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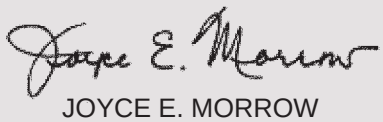
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Back cover: Best Sapper Competition 2012 (Photos by Fort Leonard Wood Visual Information Center)

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Clear the Way

Brigadier General Peter A. (Duke) DeLuca
Commandant, U.S. Army Engineer School



Thank you to everyone who helped make ENFORCE 2012 such a great event. The team superbly executed all of the usual competitive and celebratory events. We remembered our fallen, which is supremely important; but just as important, we accomplished a tremendous amount of work to advance the changes in the Regiment. It makes all the sacrifices of our Soldiers and their families meaningful and contributory to our regimental awareness, understanding, and readiness for current and future missions. We probably accomplished 3 to 4 months' work in 1 week across every aspect of doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) for our engineers. Essayons!

For those who could not attend or participate remotely in ENFORCE, many very useful and informative presentations are online at *<https://www.us.army.mil/suite/files/36000794>*. The Regimental Update is also online at *<https://www.blackboard.wood.army.mil/vids/BG_DeLuca/>*.

There are three main points to keep in focus:

- ***Swiss Army knife.*** Army engineers are the multipurpose engineer tool the Army needs. We are not niche "specialists" in only one kind of military engineering.
- ***The lodgment as key and decisive terrain for the Army.*** Nothing will happen if the engineers don't deliver the right effects in a rapid manner to open lodgments so that America can apply her combat power to achieve the objective.
- ***Army engineers must be adaptable.*** Our people, especially those who arrive early in a lodgment, must be agile and able to perform with the people and tools at hand, earning the title *Corpo de Genio*, or "Corps of Geniuses."

It seems clear that the brigade engineer battalion will become a reality and that the operational environment will continue to evolve to a situation in which most of the U.S. Army will be located in the United States by 2017, a condition we have not seen since 1941. Therefore, we knew that it was time to review many aspects of our DOTMLPF as they relate to our echelon-above-brigade engineer force (still more than 73 percent of our total engineer force even after full implementation of one brigade engineer battalion per brigade combat team). This review is underway, and it is holistic. Some of the things we are looking at include—

- Type of forces needed.
- Equipment training and certification.
- Organizations and where to embed them.
- Optimal engineer staffs at division, corps, theater Army, and joint task force level.
- Force mix.
- School and home station training-range enablers.

We need and want your input for the redesign of the echelons-above-brigade engineer force. Take your experiences in the most recent two wars; look at history when we have faced similar challenges to the emerging operational environment; and send us notes, ideas, and articles for publication. We will use them. We have our own good ideas, which we will test and refine with the field, but we are always looking for more ways to help make the Regiment even better than it is. I hope that you can see the intent to include good ideas from all sources in the contents of this professional bulletin; in the openness displayed during visits around the world by the commandant, the regimental command sergeant major, and regimental chief warrant officer; and in our daily interactions with engineers in the field.

We have an unusual and immediate opportunity to make some significant changes for the better in the current environment. There is a window of opportunity that will last 18 months or so before we routinize our processes again. Let's use this opportunity to incorporate all that we have learned and all that we foresee to make the military engineers of the U.S. Army the best engineers in our country and society and the best engineers in the history of warfare.

Essayons!

"We have an unusual and immediate opportunity to make some significant changes for the better in the current environment."

Lead the Way

Command Sergeant Major Terrence W. Murphy
Regimental Command Sergeant Major



I have been the U.S. Army Engineer School and Regimental Command Sergeant Major for a year now. I continue to be in awe of the things that our Soldiers in this great Engineer Regiment do every day. We recently completed ENFORCE 2012, and it was an extraordinary week of engineers coming together to get things done. This was a very robust week of working groups, formal and informal forums, and guest speaker engagements. The U.S. Army Maneuver Support Center of Excellence commanding general delivered an overview of Fort Leonard Wood, Missouri. The acting Chief of Engineers provided a State of the U.S. Army Corps of Engineers update, and the Engineer School commandant provided an overview of the Engineer Regimental campaign plan. Many attendees took advantage of the opportunity to conduct key leader engagements, and everyone raved about the keynote address by General David H. Petraeus (Retired), director of the Central Intelligence Agency, who spoke via video teleconference.

There were many other forums, including geospatial and energy sessions and a few other plenary forums. The 416th Theater Engineer Command executed its change of command ceremony, with Major General Paul E. Crandall relinquishing command to Brigadier General Charles D. Martin. That event took place just before the U.S. Army Reserve birthday celebration.

Our week culminated with the Regimental Command Council, the Council of Warrant Officers, and the Regimental Ball. It was a great week of camaraderie and teamwork across the entire Engineer Regiment, from company, battalion, brigade, and higher. As is our tradition at the Regimental Ball, we presented Gold de Fleury Medals to General Petraeus and Colonel John M. Morgan (Retired) for exceptionally meritorious service and dedication to the Engineer Regiment. Mr. Morgan was at the ball to receive his medal. General Petraeus received his medal earlier, and his videotaped remarks were played at the Regimental Ball. My daughters Jessica and Christine and I were honored to receive the Essayons Medal for my late wife Rhonda. She received it posthumously for her faithful service in supporting Soldiers, military families, and the Engineer Regiment.

We also executed the Best Sapper competition, a grueling event where expert Sappers from all across the Engineer Regiment came together to compete for the title. This year, 38 teams of two began the 72-hour competition, which tested the limits of their physical and mental abilities. The numerous events of the competition culminated with the "X-mile" run. Competitors finished at Gerlach Field by breaking through metal doors and running through a huge engineer castle. The first-place team consisted of Captain Michael P. Kendall and Staff Sergeant Frank E. Batts Jr., 82d Airborne Division; the second-place team was Captain Thomas L. Hatfield and Captain Nassar G. Jabour, 54th Engineer Battalion; and third place was First Lieutenant Isaac Olsen and First Lieutenant Casey L. Williams, 307th Engineer Battalion. Congratulations to those teams for placing in the top three and to all of the teams who participated in this great event!

I want to highlight the upcoming 237th U.S. Army Corps of Engineer birthday celebration. The Engineer Regiment will celebrate with a regimental run, a regimental muster with a cake-cutting hosted by Brigadier General Peter A. (Duke) DeLuca and me, and an opportunity to win a commemorative Citadel Model 1911 .45-caliber semiautomatic Colt pistol honoring Wounded Warriors. The 1st Engineer Brigade will sponsor a regimental motorcycle ride at Fort Leonard Wood to raise money for the Army Engineer Association Wounded Warrior Fund.

The U.S. Army Corps of Engineers was born on 16 June 1775, when General George Washington appointed Colonel Richard Gridley as "Chief Engineer" of the Continental Army. A Corps of Engineers for the United States was authorized on 11 March 1779. Engineer Soldiers—then called Sappers and miners—played a significant role in the Revolutionary War. Most notably, Sappers were key in preparing the defense around strategic points such as Bunker Hill and in leading assaults through fortified enemy positions such as Redoubt No. 10 at the Battle of Yorktown. Please share the photos of your unit celebrations of the 237th birthday of this great regiment. Send photos to Mrs. Kristen L. Jenner at <*kristen.l.jenner.civ@mail.mil*>.

"I continue to be in awe of the things that our Soldiers in this great Engineer Regiment do every day."

