau to identify key lessons as the Regular Army BCTs restructure so that the lessons can be applied to the Army National Guard BCTs.

With the great depth and history of our Regiment, it is inevitable that many of our greatest will depart before we are ready to see them go. I am saddened by the loss of some great Soldiers who have eternally departed our formation, and I would feel remorse if I did not take the time to mention these great heroes that we have lost. The Regiment should take the time to salute and recognize the significant contributions by, and the loss of, the following legendary leaders:

- Lieutenant General (Retired) John "Jack" W. Morris II, 91, 44th Chief of Engineers, died 20 August 2013.
- Lieutenant General (Retired) Elvin R. Heiberg III, 81, 46th Chief of Engineers, died 27 September 2013.

(Continued on page 6)

Show the Way

Chief Warrant Officer Five Scott R. Owens
Regimental Chief Warrant Officer



There is an old Chinese curse that says, "May you live in interesting times." The times we are living in now certainly are interesting, but I believe that with turmoil also comes opportunity. The drastically shrinking defense budget is impacting every aspect of our operations and I'm sure this is causing many of you to wonder about the future. Without a doubt, the next few years will be challenging, but engineers are experts at assessing and overcoming obstacles. We will meet these challenges and help shape the terrain of the future just as we shape the terrain on the battlefield. Engineer warrant officers, with their years of technical expertise and tactical experience, will be there to advise commanders, contribute to the mission, and be the trainers and systems integrators of emerging technologies and equipment.

As I write this, we have just concluded the Fall 2013 Engineer Regimental Command Council, but you will be reading this as ENFORCE 2014 is kicking off. Budgetary problems caused us to adapt and modify the venue of the council to a virtual conference via Defense Connect Online (DCO). ENFORCE will also be scaled down using a DCO component so that we can conduct dialogue with the field. This is a good news–bad news story: the good news is that we were able to get information out to the field; the bad news is that we were not able to conduct face-to-face dialogue, which is essential for ensuring that the message relays the correct context and enables understanding. Nothing beats looking someone in the eye while exchanging ideas, because you can get immediate feedback on whether your message is getting across. For ENFORCE, I challenge you to take this as an opportunity to engage via the alternate methods we will set in place: DCO, teleconferences, video teleconferences, Engineer School Knowledge Network, milSuite, and others. Thoroughly ingest the read-ahead materials, listen to the conversations and presentations, and follow up with us at the U.S. Army Engineer School so that we can hear your ideas and gain your insights. Your input serves as an azimuth check for our long-range planning.

So what does the future hold for engineer warrant officers? How will the drawdown affect us? Again, this is a good news–bad news story. Since we are currently understrength in both warrant officer military occupational specialties, engineer warrant officers will be at about 100 percent when the initial Army end strength targets are achieved. Additionally, the Department of the Army is adjusting annual accession targets slightly downward so that we do not create too many warrant officers and place them at risk in the future. That's the good news. The bad news is that as the Army shrinks, so will our feeder enlisted accession pool, which will make it that much harder to reach our accession goals. Initially, this will be a benefit because as quality noncommissioned officers find that their reenlistment options are limited, many of them will consider applying to be warrant officers. But once the turmoil has settled and the Army end strength reaches equilibrium, the ratio of the enlisted feeder pool to warrant officer accession requirements may be insufficient to reach our targets. We will have to monitor the trends closely and develop a plan to deal with that when the time comes. This is just one of the things that I think about when I wake up in the middle of the night!

To navigate through this time of change, you should study the terrain. By that, I mean read emerging doctrine, keep abreast of current events, and participate in milSuite discussions and other venues of intellectual exchange. Periodically check the Engineer Warrant Officer MilBook sites at <https://www.milsuite.mil/book/groups/senior-engineer-warrant-officer-group> and <https://www.milsuite.mil/book/groups/125d-geospatial-engineering-technician>. Along with that, continue to self-develop. Further your military and civilian education, seek broadening assignments, integrate yourselves into your unit staff processes, advertise your capabilities and, most of all, do not confuse being the quiet professional with being the silent professional. Your commander or supervisor relies on you to understand your unit mission and interject your counsel where appropriate. So be visible, be vocal, and be flexible. As my first warrant officer mentor, retired Chief Warrant Officer Three Fred Pessaro told me years ago, "Flexibility equals survivability." None of this is new, and most of you have mastered these traits already—that is also part of the good news story.

Finally, since the next promotion board for chief warrant officers three, four, and five will be held shortly after

ENFORCE, I would like to leave you with observations and feedback I received from an engineer colonel who served on the last promotion board. He noticed that many of our engineer warrant officer records were not as strong as those in several other branches. Some of the shortcomings were in the following areas:

- Ratings and rating schemes, with raters and senior raters not senior enough in rank.
- Civilian education, with many chief warrant officers three and four from other branches (including aviation and special operations) holding master's degrees.
- A general lack of visibility at higher staff levels, resulting in warrant officers from other branches (especially field artillery targeting technicians) getting higher ratings.

The bottom line is that your Officer Evaluation Report[1] is the single most important factor in your file as you compete against warrant officers from all other branches except aviation. You need to ensure that you demonstrate how important your capabilities are to the mission and that your senior rater knows the full scope of your contributions so that you get due credit for your performance. It's not enough to be a quiet professional—you need to be visible and vocal so that your leaders recognize you for the professional and unquestionable expert that you are. Until we meet again, stay safe.

Essayons!

Endnote:

[1]Department of the Army Form 67-9, *Officer Evaluation Report*, 1 October 2011.

("Lead the Way," continued from page 4)

- Command Sergeant Major (Retired) Micheal L. Buxbaum, 53, 10th Command Sergeant Major of the U.S. Army Corps of Engineers, died 9 November 2013.
- Command Sergeant Major (Retired) Arthur L. Laughlin, 62, 11th Regimental Command Sergeant Major, died 11 October 2013.

As I conclude my comments to the Engineer Family, I would ask that you consider the following thought: As a Soldier, I have no doubt that we can conquer every foe we are facing, but I would remind you that we are never very good at predicting the future—as we discovered on 11 September 2001. Most of the time, we don't choose our adversary; but every time, we can choose our response. The same applies to our everyday life. Regardless of the circumstances you find yourself in, please respond in a positive manner in all your actions. It speaks volumes about who you are as an American, a Soldier, and an engineer.

Thank you to all the Soldiers, Families, and Civilians for your service, commitment, and dedication to the Regiment, the U.S. Army, and the greatest country in the world. Stay Engineer Strong.

Endnote:

[1]Bill Boehm, "Born From Humble Beginnings, the National Guard Celebrates Its 376th Birthday," <http://www.nationalguard.mil/features/birth_2012/index.html>, accessed on 21 November 2013.



Strategic Landpower for the Company Commander: Leading the U.S. Army into the 21st Century

In Iraq and Afghanistan, a generation of officers grew up solving strategic dilemmas at the company and platoon levels. Well versed in the requirements and responsibilities of an Army at war, this generation must guide the Army into an ever-evolving and uncertain future. In order to navigate through the complexities in front of us, the Army needs capable, adaptable leaders—now more than ever—who champion the Army's strategic purpose and goals. With that, one of the most important discussions over the next few years will be how company commanders understand and implement the Army's central role in strategic landpower.



General Robert W. Cone
Commanding General, U.S. Army Training and Doctrine Command

Over the last 2 years, the Army has put a lot of great people to work examining every facet of our training, doctrine, and warfighting capability. We did not do this to examine where we stand today. Rather, all of this effort was aimed at figuring out two things—what kind of Army we will need to meet future challenges and what we have to do to build that Army even as we continue fighting in Afghanistan and remain engaged throughout the world. Much of what we concluded is available in a single brief document—U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (Pam) 525-3-0, *The U.S. Army Capstone Concept*.[1] If you have not read it yet, please do so.

I won't summarize an already brief document in this article. Instead, I will discuss how the newest and most vital ideas relate to the execution level—the company. While things have been written about strategic maneuver, nothing has been written about its application at the tactical level. Although some ideas may be new, much of what must be done remains the same—training, standards, and the understanding of the human environment. This is a result of the unchanging character of the Army's basic strategic problem and mission. As in prior eras, as part of the joint force, our Army must retain its ability to protect U.S. national interests, execute any mission assigned to us, and win on any battlefield around the world.

Given our national strategy, we are required to field an Army capable of waging war decisively. Fielding a ready and responsive force with sufficient depth and resilience to wage sustained land combat is central to our mission, and that force must be able to conduct both combined arms



A team leader from the 370th Engineer Company, 54th Engineer Battalion, prepares the initiator for an explosive charge while other members of his team pull security during military operations on urbanized terrain training.

maneuver and wide area security. A ready, robust, responsive force deters adversaries, reassures allies and, when necessary, compels our enemies to change their behavior. Maintaining such a force requires high levels of adaptability throughout each echelon of the Army. Only Soldiers with tactical skill and operational flexibility can effectively respond to changing tactical situations in support of our Nation's strategic goals and interests.

This is where company commanders fit into the concept of strategic landpower. Much like company grade officers did in Iraq and Afghanistan, the company commander of the future must be mentally agile enough to thrive within the parameters of mission command. Developing leaders who can do so, while providing clear task and purpose to their subordinates, will be critical to the success of any mission across the range of military operations. Effective Army commanders, including those at the company level, do not use fiscal constraints as an excuse for failing to develop the best possible mix of training, equipment, and regional expertise they can within their formations. Rather, they motivate their people and guide their units in a way that makes optimal use of available resources to create adaptive, effective forces.

Our Army has three primary and interconnected roles—prevent conflict, shape the operational environment, and win the Nation's wars. The company commander has important responsibilities in each of these.

Prevent Conflict

It is prudent here to define what a conflict is. Since the term gets thrown around a lot and attached to a lot of different situations, it is easy to misunderstand the doctrinal meaning. Conflict is an armed struggle or clash between organized groups within a nation or between nations in order to achieve limited political or military objectives. Irregular forces frequently make up the majority of enemy combatants we face now and may continue to do so in the future. Conflict is often protracted, geographically confined, and constrained in the level of violence. Each one also holds the potential to escalate into major combat operations.

Many of the contingencies to which the United States responded militarily in the past 50 years have been appropriately defined as conflicts. The same can reasonably be expected in the future, but with the addition of cyberspace.

As was true during the Cold War, many of our greatest successes in the future will not occur on the battlefield; rather, maintaining peace may be our greatest achievement. This will be no easy task as global tensions and instability increase in ungoverned or weakly governed spaces around the world. History has taught us that without a capable, highly trained land force, the United States has little influence in many of those spaces. That land force, our Army, must remain the best equipped, best trained, and most combat-ready force in the world if it is to have the strategic effect we seek. That readiness is built from the bottom up.

This is the first critical point where company commanders must help shape the future. As owners of the training schedule, commanders have a critical role in developing team, squad, and platoon skills. Commanders ensure that broadening training—like language, geographical, and cultural familiarization—is done effectively, in a rigorous manner. Soldiers from the generation that fought in Iraq and Afghanistan will not be satisfied with training that is focused on artificial scenarios and made-up adversaries, so their commanders need to be innovative about preparing well-coordinated, realistic training. Subordinates must be challenged, and they have to feel that their challenges have a direct link to future operations. In order not to lose 12 years of combat-proven leader development, company grade officers must find a balance between building an Army prepared for the range of military operations and succumbing to pressure to "get back to the way it used to be."

Unfortunately, the possession of such a trained and ready force is useless if it cannot affect regions where trouble is brewing. As units reposition from overseas bases and return to the United States, it becomes more crucial than ever for the Army to adopt an expeditionary mindset and improve its expeditionary capability. To do so, the Army is aligning units to specific geographical regions and arranging them into scalable and tailored expeditionary force packages that meet the needs of the joint force commander across the range of military operations. In short, our Army will be better postured to generate strategic influence anywhere in the world and, as part of the joint force, to deter aggression.

In this construct, company commanders must conduct operational environment training specific to their region. Becoming familiar with the people, cultures, and languages

of the region in which one's unit will operate is critical to the success of a continental U.S.-based Army. Conventional-force companies learned much over the past 12 years as they executed missions historically reserved for special forces. War is fundamentally a human endeavor, and understanding the people involved is critically important. Company commanders cannot now ignore the hard-won lessons of their predecessors by ignoring one of the special forces' key tasks of understanding the operational environment. Those who meet this intent and enforce standards during this training will ensure that we pay those lessons forward to the next generation.



A U.S. Army engineer speaks with soldiers from the 33d Light Infantry Battalion, Republic of Georgia.

Shape the Operational Environment

During peacetime, the Army is continuously engaged in shaping the global environment to promote stability and partner nation capabilities. We do this for several reasons—the most important of which is maintaining peace in pursuance of American national security interests. Where conflict has already broken out, engagement helps keep it contained and may even lead to a peaceful resolution. By helping to build partner capacity and trust, forward-engaged Army units greatly add to regional and global stability. Moreover, by building strong relationships of mutual trust, we facilitate access and set the conditions for success in any future combined operation in a particular region or country.

But what are shaping operations, and how are they executed at the company level? Shaping operations are defined as those operations, occurring at any echelon, that create or preserve conditions for the success of the decisive operation. Thus, engagement by regionally aligned forces positively shapes the environment in which the Army operates throughout the range of military operations. This aligns with the notion of the "strategic corporal," which recognizes that in the information age, the actions of individuals and small groups can have widespread impact well beyond what was intended at the time. Every action has a reaction, and it is necessary for junior officers to be aware of the role their Soldiers and units play in the overall strategic goals of our Nation.



A Soldier with the 591st Engineer Company provides overwatch security for U.S. Air Force explosive ordnance disposal personnel outside an Afghan Border Police checkpoint.

As part of regionally aligned shaping operations, the Army will employ a careful mix of rotational and forward-deployed forces, develop relationships with foreign militaries, and conduct recurring training exercises with foreign partners to demonstrate the Nation's enduring commitment to allies and friends. Where we share mutually beneficial interests with an ally, the Army enhances that partner's self-defense capacity and improves its ability to serve as a capable member of a future military coalition. More-capable allies generate a stabilizing influence in their regions, tending to reduce the need for American military interventions over time.

Shaping operations do not end with planned training engagements by forward-deployed units. Other actions that the units, or even small groups of individual Soldiers, take can have a shaping effect. Those actions will run the gamut from brigade- or division-size assistance after a natural disaster, to a single act of kindness to a foreign student in an Army school who later rises to high levels in his nation's armed forces. All of the specific activities that we conduct which have a shaping effect should convey to our intended audiences the clear message that, while we are committed to peace, our Nation protects its friends and defends its interests. Instilling this understanding among our Soldiers and junior noncommissioned officers (NCOs) is one of the vital roles that company grade officers play in the execution of strategic landpower.

But there is a caveat. What may be the standard for us is not necessarily useful or welcome with our host nation partners. So, shaping also entails tailoring our delivery of security assistance to our counterparts in ways appropriate for their culture and military capabilities. Company commanders can gain great

success here by applying key interpersonal skills to know and understand officers, NCOs, and soldiers from other armies and to be humble when dealing with them.

Win the Nation's Wars

Despite our best efforts to shape a stable global environment and prevent conflict, violence is likely to remain endemic to the human condition. It has been said that "Only the dead have seen the end of war."[2] While we do everything possible to prevent the outbreak of war, we must ensure that there never will be a day when the U.S. Army is not ready to fight and win wars in defense of our Nation.

What is a war? Historically, war has been defined as a conflict carried out by force of arms, either between nations or between parties within a nation. However, as we consider hostile acts in cyberspace, the definitions of war and acts of war will continue to evolve. For example, large-scale cyberattacks against government operations or critical infrastructure—such as those in the 2008 Russian-Georgian conflict—can reasonably be considered acts of war. Leveraging the technological savvy of today's Soldiers requires that leaders have an engaged interest in their development. This will require junior leaders from the same generation who are as adept at leader development as they are technologically competent.

"While we do everything possible to prevent the outbreak of war, we must ensure that there never will be a day when the U.S. Army is not ready to fight and win wars in defense of our Nation."

To defend our Nation, the Army must maintain the capacity to conduct strategically decisive land operations anywhere in the world. Though we will always conduct such operations as part of a joint force, we also acknowledge that war is a clash of wills that requires the ethical application of violence to compel change in human behavior. Here, company commanders make a dramatic contribution to the application of strategic landpower by being tactically and technically proficient in the execution of combined arms maneuver and wide area security. Without successful tactical execution, the best strategic concepts are doomed to failure.

The U.S. Army capstone concept lays out the details of what capabilities the Army must sustain and provides some guidance on how the force may be employed in the future. But it all boils down to one crucial point: An Army that cannot win on the battlefield is of little worth to the security of the Nation. As everyone is aware, we are facing austere times ahead. This fiscal reality cannot be an excuse for not doing our duty or losing sight of our purpose. In the final analysis, this country will one day—maybe soon—ask us to deploy to some distant land, close with and destroy an enemy, and then build a secure and lasting peace. Our Army is uniquely qualified to ensure the training necessary to make those things happen, thanks to the strength of our NCO Corps. Commanders must leverage the experience of their senior NCOs and find creative ways to properly train the fundamentals despite resource constraints. We've successfully done it before in our Army, and we are counting on our young leaders to do it again.