Show the Way

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



It's the week after ENFORCE 2012 as I write this edition of Show the Way, and the excitement and residual energy from last week still linger in my thoughts. It was a fast-paced week filled with highly productive meetings, briefings, working groups, and social events. Just as important, we had a record turnout of warrant officers, which made it all the more fun. The room was filled for the Regimental Warrant Officer Council on 21 April, and we shared a lot of information with the group. I trust that everyone enjoyed the comradeship we shared and found the presentations valuable. My heartfelt thanks go out to all of you who were able to attend.

Last week, we kicked off the first Warrant Officer Advanced Course for geospatial engineering technicians (military occupational specialty 125D) at Fort Leonard Wood, Missouri, with nine students. We also graduated the first expanded (26-week) Warrant Officer Basic Course for construction engineering technicians (military occupational specialty 120A), also with nine students. It's great to see the 125D and 120A populations interacting with each other and with the commissioned and noncommissioned officer students while undergoing training here. Those bonds will only grow stronger over time.

Now that ENFORCE is over, we are focused on building upon the momentum that was started. Brigadier General Peter A. (Duke) DeLuca asked us to pass on that your presence at ENFORCE 2012 enabled us to cram 3 months of work into 1 week. Your participation helped lay the foundation for us to carry out the task of "Engineering for the Wars We Fight." By the time you read this, we should have the concepts for engineer capabilities embedded where they need to be solidified.

The next few years will bring many changes as we reset the Engineer Regiment to provide the Army with the capability it needs now and will need in the future, so it is more important than ever to keep the communications lines open and active. The best way for us to do this is to use the following engineer warrant officer milBook sites:

- *<https://www.milsuite.mil/book/groups/engineer-branch-junior-warrant-officer-group>.*
- *<https://www.milsuite.mil/book/groups/senior-engineer-warrant-officer-group>.*

By using these forums, we can accomplish three main objectives:

- Provide a venue to share ideas and experiences while soliciting input from others.
- Serve as a historical record and effective platform for newly accessed warrant officers to build on their knowledge and gain insights from the experiences of those who came before them.
- Decrease the duplicate e-mail chains that go around but don't necessarily reach everyone who might benefit from the discussions.

As a rule of thumb, if you are curious about something, then chances are that others will be curious as well. By collaborating on these sites, we can strengthen our engineer warrant officer cohort and get to know each other better.

Finally, I'd like to pass my personal thanks to our outgoing Honorary Chief Warrant Officer of the Regiment, Chief Warrant Officer Four Arthur "Jim" Flinn (Retired). Jim closed out his tenure by giving a deeply moving presentation as the guest speaker for the ENFORCE prayer breakfast. He and his lovely wife Karen shared a great time with us at the Regimental Ball. Thank you, Jim!

Essayons et Faissons!

"The next few years will bring many changes as we reset the Engineer Regiment to provide the Army with the capability it needs now and will need in the future. . . ."

ENFORCE 2012: Engineering for the Wars We Fight

By Colonel Adam S. Roth

The Engineer Regimental Conference—ENFORCE—for 2012 was truly a memorable experience, not only for celebrating the accomplishments of the Engineer Regiment while at war, but also for setting conditions across the Regiment for solving the toughest challenges that lie ahead as we move toward an uncertain future. This article will encapsulate many of the takeaways from the event, especially for those who were unable to attend due to duty commitments worldwide. The theme of the conference evoked the reality that the next war we fight may not be the same as the last one, especially in an era of hybrid threats, area access/area denial challenges, and the emergence of the newest dimension—cyberspace—as a possible battlefield.

Commandant Regimental Update

Brigadier General Peter A. (Duke) DeLuca, 94th commandant of the Engineer Regiment and U.S. Army Engineer School, set conditions for the conference by laying out the regimental campaign plan and areas of focus for the coming year. Two compelling facts make the regimental campaign plan an important document. First, it is fully nested within the Army campaign plan and the Maneuver Support Center of Excellence campaign plan, meaning that our objectives complement those of the Army. Second, considering the regimental campaign plan as a schoolhouse mission-essential task list, we conduct an assessment of that list every 2 weeks during engineer roundtable discussions to ensure the validity of the tasks and to check progress toward the completion of established goals.



Major General Merdith W.B. (Bo) Temple, Colonel John M. Morgan (Retired), and Brigadier General Peter A. (Duke) Deluca



The 1st Engineer Brigade provides numerous venues for Sapper spouses to see the things that engineers do and even experience them personally.

Brigadier General DeLuca, explaining the role of the engineers within a larger context, said that we serve as the "Swiss Army knife of the Army." The resilience, technical breadth and depth, and tactical competence we provide will be key attributes as we move forward, especially in an expeditionary Army with the preponderance of our forces based in the homeland. The flexibility that we provide to the maneuver commander to solve the most complex engineering challenges will be that much more critical as we move forward.

Operational Energy

Ms. Sharon E. Burke (Assistant Secretary of Defense for Operational Energy Plans and Programs) and Mr. Richard Kidd (Deputy Assistant Secretary of the Army for Energy and Partnerships) provided a unique discussion on the topic of energy and how it affects the Army strategically. They led an interactive forum that allowed the audience to pose questions about the impact of new construction, contingency basing, and the holistic approach to energy security as we move into a future of financial and energy constraints.

Spouse Program

Critical to the success of our Sappers are spouses and families. The 1st Engineer Brigade provides numerous venues for many Sapper spouses to see the things that engineers do and even experience them personally. Spouses had the opportunity at Training Area 244 to see many of the items of equipment that our force uses, to eat in a military dining facility, and to experience a room-clearing exercise. It served to give the spouses a better perspective on what their Sappers do and deepened their relationship with the Army that they serve in a different capacity.

Regimental Run

On the morning of 20 April, Brigadier General DeLuca and Major General Merdith W.B. (Bo) Temple, acting Chief of Engineers, led the Engineer Regiment on its annual run through Fort Leonard Wood, Missouri. For anyone who participated in the run, the emotions were unmistakable as we sounded the "rhythms of war" with our feet.

Reserve Components

The Army National Guard and the U.S. Army Reserve comprise more than 80 percent of the Engineer Regiment. Senior engineer leaders of both components led meetings during ENFORCE that helped to solidify the way ahead for their component contributions to the Army of 2020. Subject matter of the meetings included—

- Hands-on career management.
- Theater security cooperation planning.
- Mobilization authorities and changes to the law.
- Proposed changes to the echelons-above-brigade engineer force structure.

A way ahead was formed for future conferences that will seek to tie the efforts of both components into a single venue.

Also during ENFORCE, the 416th Theater Engineer Command—one of only two theater engineer commands in the Army—held a change-of-command ceremony. Major General Paul E. Crandall relinquished command to Brigadier General Charles D. Martin in a ceremony followed by the celebration of the 104th birthday of the U.S. Army Reserve. Both theater engineer commands have supported overseas contingency operations since 11 September 2001 and continue to provide trained and ready Soldiers and units to the Army and the joint force.

Regimental Command Council

The Regimental Command Council, held at the Engineer Regimental Room, provided the venue for senior leaders—officers, warrant officers, and noncommissioned officers—from all three components to receive status briefings on the Engineer Regiment and provide feedback about the challenges that remain. Topics included—

- Total Army Analysis process.
- The role of the combat training center move to unified land operations.

- Engineer effects required for forcible-entry operations.
- Future of route clearance.

The council consists of colonel level commanders and command sergeants major; theater engineer commanders and command sergeants major; directors; Army service component command engineers, their chief warrant officers, and noncommissioned officer counterparts; and others by invitation.