Conclusion

It was often platoon and company leaders who took the lead in solving strategic issues in Iraq and Afghanistan. It will continue to be platoon and company leaders who keep the Army the well-trained and globally responsive force that our Nation needs to deter our adversaries, protect our friends, and defeat our enemies in the 21st century. The U.S. Army must have company commanders who understand strategic landpower and their role in it. Seek out opportunities to ingrain your training events within the framework of strategic landpower. Write articles for your branch professional bulletin, discussing the impacts of strategic landpower for your specialty. You can find the strategic landpower white paper on the TRADOC Web site at <http://www.arcic.army.mil/app_Documents/Strategic-Landpower-White-Paper-06MAY2013.pdf>[3] and on company commander discussion forums. This white paper is the primary reference for strategic landpower concepts and the one jointly approved by the Army Chief of Staff, the Marine Corps Commandant, and the commander of U.S. Special Operations Command.

It is the responsibility of senior Army leaders to set the conditions to make you and our Army successful. Your senior leaders appreciate what you do every day. These will be challenging, but exciting times; and I thank you for your service and sacrifice as we move toward making the Army of 2020 and beyond the best in the world.

Acknowledgement: Captain Jon D. Mohundro, Commander's Planning Group, TRADOC, contributed to the development of this article.

Endnotes:

[1]TRADOC Pam 525-3-0, *The U.S. Army Capstone Concept*, 19 December 2012, <http://www.tradoc.army.mil/tpubs/pams/tp525-3-0.pdf>, accessed on 29 January 2014.

[2]Although this quote is widely attributed to the Greek philosopher Plato, the source has never been definitively confirmed.

[3]"Strategic Landpower: Winning the Clash of Wills," Strategic Landpower Task Force, <http://www.arcic.army.mil/app_Documents/Strategic-Landpower-White-Paper-06MAY2013.pdf>, accessed on 29 January 2014.

ENGINEER COMPANY COMMANDERS AND STRATEGIC LANDPOWER

By Captain Loren C. Baldwin

Army engineers are renowned for their resourcefulness and ability to make things happen. It is a hallmark of who they are and what they do. This reputation doesn't happen by chance; it comes through executing tough, realistic training; critically thinking through challenges; and understanding and appreciating the impact that our efforts will have on echelons above our own. Throughout history and in our current operating environment, engineers have been at the forefront of operations. Who has been the center of gravity for ensuring that skill sets remain sharp, that engineers stand ready to deploy in support of the range of military operations, and that they retain the operational and institutional knowledge that has been built over the past 12 years of conflict? Engineer company commanders are pivotal in the Army's ability to prevent conflict, shape the operational environment, and win the Nation's wars.

Prevent Conflict

Commanders are ultimately responsible for the training of their formations. Commanders are the officers who plan and resource the training that they feel is necessary to accomplish their unit missions. However, the ability to train is frequently constrained by scarce resources in the engineer realm, especially in the Reserve Component. Environmental issues and the availability of land limit horizontal unit training when it comes to earthmoving, road construction, and ditch digging. Vertical units frequently are unable to swing hammers, lay bricks, string wire, or sweat pipe due to a lack of funds to buy materials or perform an approved project. Mobility augmentation companies are part of combined arms maneuvers, yet find it difficult to practice their tasks if they do not have combined arms units to work with. These are real-life issues that engineer company commanders face today.



U.S. Army engineers remove a dilapidated schoolhouse window as part of Beyond the Horizon, an exercise that provides infrastructure renovation to rural areas of Central America.



Soldiers from the 775th Engineer Detachment (Well Drilling), drill a well in Dijbouti in support of Combined Joint Task Force–Horn of Africa.

To get around these obstacles, construction commanders may elect to have their units deployed for overseas duty training in El Salvador, Ecuador, or Panama for exercises such as *Nuevos Horizontes* and Beyond the Horizons. These company level exercises give commanders the opportunity to execute job-specific training and create the opportunity to conduct the language and cultural training that are vital to any combat deployment. These exercises are tough; the Soldiers don't deploy just to execute training. They go to help construct infrastructure, build or repair roads, and share the goodwill of the American people. By doing so, conflict prevention can result as a benefit from the Army's presence. Related to this is shaping the international operational environment, which is achieved by building partnership capacity and trust. We build strong relationships with the local populace by providing them with much-needed schools, wells, or new roads, showing them that the Army is not solely for warfighting.

Shape the Operational Environment

Engineers help to shape the operational environment through infrastructure building and stability operations with partner nations. These tasks are vital for national interests because they allow company commanders, as representatives of the United States, to build relationships with the local nationals. If, during a *shura* with the local imam, a commander learns that insurgents have placed improvised explosive devices under area overpasses, then that commander's route clearance company can now assure mobility to the maneuver commander by successfully defeating those devices. In this example, the shura is a shaping operation as the outcome created a condition for the success of an operation.



Soldiers with the 829th Engineer Company, along with Colombian soldiers, remove lumber from a construction site in Las Marias, El Salvador.



Soldiers of the 41st Engineer Company provide security during a route clearance mission along the Konar River in Afghanistan.

Another way engineers shape the operational environment is through training with host nation militaries. Throughout the conflicts in Iraq and Afghanistan, engineer companies have trained their host nation counterparts on U.S. engineer doctrine. Training foreign militaries is a force multiplier since it provides better-trained partners and helps assure our security in the region. Even when not forward-deployed to a theater of operations, Army engineers continue to shape the operational environment via the international exchange student program. Hosting officers from partner, allied, and coalition militaries provides us an opportunity to share the American perspective that we want to live peacefully, but will defend our national interests and allies if necessary.

Win the Nation's Wars

Winning wars is the Army's primary mission, and we train for it. The Engineer Regiment is the most diverse of all Army branches, with roles in the warfighting functions of movement and maneuver, protection, and even intelligence. Within those functions, engineers perform combat roles and support roles through horizontal, vertical, and geospatial expertise. While each company specializes in one of these areas, it is critical for the engineer company commander to understand and know how to employ each with respect to unified land operations. As recent conflicts have shown, we win wars at the company level.

It is within the strategic-operational-tactical framework where engineer company commanders show their understanding of how their mission most affects the mission of the next higher level and must communicate it to their subordinates. Many of the operations conducted in Iraq and Afghanistan were company-executed. Whether that mission was rebuilding the local market, creating a new road, or clearing a route, it was vital to the strategic goals of the combatant commander. The ability to execute missions results from company commanders being able to set the right conditions during training and knowing how to employ the talents and expertise of their subordinates.

Conclusion

Engineer company commanders do not have it easy when it comes to training their units. This is because of the specific mission of each company (and its components), the constraints of budget and training space available, and the need to comprehend how tactical operations affect strategic goals. When engineers are able to properly execute training, it is both technical and tactical. Understanding the role that engineers play in the joint operating environment is critical to the success of the unit and, in many cases, of the large-scale operation itself. Without this strategic perspective at the engineer company level, it is difficult for the Army to accomplish its mission. After all, we clear the way.

Captain Baldwin attends Engineer Captains Career Course 1-14 at the U.S. Army Engineer School, Fort Leonard Wood, Missouri. He is a graduate of the Heavy Construction Equipment Operators Course, the Joint Engineer Operations Course, and the Master Resilience Trainer Course. He holds a bachelor's degree in operations management from the University of Cincinnati and is pursuing a master's degree in management and leadership from Webster University.

Net Zero for Training Through Construction

By Colonel Adam S. Roth

In an era of declining resources, numerous measures have been taken to reduce costs. These have led to a decrease in available training opportunities and dollars, with a corresponding decrease in readiness. The establishment of the U.S. Army Installation Management Command (IMCOM) fundamentally changed the way that U.S. Army installations were funded and managed, and it created a physical divide between engineers and the installations they support. Due to the demands of more than 12 years of conflict, duties such as gate guard and dining facility worker have been contracted, in part to free uniformed Soldiers for combat. These contracts, though necessary, are costly. In light of current fiscal realities, a process of regreening is taking place. Military police Soldiers are manning installation gates. Army cooks are preparing food in dining facilities. This article asks, "Why not do the same with our engineers, irrespective of component?"



Engineers level a concrete pad while helping with construction at a training site.

Background

Our Army is a brigade combat team (BCT)-centric Army. BCTs are our most important platform, serving as our "aircraft carriers." They conduct training such as company and battalion task force green weeks that culminate in a decisive-action training environment rotation at one of the combat training centers, which costs roughly $23 million per rotation. The Army has spent an enormous amount of money to attain a certain level of readiness; but at the end of that pathway, all we have is readiness. Senior Army leaders say that we should not pay for readiness we will not use. In the future, if you are not performing a specific mission (especially as Operation Enduring Freedom winds down), then what will the Army be paying you to do? Engineers must also attain a level of readiness, but the pathway to that readiness and how we will use it are markedly different. That is the thrust of this article.

Net Zero for Training

When one thinks of net zero, the first images that arise are green roofs, motion-sensitive light switches, rainwater reuse, and photovoltaic devices. Using the BCT training example above, can we not apply a net zero approach to engineer training that would provide readiness and a material cost savings to the U.S. government for operations and maintenance; sustainment, restoration, and modernization; minor construction; and even civil works projects? Perhaps we could call this *Net Zero for Training*.



A Soldier uses a circular saw to cut a block for a bond beam.

If we assume that pay and allowances are set costs and examine a project that would normally cost $1 million, it would be reasonable to assume that direct and indirect labor would account for more than 70 percent of that cost, with the remainder attributed to materials. If an Army construction unit were able to accomplish that project, the results would include—

- Theoretical savings of $700,000 (less travel and life support costs).
- Increased readiness for the construction unit.
- Cost neutrality (or savings) in unit training costs.
- Satisfaction on the installation served.

This approach would always raise questions about what the training actually accomplished, how much the training increased readiness, and how much it saved the government.

Two Tribes

Within the Engineer Regiment, there exist two separate tribes that frequently spin in vastly separate orbits: the modified table of organization and equipment unit orbit (which centers around training, missions, and deployments) and the facilities engineering orbit (which centers around directorates of public works [DPWs] and the civil works missions of the U.S. Army Corps of Engineers [USACE], where the languages spoken include money, contracting, and legal oversight). Net Zero for Training could serve as a bridge between these two tribes. It could form the basis of a mutually beneficial program to take the demand signals of the facilities engineering community and turn them into opportunities to improve the training and readiness of components on the green-suit side of the Engineer Regiment. My last article ("One Regiment: Breaking Down the Stovepipes," *Engineer*)[1] spoke to the potential of viewing the U.S. Army Installation Command as the Army's seventh Army service component command, meaning that its demand signals could be filled by the U.S. Army Forces Command, National Guard Bureau, and U.S. Army Reserve Command, based on the training objectives of commanders. Could this be applicable across the entire spectrum of engineer requirements, leading to training and readiness opportunities and cost savings?

Current Practice

No doubt there are units from all components that interact with their local DPW. This will always be the bread and butter of company commanders and other leaders in the construction world. The challenges in making such opportunities happen are usually local in nature. Often, the problems relate to installation construction always taking second place to other missions, such as deployments, combat training center rotations, and other requirements. The sole job of an Air Force installation engineering unit is to provide support to the installation. Why does the Army see things so very differently? One factor may be the reluctance of a DPW to use troop labor due to perceived threats to the civilian or contractor work force. The money for critical programs has long been flatlined, but what will happen when those funds take a precipitous nosedive? During the past 12 years of war, engineers have consistently practiced the mantra of "no engineers in reserve" while deployed, regularly performing construction and maintenance projects efficiently. However, what happens when the engineers are back at their stateside installation is vastly different. Shouldn't it be the same for stateside and overseas jobs?

"Hidden" Military Construction

A new enhanced-performance round was discussed at a recent council-of-colonels meeting. This new service grade ammunition offers many environmental benefits, but it also has a major implication. The ricochet angle created by the impact of the round on a target is much larger than that of current ammunition, creating a safety concern. The challenge is that there is now an unforeseen military construction requirement to modify the protective berms at ranges to make them safe. This would be a great opportunity for a unit to get training in design and horizontal construction at low or even no cost to the government. In an era of declining resources, we need to start looking within and see the training opportunities that such challenges create, rather than immediately hitting our instinctive contractor button.

The Way Ahead

What is needed is a much larger approach to the articulation of requirements (via demand signals) and the programming of funds to complete



National Guard Soldiers hammer a truss into place during the construction of a building that will be used as living quarters for Soldiers on Forward Operating Base Lightning, Afghanistan.

the projects that emanate from those requirements. The following are thoughts for further consideration:

- Explore component level discussions with IMCOM about the risks of budget cuts and how comprehensive risk management strategies can be developed for operations and management (for demand work orders and scheduled maintenance); for sustainment, restoration, and modernization; and for minor construction using and programming contributions by the uniformed side of the Engineer Regiment.
- Explore the potential of green-suit participation in civil works and military construction projects. This doesn't suggest that an Army unit would construct the next Hoover Dam. But units could participate in major civil works projects by simply clearing and grubbing as site preparation (something that could be accomplished by sapper units with chain saws), taking part in an existing project such as routine maintenance of USACE-owned levees, or performing emergency hazard mitigation during floods. A proof of principle is in the planning stages at the Folsom Dam in California, where there is potential for Army units to reestablish an access roadway and demolish an existing temporary access bridge as part of a much larger project.
- Continue the integration process of broadening and increasing connectivity between the tribes of the Engineer Regiment. Perhaps some IMCOM or USACE projects might interest the green-suit side of the Regiment if they can lead to material cost savings for the government. The USACE technical-development program is just one point of light in this vein that allows engineer officers to train at a USACE district and then receive a guaranteed seat at the Engineer Captains Career Course. How often do we allow branch-qualified officers to intern with USACE or a garrison DPW before taking their next critical career step?
- The authoritative regulation, Army Regulation 415-32, *Engineer Troop Unit Construction in Connection With Training Activities*,[2] was last revised on 15 April 1998. The changes the Army has experienced in that time should feed a new revision that creates pathways rather than barriers to realizing this concept.
- The biggest takeaway must be that the potential exists for a change in mind-set for Net Zero for Training to take place. If this mind-set can be adopted, it will assure a higher level of readiness for the Engineer Regiment and will ensure its indispensability to our Army and our Nation at a time when they need us most.

Conclusion

This article is meant to stir discussion about how to create low- to no-cost training opportunities under the tight budgets of the future. It is by no means all-inclusive. It is apparent that the total Engineer Regiment will need to bridge the gaps in funding and thinking to create conditions for building readiness and solving larger infrastructural challenges. Above all, we must not stop thinking and discussing due to retrenchment into our basic tribes. It will be a combination of relationships, proximity, and good engineer economical methods that will carry us through the coming era of declining resources. Net Zero for Training may be one way to help us get there. As always, the author welcomes vociferous debate and can be reached at <adam.roth @us.army.mil>.

Endnotes:

[1]Adam S. Roth, "One Regiment: Breaking Down the Stovepipes," *Engineer*, Volume 43, May–August 2013, pp. 6–8.

[2]Army Regulation 415-32, *Engineer Troop Unit Construction in Connection With Training Activities*, 15 April 1998.

Colonel Roth serves as the Chief of Staff (Reserve Affairs) at the Office of the Chief of Engineers at the Pentagon. He is a resident graduate of the U.S. Army War College and previously served as the Deputy Assistant Commandant (Army Reserve) at the U.S. Army Engineer School. He is a graduate of the U.S. Army Command and General Staff College and holds a master's degree in mechanical engineering from Boston University.

LESSONS LEARNED:
POWER AND ENERGY USAGE AT CONTINGENCY BASE CAMPS

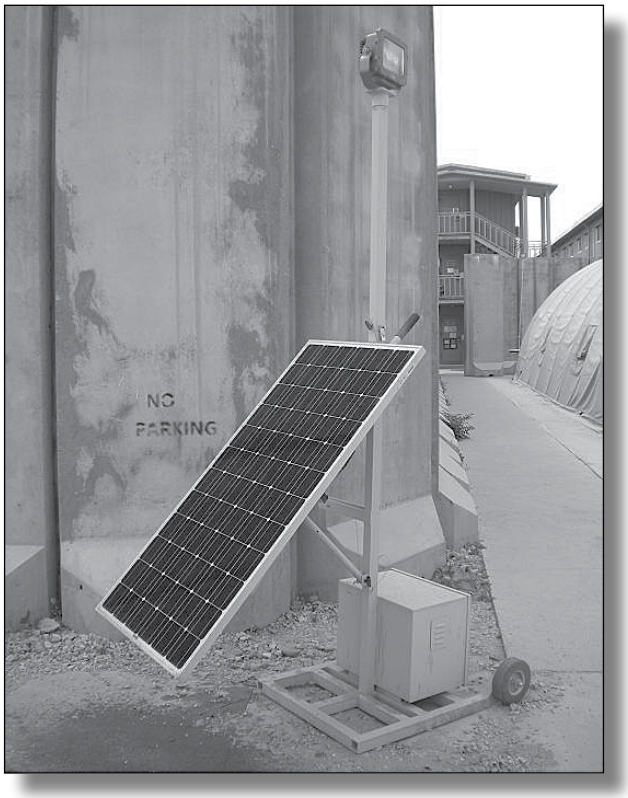
By Mr. John L. Vavrin and Mr. William T. Brown III

The Assistant Secretary of the Army for Installations, Energy, and Environment defines operational energy (OE) as "the energy and associated systems, information, and processes required to train, move, and sustain forces and systems for military operations."[1]

Managing OE at contingency bases is a challenging task for senior commanders, base camp mayors, and their staffs. They must satisfy competing demands across all areas of an operational environment and base camp functions. Energy management is further complicated by the interdependency among power, water, wastewater, and solid waste, which must be handled carefully under difficult and dangerous conditions. Moreover, most contingency bases depend on lengthy, hazardous air and ground lines of communication in areas with unimproved ground transportation networks. Under certain conditions—primarily weather-related—the bases can only be resupplied by airdrop.

A survey developed by the U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC-CERL) was distributed to key stakeholders, subject matter experts, and other USACE personnel. Information was also gathered from recent after action reviews, engineer initial impression reports from Operation Iraqi Freedom and Operation Enduring Freedom, and other technical reports. The results led to specific recommendations for improvements to all facility life cycle phases and to overall OE management for contingency bases.

Survey respondents reiterated the long-recognized fact that a major inefficiency and contributor to excessive fuel consumption at contingency bases is a disproportionate use of inefficient spot generation. During the early phases of operations, units that initiate and develop base camps



A mobile solar light cart provides safety and security at Bagram Airfield.



A 46-megawatt central power plant and fuel storage tanks light up Bagram Airfield.

bring with them tactical generators, their single reliable source of power during this phase. Unless the command can identify enough subject matter experts with the knowledge, skills, abilities, tools, and equipment to manage power, spot generation will continue and will even expand as the base camp grows and matures into a potentially enduring site. To compound the situation, spot generation takes away valuable resources, including the personnel and ancillary equipment required for operations, maintenance, and fuel delivery. These requirements, multiplied by hundreds of existing combat outposts and forward operating bases in a large, combined joint operational area, clearly illustrate the enormity of the issue.

Survey results indicate that USACE can improve processes and programs that deliver OE management capabilities to the warfighter by—

- Promoting and implementing sustainability practices across projects funded for operations and maintenance (those costing under $750,000) and military construction (those costing more than $750,000).
- Providing dedicated OE subject matter experts during the planning and design phase of construction projects.
- Assuming proponency for U.S. Army and Department of Defense base camp master planning and OE management for contingency bases.
- Improving the commissioning and/or postconstruction verification process.
- Providing a robust reachback capability above what is currently offered.
- Providing the requisite number of qualified individuals to conduct oversight during all phases of construction.

The Department of Defense has expended significant resources and made considerable progress in OE management for contingency bases, primarily through the doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) business process. The OE management of contingency bases can be further improved by—

- Providing a dedicated budget to the OE managers and staffs.
- Incorporating a task force power and energy organization into the theater level joint engineering directorate at the beginning of a campaign.
- Scaling the size (not the functions), based on current and anticipated future theater requirements.
- Developing and implementing an energy conservation/awareness program for officers and enlisted professional military education and predeployment training.
- Offering incentives to the Logistics Civil Augmentation Program or other contractors to propose and implement energy- and water-saving projects, essentially making it a type of performance contract program for energy savings.
- Investing in power distribution training.
- Developing and improving an OE reporting process at all command levels within an operational area.

Survey respondents also indicated that one of the successful initiatives at the outlying locations for OE energy management for contingency bases in Afghanistan occurred during Operation Dynamo, in which tactical, quiet generators were replaced with tactical power distribution equipment and improved generators and environmental control

"Proactively addressing [OE contingency base energy management] requirements will allow operations to develop fully in the most effective, efficient, and sustainable manner while enabling mission accomplishment without sacrificing Soldier quality of life."

units. During this operation, energy-inefficient facilities and tents were also replaced.

In addition, the U.S. Army Rapid Equipping Force initiated the Energy to the Edge Program, which deployed alternative and renewable energy systems to remote sites. They provided photovoltaic and energy storage systems, conducted energy assessments at combat outposts, and optimized their power systems. The Project Manager–Force Sustainment Systems also provided advanced energy-efficient systems with improved tent liners, light-emitting diode lighting, vestibules, solar shades, and improved environmental control units.

Survey respondents also noted that allowing senior 249th Prime Power Battalion noncommissioned officers, warrant officers, and mid-level captains to serve as OE advisors can pay great dividends. Military OE advisors can advise contingency base camp leaders on ways to maintain a reliable prime power grid; minimize spot generation; implement demand-reduction measures; and provide well-informed, energy-related information to the commander and staff to help them make sound decisions without reducing mission readiness or Soldier quality of life. They would also have the skills and capabilities to make necessary changes on-site if needed.

A final report from the Special Inspector General for Iraq Reconstruction in March 2013[2] addressed lessons learned from the Iraq reconstruction program to help improve the U.S. approach to future stabilization and reconstruction operations. The report addressed seven best practices for stabilization and reconstruction audit programs. The best practices that are relevant to OE management for contingency bases include—

- Focus early audit attention on contracting, quality assurance, and quality control resources dedicated to programs and projects.
- Develop a systematic approach to reporting on the sustainability of projects.
- Develop an integrated database of contracts, grants, and projects to keep track of procurements and deliveries.
- Develop close working relationships with senior reconstruction managers to encourage improved program implementation.

These best practices suggest that to ensure proper quality assurance and quality control in all phases of construction, an adequate number of qualified contracting officer representatives must be in place.

Base camps require large supplies of energy and clean water, along with an environment that has clean air and is largely free of disease and disease vectors. The failure to properly manage wastes hinders mission readiness, increases resource requirements, increases liabilities, and negatively affects the health of Soldiers and local populations (causing damage to relations with the host nation). Proactively addressing these requirements will allow operations to develop fully in the most effective, efficient, and sustainable manner while enabling mission accomplishment without sacrificing Soldier quality of life. Most importantly, strong OE management for contingency bases saves lives by—

- Reducing the logistical footprint.
- Denying enemy access to a critical resource.
- Allowing commanders to shift significant fiscal resources to support other warfighting priorities.

Efficient OE contingency base energy management is a true force multiplier.

Endnote

[1]"Operational Energy," <http://www.asaie.army.mil/Public/ES/operationalenergy.html>, accessed on 04 March 2014.

[2]Stuart W. Bowen, Jr., "Learning for Iraq: A Final Report from the Special Inspector General for Iraq Reconstruction," Special Inspector General for Iraqi Reconstruction, Arlington, Virginia, March 2013, <http://www.sigir.mil/learningfromiraq/>, accessed on 11 September 2013.

Mr. Vavrin is a researcher and project manager with ERDC-CERL in Champaign, Illinois. He is a retired Army engineer officer, is a graduate of the U.S. Military Academy, holds a master's degree in mechanical engineering from Southern Illinois University–Carbondale, and holds a master's degree in strategic studies from the U.S. Army War College. He is a registered professional engineer in Illinois.

Mr. Brown is a researcher with ERDC-CERL. He holds bachelor's and master's degrees in mechanical engineering from North Carolina Agricultural and Technical State University.



ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center of Excellence
Capabilities Development and Integration Directorate
Concepts, Organizations, and Doctrine Development Division

Publication Number	Title	Date	Description (and Current Status)
Publication Revisions			
FM 3-34	*Engineer Operations*	Aug 11	This revised version contains the "box top" as our doctrinal framework; integrates the three engineer disciplines of combat, general, and geospatial engineering; and introduces the four lines of engineer support for decisive actions. **Status:** The revised version has been approved by the U.S. Army Engineer School (USAES) commandant and is awaiting publishing at the Army Publishing Directorate (APD). Anticipate publication in 2d quarter, fiscal year (FY) 2014.
ATP 3-34.22 (FM 3-34.22)	*Engineer Operations—Brigade Combat Team and Below*	Feb 09	This is a revision and conversion of Field Manual (FM) 3-34.22, *Engineer Operations—Brigade Combat Team and Below*, to Army Techniques Publication (ATP) 3-34.22. It is under development and will include information on the brigade engineer battalion (BEB). **Status:** Anticipate the final draft to be sent for worldwide staffing 2d quarter, FY 14. To be published 4th quarter, FY 14.
ATP 3-34.23 (ATTP 3-34.23)	*Engineer Operations—Echelons Above Brigade Combat Team*	Jul 10	This is a revision and conversion from Army Tactics, Techniques, and Procedures (ATTP) 3-34.23, *Engineer Operations—Echelons Above Brigade Combat Team*, to ATP 3-34.23. **Status**: Anticipate the final draft to be sent for worldwide staffing 2d quarter, FY 14. To be published 4th quarter, FY 14.
ATP 3-90.61 (FM 3-90.61)	*Brigade Special Troops Battalion*	Dec 06	This is a revision and conversion from FM 3-90.61, *The Brigade Special Troops Battalion*, to ATP 3-90.61. **Status:** Anticipate the final draft to be sent for worldwide staffing 3d quarter, FY 14. To be published 1st quarter, FY 15.
Combat Engineering			
ATP 3-34.20 (FM 3-34.210)	*Explosive Hazard Operations*	Mar 07	This is a multi-Service manual and conversion from FM 3-34.210, *Explosive Hazards Operations,* to ATP 3-34.20. **Status:** Staffing of the final draft is complete, and the final approved draft is being prepared. To be published 3d quarter, FY 14.
ATP 3-90.4 (ATTP 3-90.4)	*Combined Arms Mobility Operations*	Aug 11	This is a multi-Service manual and conversion from ATTP 3-90.4, *Combined Arms Mobility Operations*, to ATP 3-90.4. **Status:** Anticipate the final draft to be sent for worldwide staffing 2d quarter, FY 14. To be published 4th quarter, FY 14.
ATP 3-90.8 (FM 3-90) (FM 5-102) (FM 90-7)	*Combined Arms Countermobility Operations*	Jul 01 Mar 85 Sep 94	This multi-Service manual is a full revision that consolidates FM 3-90, *Tactics*; FM 5-102, *Countermobility*; and FM 90-7, *Combined Arms Obstacle Integration*. It discusses countermobility and combined arms obstacle integration and their relationship to the combined arms defense and warfighting functions with regard to wide area security. **Status:** The final draft has been approved by the USAES commandant and is now awaiting U.S. Marine Corps (USMC) approval. To be published 2d quarter, FY 14.
ATP 3-90.37 (FM 3-90.119)	*Combined Arms Improvised Explosive Device Operations*	Sep 07	This is a conversion from FM 3-90.119, *Combined Arms Improvised Explosive Device Defeat Operations*, to ATP 3-90.37. **Status:** Staffing of the final draft is complete, and the final approved draft is being prepared. To be published 3d quarter, FY 14.

Engineer Doctrine Update

U.S. Army Maneuver Support Center of Excellence
Capabilities Development and Integration Directorate
Concepts, Organizations, and Doctrine Development Division

Publication Number	Title	Date	Description (and Current Status)
General Engineering			
ATP 3-34.5 (FM 3-100.4)	*Environmental Considerations*	Feb 10	This is a conversion from FM 3-100.4, *Environmental Considerations in Military Operations*, to ATP 3-34.5. **Status:** Staffing of the final draft is complete, and the final approved draft is being prepared. To be published 3d quarter, FY 14.
ATP 3-34.40 (FM 3-34.400)	*General Engineering*	Dec 08	This multi-Service manual is a conversion from FM 3-34.400, *General Engineering*, to ATP 3-34.40. **Status:** Staffing of the final draft is complete, and the final approved draft is being prepared. To be published 3d quarter, FY 14.
ATP 3-34.45 (FM 3-34.480)	*Power Generation/ Distribution*	Apr 07	This multi-Service manual is a conversion from FM 3-34.480, *Engineer Prime Power Operations*, to ATP 3-34.45. **Status:** Anticipate the final draft to be sent for worldwide staffing 3d quarter, FY 14. To be published 1st quarter, FY 15.
ATP 3-34.81 (FM 3-34.170)	*Engineer Reconnaissance*	Mar 08	This is a conversion from FM 3-34.170, *Engineer Reconnaissance*, to ATP 3-34.81. **Status:** Anticipate the final draft to be sent for worldwide staffing 3d quarter, FY 14. To be published 1st quarter, FY 15.
Geospatial Engineering			
ATP 3-34.80 (FM 3-34.230)	*Geospatial Engineering*	Mar 08	This is a conversion from FM 3-34.230, *Topographic Operations*, to ATP 3-34.80. **Status:** Staffing of the final draft is complete, and the final approved draft is being prepared. To be published 3d quarter, FY 14.

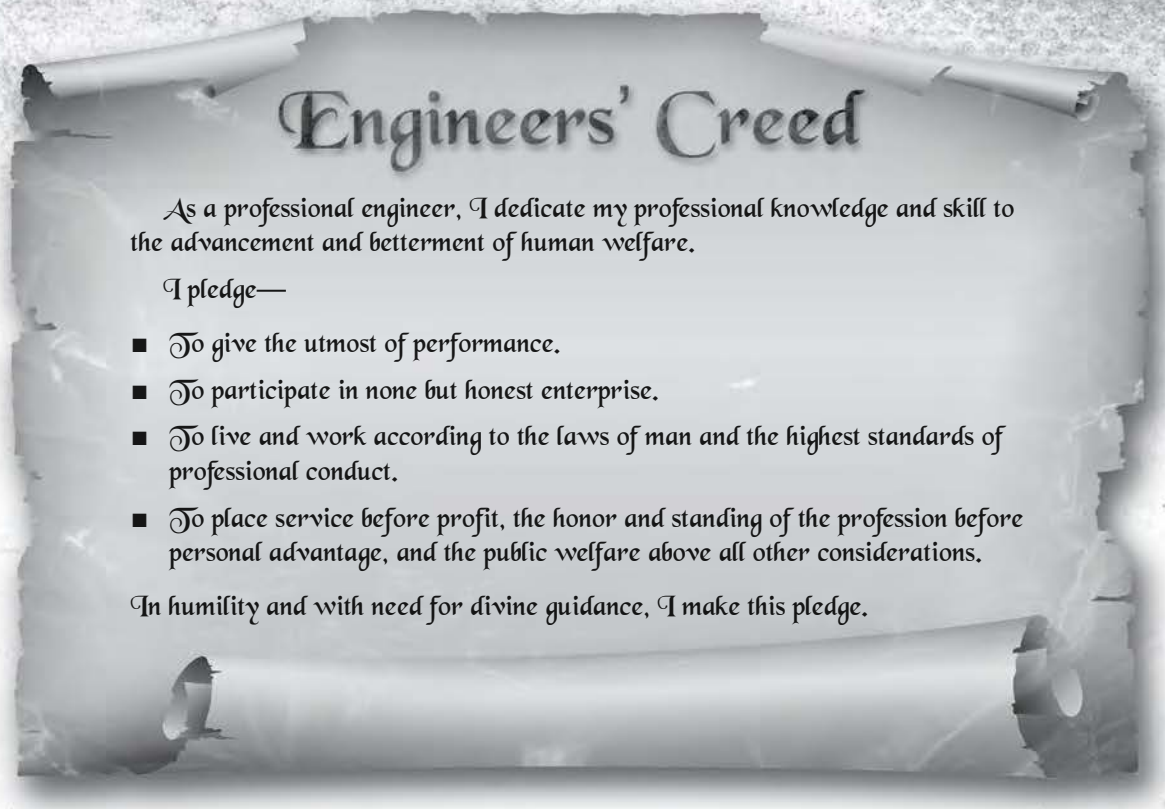
Notes:

1. Current engineer publications can be downloaded from the Army Publishing Directorate Web site at <http://www.apd.army.mil>. The manuals discussed in this article are currently under development and/or recently published. Drafts may be obtained during the staffing process by contacting the Engineer Doctrine Branch at commercial (573) 563-0003, DSN 676-0003, or <usarmy.leonardwood.mscoe.mbx.cdidcodddengdoc@mail.mil>. The development status of these manuals was current as of 5 December 2013.

2. Items in parentheses are publication numbers of current publications, which will be superseded by the new number at the top of the entry. Multiple numbers in parentheses indicate consolidation into one manual.

3. Currently, all 30 Army doctrine publications/Army doctrine reference publications have been published. Every Army professional should have a basic knowledge of our fundamental principles since they rarely change quickly. They can be downloaded from the Army Publishing Directorate Web site at <http://www.apd.army.mil>.

"One of the best ways to keep peace is to be prepared for war."
—George Washington



The Engineers' Creed:

A Statement of Precision and Integrity

By Staff Sergeant Cole A. Williams

In most professions, it is the goal of the professional to reach the highest level of achievement and present an unparalleled level of quality. During this quest, many morals and ethics are often overlooked. In the Army, we as professionals are not offered that option. This is brought to light when reading the Engineers' Creed. The creed outlines a hard path for all engineers to follow. It includes the perfection of the craft, a pledge to deliver at the highest production levels, and a promise to perform at this level with integrity.

The creed states that an engineer dedicates his or her knowledge and skills to the advancement and betterment of human welfare. The information and skills learned from the grade of private all the way to general are to be used to benefit mankind. It relates that the mind-set of an engineer should be one of generosity. Engineers have a duty—not only to our own, but to the whole of humanity—to create a world that is more convenient and proficient. We do these things with no need for recognition. Fanfare and celebration are by-products of our actions. If presented with these accolades, we accept them and carry on with the knowledge that the standard has been raised. When our actions are not praised, an internal review occurs to evaluate what can be done better the next time we are asked to assist. We continue to strive to be more professional and altruistic in each endeavor we undertake.