A final topic at the council included Project Peach, the Operation Iraqi Freedom history project, which was briefed by Dr. David J. Ulbrich, U.S. Army Engineer School historian. The project will include a volume produced by the U.S. Army Corps of Engineers and another produced by the school. The key to accomplishing this task is participation by officers, warrant officers, noncommissioned officers, and Soldiers from the Regular Army, Army National Guard, and U.S. Army Reserve; and retirees who report their insights into engineer contributions to Operation Iraqi Freedom. Dr. Ulbrich can be contacted at <*david.j.ulbrich.civ@mail.mil*> or (573) 563-6365 to schedule a personal interview while memories are still vivid.



Major General Temple addresses participants on the future of the Engineer Regiment.

Fallen Sapper Memorial

With the Army at war, the realities of combat have affected the Engineer Regiment. Many families of fallen Sappers attended special events during ENFORCE that may allow them to continue the healing process. Brigadier General DeLuca and Regimental Command Sergeant Major Terrence W. Murphy participated in a dinner for those families in the Regimental Room, followed by a memorial ceremony at the Fort Leonard Wood Memorial Chapel to honor Sappers who have fallen during the past year. The event culminated with a wreath-laying at the Engineer Memorial Grove.

Chief's Address

Major General Temple addressed all participants on the future of the Engineer Regiment in an interactive session that covered many of the main challenges of the future, to include the engineer contribution to the Army of 2020, the role of the engineer in civilian infrastructure, and the role of technical competence in the engineer force of today and tomorrow.

Keynote Speaker

The Engineer Regiment was honored to have General David H. Petraeus (Retired) as the keynote speaker. General Petraeus, former commander of U.S. forces in Afghanistan who is now serving as the director for the Central Intelligence Agency, provided unique insights into how the threat environment will evolve, based on his rich military experience and his current duties. His interactive discussion, moderated by Brigadier General DeLuca, allowed the audience to ask probing questions about the threat challenges ahead and how the engineers will need to meet and solve those challenges to support national military objectives.

Regimental Ball

The Engineer Regimental Ball honored those who have contributed to the Engineer Regiment. Among those honored was Colonel John M. Morgan (Retired), who received the coveted Gold de Fleury Medal for a lifetime of service.

In Context

ENFORCE served to bring the Engineer Regiment together, but was only a waypoint on the long journey to the Army of 2020 and beyond. It is only with your support that the discussion remains alive, vibrant, and relevant. Engage in forums on the Engineer School Knowledge Network (ESKN), contribute to *Engineer*, participate in the numerous teleconferences that are held on a recurring basis, and above all—keep in touch.

Colonel Roth serves as the Deputy Assistant Commandant (Army Reserve) at the U.S. Army Engineer School. Before his graduation from the U.S. Army War College, he served as the commanding officer of the 844th Engineer Battalion and deployed to Iraq as part of Task Force Sky. He is a graduate of the Command and General Staff College and holds a master's degree in mechanical engineering from Boston University.



ENFORCE 2012 Working Groups and Panels

By Mr. Michael A. Dascanio

ENFORCE 2012 working groups and panels were well-attended, content-rich events with powerful takeaways for everyone in the audience. Each working group and panel was led by experts in their fields and provided an opportunity for the Engineer Regiment to hear several knowledgeable people present information and discuss personal views. They were all great discussions that provided a better understanding of issues that are particularly relevant to engineering for the wars we fight.

ENFORCE Working Groups

The overarching theme for the ENFORCE working groups was the Regimental Training Network. It is composed of all those involved with engineer training—Regular Army and Reserve Components—and includes individual and collective training. To address the many issues impacting the network, three working groups were conducted.

Group 1—Engineer Institutional Training Working Group (EITWG) and the One Army School System (OASS)

This group worked to ensure that engineers get the best institutional training possible. It addressed and resolved issues within the engineer training centers and regional training institutes for all three components and developed ways to implement the OASS. This effort improved the synchronization of the three engineer component school systems to help Soldiers attend the right class at the right time, regardless of component.

Discussion during the first part of this meeting centered on the EITWG and identified shortfalls in training resource and support requirements for the Engineer Regiment's Reserve Component. The working group included representatives from the Regular Army, Army National Guard, and U.S. Army Reserve. The working group identified issues in, and determined solutions for, distributed learning instruction. Solutions included extended help desk hours, improved enrollment procedures, and a reduction in student backlog. Other major areas of concern were schoolhouse issues such as equipping and program-of-instruction validation. These initiatives, although small, will create significant improvements for Reserve Component units and Soldiers once implemented.

Most of the group's work was informational, providing knowledge about OASS and including a detailed briefing and discussion session with a spokesman from the Reserve Component Training Integration Directorate at U.S. Army Training and Doctrine Command. The technical engineer military occupational specialty (12T) was identified for possible OASS conversion; courses of action will be developed to make the 12T advanced and senior leader courses OASS-compliant.

Group 2—Engineer Training Network

This working group examined current engineer training support to the Army force generation cycle. Engineer training focuses on planning horizons that require systems to be in place early to achieve assured and predictable access to Regular Army and Reserve Component units. The group worked to identify the mechanisms needed throughout the Army force generation cycle to provide support to all engineer units.

One important issue discussed was the synchronization of training opportunities for independent units. Major General Michael R. Eyre, U.S. Army Corps of Engineers deputy commanding general for Reserve Affairs, and Major General James H. Trogdon III, assistant adjutant general–Army, North Carolina National Guard, will cooperate to track training requirements and link with other units for missions such as disaster relief. Another area of concern identified is how to determine training gaps for the next war: Where were there gaps in past training? What is currently happening in theater? What should be trained for possible future conflicts? The consensus was that the Engineer Regiment should be involved in combat training center operations for hybrid-threat/decisive-action training feedback in order to keep abreast of what is being seen in theater. Finally, there is confusion across the spectrum about the training mission dates and needs of mobilizing units. Currently, missions often turn into individual tasks rather than unit tasks. Monthly videoteleconferences are planned to prevent this and to provide a discussion forum to ensure that mobilizing unit training mission dates and needs are adequately synchronized.

Group 3—Engineer Collective Home Station Training Enablers

The purpose of this working group was to develop solutions to ensure that engineer leaders and units are capable of planning, preparing, executing, and assessing training. It discussed current engineer collective and home station training, to include new equipment training, doctrine and tactics training, mobile training teams, and commanders sustainment training. It also investigated ways to better meld leader, battle staff, and individual training requirements into collective training events for the Engineer Regiment.

This working group discussed several collective training issues that will be considered for inclusion in the regimental campaign plan. One was the desire for better information sharing. Engineer leaders want a centralized information site that pushes information to them. The recommendation to address this issue was to reconsider the current Web site design and capability to push information. Also, engineer leaders want engineer qualification training tables designed for construction/geospatial military occupational specialties. Many felt that the current Combined Arms Training Strategies—designed using the Department of the Army-approved Army force generation templates—do not support the actual time available for training. This design will be reconsidered with the goal of improving usability.

ENFORCE Panels

This year's ENFORCE panel discussions brought together experts from throughout the Engineer Regiment to discuss important subjects and offer their points of view. The panels were also followed by breakout sessions where participants further investigated the topic, determined solutions, and recommended changes to the regimental campaign plan. The panels viewed the plan through the prism of four topic areas:

- Geospatial engineering.
- Special operations forces (SOF) engineers.
- Interagency and intergovernmental support to engineer efforts.
- Joint and multinational engineers.

The panels determined where gaps required new decision points to support the topic areas or the revision of current decision points to accommodate those unique areas.