The second stanza relates the pledge under which all engineers operate. The Engineers' Creed promises—

- To give the utmost of performance.
- To participate in none but honest enterprise.
- To live and work according to the laws of man and the highest standards of professional conduct.
- To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations.

Simply, these promises mean that engineers will provide the very best at all times while maintaining a strong moral compass. An engineer's business is not underhanded. The use of poor materials, out-of-date practices, and dishonest reports is not tolerated. The pride that is taken in an engineer's performance is sizable. This is shown by the craftsmanship and attention to detail we put into the projects we complete. The second line stresses the importance of the way we work as well as the way we live. We will not only follow the rules while at work, but also in our personal lives. We are to be an all-around example, rather than simply having a specialized persona during times of review. Continuing down the list, emphasis is placed on the goodwill of the engineer. This is truly the most important part of the creed. The measure of a man is not what he has, but how much he can give. As engineers, we have a plethora of knowledge and expertise. We have a responsibility to help those who cannot help themselves. By choosing to do this, instead of selling out to the highest bidder, we set ourselves apart and hold each other to a higher standard than most.

The final line of the creed is an affirmation of the lines that precede it. The Engineers' Creed explains that we cannot do this without the guidance of a higher power. This is most true. With whatever faith engineers are affiliated, one standard holds true—we are merely the hands of the One who guides humanity. We have been charged to create in an earthly sense. We have been given the opportunity to learn, design, and create works of efficiency and productivity. By recognizing that we could not do this without the power of a divine presence, we make this pledge while asking for guidance from the One who created all.

In summary, the Engineers' Creed is not one that is followed by the weak. It takes a strong heart and a fluid mind to live up to every part of this creed. Professionalism, generosity, and integrity are the words that underline this text. As engineers, we strive to keep up these standards in everything we try to accomplish. As in everything else in life, we as humans are not perfect. We are not expected to adhere to the principles of this creed 100 percent of the time. But when we stumble, engineers have merely to look at this creed and find our way back to plumb.

Staff Sergeant Williams is a squad leader with Charlie Company, 4th Brigade Special Troops Battalion, 4th Brigade Combat Team, 1st Armored Division, Fort Bliss, Texas. He wrote this article while attending the Engineer Advanced Leader Course at Fort Leonard Wood, Missouri.

ENGINEER WRITER'S GUIDE

Engineer is a professional-development bulletin designed to provide a forum for exchanging information and ideas within the Army engineer community. We include articles by and about officers, enlisted Soldiers, warrant officers, Department of the Army civilian employees, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to engineers. Articles may share good ideas and lessons learned or explore better ways of doing things.

Articles should be concise, straightforward, and in the active voice. If they contain attributable information or quotations not referenced in the text, provide appropriate endnotes. Text length should not exceed 2,000 words (about eight double-spaced pages). Shorter after action type articles and reviews of books on engineer topics are also welome.

Include photos (with captions) and/or line diagrams that illustrate information in the article. Please do not include illustrations or photos in the text; instead, send each of them as a separate file. Do not embed photos in Microsoft PowerPoint® or Word®. If illustrations are in PowerPoint, avoid the excessive use of color and shading. Save digital images at a resolution no lower than 200 dpi. Images copied from a Web site must be accompanied by copyright permission (see our photographer's guide at <http://www.wood.army.mil/engrmag/Photograph%20Illustration%20Guide.htm>).

Provide a short paragraph that summarizes the content of the article. Also include a short biography, including your full name, rank, current unit, job title, and education; your mailing address; a fax number; and a commercial daytime telephone number.

Articles submitted to *Engineer* ***must*** be accompanied by a written release by the author's unit or activity security manager prior to publication (see <http://www.wood.army.mil/engrmag/writersguide.htm>). All information contained in the article must be unclassified, nonsensitive, and releasable to the public. *Engineer* is distributed to military units worldwide and is also available for sale by the Government Printing Office. As such, it is readily accessible to nongovernment and foreign individuals and organizations.

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Engineer is published three times a year: April (article deadline 1 December), August (article deadline 1 April), and December (article deadline 1 August). Send submissions by e-mail to <usarmy.leonardwood.mscoe.mbx.engineer@mail.mil> or on a CD in Microsoft Word, along with a double-spaced copy of the manuscript, to: Managing Editor, Engineer Professional Bulletin, 14010 MSCoE Loop, Building 3201, Suite 2661, Fort Leonard Wood, MO 65473-8702.

Note: Please indicate if your manuscript is being considered for publication elsewhere. Due to the limited space per issue, we usually do not print articles that have been accepted for publication in other Army venues.

THOUGHTS FOR FUTURE BEB COMMANDERS

By Lieutenant Colonel Larry F. Dillard, Jr.

The Army's recent announcement of the conversion of brigade special troops battalions (BSTBs) into brigade engineer battalions (BEBs) represents a great opportunity for the Engineer Regiment to solidify its place as an essential member of the combined arms team. The BEB will provide brigade combat team (BCT) commanders with a robust set of organic combat engineer capabilities and adequate mission command capacity to receive additional enablers tailored for specific missions. Also, the BEB structure corrects some of the organizational deficiencies in the BSTB structure, especially the absence of a forward support company. Despite these improvements, BEB commanders will face many of the same challenges that BSTB commanders have faced in the 9 years since the Army introduced the BSTB. As a combat engineer who has commanded 4th BSTB, 101st Airborne Division, for the past 2 years in training and in combat, I offer this list of my top 10 recommendations to future BEB commanders.



Soldiers from the 19th Engineer Battalion string concertina wire in Afghanistan.

1. Command the Entire Battalion

It is important for commanders to remember that they are not commanding an engineer battalion with a few enablers attached for administrative oversight. The Army has decided to entrust engineer senior leaders with the training, development, and operational employment of organic chemical, biological, nuclear, and radiological; military intelligence (MI); and signal formations of the BCTs, so commanders must develop expertise in the capabilities and requirements of these units. To add to the challenge, these units are much more complicated to train than the engineer companies. In the BSTB, every platoon is unique, except for the two sapper platoons. The additional engineer company in the BEB will give the sappers even greater commonality and shared training opportunities. Moreover, sapper training is relatively straightforward compared to the functional MI, signal, and support platoons. Give a sapper platoon some time, a piece of land, and a case or two of rations and they can have a great training event. For example, the tactical unmanned aircraft system platoon requires all of the above, plus an airfield, aviation gas (which is likely not available through the brigade Class III commodity manager), Federal Aviation Administration-approved flight plans that are deconflicted with aircraft and artillery, a qualified instructor-operator, and more. These complicated operations require that the battalion commander and staff are well versed in the basics of each specialty platoon in the battalion.



Soldiers from the 65th Engineer Battalion clear a potential improvised explosive device while performing route clearance.

My advice is to forget about the engineer companies—for a little while. In the new BEB structure, the commander, command sergeant major, and operations (S-3) officer are engineers. Without having a deliberate plan, the commander runs a risk of neglecting the nonengineer units in the battalion. Especially during the first 6 months, spend more time with the units you know less about. The forward support company, MI company, and signal companies will be full of smart and technically proficient Soldiers who will love to explain what they do. Give them the opportunity. This will demonstrate that you are invested in them, and it will be invaluable later when the brigade commander expects you to advise him on the capabilities and limitations of your logistics, MI, and signal companies.

2. Do Not Abdicate Command to Brigade Staff Officers

Battalion commanders are responsible for training their MI and signal companies, but the functional experts for these formations reside in the brigade intelligence (S-2) and communications (S-6) shops. Consequently, there is a tendency for the companies to bypass the battalion and work everything directly through the brigade staff. While a high degree of direct coordination between the companies and brigade staff is necessary and desirable, coordination can veer into an encroachment of command authorities.

The best advice on handling these relationships is to encourage direct coordination between the companies and their respective staff functional experts, but clearly establish red lines for subordinate commanders and the brigade staff. My experience has been that brigade staff officers are invaluable resources to my battalion and to me, and they always act with the best intentions. The following business rules will set conditions for productive teamwork among brigade, battalions, and companies:

- The brigade engineer, S-2, and S-6 have no tasking authority. All tasks should come through S-3 channels to the battalion, never to companies directly. It sounds obvious, but remember that the staff proponent for a maneuver element is the S-3, so it's natural that maneuver tasks come through the S-3. Frequently, the brigade engineer, S-2, or S-6 has tried to task BSTB companies directly without going through the battalion, always with good intentions, but never with good results.
- Brigade staff officers recommend proper employment, location, and command relationships for BEB enablers in consultation with the BEB staff, but commanders decide.
- Commanders make all personnel decisions.

3. Constantly Manage Officer Talent

Typical functional battalions receive newly minted lieutenants and grow them into company executive officers and junior staff officers. They also receive new captains as battalion staff officers and grow them into company commanders. In a multifunctional battalion like the BSTB, most of the officers come in lateral moves from adjacent battalions, with engineers being the exception. Brigade commanders typically choose the best maneuver battalion S-2 to command the MI company. MI platoon leaders may spend their first year in the brigade as the assistant S-2 in a sister battalion, and signal officers follow a similar pattern. The result is that battalion commanders generally can't grow their own leaders.

BEB commanders should take an active interest in the MI Corps, Signal Corps, and Chemical Corps officers in the brigade. The brigade S-2 and S-6 will probably develop the assignment slate for the MI Corps and Signal Corps officers, but it is helpful for them to involve the battalion commander before they present the slate to the brigade commander. Rely on the S-2 and S-6 to help mentor and counsel these officers. Branch-specific, brigade officer professional development classes can help keep these officers connected to their craft and deepen the battalion commander's understanding of their capabilities.



Soldiers from the 65th Engineer Battalion conduct an after action review.

4. Devise Inclusive Team-Building Activities

New BEB commanders inherit the lineage and honors of storied engineer battalions. Respect that heritage, but figure out ways to celebrate the contributions of the rest of the team. Commanders can't rewrite history, but they can alter ceremonies and traditions to make them inclusive. There will be a natural camaraderie among the engineers, born from a shared set of experiences and assignment patterns. Platoon leaders from one engineer company will move to be the executive officers of a sister company or to the battalion S-3 shop. Engineer captains on the battalion staff will move down to take command of the engineer companies. These patterns will stitch the engineers together by establishing natural lines of communication and cooperation. The same patterns do not exist with the other companies, so it takes deliberate command emphasis to build a cohesive team.

Shared training, competitions, and social events are effective in building greater cohesion across the formation. When structuring competitions, commanders need to ensure that they provide every formation an opportunity to play to their strengths. The great diversity of the BEB companies will bring diverse skills. Some companies will have an advantage in physical activities, while others will shine in skill-based competitions. For example, instead of conducting a simple litter relay, a contest could require teams to use a radio to call for a medical evacuation first. Likewise, ceremonies and traditions can be adjusted to include the other branches.

5. Develop Clear Command and Support Relationships

The adage that "good fences make good neighbors" could read "clearly defined command and support relationships make good neighbors." In Afghanistan, my BSTB had 18 separate entities working with or for adjacent battalions. Clearly defining each of these relationships is the commander's business. Staff officers tend to use the terms *attached*, *direct support*, *tactical control*, and *operational control* interchangeably and loosely. In one case, during battalion train-up, a draft brigade task organization showed half of my signal company was under the operational control of the brigade S-6. Not only is this doctrinally impossible, it is operationally problematic. I recommend that BEB commanders be personally involved in the development of the brigade's task organization. Throughout our brigade's preparation for deployment, my battalion S-3 and I routinely discussed task organization with the brigade engineer, S-2, S-3, and S-6 to ensure that subordinate units were providing proper support with the proper command/support relationship.

6. Prepare to Function as an Alternate Brigade Command Post

Embrace nonstandard missions. Part of the beauty of the BSTB is its ability to cover down on nonstandard missions for the BCT commander. Because a significant part of the battalion is typically task-organized under the operational control of other battalions, the BSTB becomes something of an extra mission command node for the brigade commander. This may be slightly less true for the BEB than the BSTB, but the battalion still provides the brigade commander with a complete staff that can exercise mission command over missions such as base defense; area security; reception, staging, onward movement, and integration; and training for enablers (female engagement teams, military working dogs). Although the BEB has the smallest battalion staff, it also has the most functionally diverse one. This diversity increases the ability to execute a diverse range of missions effectively.

7. Find Ways to Train the Battalion Together

The unique squads and platoons of the BSTB make it challenging to structure a shared training experience for the battalion for anything beyond common warrior tasks. In earlier engineer battalions, it was typical for the battalion to centrally organize and execute squad and platoon training lanes for each identical sapper platoon, often with a best squad/platoon designation at the end.

In addition to the cohesion that naturally flows from such events, these external evaluations provided a valuable opportunity for the commander to evaluate and coach subordinate leaders and certify the readiness of platoons. There are also efficiencies in planning, resourcing, and executing the training by running every platoon through a standard set of training lanes. Unfortunately, this is not feasible when there are 12 platoons with unique training paths.

Commanders should seek opportunities to train the battalion companies together. When our maneuver battalions were doing their squad and platoon live-fire exercises, the BSTB conducted a week-long field training exercise that pulled sappers; signal and human intelligence specialists; tactical unmanned aircraft system specialists; military police Soldiers; joint network node platoons; and company and battalion command posts into a reasonable scenario. On a typical day, the engineers provided route clearance support to a signal reconnaissance mission to determine a suitable location for a brigade retransmission site while unmanned aircraft reconnoitered known improvised explosive device engagement areas ahead of the route clearance patrol. Meanwhile, the signal intelligence platoon collected opposing-force communications intelligence to support a military police platoon raid. While these scenarios may not be completely realistic, the field training exercise gave each platoon the opportunity to employ its unique skills as an enabler supporting a maneuver element. It was a great training event for company and battalion command posts in preparation for the battalion role as an operational environment integrator in Afghanistan.

8. Train Units to Be Good Attachments

It is typical for the BSTB to have two- to three-Soldier teams operating in distant locations supporting maneuver battalions. While deployed, we had human intelligence control teams, female engagement teams, and joint fires observer teams (from the brigade fires section) operating at combat outposts and forward operating bases throughout two provinces in Afghanistan, frequently with no other BSTB element at their location. The units that BEB platoons support will generally be unfamiliar with the capabilities and support requirements of your specialty teams. To address this challenge, we developed a standardized enabler in-brief to inform the supported unit about the capabilities and support requirements for our supporting teams. We trained junior noncommissioned officers to present this information to a battalion commander or staff. These steps didn't eliminate all friction, but they helped minimize it.

9. Emphasize Military Occupational Specialty Training Early

In the latter part of the train force pool of the brigade Army force generation cycle, all specialty enablers should be embedded with their supported maneuver units. Accomplishing this objective requires that specialty training be conducted for BSTB Soldiers earlier in the Army force generation cycle than many of the other units in the brigade. My predecessor in command programmed U.S. Army Project Foundry Advanced Geospatial–Intelligence training for the military intelligence company to start before the battalion came out of reset. While most of the rest of the brigade was doing individual warrior task training, 4th BSTB Soldiers were engaged in military occupational specialty-specific training for individuals, teams, and platoons. This paid dividends later in the Army force generation cycle when we integrated enablers for platoon and company live-fire exercises and then deployed teams with habitual support relationships to the Joint Readiness Training Center for the brigade mission readiness exercise. BEB commanders should lean on the functional expertise of the brigade S-2 and S-6 to ensure that training for the military intelligence and signal companies is properly prioritized and resourced.

10. Establish the Role of the Brigade Headquarters and Headquarters Company

It has become common practice for the BSTB commander to serve as the commander for the brigade headquarters and headquarters company, particularly if the brigade doesn't have a former battalion commander serving as the deputy commander. This practice makes sense and will likely continue with the BEB because it frees the brigade commander and his staff from a great deal of administrative workload. Without clearly defined roles and responsibilities, however, this can be a minefield for the company and the battalion commander.

New BEB commanders should discuss this topic with the brigade commander before assuming command and should establish clear terms of reference for all three commander levels: brigade, battalion, and company. Topics to cover explicitly include the Uniform Code of Military Justice jurisdiction, rating chain, reporting chain, and family readiness groups. There aren't any right or wrong answers, but early and frequent communication can minimize the inevitable frictions.

Conclusion

Like the BSTB before it, BEB command will offer unique challenges and exciting opportunities for future engineers. The BEB will be a diverse, dynamic, and essential organization that serves an integral role in our Army's central formation—the BCT. Those who embrace the rich diversity of their units will find it to be the most rewarding assignment of their careers.

Lieutenant Colonel Dillard commands the 4th BSTB, 101st Airborne Division (Air Assault). He holds a bachelor of science degree in economics from the U.S. Military Academy, a master of science degree in engineering management from the University of Missouri–Rolla (now Missouri University of Science and Technology), and a master of business administration degree from Stanford University. He welcomes comments or questions at <larry.dillard@us.army.mil>.

Engineer School Environmental Training: Value Added for the Engineer Regiment



By Mr. Albert M. Vargesko

In the early days of Operation Iraqi Freedom and Operation Enduring Freedom, waste management was not a priority in U.S. base camps. Since there was no other solution at the time, the U.S. Army used burn pits, with all their associated problems. Years later, there is still a need for cost-effective solutions for waste management, especially when it is time for the transfer or closure of a base camp.