Panel 1—Geospatial Engineering

This panel discussed the current state of geospatial intelligence (GEOINT) partnerships and identified issues that require further development or monitoring. It examined the current state of GEOINT capabilities and whether a gap in GEOINT support capabilities exists for global missions. Finally, it identified actions and action officers assigned with deliverables.

As a result of this discussion, it was decided to revise the memorandum of agreement between the U.S. Army Intelligence Center of Excellence and the U.S. Army Engineer School. The revision will recognize the successes that military intelligence and engineering have achieved in GEOINT and address identified gaps in doctrine, organization, training, materiel, leadership and education, personnel, and facilities. The gaps include—

- Army Foundry Intelligence Training Program.
- Iraq Reconstruction Operations Center collective training.
- Contingency operations.
- Doctrine.
- Engineer force structure redesign.
- GEOINT collective tasks.

As a part of this initiative, a training support package based on Army Research Institute and combat training center studies for senior leader engagement about GEOINT capabilities and services will be developed. This will ensure that the importance of geospatial engineering as a cross-domain solution within the Department of Defense is recognized.

Panel 2—SOF Engineers

This panel articulated SOF requirements for engineer support and improved leader understanding of SOF engineers within the Engineer Regiment. Gaps were identified in force structure, training, and equipment. Recommendations to address theses gaps included—

- The creation of a special operations engineer force at echelons above brigade, similar to the 249th Engineer Battalion (Prime Power).

(continued on page 15)

Regimental Awards

Each year we recognize the best engineer company, platoon leader, warrant officer, noncommissioned officer, enlisted Soldier, and civilian employee in each component for outstanding contributions and service to our Regiment and the Army. Every engineer unit in the Regiment can submit the name and achievements of its best to compete in these distinguished award competitions. Only the finest engineer companies, Soldiers, and civilians are selected to receive these awards. They will carry, throughout their careers, the distinction and recognition of being the best and brightest of the Engineer Branch. Following are the results of the 2011 selection boards for the Itschner, Outstanding Engineer Platoon Leader (Grizzly), Outstanding Engineer Warrant Officer, Engineer Soldier of the Year (Van Autreve), and Outstanding Civilian of the Year Awards and the Sturgis Medal.

Regular Army

Itschner Award: 643d Engineer Company, 84th Engineer Battalion, 130th Engineer Brigade, U.S. Army Pacific.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Brittany Clark, 535th Engineer Company, 54th Engineer Battalion, 18th Engineer Brigade, U.S. Army Europe.

Outstanding Engineer Warrant Officer Award: Chief Warrant Officer Two Weaver D. Prosper, 142d Survey and Design Detachment, 84th Engineer Battalion, 130th Engineer Brigade, U.S. Army Pacific.

Engineer Soldier of the Year (Van Autreve) Award: Specialist Devon C. Fox, Company A, 40th Engineer Battalion, 170th Infantry Brigade, U.S. Army Europe.

Outstanding Civilian of the Year Award: Mr. Harry S. Hayduk, Company D, 35th Engineer Battalion, 1st Engineer Brigade, U.S. Army Training and Doctrine Command.

Sturgis Medal: Sergeant First Class Robert E. McEntire, 561st Engineer Company, 84th Engineer Battalion, 130th Engineer Brigade, U.S. Army Pacific.

Note. The Regular Army winning submissions can be viewed at <*https://www.us.army.mil/suite/files/36769114*> (a common access card is required).

Army National Guard

Itschner Award: 623d Engineer Company (Vertical); Nebraska Army National Guard; Wahoo, Nebraska.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Brian C. Ross; 649th Engineer Company (Horizontal); California Army National Guard; Chico, California.

Outstanding Engineer Warrant Officer Award: Chief Warrant Officer Two Robert E. Sexton; 1430th Engineer Company (Vertical); Michigan Army National Guard; Gladstone, Michigan.

Engineer Soldier of the Year (Van Autreve) Award: Specialist Ryan E. Lindberg; 817th Engineer Company (Sapper); North Dakota Army National Guard; Jamestown, North Dakota.

Sturgis Medal: Sergeant Pierre R. Laroussini, 231st Survey and Design Team; Mississippi Army National Guard; Gulfport, Mississippi.

U.S. Army Reserve

Itschner Award: 428th Engineer Company, 379th Engineer Battalion, 372d Engineer Brigade.

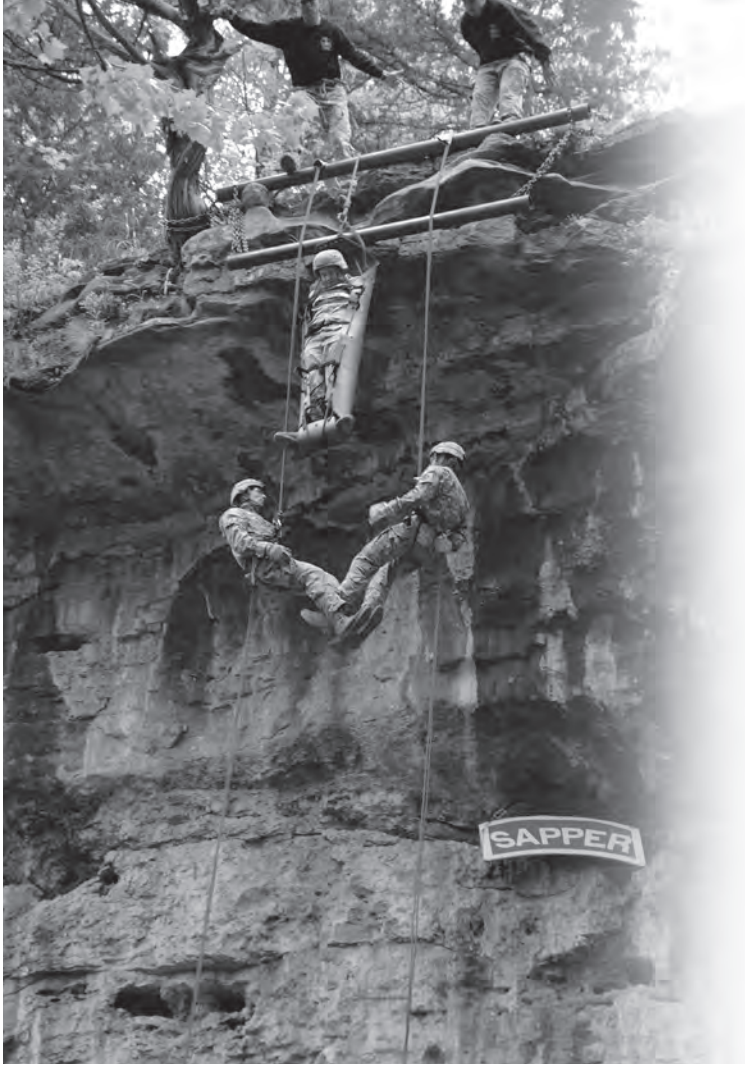
Outstanding Engineer Platoon Leader (Grizzly) Award: Captain Marcus C. Eason, 672d Engineer Company, 321st Engineer Battalion, 202d Maneuver Enhancement Brigade.

Outstanding Engineer Warrant Officer Award: Chief Warrant Officer Two Hermino Romero, 471st Engineer Company, 448th Engineer Battalion, 210th Regional Support Group.

Engineer Soldier of the Year (Van Autreve) Award: Specialist Patrick L. Griffith, 336th Engineer Company, 463d Engineer Battalion, 411th Engineer Brigade.