Engineer students use ENFIRE kit devices during an environmental baseline survey.

One of the goals of a doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) analysis is to close capability gaps without looking to a costly materiel solution as the first option. Additional training by the Directorate of Environmental Integration (DEI), at the U.S. Army Engineer School at Fort Leonard Wood, Missouri, can sometimes close a capability gap. As part of the building great engineers effort at the Engineer School, DEI personnel analyzed the problems, studied lessons learned, and visited the battlefield and U.S. base camps to develop training solutions. They quickly put together a 3-day course of environmental training following the Army Learning Model for 2015.[1] Members of the DEI environmental training team began teaching the 3 days of training to the Engineer Warrant Officer Basic and Advanced Courses. Soon after, they began teaching at the Engineer Captains Career Course and now



Students examine the contents of a container during an environmental baseline survey.

teach at all the engineer officer courses, including 1 hour at the Engineer Precommand Course and 3 days at the Engineer Basic Officer Leader Course. Steady improvements, based on class critiques, lead DEI trainers to think that they have excellent content and delivery methods.

Training consists of a healthy mix of environmental presentations, performance evaluations, and out-of-classroom field work. Student teams are required to produce a base camp environmental baseline survey (EBS) and an integrated waste management plan. DEI facilitators coach the students and facilitate their training rather than just spout information from the platform. The DEI staff uses the tactical training base at Training Area 246 to conduct EBSs. This state-of-the-art base camp—also known as the Contingency Basing Integration Technology Evaluation Center—includes a 100-kilowatt solar panel array, barracks huts with maximum insulation to reduce the energy required for heating and cooling, energy efficient "smart" generators, an electricity microgrid, and solar water heaters. Once students have been on the ground at the training area for the EBS, they have a better feel for preparing an integrated waste management plan for the proposed base camp. They consider proper placement for the hazardous waste storage area, recycling area, landfill, sanitary waste lagoons, gray water evaporation pond and, if needed, the compost site. They complete their design as a team and must explain and defend their solution in a 15- to 20-minute briefing.

A visit to a U.S. Army TACOM Life Cycle Management Command motor pool is another chance to get students out of the classroom, and it is sometimes their first visit to an Army maintenance facility. This tour gives them ideas about what systems are possible and practical in a motor pool that welcomes sustainable practices. They get to see antifreeze recycling, waste oil reutilization, battery maintenance, an oil/water separator, and other ideas that can stretch dollars and support sustainability.

Tools used in the course include Turning Point® technology to keep the students engaged with video simulations developed by the U.S. Army Training and Doctrine Command Training Brain Operations Center at Fort Eustis, Virginia, and many components from the Instrument Set, Reconnaissance and Surveying (ENFIRE) kit. Students also get an Environmental Deployment Toolbox compact disk, which reinforces the classroom training. DEI also uses the Digital Training Facility to conduct virtual EBSs during inclement weather.

Finally, the DEI staff developed online courses that can be accessed by Soldiers at any time. The Environmental Officer Course on Blackboard at <https://www.blackboard.wood.army.mil/> has trained thousands of Soldiers. An online Cultural Property Protection Course launched in 2013 takes only about an hour to complete.[2] Other environmental training products such as lesson plans and graphic training aids can be downloaded from the Army Training Network at <http://usacac.army.mil/cac2/atn/> or the Central Army Registry at < http://www.adtdl.army.mil/>.

For more information, contact DEI by phone at (573) 563-7673, via the Internet at <www.wood.army.mil/dei>, or by e-mail at <usarmy.leonardwood.engineer-schl.mbx.dei@mail.mil>.

Endnotes:

[1]U.S. Army Training and Doctrine Command Pamphlet 525-8-2, *The Army Learning Concept for 2015*, 20 January 2011.

[2]Cultural Property Protection for Military Personnel in Deployed Setting, <http://www.blackboard.wood.army.mil/>.

Mr. Vargesko is the chief of the Doctrine and Training Division, Directorate of Environmental Integration, U.S. Army Engineer School. A retired engineer officer, he received his environmental experience working for the Missouri Department of Natural Resources from 2001 to 2003. He holds a bachelor of science degree from Indiana University of Pennsylvania and a master's degree from the U.S. Army Command and General Staff College.

Careful Cleanup:

USACE Removes World War I Era Munitions

By Ms. Brenda M. Barber, Mr. Clem Gaines, and Ms. Andrea M. Takash

The U.S. Army Corps of Engineers (USACE), Baltimore District, has spent two decades investigating and cleaning up Spring Valley, a community in northwest Washington, D.C. Around the time of World War I, the U.S. government used the American University Experiment Station site to research and test chemical agents, equipment, and munitions. Today, the site encompasses about 1,600 private properties, including the homes of U.S. government officials and public figures, foreign embassies, and facilities for American University.

In 2000, USACE discovered that one of the properties contained a burial pit. After two investigations recovered large quantities of munitions, glassware, and soil contaminated by arsenic and other chemical agents, it was determined that other items of concern could be present in uninvestigated areas, particularly around and beneath one particular structure. Following extensive reviews and a public comment period, USACE decided to remove the house and clean up the property. People passing by the property during the last year probably noticed the site's enormous transformation. A stately colonial brick house once stood on the half-acre property, now owned by American University. After thorough coordination and input, the house was razed in November 2012, making it the first house to be removed from a former defense site.

Once crews demolished the house, they began preparing the site for high-probability operations. The team uses the phrase *high probability* to emphasize the likelihood that it will find and remove chemical warfare materiel in specified areas of the property. Site preparation included digging test pits in several areas of the property, relocating utilities, and installing the engineering controls needed to safely remove debris. Removal operations began in September 2013 and will last approximately 1 year, depending on the types and amounts of debris encountered. The goal is to completely remove any remaining World War I era debris and restore the property to residential standards by late 2014.

Staffs from across USACE, Department of the Army, U.S. Environmental Protection Agency, District Department of the Environment, and American University have worked on the investigation, said the project manager. She said that the team is prepared for the discovery of potentially dangerous debris throughout the project and is using proven engineering control technologies to protect workers and the community throughout the complex environmental cleanup process.

The property rises approximately 30 to 40 feet on three plateaus, making it challenging to place equipment for the operations. Each of the key pieces of equipment has been tested and used for years at other defense sites across the country. Where the house once stood, there is now an engineering control structure (ECS), a large tent of polyurethane material pulled taut over a metal skeleton. The ECS is secured to the ground and kept under negative air pressure by chemical agent filtration systems, which ensure that no air will escape from it. Assurance that the ECS is under negative pressure has been tested and proven by Edgewood Chemical Biological Center, part of the U.S. Army Research, Development, and Engineering Command. Under the structure, workers in full personal protection equipment remove soil by excavator and sometimes by hand, digging down to bedrock to find and remove debris.



A dig team trains inside the engineering control structure wearing full personal protective equipment.



Multiple layers of engineering controls address safety at the cleanup site.

A large aluminum tube, similar to heating, ventilation, and air-conditioning ducting, transfers air from the ECS to large pieces of filtration equipment, each with multiple carbon filters where the air is cleaned. Noise dampeners ensure that the operating noise level is within the Washington, D.C., guidelines of 55 decibels at the edge of the project.

A continuous air-monitoring system analyzes the air emitting from the ECS, looking for key chemicals in the airflow. If a sensor notes a chemical of concern, technicians from the Edgewood Chemical Biological Center alert leaders at the site. Coordinated protocols have been established, with extensive training on how to respond.

From a command trailer that serves as the nerve center for the entire site, project leaders have radio communications and visual oversight of the project area. In addition, cameras with 360° views inside the ECS provide leaders with an immediate update on excavation operations as the dig team works deeper and deeper into the soil. Members of the team wear a full personal protective equipment ensemble, including a breathing apparatus. Site leaders carefully review the weather each day and adjust work schedules if local conditions such as heat and humidity could cause a safety issue.

A site crew of approximately 50 workers, representing multiple agencies and organizations, is on-site every day during the project. This includes USACE colleagues from the U.S. Army Engineering and Support Center, Huntsville, Alabama; Army representatives from the Edgewood Chemical Biological Center and 20th Support Command; and District of Columbia police personnel. For safety, an ambulance is parked nearby, ready to respond to any injuries that may occur on the site.

During the almost 21-year Spring Valley Formerly Used Defense Site Project, nearby residents have not needed to shelter in place to avoid a chemical release. However, as an added safety layer, USACE has implemented a shelter-in-place system that includes an evacuation zone, a notification system with a strobe light and siren alerting system to alert residents, and a system to automatically call people on a roster.

If any chemicals of concern are released into the atmosphere, eight residences and designated American University staff will be notified. Project leaders have met with these families and tested telephonic and e-mail notification systems in English and Spanish. The system will be tested monthly throughout high-probability operations. Recognizing that this is a high-profile project, project leaders have maintained a robust and transparent communications effort, to include meetings with community members, weekly updates on the District's Web site, and multiple news media interviews emphasizing project safety.

To see an interactive tour of the 4825 Glenbrook Road project, visit <http://youtube/yVws5UnBuZw>.



The ECS occupies the space where the house stood at the cleanup site.

Ms. Barber is a project manager with USACE, Baltimore District. She holds a bachelor's degree in civil engineering from Southern Illinois University at Edwardsville. She is a licensed professional engineer.

Mr. Gaines is a public affairs specialist with USACE, Baltimore District. He holds a bachelor's degree in communications from the University of Wisconsin–Madison and a master's degree in human resources management from Golden Gate University.

Ms. Takash is a public affairs specialist with USACE, Baltimore District. She holds a bachelor's degree in communications studies from Youngstown State University and a master's degree in business administration from Columbia College.



Joint Service Bridge Exercise

By First Lieutenant Michael C. Crimmins

During the disaster relief response after Hurricane Sandy, Soldiers of the 19th Engineer Battalion, Fort Knox, Kentucky, developed a very good working relationship with the U.S. Marines of the 8th Engineer Support Battalion, Marine Corps Base Camp Lejeune, North Carolina. No units have benefited more from this link than the 502d Multirole Bridge Company (MRBC), 19th Engineer Battalion, and the Bridge Company, 8th Engineer Support Battalion. In March 2013, the improved ribbon bridge (IRB) platoon from the U.S. Marine battalion traveled to Fort Knox to take part in the boat live-fire exercise conducted by the 502d. The exercise included IRB rafting operations on the Ohio River and live-fire training on one of the few riverine ranges in the United States. The cooperation between the Soldiers and Marines was quickly recognized as invaluable, and the 8th Engineer Support Battalion promptly invited the 502d Engineers to their home turf at Camp Lejeune to take part in a 1,000-foot, full-enclosure exercise.



Soldiers wade through an obstacle on the endurance course.

In the Army, military occupational specialty (MOS) 12C designates a career of bridge building. However, the Marines do not have a designated bridge-building MOS, which means that a Marine bridge company is fundamentally different from an Army bridge company. While an Army MRBC platoon can bridge wet and dry gaps using the IRB, the medium girder bridge (MGB), or the dry support bridge, a Marine Corps bridge company has an IRB platoon that is responsible only for wet gaps and an MGB platoon that is responsible only for dry gaps. Because the Marines have no specific bridge-building MOS, this distinction halves the amount of equipment that Marines must learn to use. Therefore, they can become combat-effective much faster.

On the morning of 27 July, the Soldiers of 2d Platoon, 502d MRBC loaded up for an 800-mile convoy to Camp Lejeune. The convoy consisted of common bridge transporters loaded with interior bays for the IRB, fuel trucks, a wrecker, and a contact truck. With a few exceptions, the Soldiers had never driven their vehicles on the interstate highway system, so the drive was a valuable training experience. After a 2-day trip (with an overnight stay at a truck stop), the platoon



Soldiers and Marines prepare to start the Marine Corps endurance course.

arrived safely at Camp Lejeune, ready to begin training the next day.

The training schedule for the week split 2d Platoon into two sections. The first section would work with the Marine MGB platoon for 2 days and then train with the IRB platoon for another 2 days. Training for the second section mirrored that schedule. On the first day, physical training was conducted at 0500. Soldiers and Marines formed up side by side to quickly march 3 miles to the endurance course, which is a 4-mile route through a swamp with mud pits and obstacles to traverse. After completing the grueling course and getting a quick shower, the platoon split into sections to train with the two Marine platoons. The 502d cannot train with the MGB regularly because it is not a part of the unit inventory at Fort Knox. Since training on the MGB usually consists of an annual trip to Fort Leonard Wood, Missouri, any extra hands-on time is invaluable in keeping Soldier skills up to standard.

The main event, however, was training on the IRB. At Fort Knox, there is only one good location—the Ohio River—to train with the IRB. While the fast current and a small boat slip make the river an ideal location for raft operations training, it is simply too wide and busy with civilian traffic to use for bridge operations training. At Camp Lejeune, the distance from the boat slip at Engineer Point to the other side of the waterway is 1,000 feet—the longest distance the Marine Corps expects to bridge. The seven interior bays that the Army platoon brought with them were needed to help bridge the span because the equipment organic to the Marine Bridge Company can only span about 800 feet. Soldiers and Marines worked hand in hand to drop the bays into the water, where the Marine bridge erection boats maneuvered them. After about 2 hours of intense labor, the full enclosure was complete and vehicles began to move across the bridge.

Normally, a 2-hour construction time would be too long for a bridge of this size, but the Soldiers and Marines had to get acclimated to the techniques used by their counterparts. This is the main reason that more units should cross-train with other Services and units at different posts. Not only would units be able to take advantage of training areas and opportunities not normally available to them, but they would also get to learn how different people operate. "Train as you fight" has become the mantra for the U.S. military, and Soldiers do not fight exclusively alongside other Army personnel. Soldiers and Marines need more training time together in garrison to work together more effectively while overseas.

Training at Camp Lejeune was an invaluable experience for the Soldiers of the 502d MRBC. It gave them valuable insight into the way Marines work and let Soldiers have hands-on experience with a newer type of bridge erection boat. Training like this could easily shave minutes from a joint bridge build. At a build site that is susceptible to direct and indirect fire, those few minutes could mean the difference between life and death. Cutting the amount of time that Soldiers and Marines are exposed on the water is an extremely important factor in the success of any bridging mission.



Soldiers and Marines haul a piece of an MGB during training.

The 502d MRBC is excited to continue the relationship formed during Hurricane Sandy disaster relief operations last year and is planning another bridge exercise with the Marine Bridge Company. This will enable further cross-training as Marines from the MGB platoon get experience working on the Army's dry support bridge.

First Lieutenant Crimmins is a platoon leader with the 502d MRBC, 19th Engineer Battalion. He holds a bachelor's degree in civil engineering from the U.S. Military Academy.

INCORPORATING THE FIVE BREACHING TENETS

By Lieutenant Colonel Gerald S. Law

This article presents a way for leaders who are supporting a maneuver task force and for task force engineers and operations officers to understand, incorporate, and execute the five breaching tenets. It also describes the breaching tenets and presents breaching trends observed at the National Training Center, Fort Irwin, California. Finally, it presents tools and methods to assist leaders during the planning and rehearsal process of combined arms breaching.

The breaching tenets are—

- Intelligence.
- Breaching fundamentals.
- Breaching organization.
- Mass.
- Synchronization.[1]

Intelligence consists of developing obstacle information requirements such as location, size, type of mines, and potential point of breach (POB). To gather the intelligence necessary for success in combined arms breaching, it is necessary to determine the available reconnaissance capabilities, such as an unmanned aerial vehicle, scout platoon, scout weapons team, or engineer reconnaissance team. Once identified, the assets must be focused on developing obstacle intelligence. It is critical that task force engineers work closely with battalion intelligence officers to ensure that information collection assets focus on intelligence, which provides the critical information necessary to plan and execute the second breaching tenet—breaching fundamentals.

Breaching fundamentals describe actions on the objective, otherwise known as SOSRA:

- ***S***uppress means to provide effective direct and indirect suppressive fires on the objective.
- ***O***bscure means to employ smoke on and between enemy positions and the reduction area.
- ***S***ecure means to hold the obstacle with appropriate combat power.
- ***R***educe means to use explosive, mechanical, and/or physical means to destroy the obstacle.
- ***A***ssault means to destroy the enemy on the far side of the obstacle.[2]



The support force moves into position during a combined arms breach at the National Training Center.



A cavalry unit conducts a combined arms rehearsal before a live-fire exercise.

SOSRA actions are vital to combined arms breaching, but they can only be accomplished if the maneuver task force is task-organized properly using the third breaching tenet—breaching organization.

Breaching organization consists of three main forces: support, breach, and assault. The support force suppresses all direct and observed indirect enemy fires in and around the POB or reduction area. The breach force consists of a reduction element and a security element. The reduction element reduces the obstacle by creating and marking lanes; and the security element secures the near side and far side of the obstacle. The assault force attacks through the obstacle and seizes the objective.

Intelligence, breaching fundamentals, and breaching organization have to work together in space and time to be effective. This is accomplished through the two final breaching tenets—mass and synchronization.

Mass consists of inflicting overwhelming combat effects at the right location to create an enemy weakness at the POB or reduction site.

Synchronization entails massing those forces and effects at the right time by communicating clear instructions to subordinate units. Synchronization brings all breaching tenets together through effective mission command.