Outstanding Civilian of the Year Award: Mr. James R. Dervaes, 659th Engineer Company, 321st Engineer Battalion, 301st Maneuver Enhancement Brigade.

Sturgis Medal: Staff Sergeant Connie M. Cavanaugh, 652d Engineer Company, 397th Engineer Battalion, 372d Engineer Brigade.



Best Sapper 2012

By Mrs. Melissa K. Buckley

One competitor described the competition as smashing the 28-day Sapper Leader Course into 53 hours of grueling tasks spread across Fort Leonard Wood, Missouri. Now two Soldiers have proven that they are the 2012 Best Sappers—Captain Michael P. Kendall Jr. and Staff Sergeant Frank E. Batts, 82d Airborne Division, Fort Bragg, North Carolina.

Brigadier General Peter A. (Duke) DeLuca, U.S. Army Engineer School commandant, watched the competition kick off with 38 teams in the early hours of 19 April and was impressed as he cheered on the final 10 teams pushing through the finish line early on 21 April.

"Only the strong survive, and you are the strongest of the strong Sappers. You inspire us all with your mental toughness, physical resilience, strategizing and tactics, and your pure animal drive to survive and win on the battlefield. You guys are animals!" Brigadier General DeLuca said.

Captain Thomas L. Hatfield and Captain Nassar G. Jabour, 54th Engineer Battalion, Bamberg, Germany, placed second; and First Lieutenant Isaac Olsen and First



Soldiers scramble to assemble an M2 .50-caliber machine gun.





Above: **A Soldier times and scores other Soldiers as their water impulse charge explodes during the Sapper Stakes.**

Left: **Soldiers rally their strength to pull a vehicle during the final event, the X-mile run.**

Lieutenant Casey L. Williams, 307th Engineer Battalion, Fort Bragg, placed third.

Early in the morning of Day 1, competitors started with a nonstandard physical fitness test. Then the Sappers immediately continued on to 10 timed tasks, beginning with a helocast and swim. The rest of the day was spent navigating from one event to the next. From thermal breaching to casualty evacuation, the tasks were designed to push Sappers past their mental and physical breaking points, filtering the smartest and strongest Sappers to the next level of competition. Following this round of events, the contestants were cut down to the 30 top-scoring teams.

Throughout the first night, teams participated in a land navigation event, with the top 20 teams proceeding to Day 2—Sapper Stakes. These eight events tested the competitors on their combat engineer skills with tasks like field-expedient charges, in-stride breaching, and mountain operations. During the mountain operations event, Sappers had to evacuate a "casualty" down a 92-foot cliff—and this year they weren't using a dummy. To add realism, a Soldier was strapped into the stretcher. To the surprise of the Sappers, the Fort Leonard Wood and Maneuver Support Center of Excellence Command Sergeant Major Robert J. Wells volunteered to be rigged in the stretcher. He didn't think twice about his safety.

"They are some of the finest Soldiers in the U.S. Army. The two Sappers executed the litter rappel to standard and in excellent fashion. I told them we're a metaphor—young leaders carrying an old Sapper off the field," said Command Sergeant Major Wells.

This day wrapped up with a 16-mile ruck march, which cut the teams to 10. With little to no sleep going into the third and final morning of competition, the Sappers mustered their last bit of motivation to tackle the X-mile run, which included 10 more physically demanding challenges spread across an undisclosed number of miles. The winning team praised the instructors of the Sapper Leader Course.

"The Sapper Leader Course cadre that put this on are absolutely amazing. They are true professionals. They put in a lot of effort—it's amazingly coordinated. They are the real heroes of this competition," said Captain Kendall.

Mrs. Buckley writes for the Fort Leonard Wood newspaper, the Guidon.



Sapper Leader Course History

By Captain Joseph A. Cymerman and Major Kevin R. Golinghorst

As deployments in the Middle East begin to subside after a decade of continuous combat operations, the U.S. Army naturally is shifting its posture to prepare for future conflict. Strategically, this means taking a hard look at the force structure. However, it also means assessing aspects that used to be perfected in the daily Army grind but may have become rusty: counseling, evaluations, training management, command supply discipline, maintenance, and combined arms maneuver. While these areas will be reemphasized again, there is one area of focus that remains relatively silent in this new conversation—unit histories.

Consider the Sapper Leader Course and the impact it has had on the Engineer Regiment. Though the 169th Engineer Battalion[1] currently oversees the course, oversight has shifted from one unit to the next over the years since its inception in 1985. Remarkably, though it is an important gem to the Engineer Regiment, the history of the Sapper Leader Course remains largely undocumented. The course has a rich group of former instructors who have served the Army well since the course started, including at least 43 senior noncommissioned officer (NCO) leaders[2] who continued to serve as master sergeants or command sergeants major. Yet not even the U.S. Army Engineer School history office or library has an inclusive publication pertaining to the Sapper Leader Course. One might find the history of the term "sapper" dating back to the 16th century, but will find nothing on the Sapper Leader Course.

In its efforts to collect and produce the history of the course, the 169th Engineer Battalion initiated the Sapper Leader Course History Project in February 2012. The project consists of several steps. The first step—contacting former cadre members—is filling the gaps of the course's segmented history. An e-mail survey of former instructors and noteworthy graduates is collecting administrative information and providing for cogent interviews at a later time. Sapper Leader Course instructors who would like to participate should go to <*https://www.us.army.mil/suite/page/668915*>, or look for the Sapper Leader Course History Project on the Engineer School Knowledge Network on Army Knowledge Online. Second, the project focuses on creating systems to ensure the ongoing maintenance of Sapper history. The Web site and its accompanying

"One might find the history of the term 'sapper' dating back to the 16th century, but will find nothing on the Sapper Leader Course."

database will store contact information, survey responses, and any digital donations or articles, pictures, and videos. Interviews with influential leaders from the Engineer Regiment conducted during the April 2012 ENFORCE conference (including one with Lieutenant General Robert B. Flowers [Retired], former Chief of Engineers and commanding general of Fort Leonard Wood, Missouri) will be available on the Web site.

To date, more than 15 former Sapper instructors have contributed to the project. Four of them, including Command Sergeant Major Iokimo Falaniko (Retired), Command Sergeant Major Joseph T. Toth (Retired), Master Sergeant James R. Watnes (Retired), and Sergeant First Class William E. Rostad (Retired) shared their stories on camera at Fort Leonard Wood. The Sapper Leader Course History Project interviews with past and present instructors continue. Working with leaders of such high caliber has been a sincere honor and a pleasure.

The project also has uncovered articles and annual command histories documenting the early history of the course. In 1985, Captain Michael J. Grove, the officer in charge of the first Sapper class, wrote an article about the success and scope of the Sapper Leader Course from the perspective of a company commander roughing it next to his own platoon sergeants, platoon leaders, and team leaders.[3] The effort also uncovered personal 1987 correspondence from Lieutenant General David E. Grange (Retired) to Secretary of the Army John O. Marsh, Jr., with an appraisal of the course.



Lieutenant General Robert B. Flowers (Retired) shares his experiences on camera during ENFORCE, contributing to the Sapper Leader Course History Project.

U.S. Army Engineer School annual command histories also provide insight on issues and significant events between 1989 and 1999. Eventually, the Web site will include videos, articles, and other products that tell the story of the Sapper Leader Course.

In today's circumstances—a shrinking Army, tighter budgets, and increasing competition for talented officers and NCOs—there has never been a greater need to tell the story of the Sapper Leader Course. All Soldiers, especially engineers, know that the course is important, that it is tough, and that its impact on the Engineer Regiment and the Army has been immeasurable. Most Sappers might think that the course will last forever, but it's notable that it almost didn't make it through the early to mid-1990s amid constraints like the Army faces today. Tough budgeting has always earned the course a serious look, and talented NCOs are becoming harder to find. Combat rotations naturally encourage NCOs to seek time with their families rather than seek special training like the Ranger or Pathfinder Schools, and engineer units may want to retain their best NCOs. Leaders across the Engineer Regiment should encourage their best NCOs to serve as Sapper Leader Course instructors, embracing the opportunity to increase the esteem of their own units by putting their best foot forward.

Given the operational tempo of the past decade, there are sound reasons why annual command histories were not always a priority. Nevertheless, as the Army begins to reemphasize the importance of officer and NCO evaluations and stress the proper way to write recommendations for individual awards, perhaps we should consider reinstating the art of telling the stories of units as well. In this case, keep an eye open for the history of the Sapper Leader Course, the cutting edge of our country's sword.

Endnotes:

[1]The 169th Engineer Battalion is arguably the most diverse training battalion in the Army, consisting of advanced individual training companies and detachments of divers, electricians, technical engineers, geospatial engineers, plumbers, firefighters, and carpenters.

[2]Twelve command sergeants major, four sergeants major, and 27 first sergeants or master sergeants have been documented so far by the Sapper Leader Course History Project.

[3]Michael Grove, "A New Rope to Climb," *Engineer Professional Bulletin*, Volume 15, No. 4, Winter 1985–1986, pp. 12–15.

Captain Cymerman graduated from the Sapper Leader Course in June 2010 and now attends the Engineer Captains Career Course at Fort Leonard Wood.

Major Golinghorst graduated from the Sapper Leader Course in June 1998 and now serves as the executive officer of the 169th Engineer Battalion.

("Working Groups," continued from page 9)

- Training that would place selected Soldiers in an SOF track.
- The analysis of U.S. Navy; U.S. Air Force; and commercial, off-the-shelf equipment sets that meet SOF engineer requirements.

Panel 3—Interagency and Intergovernmental Support to Engineer Efforts

This panel discussed defense support to civil authorities and included foreign humanitarian assistance case study discussions. The discussions improved the leader understanding of interagency and intergovernmental support to engineer efforts within the Engineer Regiment. The leading issue discussed during the breakout session was the need for a better knowledge of engineer capabilities among junior leaders. Students should become familiar with sister Service engineer capabilities, beginning in the Engineer Basic Officer Leader Course. In the Engineer Captains Career Course, leaders should have improved knowledge of sister Service engineer capabilities and a common understanding of other U.S. government agencies. They must also be able to apply an understanding of interagency organizations, roles, and functions. The group recommended leveraging existing courses from other agencies to meet these training requirements.

Panel 4—Joint and Multinational Engineers

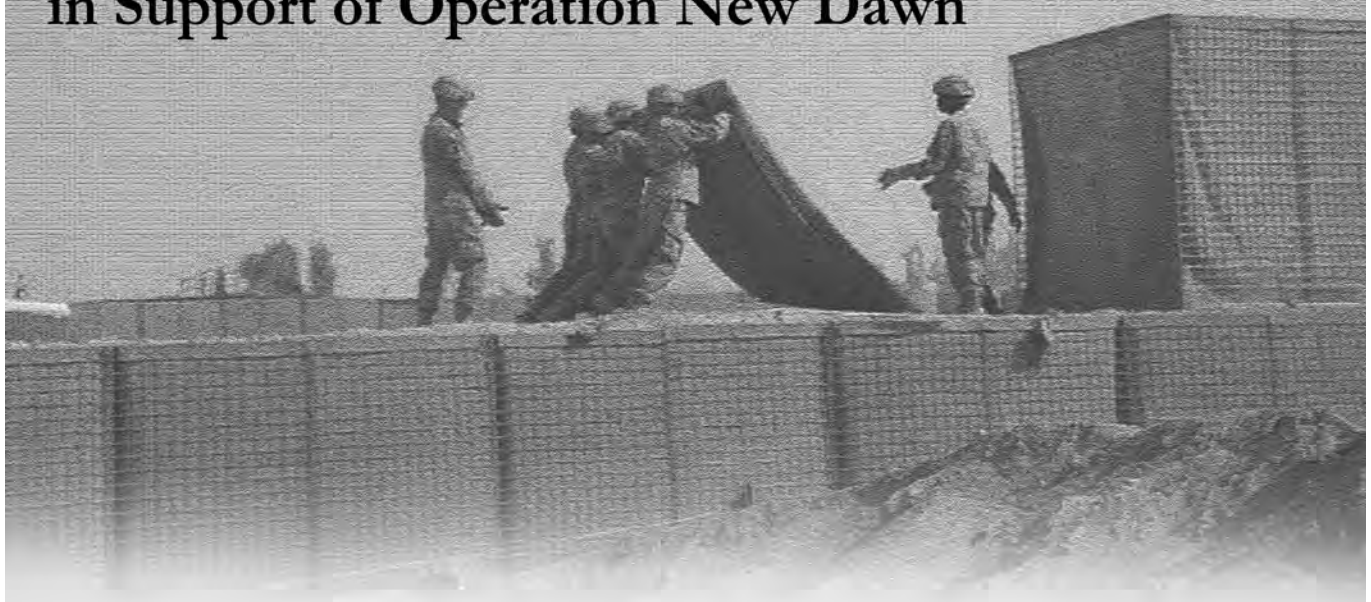
This panel was an open discussion among panel members who provided a short presentation on the top engineer priorities for their areas of concern. The breakout group from this panel recommended broadening the Army's knowledge of the joint, interagency, intergovernmental, and multinational (JIIM) process. Many attendees felt that operational personnel generally have little experience operating in a full JIIM environment. Also, as forward-deployed U.S. forces are drawn down, they do not have as much opportunity for short-term exchanges with partner nations. Thus, there is a need for increased JIIM assignments, internships, and fellowships to provide selected military and civilian leaders with a broadened knowledge of the culture, environment, and organizational processes of partner nations.

Thanks to all who participated in this year's ENFORCE working groups and panels. Participation was exceptional, and great feedback came in from the field. The engineer regimental headquarters will continue to work on and refine your recommendations as the regimental campaign plan moves forward. We encourage everyone to be active participants in further developments and to track our progress in achieving these objectives.

Mr. Dascanio is the technical director of the U.S. Army Engineer School Directorate of Training and Leader Development.

With Honor and Success:

Full Spectrum Joint Engineer Planning in Support of Operation New Dawn



By Brigadier General Scott F. (Rock) Donahue, Lieutenant Colonel Michael C. Gibson, Major James M. Rohrer, and Captain Jonathan M. Diaz

"Start by doing what is necessary, then what is possible, and suddenly you are doing the impossible."

—St. Francis of Assisi[1]

Prelude

After 7 years of violence, destruction, and civil unrest, the final chapter of the American military presence in Iraq was inscribed. On 1 September 2010, combat operations in support of Operation Iraqi Freedom transitioned to U.S. Forces–Iraq (USF-I) stability operations in support of Operation New Dawn (OND). The mission of the USF-I J7 (Engineer Directorate) now focused clearly on providing full spectrum joint engineer support to USF-I, the Department of State (DOS), and the emerging Office of Security Cooperation–Iraq (OSC-I).