Trends

Breaching trends observed at the National Training Center from spring 2012 to spring 2013 can be divided into two categories—planning and execution. One common trend during planning relates to intelligence, the first breaching tenet. Most task forces struggled to obtain obstacle intelligence during the planning process. This was due to their failure to employ reconnaissance assets at echelons in support of the combined arms breach. Using reconnaissance assets to gain obstacle intelligence facilitates planning. It allows the unit conducting the breach to determine the POB; the size, type, and makeup of the obstacle size; enemy locations; the identity of key terrain surrounding the obstacle; and possible bypass locations.

A second trend observed during planning involved the lack of engineer-specific input during course-of-action development and war games. These trends included—

- Failure to develop or reference engineer assets and tasks in the maneuver task force execution synchronization matrix (ESM).
- Failure to develop decision points related to the support, breach, and assault forces or failure to place decision points on a decision support matrix.

"[Using reconnaissance] allows the unit conducting the breach to determine the POB; the size, type, and makeup of the obstacle size; enemy locations; the identity of key terrain surrounding the obstacle; and possible bypass locations."



The assault force moves through the point of breach.

- Failure to show graphics of decision points associated with the breach on a decision support template.

Better attention to these planning deliverables will greatly help units synchronize the support, breach, and assault forces and implement the breaching fundamentals.

The final trend observed during the planning process involved rehearsals; specifically, the lack of participation by engineer leaders as briefers on terrain models. Engineer leaders or task force operations officers often do not brief necessary details of the breaching tenets during the combined arms rehearsal. Engineer-specific icons often were not developed or placed on the terrain model. If they were, the icons themselves were not referenced or used during the combined arms rehearsal.

During the execution of the combined arms breach, maneuver task forces struggled to synchronize the support, breach, and assault forces. This contributed to an inability to execute SOSRA. The following are observations obtained from numerous executions of combined arms breaches during several decisive action training environment rotations—

- The breach force moved toward the POB before the support force suppressed the objective.
- The support force fired obscuration smoke too early or too late.
- The breach force began reduction without adequate obscuration.
- The breach and assault forces failed to secure the breach site.
- The breach force began obstacle reduction before the breach site was secured.
- The breach and assault forces struggled to mass at the POB.
- The assault force failed to understand the marking technique used.
- The assault force moved through the breach lane before the lane was marked
- The assault force stalled at the breach.

Planning Tools

Several tools help leaders incorporate the breaching tenets during planning to ensure that the maneuver task force employs them during execution.

The ESM records war game results and helps the staff synchronize a course of action across time and space.[3] Here, the engineer leader or planner ensures that the support, breach, and assault forces—each with its associated task and purpose in relation to time and space—are captured on the ESM. Populating the ESM during the military decisionmaking process begins synchronization. The ESM allows the staff to visualize the breach organization, task, and purpose. Most importantly, it shows how the support, breach, and assault forces relate to each other in time and space. The proper use of the ESM also confirms the results of reverse breach planning, develops instructions to subordinate units, and helps determine effective mission command node composition and locations. The ESM describes any decision points determined by the staff that lead to the development of the second and third tools—the decision support matrix and decision support template.

The matrix and template facilitate the synchronization of the combined arms breach. The template depicts decision points, timelines associated with the movement of forces, and the flow of the operation.

Army Doctrine Publication (ADP) 5-0, *The Operations Process*, defines a decision point as "a point in space or time the commander of staff anticipates making a key decision concerning a specific course of action."[4] A decision support matrix describes those decision points and associated actions. The matrix is part of the template, and they work together to portray key decisions and potential actions that are likely to arise during execution.[5] Developing a matrix and template forces engineer and maneuver planners to anticipate any questions that may arise during a combined arms breach, such as where the point of penetration is, when the support force starts suppression, and when the support force starts obscuration fires.

Once a decision is made, the next step is to develop a trigger to help the commander make the decision. The point at which the engineer reconnaissance team identifies obstacle and enemy positions would be the trigger to help decide where the point of penetration should be located. Below are additional recommended decisions with their respective criteria:

- ***When does the support force occupy the support-by-fire position?*** The recommended criteria are when obscuration assets are set and the support force is set to move to the support-by-fire position.
- ***When should the breach force be committed?*** The recommended criteria are when suppression and obscuration measures are adjusted and effective, engineer preparations are complete, fire control measures are in effect, air defense artillery is in position, and casualty evacuation assets are ready to accept casualties.
- ***When should the reduction element be committed?*** The recommended criteria are when the breach force near side security is in position and the security element controls the reduction site by force.
- ***When should the assault force be committed?*** The recommended criteria are when the lane is reduced, proofed, and marked and far side security is in position.

Effective planning results when the staff develops an ESM and a decision support matrix and template.[6] These tools help commanders visualize key decisions and potential actions related to the combined arms breach.[7]

They also help synchronize the support, breach, and assault forces. The ESM and the decision support matrix and template contain decisions and their related triggers, which contribute to the execution of subtasks that accomplish SOSRA. These triggers provide the basis for the execution checklist, another tool available for commanders and planners to synchronize efforts.



The breach force marks a lane in support of an assault onto the objective.



The breach force uses a mine-clearing line charge as the primary method of breach at the National Training Center.

Execution Checklist

An execution checklist helps synchronize units and efforts by sequentially listing critical tasks that must be accomplished. The checklist typically describes the unit, tasks, anticipated time of completion, and associated procedure words. A common trend in most execution checklists is to list only the main tasks to be accomplished. However, listing subtasks contributes to the overall synchronization of efforts. Therefore, subtasks and associated procedure words that help achieve SOSRA should be developed. For example, most execution checklists note when suppression is accomplished, when obscuration is completed, or when the assault force has moved through the breach. (This assumes that everything is synchronized.) Commanders should use the execution checklist together with the decision support matrix. Therefore, the triggers developed for the matrix and template should be listed and then codified into a standard breach drill standing operating procedure to be used across the brigade combat team.

Example 1. Instead of listing "suppression of breach site completed," the execution checklist should list "support force at support-by-fire position 1," followed by "breach force at attack-by-fire position 1," and then "support force begins suppression of objective." This will synchronize the support and breach forces by ensuring that they are at their proper locations before the support force suppresses the objective. Also, a breach drill standing operating procedure that standardizes those actions and code words will contribute to a mutual understanding across the brigade combat team.

Example 2. Instead of listing "obscuration of breach site completed," the execution checklist could note "support force at support-by-fire position 1," followed by "breach force crosses Phase Line Green," and then by "support force fires obscuration on objective." Phase Line Green is a graphic control measure determined through the time/distance analysis for the breach force to move from a specified location to the breach site. It was determined that Phase Line Green is where the breach force must be located before the support force fires obscuration on the objective. This ensures that the breach force is not too far away or too close for obscuration to adequately cover the objective.

Finally, the combined arms rehearsal (CAR) is the last tool to assist engineer leaders during the planning and rehearsal process. Army Tactics, Techniques, and Procedures (ATTP) 5.0-1, *Command and Staff Officer Guide*, states that "A combined arms rehearsal is a rehearsal in which subordinate units synchronize their plans with each other."[8] The CAR is the last opportunity for the efforts of a maneuver task force to be synchronized. Done properly, it will ensure that all breaching tenets are addressed.

Recommendations for engineer platoon leaders or company commanders to prepare for the CAR include—

- Ensuring that the engineer platoon leader or company commander has a speaking part at the CAR.
- Placing engineer icons (such as units, triggers, graphic control measures, and fire control measures) on the terrain model meant to help synchronize the combined arms breach.
- Briefing engineer composition, disposition, task, and purpose.
- Briefing primary and secondary methods of breaching with associated impacts.
- Briefing primary and secondary methods of proofing with associated impacts.
- Ensuring that the schemes of maneuver for support, breach, and assault forces are addressed.
- Briefing the marking system with an example set up for participants to reference.

Conclusion

Recent trends observed during the conduct of combined arms breaches at the National Training Center point to one major observation: maneuver task forces routinely struggle to synchronize the support, breach, and assault forces, contributing to an inability to execute SOSRA. Battalion operations officers and task force engineers need to understand the breaching tenets and incorporate them into the planning and rehearsal process. Breaching fundamentals are only one breaching tenet; therefore, addressing SOSRA alone is not enough. An ESM, decision support matrix and template, and execution

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Explosive Hazards Team: Final Chapter

By Major Glen A. MacDonald, Captain Vincent T. Ramos, and First Lieutenant Kathleen L. Rose

The 15th Explosive Hazards Team (EHT) is embedded within the 130th Engineer Brigade headquarters in Afghanistan, giving it a sphere of influence that spans the theater. After 5 years of nondoctrinal manning, this is the first properly manned EHT led by an explosive ordnance disposal (EOD) officer, as described by the Army modified table of organization and equipment. The team manages and conducts blow-in-place (BIP) training for the theater; synchronizes tactical needs with the Rapid Equipping Force (REF) for sourcing solutions; and gathers and coordinates tactics, techniques, and procedures between route clearance battalions. Operating under the theater engineer brigade, it feeds the theater common operational picture for mobility. What was a tactical-level unit when the EHT concept was born in 2008 is now an operational-level plug-in with a theater-wide problem set.

Five years ago, doctrine was new and evolving, the team was not manned appropriately, the mission was unknown, and the Iraq combat theater was baffled by the arrival of the first EHT. EHT capabilities were misunderstood, and the team struggled to find validity and relevance in the combat theater. The ensuing combat proof of concept did little to improve the situation. In fact, multiple EHTs have been deployed nondoctrinally since. However, the proof of concept resulted in some focused after action review comments to the Engineer Regiment, the U.S. Army Engineer School, and the Center for Army Lessons Learned. Ideally, these comments helped improve subsequent deployments and refinements of the EHT concept. A look at the EHT today adds validity to this assumption, as it looks very little like its 2008 predecessor.

The EHT concept today is the result of a significant evolution. Doctrine and employment have changed considerably in the past 5 years. Multiple units have deployed as EHTs at different levels within the theater task organization. Some have been manned more appropriately than others. But until now, none have included the requisite EOD personnel. As fate would have it, the current, appropriately manned theater EHT will also be the last deployed to Afghanistan and possibly the last deployed to combat.

Doctrine

The first appearance of the EHT in doctrine was in Army engineer field manuals published around 2006 to 2007. As early as 2003, the engineer and ordnance branches had begun formulating plans for the EHT through

the Fort Leonard Wood, Missouri, EOD fusion cell. As the improvised explosive device (IED) threat continued to skyrocket in Operation Iraqi Freedom, the EHT concept slowly crystallized, ultimately being captured in doctrine and published in 2007.[1]

Doctrine today envisions a significantly modified capability in the EHT. It is no longer the tactical-level fusion of EOD and engineer effort foreseen in 2007. Instead, the EHT is expected to operate at theater echelon, the operational level of combat. According to Field Manual 3-34, *Engineer Operations*,[2] the EHT embeds at brigade, division, or corps level. The current unit on the ground, the 15th EHT, operates in line with this construct through its organization within the Afghanistan Theater Engineer Brigade.

Team Manning

The 15th EHT was originally scheduled to deploy as an explosive hazards coordination cell, a unit similar to the EHT but slightly larger and usually manned by more senior personnel. However, the theater manning requirement was slightly decreased before deployment. By doctrine, an EHT and an explosive hazards coordination cell are virtually interchangeable in terms of employment, so the adjustment in team type had little impact on predeployment training. The team was composed of EOD and engineer Soldiers, augmented by a military intelligence officer. The engineer noncommissioned officers (NCOs) were selected because each was qualified through the Engineer Explosive Ordnance Clearance Agent Course and had route clearance experience. The blend of training and real-world experience among team members could not have been more comprehensive. Although there was a plan to add another engineer officer to the team upon arrival in-theater, other requirements prevented it.

The team was split between two major bases. The team officer, the NCO in charge, a military intelligence officer, and the NCOs in charge of operations and BIP were located at one base. A mobile assistance team (MAT), consisting of an NCO, a Soldier, and a senior EOD NCO who managed theater-specific BIP training were located at the second base.

The 15th EHT manning represents the first doctrinal personnel deployment to a combat theater. EOD and engineer fusion was finally accomplished as envisioned, effectively bridging the gap between EOD and engineers in-theater through a number of means. Specifically, the EHT implemented theater-specific BIP training, MATs, and REF equipment solutions.

Bridging the Gap

BIP. Though required in theater, BIP is not standard Army training outside Afghanistan. It is also not a doctrinal role of the EHT; but in 2009, its importance to route clearance units was recognized. U.S. Forces–Afghanistan published an order directing the theater explosive hazards coordination cell (predecessor to the EHT) to conduct mandatory, theater-specific BIP training for all explosive ordnance clearance agent-qualified engineers. The 15th EHT inherited this responsibility upon arrival in-theater, and the training certified route clearance engineers for their mission through the dissemination of current and relevant, theater-specific information and tactics, techniques, and procedures.

BIP training was conducted at Kandahar Airfield and at Bagram Airfield. Both sites were managed by the EHT and supplemented with contract trainers. The contractors were prior service engineer and EOD Soldiers, giving them immediate credibility with Soldiers. Focus areas included ordnance identification, IED components, and hands-on familiarization with the robot systems in use. Soldiers in key leadership positions left the course certified for their role in combat and better prepared for the IED threat they would encounter on the ground.

MAT. Before deployment, the 15th EHT drafted a plan to transition the earlier-employed theater mobile observation teams to a new construct—MATs. This plan was based on feedback from ground units where mobile observation teams had been perceived as outsiders with the sole purpose of highlighting mistakes made by units. Those teams had focused on observing and critiquing. In contrast, an MAT embedded for two to three missions with each unit visited, with full participation as the rule.

The 15th EHT executed a solutions-based approach through its MATs. MATs lived, patrolled, collected, developed TTP, exchanged intelligence, and ate with the unit in which they were embedded, becoming virtual members of the unit. Issues identified through this process were refined with the unit and, if necessary, brought to the attention of higher headquarters or other theater organizations for assistance. The partnership with the REF effectively solved many equipment and material problems.

REF and Equipment Solutions. Working with the REF was invaluable for the EHT. By creating a working relationship with the REF laboratory, the 15th EHT implemented solutions that were developed and tested based on requirements, input, and feedback from units conducting clearance missions.

An IED command wire detector that proved useful at night is a great example of rapid equipping success; an increase in night patrols and a need for increased lighting capability led to its development. Through the REF and its three-dimensional printer, the EHT provided a quick turnaround on prototypes for testing by units. These prototypes became the proof of concept for future equipping solution partnerships with the REF. On average, each product took about a month to go from prototype to an 80 percent complete product in the hands of units on the ground.

In addition to working with the REF, the EHT worked with Combined Joint Task Force Paladin to ensure that each route clearance company received the proper equipment based on requirements specific to its own area of operations. Through that task force, the team was able to assist in filling shortfalls and providing required equipment quickly and

effectively. Electronic warfare equipment was also pushed to the route clearance companies through the efforts of the EHT senior NCO. Through his actions and connections, the EHT established an unprecedented link between tactical units and theater solutions. Though nondoctrinal in nature, the result was clearly beneficial.

Way Ahead

After 5 years of struggling to establish and employ a truly doctrinal team, the Army has charted a very simple way ahead. The EHT ceases to exist in the Regular Army or the Reserve Component in 2016. This means that the first doctrinally manned EHT will also be the final team deployed to combat. However, the authors of this article strongly agree with the decision to end the EHT concept.

The EHT was designed to close the gap between EOD Soldiers and engineers at the tactical level. That vision never came to pass. However, while the doctrinal vision for the team may have never found true value in its employment, the men and women who participated in this long proof of concept clearly did bring value to the theaters where they served. As the Army closes the book on EHTs over the next few years, it ends a concept that has been challenged since the day it was first envisioned. The concept was employed on multiple battlefields in two wars but never closed the operational gap it was created to fill. It is with a sense of relief that the authors close the final chapter on this small piece of U.S. Army history.

Endnotes:

[1]Glen A. MacDonald, "Explosive Hazards Team: Concept, Employment, and the Way Ahead," *Engineer*, September–December 2009, pp. 18–22.

[2]Field Manual 3-34, *Engineer Operations*, 4 August 2011.

Major MacDonald is the plans officer for the 130th Engineer Brigade. He is a graduate of Intermediate Level Education and the basic and advanced engineer officer courses. He holds a bachelor's degree in fine arts from the University of Connecticut, a master's degree in public policy administration, and a master's degree in legislative affairs from George Washington University, Washington, D.C.

Captain Ramos is the commander of the 15th Engineer Detachment (EHT), deployed in support of Operation Enduring Freedom. He is a graduate of the ordnance basic officer leader course and explosive ordnance disposal training. He holds a bachelor's degree in accounting and information systems from the University of Alaska at Fairbanks.

First Lieutenant Rose is the knowledge management officer for the 130th Engineer Brigade, deployed in support of Operation Enduring Freedom. She is a graduate of the basic engineer officer and engineer explosive ordnance clearance agent courses. She holds a bachelor's degree in cultural anthropology and a master's degree in geography from the University of California at Santa Barbara.