In January 2011, the core of the USF-I headquarters transitioned from III U.S Corps to XVIII Airborne Corps, signifying a change in key staff leadership and a major shift in the USF-I battle rhythm. There was also a change in the joint plans and operations decision cycle aimed at achieving a greater level of staff integration and synchronization before seeking decisions from the USF-I commanding general. Using the operational framework of USF-I Operations Order 11-01, consisting of three lines of effort (LOEs) and their specified objectives, USF-I integrated numerous joint processes and established specific executive forums to ensure that future plans and current and future operations were synchronized across all warfighting functions and nested within the commander's intent.

The forums rotated weekly and included a monthly joint assessment board to assess progress on campaign LOEs and objectives. A monthly operational synchronization board synchronized operational maneuver and addressed special topics to inform the USF-I senior leadership. The operational framework feeding the joint assessment board provided the basis for three of the four weekly commander's update briefs. Each brief aligned with an LOE and its objectives:

- LOE 1—Strengthen the Iraqi Security Force.
- LOE 2—Conduct transitions.
- LOE 3—Reposture the force.

The J7 directly influenced the progress of some objectives and was principally responsible for achieving one—the completion of base transition and facility construction.

Comprehensive assessments were provided weekly to the USF-I commanding general.

The weekly joint plans and operations decision cycle ensured staff integration and synchronization during the planning process, with each successive venue providing greater refinement and guidance. The decision cycle began with the joint plans and operations group chaired by the USF-I deputy chief of staff, with deputy directors and select planners attending. Results were then presented as recommendations to the joint plans and operations council chaired by the USF-I deputy commanding general for operations and attended by other USF-I deputy commanding generals, staff directors, representatives from major subordinate commands, and coordinating and special staff members. Analysis, planning priorities, and course-of-action recommendations from the council were then presented for guidance and decision to the commanding general in two forums:

- The joint plans and operations "huddle" consisted of a small group that included the deputy commanding generals, the USF-I operations and plans officers, and—depending on the topic—other directors.
- The joint plans and operations board was chaired by the commanding general with USF-I deputy commanding generals; directors; major subordinate commands; and members of coordinating, special, and personal staffs in attendance.

With the arrival of a new director and the XVIII Airborne Corps engineer section in January 2011, the J7 developed a restated mission with clear purpose and intent; identified key tasks to meet evolving mission requirements and achieve the desired end state; reorganized internally to create a flatter, faster, and more transparent structure; and realigned its internal planning, decision, and execution cycles to meet the demands of the complex operational environment and to establish the means to transition to end of mission (T2EOM).

Key Takeaways

The following key takeaways enabled the J7 to achieve its mission and set engineer-specific war termination conditions.

A Clear Vision and Shared Operating Philosophy

This ensured full spectrum engineer support to USF-I stability operations and enabled the success of the DOS and OSC-I. A clear vision defined the means to enable an organization to effectively lead change and manage complexity. In January 2011, the USF-I J7 director assessed the USF-I commanding general's intent, operational guidance, and top 10 priorities, as well as the J7 organization and staff processes. To provide purpose and direction for the J7 staff, the director established the following key tasks:

- Assure mobility and protect the force.
- Develop Iraqi Security Force capability.
- Provide base, environmental, and facilities support.
- Provide general and geospatial engineering support.
- Enable base transitions.
- Reposture engineer forces.

From these six key tasks, 50 critical tasks were developed in the last 90 days of OND to ensure the completion, transfer, or transition of each critical task to the Government of Iraq; DOS; OSC-I; U.S. Army Corps of Engineers (USACE), Middle East District–Iraq Area Office; U.S. Army Central; and U.S. Central Command. This process was known as the *J7 T2EOM*. In the last 60 days of OND, USF-I developed a conditions checklist to ensure that USF-I and each directorate identified tasks to enable war termination. The comprehensive assessment by J7 earlier in the year and the development of the T2EOM critical task list enabled immediate identification of the engineer conditions that supported the USF-I war termination conditions check. Through the execution of the critical tasks, the USF-I J7 displayed its commitment through partnership with Iraqi engineers, the DOS, and the newly formed OSC-I J7, thus enabling a more stable, secure, and self-reliant Iraq.

"[A Clear Vision and Shared Operating Philosophy] . . . ensured full spectrum engineer support to USF-I stability operations and enabled the success of the DOS and OSC-I. A clear vision defined the means to enable an organization to effectively lead change and manage complexity."

Dynamic Update of USF-I J7 Task Organization

This enabled effective, distributed mission command and ensured the unity of effort to meet emerging engineer requirements. In the year following the arrival of the XVIII Airborne Corps, the USF-I J7 revamped task organization twice to meet emerging requirements and support a distributed staff at seven USF-I mission command nodes. Besides a director cell for executive administration,

communications, and logistics support, the USF-I J7 consisted of the following staff divisions (as of 1 January 2011):

- Operations, Plans, and Readiness Division.
- Basing, Facilities, and Environmental Division.
- Engineer Program Management Division.

Two functional components fell under the director's cell and reported to the deputy director. The first was Team Muhandis, an Iraqi Army engineer advise, train, assist, and equip team. The second was an "enduring sites" element, recently established to manage the engineer requirements necessary to transition enduring sites to U.S. Mission–Iraq, which consists of the DOS and OSC-I. Over the next year, the USF-I J7 facilitated the monumental task of transitioning all remaining USF-I bases in the Iraq joint operations area (IJOA) while simultaneously supporting the USF-I commanding general's intent and operational maneuver.

An increase in construction and basing support required shifting focus from the advise, train, assist, and equip mission to providing guidance to the enduring sites element. Consequently, USF-I J7 realigned Team Muhandis under the Operations, Plans, and Readiness Division and expanded the enduring sites element to an Enduring Sites Transition Division. It also established a theater construction fusion cell to synchronize and manage the growing complexity of completing construction requirements. The theater construction fusion cell tracked all theater construction to support T2EOM tasks.

As USF-I prepared for T2EOM, it was essential to reduce the size of its headquarters and distribute its mission command nodes to facilitate the flow of units out of the IJOA. The USF-I J7 shifted personnel to locations where their capabilities best supported the USF-I commanding general's intent and operational maneuver. At the height of OND, the USF-I J7 geographically distributed to seven mission command nodes within the IJOA and Kuwait.

Persistent Forecasting of Short- and Long-Term Requirements

This helped retain joint engineer critical capability, curtail units with diminishing capacity, and cancel unnecessary structure. In 2009, three engineer brigades were deployed to support operations in the IJOA. In the initial planning for OND, it was proposed to redeploy all engineer brigades to meet the USF-I force cap of 50,000, but one engineer brigade was retained to support the multiple engineer missions foreseen. Later, USF-I thinned to one theater engineer brigade (TEB) headquarters that provided full spectrum, joint engineer capabilities, all of which were in high demand during the transition and reposturing of USF-I. Specifically, construction program and project planning, design, execution, and quality assurance and control proved invaluable. Further, the TEB assumed the base mayoral role at the fourth largest base in Iraq and led the base transition process. Additionally, all echelon-above-division engineer units and assets were under the mission command of the TEB, enabling the successful completion of enduring site construction and base transitions. To ensure that appropriate capabilities remain during future base transitions and force reposturing, engineer planners should consider the following assumptions:

- Personnel turnover in the DOS and U.S. forces requires a well-defined process to maintain continuity in the plans process to ensure that good ideas are not reintroduced midway through the execution process.
- U.S. forces will expend a significant amount of staff energy and troop labor to enable DOS and OSC-I sites to achieve mission-capable status.
- Force repositioning from smaller bases to larger bases and then out of theater often increases requirements at bases. In some cases, requirements exceed the existing base capacity to support.
- U.S. forces cannot plan to remain on a large base unless it is transferring to DOS/OSC-I, since temporary forces must move off large bases in time to allow infrastructure closure before transition.
- Organizations have different limitations. The DOS Bureau of Overseas Buildings Operations is organized to conduct long-term, secure facility design and construction. The Department of Defense specializes in expeditionary design and construction. Anticipate the requirement to support DOS building operations with expeditionary construction planning, design, and execution.
- A joint staff-integrated vulnerability assessment on enduring DOS/OSC sites should be conducted early so that the results can be included in site master planning.