("Breaching Tenets" continued from page 38)

checklist developed during planning are tools that facilitate the incorporation of the breaching tenets and should be used during execution. The engineer platoon leader or engineer company commander provides input into the ESM, the decision support matrix and template, and execution checklist. Battalion operations officers and task force engineers ensure that a proper CAR addressing the breaching tenets is conducted. The CAR addresses engineer assets with task and purpose; primary and secondary methods of breaching and proofing; graphic control measures and triggers that facilitate synchronization; marking technique; and scheme of maneuver for the breach, support, and assault forces.

The five breaching tenets are vital for the combined arms breach. If not incorporated into the planning and rehearsal process, the maneuver task force will struggle, or even fail, to implement them during execution.

Endnotes:

[1]ATTP 3-90.4, *Combined Arms Mobility Operations*, 10 August 2011.

[2]Ibid.

[3]ATTP 5-0.1, *Commander and Staff Officer Guide*, 14 September 2011.

[4]ADP 5-0, *The Operations Process*, 17 May 2012.

[5]ATTP 5-0.1, *Commander and Staff Officer Guide*, 14 September 2011.

[6]Ibid.

[7]Ibid.

[8] bid.

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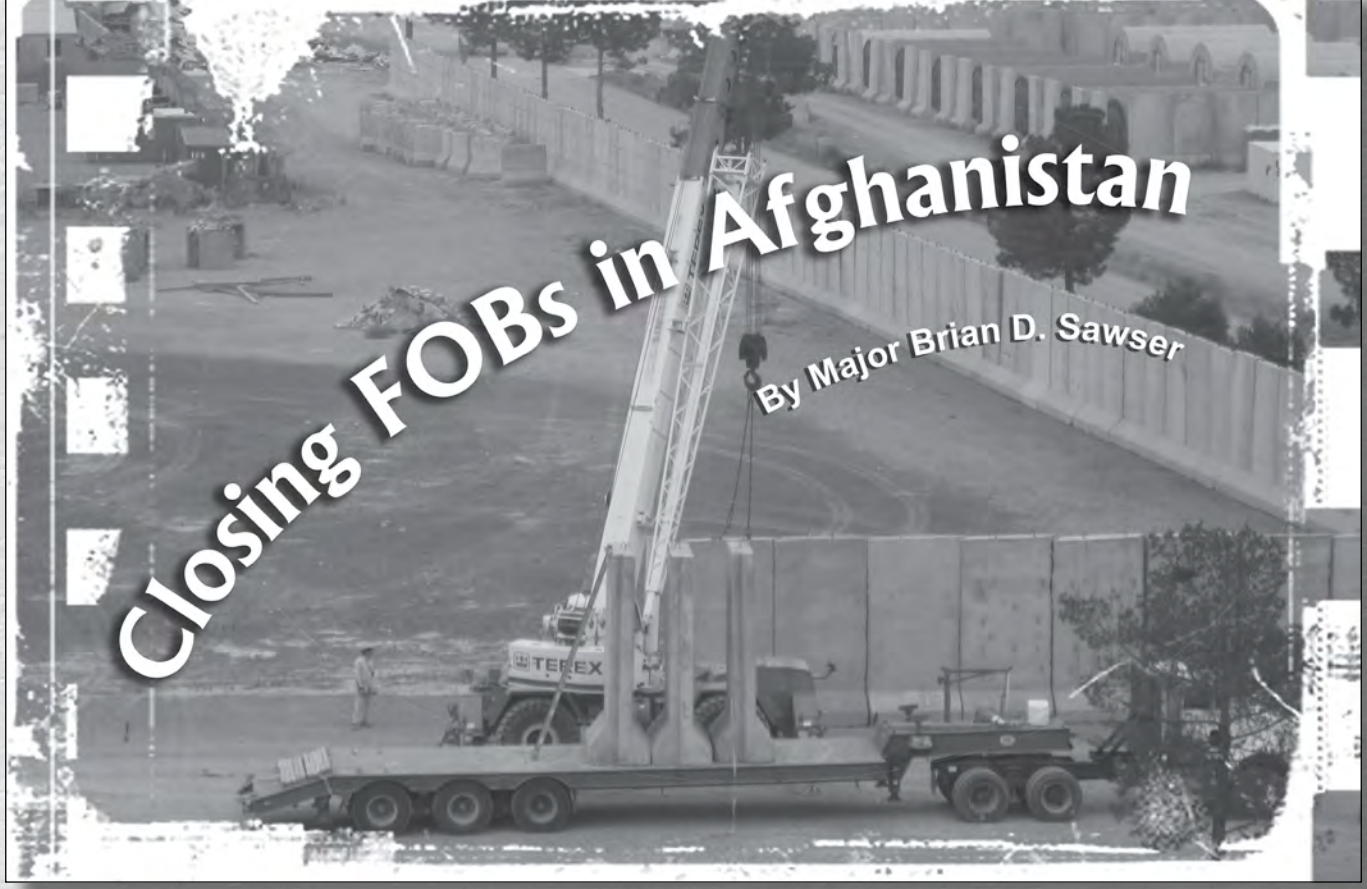
ATTP 3-90.4, *Combined Arms Mobility Operations*, 10 August 2011.

ATTP 5.0-1, *Commander and Staff Officer Guide*, 14 September 2011.

Army Doctrine Reference Publication 3-0, *Unified Land Operations*, 16 May 2012.

ADP 5-0, *The Operations Process*, 17 May 2012.

Lieutenant Colonel Law is a common core instructor at the Department of Distance Learning at the Command and General Staff College (CGSC), Fort Leavenworth, Kansas. He is a graduate of the Engineer Officer Basic Course, the Engineer Captains Career Course, the Combined Arms Service Staff School, and Intermediate Level Education at CGSC. He holds a bachelor's degree in industrial engineering from Utah State University, a master's degree in geology and geophysics from the University of Missouri–Rolla (now Missouri University of Science and Technology), and a master of military arts and science degree from CGSC.



Closing FOBs in Afghanistan

By Major Brian D. Sawser

While providing sanctuary for military forces and civilians, forward operating bases (FOBs) are one of the most recognizable products from the wars of Afghanistan and Iraq. For more than a decade, FOBs hosted multiple rotations of military and civilian organizations, collecting legacy materiel along the way. In providing a safe haven for refit and regroup, FOBs have little incentive to reduce excess when the focus is on warfighting. Reducing excess is an afterthought; and FOBs tend to grow, not shrink, over the years. Further accelerating the growth in FOBs are special projects that come to the combat theater, serve their purpose, and then never completely leave. Such was the case with FOB Salerno in the Khost Province of Afghanistan in April 2013. More than 10 years of war had left the FOB bloated with stuff, often with no current, accountable tenant.



Soldiers from the 864th Engineer Battalion provide demolition and deconstruction services at FOB Salerno.

As the executive officer of the 4th Brigade Special Troops Battalion, 4th Brigade Combat Team (Currahee), 101st Airborne Division, I experienced the unique challenge of closing a modern military base while forward-deployed in hostile territory. Located approximately 20 kilometers from the Pakistan border, the battalion oversaw an operational environment with the mission of defending FOB Salerno, previously known as Rocket City, while simultaneously preparing it for closure. These missions alone were challenging enough, but the battalion also executed the traditional mission set of a brigade special troops

battalion—performing route clearance and providing military intelligence and signal operations in support of the brigade mission command. Given all of these missions, the battalion commander directed the battalion operations officer to oversee the security mission, while I had the task of preparing the FOB for closure. The brigade commander directed that FOB Salerno be closed before winter came to the notorious Khost-Gardez Pass, which would severely restrict ground retrograde. This left approximately 6 months to complete the closure. Fortunately, our predecessors had significantly reduced the container count and consolidated personnel on the FOB before our arrival.

As a former instructor in the systems department at the U.S. Military Academy, I used a problem-solving methodology to attack FOB closure, truncating the design process taught at West Point to three distinct phases—problem definition, solution design, and execution.

Problem Definition

On its surface, FOB closure seems to be a straightforward proposition: find out who lives on the base and help them retrograde personnel and equipment, while simultaneously and systematically off-loading life support systems. Since most life support systems such as field feeding, power, water production, wastewater removal, and trash collection were provided or managed by a single Logistics Civil Augmentation Program (LOGCAP) contractor, finding bridging strategies to replace these services was straightforward. The real challenge was identifying the stakeholders and synchronizing them to depart in an organized manner. The months of May and June 2013 were primarily consumed with this stakeholder analysis. Using broad categories, the following stakeholders existed on FOB Salerno:

- ***Decisionmakers.*** The U.S. Army clearly establishes commanders as decisionmakers. Essentially there were two—the battalion commander, who was the FOB commander; and the brigade commander, who also resided on the FOB.
- ***Owners.*** The owners were the battalion staff and the brigade Headquarters and Headquarters Company, which fell under our battalion and served as the base operations node on the FOB. The brigade staff and brigade support battalion (both on FOB Salerno) fell into this category. The contracted LOGCAP provider was involved in all life support systems on the base and also had an ownership stake in this problem.
- ***Clients.*** All major tenants on FOB Salerno (such as 4th Brigade Combat Team task forces, Special Operations Command elements, other government agency partners, and other military units) comprised this category. Unlike owners, clients shouldered defined mission sets that were unaligned with FOB closure. Thus, while the closure of FOB Salerno affected their future operations, they were participants rather than driving forces in the process.
- ***Users.*** Composed of more than 50 somewhat detached agencies on FOB Salerno, users included field service representatives; special contractors unaligned with any FOB military organization; and transients, some of whom could be described as squatters.



Starting work at 0500 daily, Soldiers recover a 300-meter section of metal aircraft landing panels in just 2 days.



Afghan workers complete a portion of the enduring perimeter.

FOB Salerno had a population of about 4,000 personnel in May 2013, and it took nearly 2 months to get a detailed list of these parties. By early July, it became evident under which label each tenant belonged. This informal stakeholder analysis and the decision that FOB Salerno would be transferred to Afghan National Security Force control clarified the problem set faced by the battalion.

In accordance with Army Doctrine Reference Publication 5-0, *The Operations Process*,[1] the problem could be framed by three basic questions:

- How should the exodus of units and agencies be synchronized while maintaining operations during the summer fighting season?
- What would be the most efficient way to off-load life support services to support FOB closure?
- How should the FOB be prepared for eventual transfer to Afghan control while maintaining the necessary level of force protection?

To address those questions and perform the complex planning required, the brigade commander directed the brigade staff to execute a full military decisionmaking process on the closure of FOB Salerno. Since the staff was deployed, planning time was not a factor. Led by the brigade executive officer, the brigade staff spent many nights developing a plan that addressed the three framing questions. As the executive officer of the battalion tasked with the closure, I was also involved in planning. With the brigade commander's direction, we had the authority and approved timelines to complete the mission.

Solution Design

Three working groups were established to meet and execute the plan.

Force Protection/Facilities Utilization. A legacy of the previous task force, this working group was known as FP/FU. Originally created to publish force protection command messages in the style of a town hall meeting, these meetings were expanded to cast as wide a net as possible and were held every 2 weeks. Through exhaustive personal interactions and mass e-mails, as many of the FOB users as possible were assembled. To avoid problems with security clearances, the information presented was unclassified. Publicly, the meetings were presented as a way for tenants to learn about the closure. Privately, the meetings were meant to learn about the disparate agencies that showed up. The sign-in rosters proved critical since they yielded contact information and internal departure timelines that were often at odds with aggressive closure deadlines. At their peak, these meetings drew more than 35 agencies to one sitting and proved to be very effective during the early phases of execution.

Executive Officer/Base Operations. This meeting brought together clients and owners who formed the core group tasked with reducing the FOB to the point of transfer. Participants included commissioned and noncommissioned officers from the engineer horizontal company (tasked with demolition operations), the forward retrograde element, prime power providers, strategic signal elements, the logistics support office, and the movement control team. Additionally, key force protection field service representatives and brigade representatives (such as the brigade engineer, transportation officer, and base operations officer) also attended.

Designating the right assortment of attendees took time; but eventually, the key players who made the physical reduction of FOB Salerno possible were identified. This group met twice weekly, with a focus on the next 72 hours of the reduction fight. A grand task list, sorted by date and associated with a FOB Salerno grid reference graphic, helped maintain an internal common operational picture. This was a sausage-making meeting that kept us ahead of the timeline.

FOB Salerno Closure. The meeting included the battalion executive officer of each 4th Brigade Combat Team task force, officers from the Special Operations Command, representatives from other government agencies, critical sustainment representatives such as the brigade logistics support team and brigade security and plans officer, and the officer representing the 401st Army Field Support Brigade.

Given the size and scope of responsibility, the LOGCAP site supervisor was also invited. The purpose of this meeting was to have the major tenants on FOB Salerno provide the base commander with a progress update and establish projected personnel and equipment retrograde moves, essentially establishing a contract between landlord and tenant. This allowed the staff to forecast logistic bottlenecks weeks ahead of time and recommend the allocation of reduction and retrograde assets. The meeting also served as an excellent venue to broadcast critical information and gain buy-in from all the major clients.



Army engineers and LOGCAP contractors disassemble a large area maintenance shelter.

Additional working groups were occasionally set up to deal with special problems such as LOGCAP cessation, the transition to spot power generation, and airfield closure; but the three main working groups proved to be the most valuable. Armed with a brigade order and these focused working groups, we were then able to get down to the business of closing the FOB.

Execution

After reaching an understanding of the problem and establishing the means to track progress and receive the commander's guidance, we began the business of execution. Rather than dictate the exact techniques and procedures used in executing the plan, the following three beneficial approaches are highlighted:

- Maintaining a sense of urgency.
- Winning the ground game.
- Harnessing the benefits of "going expeditionary."

Our predecessors had established systems for identifying and removing hundreds of excess containers and consolidating personnel to open up billeting and operational space. Maintaining that momentum was critical. Decision makers needed to provide guidance, and staffs had to build tracking mechanisms. Therefore, during the initial months, the following steps were taken to build up a general sense of urgency:

- Publication of guidance reducing the number of nontactical vehicles.
- Establishment of a program forcing FOB civilians to be sponsored by a Currahee leader.
- Imposition of restrictions on the previously free-flowing passenger terminal at the flight line.
- Consolidation of retrograde nodes into one corner of the FOB.



A b-hut reaches the end of its life cycle.



Afghan contractors disassemble the FOB Salerno incinerator for repurposing on the local ecomony.

These steps were intended to reestablish a more expeditionary lifestyle with the distinct purpose of informing FOB tenants that closure was a clear and imminent reality.

Every FOB has unique personalities and stories. FOB Salerno was no different. In one case, a civilian contractor had lived in a secluded, gated compound of several buildings for more than 5 years. The building he lived in was cooled by 19 air conditioners affixed to the walls. Although the tenant provided value to the FOB, he lived alone with mountains of stuff stacked up around him. He was surprised when I informed him that he had 4 weeks to vacate the base. In many ways, he had truly gone native and was reluctant to change. This was exactly the type of user that we needed to find, inform, and assist in leaving the FOB.

Nobody can close an FOB from behind a desk. Over the summer, I strove to interact with people daily. I normally got to the point quickly: "Who are you? What do you do? Where do you live? When are you leaving? Please give me your e-mail and phone contacts. You need to come to our FP/FU meeting on Wednesday." I tried to impart a sense of urgency and let people know that I was holding them accountable for clearing the FOB. Soon, most contractors and smaller military agencies were scrambling to resource and execute their own retrogrades.

This last point is straightforward. Miraculously, as the quality of life on the FOB decreased, people wanted to leave. Suddenly, groups of people were leaving faster than planned. Harnessing the benefits of going expeditionary was critical. The goal was to make life harder, sooner. Services had to be reduced and eventually stopped, or the FOB would never close. Shutting down the shelter that served as the gymnasium truly kicked off the expeditionary phase during the first week of August. Then, the coffee shop; post exchange; U.S. Army Morale, Welfare, and Recreation computer facility; and finance office closed. Shortly thereafter, we closed the dining facility, simultaneously canceling two hot meals. Laundry, post office, and private Internet services ceased, followed by central electrical power. Life was very different on FOB Salerno 40 days from closure. Through the working groups, e-mails to account holders, posted signs, and word of mouth, we harnessed the effects of these changes to our benefit.

Closing an FOB requires an understanding of the problem, systems to track progress and enforce directives, and dedicated personnel empowered to act. Leaders with authority, staffs with plans, and Soldiers with bolt cutters made FOB closure possible. There are countless officers, noncommissioned officers, and Soldiers who made the closure of FOB Salerno possible—on time and beyond initial expectations.

Endnote:

[1]Army Doctrine Reference Publication 5-0, *The Operations Process*, 17 May 2012.

Major Sawser is the executive officer of the 4th Brigade Special Troops Battalion, 4th Brigade Combat Team, 101st Airborne Division. He holds a bachelor's degree in engineering management from the U.S. Military Academy, a master's degree in civil engineering from the University of Missouri–Rolla (now Missouri University of Science and Technology), and a master's degree in industrial engineering from Texas A&M University.



By Captain Dane M. Hanson

Assuring mobility is the cornerstone of the Task Force Bayonet mission in Afghanistan. An integral part of this robust task force are the "Otters" of the 1438th Multirole Bridge Company (MRBC). From conducting monthly bridge inspections along Highway 1 throughout each regional command, retrograding bridge equipment, training Afghan partners in the Ministry of Public Works, and being constantly prepared to execute theater emergency bridge repairs, the 1438th MRBC bridges the gap to create enduring solutions.

The Tom Bridge in Helmand Province is key to maintaining lines of communication along Highway 1. Built across the Helmand River in 1964 by the Soviet Union, the bridge is an essential artery, providing commerce for local nationals and facilitating combat and retrograde operations in Regional Command–Southwest. After an improvised explosive device struck a logistic convoy in the spring of 2012, damage to the bridge needed repairs. Overbridging was the best temporary course of action, but a long-term solution was critical for future operations. Overbridging is the primary means to rapidly restore a line of communication by augmenting existing bridges or spans using standard or tactical bridging.[1] A previous MRBC had emplaced a six-bay Mabey-Johnson bridge. As local work progressed through the regional Department of Public Works, the bridge had to be moved 1 meter to allow the contractor to work underneath it. After conducting several reconnaissance missions, the 1438th added a span to the existing overbridge to allow the contractor to complete his work. This shift of the bridge then facilitated a permanent Afghan solution to Tom Bridge. Approximately a month later, the 1438th removed the overbridge from the repaired section.

Gap-Crossing Planning and Doctrine

We never truly appreciate gap-crossing operations until faced with these natural obstacles in a deployed environment. A unit must observe the following six fundamentals for gap-crossing operations:

- Surprise.
- Extensive preparation.
- Flexible planning.
- Traffic management.
- Organization.
- Speed.[2]

Task Force Bayonet achieved these fundamentals through persistent communication and representation at the combined and joint levels. Communication was critical to



A Soldier observes the initial phase of Afghan contractor construction of the structure beneath the Tom Bridge overbridge.

understand, visualize, describe, direct, and assess the operation. The use of gap-crossing terminology and graphics displayed how the mission was planned, resourced, and executed. Understanding doctrine enabled multiple intertwined players to communicate modifications due to the mission, enemy, terrain and weather, troops, time available, and civil considerations.

Planning for this operation required cooperation from a variety of personnel ranging from Regional Command–Southwest down to the crossing site commander. Task Force Bayonet worked with the civil affairs section of the provincial reconstruction team at Lashkar Gah, the operations and engineer staffs of the 2d Marine Expeditionary Force, and Task Force Helmand and Manoeuvre Battlegroup at Camp Bastion. Due to the amount of information being transferred among players, the operations staff from Regional Command–Southwest gathered everyone into an operational planning team to ensure that the mission was coordinated, synchronized, and supported. Task Force Bayonet worked closely with Task Force Helmand and North Atlantic Treaty Organization authorities under the 4th Battalion, Royal Regiment of Scotland. To support clearance operations around the bridge, Task Force Bayonet brought in a U.S. Marine Corps explosive ordnance disposal unit and a Regional Command–Southwest dog team. Task Force Bayonet also provided a squad-size element of sappers from the 82d Engineer Support Company to support route and area clearance and provide inner cordon security at the crossing site. Through participation in mission analysis, course of action development, and war games, the maneuver battle group clearly understood the capabilities of the 1438th MRBC and how the bridge repair force planned to execute the mission. Task Force Bayonet provided support to all planning processes, to include intelligence products about past significant activity and potential route bypasses in the worst-case scenario for the bridge repair. The efforts by the Task Force Bayonet team contributed to a shared understanding with the joint partners.

Before the operation, the crossing area commander offered the following Cs for everyone to focus on:

- ***Complexity.*** Understand the mission, friendly force locations, and the scheme of maneuver.
- ***Complacency.*** Focus on security during a controlled withdrawal since the mission will extend into the early hours of the morning.
- ***Communication.*** Ensure that rehearsals are conducted, that systems can work with each other, and that liaisons are placed with key leaders.
- ***Coordination.*** Work with the same maps and graphics so that reporting is not confused.
- ***Composure.*** Remain cool under pressure; be wary of the threat of suicide, vehicle-borne, improvised explosive devices; and be prepared to engage, with force, if necessary.

The joint operational team adhered to these five Cs in accordance with combined arms gap-crossing doctrine in the execution phase.[3]

Execution

Phase I: Advance to the gap. Before executing this phase, an extensive reconnaissance was conducted with imagery, maps, and previous on-site visits to the bridge. The 1438th MRBC platoon leader (the crossing site commander) was responsible for the crossing means and the command of the engineers operating within the crossing area. He was familiar with the site and planned the location of the modified engineer equipment park.

An engineer equipment park should be located close enough to the bridging site for assembling, preparing, and storing bridging equipment and material without interfering with traffic at the site. In this case, the advance to the gap did not require an extensive amount of bridging equipment, since the overbridge was already emplaced. However, since this route was highly traveled, understanding population density, traffic patterns, and timing was paramount for the advance to the gap. Following the timely movement of



Soldiers from the 1438th MRBC inspect decking on an overbridge ramp.

joint maneuver forces securing the near side and the establishment of traffic control posts by Afghanistan National Security Forces and Afghan Uniform Police partners, the conditions were set for the 1438th MRBC Soldiers to conduct bridging operations.

Phase II: Assault across the gap. Unlike the case in traditional gap-crossing operations, we had the benefit of friendly forces on the far side. Objectives on the near side and far side were secured simultaneously. Our Afghan partners set up traffic control points at major intersections leading into the bridgehead to prevent local traffic interference while the 1438th was on-site completing bridge repairs.

Phase III: Advance from the far side. During the entire operation, constant intelligence, surveillance, and reconnaissance were available. The crossing area commander and the joint staff had visualization of the avenues of approach toward the bridgehead and of the bridgehead itself. (The bridgehead is an area on the enemy's side of the obstacle that is large enough to accommodate most of the crossing force, has adequate terrain to permit defense of the crossing sites, provides security from enemy direct fire for the crossing force, and provides a base for continuing the attack.) The friendly forces on the far side secured areas that could be defined as exit bank objectives, further denying and interdicting any insurgent threats or local national unrest outside the crossing area.

Phase IV: Secure the bridgehead line. The bridgehead line was already secured and maintained by active Afghan patrols and traffic control points. The local face to this operation was imperative. The Afghan National Security Force and Afghan Uniform Police understood the importance of maintaining security around the critical infrastructure. This effort was furthered by an aggressive information operations campaign by the operational environment owner. Messages were announced on local radio, through local *shura* councils, during meetings with the Department of Public Works, by provincial and local government authorities, and by word of mouth on the street. An information operations campaign spread the understanding that coalition forces were working with the Afghan people to provide an Afghan solution. Fortunately, local inhabitants were still upset that the insurgents had damaged the bridge, which was key to everyone's livelihood. To their surprise, the 1438th completed bridge repairs in less than 8 hours after an initial estimate of



Soldiers conduct reconnaissance of the Tom Bridge to determine the best course of action to remove the overbridge.

10 hours, to the joy of local populace. Freedom of movement was restored before the morning rush hour traffic.

Phase V: Continue the attack. This phase was strictly dependent on the success of the other four phases of the operation. While there was no attack involved, the positioning of friendly forces within the crossing area and bridgehead could have dealt with any threat. As a joint planning team, we recognized that the most likely time to encounter an insurgent threat was during withdrawal from the objective. The withdrawal plan was synchronized through communication from the crossing site commander's updates to the forward command post. If a unit can withdraw to secure locations on both sides of the gap, it will have a smooth transition off the objective since the commander will need less combat power to travel back across the gap.

Conclusion

Bridging is a combined arms effort and, in this case, was also a joint endeavor. Following doctrine and doctrinal templates not only worked but also helped make the operation easily articulated and understood. The mission was synchronized through a simple and clear decision support matrix. Mission command was clear. When planning for gap-crossing operations in combat, in general engineering, or during an exercise, it is imperative to use doctrine to bridge the gap in knowledge and experience. It is critical for the Engineer Regiment to ensure that its focus remains on what is so often neglected—bridging. This operation succeeded due to a degree of surprise; extensive preparation, coordination, and representation with coalition partners; flexible planning, with decision points identified by clear criteria; the ability to adjust schedules; traffic management through successful blocking and traffic control points implemented by Afghan and coalition partners; organization by effective mission command and liaison vehicles located with the tactical command post and crossing site commander; and the speed with which all parties fulfilled their respective tasks within the crossing area and bridgehead line.

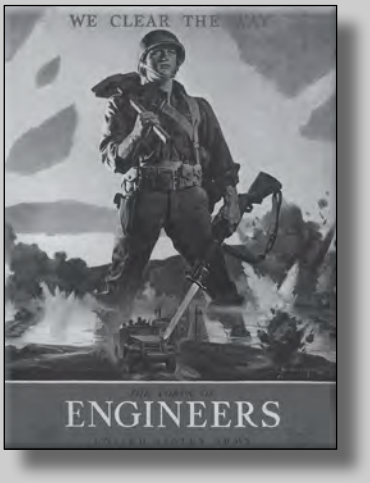
Endnotes:

[1]Army Tactics, Techniques, and Procedures 3-90.4, *Combined Arms Mobility Operations*, 10 August 2011, p. F-8.

[2]Ibid., p. 4-5.

[3]Lieutenant Colonel James Roddis, commanding officer, the Highlanders, 4th Battalion, the Royal Regiment of Scotland, Manoeuver Battlegroup, briefing presented at Camp Bastion, Afghanistan, November 2013.

Captain Hanson is the commander of the 34th Sapper Company, 84th Engineer Battalion. He holds a master's degree in engineering management from Missouri University of Science and Technology at Rolla, and a bachelor's degree in government and law from Lafayette College, Easton, Pennsylvania. When he wrote this article, he was the officer in charge of the Task Force Bayonet tactical command post at Camp Leatherneck, Afghanistan.



Webster defines *ready*
As being prepared mentally or physically
For some experience or action,
Prepared for immediate use.
But with all due respect to Webster,
There's ready,
And there's *Engineer Ready*.
It's a physical readiness.
It's an emotional readiness.
It's a readiness of character,
And a readiness of purpose.
It's a readiness to do good today,
And a readiness to do well tomorrow.
It's a readiness to obey,
And a readiness to command.
It's a readiness to build,
And a readiness to tear down.
It's a readiness to get yourself over,
And a readiness to get over yourself.
There is nothing on this green earth
That is more ready
Than the U.S. Army Corps of Engineers.
Because there is nothing on this green earth
That's more ready
Than the Soldiers and civilians
Of the U.S. Army Corps of Engineers.
Army Strong, Engineer Ready!

– Lieutenant General Robert L. Van Antwerp, Jr.

EDUCATING GEOSPATIAL ENGINEERS FOR TACTICAL OPERATIONS

By Lieutenant Colonel Jared L. Ware

"First, the engineer officer must be able to connect geospatial engineering with tactical operations."

—Major R. Wendell Stevens[1]

The idea of educating engineers to understand geospatial engineering in support of tactical operations is not a new one. Over the past three decades, the Engineer Regiment has advocated that engineer officers become terrain experts at the tactical level. However, there has never been a dedicated training curriculum for officers for the application of geospatial engineering to tactical operations. The military occupational specialty-producing courses for warrant officers, noncommissioned officers, and enlisted Soldiers provide excellent individual technical skills in geospatial engineering. The National Geospatial–Intelligence Agency previously offered joint-level courses on various geospatial topics, which included everything from learning to use FalconView® software in the Geospatial Information and Services for the Warrior Course to training topographic engineer officers to supervise the development of hardcopy mapping products in the legacy Topographic Officer Management Course at the National Geospatial–Intelligence Agency. Yet, no single course offered a complete understanding of how Army engineer officers could use geospatial engineering capabilities to address the full spectrum of tactical operations in which engineers could be involved.

Development of Tactical Geospatial Knowledge

There is no course available that is dedicated to training Army personnel to use geospatial data for planning or conducting operations at the tactical level. No specific training on using geospatial engineering at the tactical level existed for commissioned officers. To address this gap in training, the 20th Engineer Brigade (Combat) developed a 24-hour course focused on educating officers assigned to positions requiring the application of geospatial engineering for tactical operations. The Geospatial Engineer Tactical Operations Course (GETOC) was developed by field grade officers who possessed operational and academic experience in the fields of tactical combat engineering and geospatial intelligence.

The GETOC is a course "for geospatial engineers by geospatial engineers" that focuses on developing the geospatial knowledge of company grade Army engineer officers assigned to positions where a significant amount of geospatial engineering is applied to tactical operations. The course was designed to prepare new lieutenants to attain a level of baseline geospatial expertise to lead platoons in a geospatial engineer company. It was also designed to provide junior warrant officers with an understanding of how geospatial information and services can be applied to tactical operations in wartime, contingency, and disaster relief environments.

The objectives of the GETOC are—

- Provide company grade geospatial engineering officers with a fundamental understanding of how geospatial information and services are used for tactical military operations.
- Familiarize students with common geospatial hardware, software, and data.
- Provide company grade leaders with fundamental geospatial concepts for planning and leading geospatial operations at the tactical level.

Course Overview

The GETOC is a 3-day (24-hour), tactically based course that focuses on geospatial engineering support to warfighters engaged in land-based operations. It provides a fundamental understanding of geospatial engineering and common geospatial products. It also provides tactical-level leaders with a basic understanding of their roles and responsibilities concerning geospatial information and services. The course focuses on the application of geospatial information and products to tactical-level military operations.

The GETOC does not provide any executive-level training or U.S. Army Training and Doctrine Command military occupational specialty certification. That type of training is outside the charter of a tactical-level combat engineer brigade. The GETOC is not a joint, strategic, academic, or theoretical course; but it does introduce various concepts in those domains as they relate to tactical military operations. The GETOC does not educate students specifically on geospatial

hardware or software packages, but provides an overview of Army geospatial systems and common geospatial software packages used by Army personnel at the tactical level. Also, the GETOC is not a geospatial intelligence course but it does explain what geospatial engineers do with respect to tactical geospatial intelligence operations. Although the course does not train students to conduct in-depth geospatial analysis, it does outline what is required to develop geospatial products that best enable tactical-level (squad to corps) mission sets.

The GETOC educates students in nine fundamental concepts and one capstone exercise:

- Geospatial information and services.
- Geospatial data accuracy and data error.
- Formats for digital geospatial data.
- Geographic information systems.
- Satellite imagery and remote sensing.
- Global positioning system and digital surveying.
- Digital terrain modeling.
- Digital mapping.
- Geospatial analysis.
- Operation Caspian Tiger.

For the capstone exercise, Operation Caspian Tiger, students apply their geospatial knowledge to develop a geospatial operations brief for a Stryker brigade combat team movement to contact into an urban environment. The exercise challenges students to use real-world geospatial data in the area of interest. Students use Esri ArcReader® software for basic geospatial analysis. ArcReader is a free viewer that is compatible with Esri ArcGIS® software, which is resident on the Digital Topographic Support System and will remain as the geospatial suite of software embedded in the Distributed Common Ground System–Army. Students are required to work in small teams and complete the capstone exercise brief to receive full credit for the GETOC. The scenario further challenges students to support the brigade combat team civil affairs mission in subsequent phases of the operation.

Lessons Learned

Graduates from the GETOC have measurably improved their geospatial engineering aptitude, based on the results of the course examination. Based on the course after action review, 24 hours provide the proper amount of time and information to meet the baseline requirements for an introductory geospatial engineering course. This is also optimal for any Army National Guard and U.S. Army Reserve personnel who want to use the course as a flexible option for their geospatial engineering training. The nine fundamental concepts can be covered over a training weekend using certified instructors. The final exercise can be completed later, at a subsequent drill weekend or via digital media, at the discretion of the course director.

To add an element of credentialing, students who achieve all course requirements will receive a certificate of completion (suitable for framing) signed by the course director and a signed Department of the Army Form 87, *Certificate of Training*.[2] Also, personnel who require documentation for geographic information systems professional certification requirements will receive a memorandum signed by the course director, who is a certified geographic systems professional.

Impact of GETOC

A critical responsibility of any senior commander is to train junior officers on the engineering requirements expected of them, and a concern in our brigade was the minimal amount of geospatial engineering curriculum currently available to officers. Major Stevens stated "the expert understands the limits and capabilities of [geospatial information and services] and can integrate them into the appropriate tactical language and processes."[3] It is not expected that company grade officers will become technical geospatial experts or software gurus, but it is expected that they will possess a baseline expertise on the application of geospatial engineering when working within a brigade combat team, on a joint exercise with partner services or nations, or with a federal agency such as the Federal Emergency Management Agency in disaster relief operations. Educating engineer officers in geospatial engineering is nothing new. However, given the current resource-constrained environment, geospatial engineer education is an area that requires more immediate solutions while expending minimum funding and resources. The catalyst for the GETOC was to present company grade officers assigned to the brigade with the relevant geospatial engineering knowledge required for Army- and land-based operations at the tactical level. With the development and implementation of the GETOC, graduates of the course can use what they learn to confidently tailor their future geospatial knowledge to what is required across the full spectrum of tactical operations, with the benefit of receiving a quality educational course at a cost of just 24 hours of their time.

Endnotes:

[1]R. Wendell Stevens, "Enabling Engineer Officers as Terrain Experts," thesis for master's degree in military art and science, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 6 June 2003, p. 23.

[2]Department of the Army Form 87, *Certificate of Training*, 1 October 1978.

[3]Stevens, p. 24.

Lieutenant Colonel Ware serves as the deputy brigade commander, 20th Engineer Brigade (Combat), Fort Bragg, North Carolina. He holds an advanced degree in defense geographic information from the Royal School of Military Survey, Hermitage, England.

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