In addition to the TEB, it was essential to retain low-density, high-demand engineer capabilities, since a variety of small engineer detachments were helpful in supporting enduring sites and enabling base transitions. As the basing footprint decreased, the need for power generation assessments and capability increased. Prime power teams conducted numerous assessments of enduring site power requirements and provided contract officer technical representative expertise to multiple power plants in the IJOA. In addition, forward engineer support teams–advance provided civil, electrical, environmental, and mechanical engineering expertise and design capability to enduring sites and to the repostured units as bases transitioned. Facility engineer teams were similar in capability to the advance teams, but could execute small, quick-turnaround construction projects. These low-density, high-demand units contributed immensely to theater construction efforts.

Deliberate, Nested, Virtual Collaboration

This enabled and equipped theater engineers to coordinate and synchronize full spectrum, joint engineer plans

and operations. In February 2011, the USF-I J7 hosted two forums to synchronize engineer support throughout the IJOA. The first was the Engineer Plans and Operations Breeze, a virtual J7 battle rhythm event to review planning efforts and operations to support the USF-I decision cycle. The second was the Engineer Leaders Breeze, a weekly, virtual J7 battle rhythm event focused on sharing IJOA-wide engineer initiatives. It was attended by U.S. division engineers; the TEB commander; the USACE, Gulf Region District commander; and the USF-I J7 director.

However, the implementation of the joint plans and operations decision cycle to the USF-I battle rhythm significantly increased the demand for engineer information and decisions. This required a single forum to synchronize engineer plans and operations and provide guidance to, and gain decisions from, the senior engineer in the IJOA. To fill this need, the USF-I J7 combined the Engineer Plans and Operations Breeze with the Engineer Leaders Breeze to form the Joint Engineer Plans and Operations Group (JEPOG). This was a theater-wide forum for engineer leaders, planners, and USF-I J7 staff to discuss current engineer operations and planning efforts and to receive guidance and assistance from the USF-I J7 director and staff. Nesting the JEPOG within the joint plans and operations decision cycle facilitated theater engineer synchronization by integrating subordinate engineer organizations in planning efforts and operations cycles and enabled collaboration before entering the USF-I decision cycle.

Each JEPOG focused on construction or assured mobility and began with an overview of USF-I planning priorities and specific J7 planning efforts. This was followed by the USF-I planning efforts and briefings entering the joint planning and operations decision cycle. Subsequently, USF-I J7 plans updated theater engineers on base transition dates and other engineer planning efforts and let subordinate engineer organizations provide input or identify friction points. Also, division engineers provided updates on route clearance, construction, and other special topics in their operational environments. The TEB provided updates on support to operational maneuver, construction projects, and bridging, while the USACE, Gulf Region District (and later, the USACE, Middle East District–Iraq Area Office) provided updates on its current construction program and ongoing projects.

Further, the USF-I J7 divisions updated key battle rhythm events such as the large base transition board, the embassy support and enduring sites transition board, and a theater construction update. Finally, to ensure that an engineer common operational picture was presented accurately to the USF-I senior leadership, the commander's update brief and OSC-I J7 transition update slides were presented to identify issues and to correct slides and scripts. This agenda ensured that all engineer leaders and planners were aware of all aspects of full spectrum engineer operations in the IJOA.

Final Thoughts

Throughout 2011, the USF-I J7 directorate completed its full spectrum engineer mission in support of OND on time and to standard. Theater engineers were committed to finishing the first-rate work started nearly 9 years ago through inspired leadership, an enduring U.S.-Iraqi engineer partnership, superior performance, and the indomitable spirit of a team of resilient, versatile, survivable, and partnered engineers.

Endnote:

[1]"SearchQuotes," <*http://www.searchquotes.com/quotes/author/St_Francis_of_Assissi*>, accessed on 31 May 2012.

Brigadier General Donahue serves as the deputy chief of staff, G-3/5/7, for the U.S. Army Reserve Command, Fort Bragg, North Carolina. He holds a bachelor's degree in civil engineering from Virginia Military Institute, a master's degree in operations research from the Naval Postgraduate School, and a master's degree in strategic studies from the U.S. Army War College. Brigadier General Donahue was the director of USF-I J7 during the last year of OND.

Lieutenant Colonel Gibson serves as the professor of military science and department chair for the Marquette University Reserve Officer Training Corps in Milwaukee, Wisconsin. He holds a bachelor's degree in business management from Xavier University, Cincinnati, Ohio, and a master's degree in business administration from Franklin University, Columbus, Ohio. He served as chief of plans for USF-I J7 during the last year of OND.

Major Rohrer is the operations officer for the 30th Engineer Battalion, 20th Engineer Brigade, Fort Bragg. He holds a bachelor's degree in geology from California State University, Northridge, and a master's degree in geology from the University of Missouri–Rolla (now Missouri University of Science and Technology). He served as the USF-I J7 assistant chief of staff during the last year of OND.

Captain Diaz is the commander of the 133d Engineer Detachment, Construction Management Team, 20th Engineer Brigade, Fort Bragg. He holds a bachelor's degree in political science from California State University–Fresno. He served as the USF-I J7 future operations, force management, and logistics plans officer during the last year of OND.



The Sidewinders:

Most Versatile Team in the Desert

By Major Gerald S. Law

The lessons learned and trends published by the National Training Center (NTC), Fort Irwin, California, are probably familiar to many readers, but the observer/coach trainer (O/CT) teams who develop and publish those lessons learned may not be so familiar. The teams coach, teach, and mentor units within a brigade combat team (BCT) as they conduct operations at the NTC. Of the numerous NTC operations group teams tasked with this mission, the Sidewinder Team is the most versatile.

Officially known as maneuver support trainers, the Sidewinder Team may not be the oldest in the desert, but the members include O/CTs versed in all warfighting functions. They provide overall O/CT coverage to brigade special troop battalions (BSTBs) and engineer, military police, and Stryker infantry battalions.

History and Capabilities

Engineer trainers have been a part of the NTC since its beginning in 1982. Ten years later, engineer battalions arrived for training; and by 1993, the Sidewinder Team was born. Establishing the motto *Qui Experit Succedit*—"He Who Tries Succeeds"—the Sidewinder Team became the Army's premier engineer trainer from 1993 to 2003.

By 2004, most engineer battalions began transforming into BSTBs, which required the Sidewinder Team to transform. No longer focusing on engineer capabilities alone, the Sidewinders increased their skill sets and capabilities to coach, teach, and mentor the types of units within a BSTB, such as military intelligence companies, signal companies, military police platoons, sustainment platoons, and maintenance platoons. Based on the BCT commander's guidance, the Sidewinder Team also trains the battalion command group and staff to assume multiple roles in theater, to include owning and controlling an area, providing enablers, or controlling brigade assets.



Photo by Sergeant First Class Marlon Munoz

A Sidewinder O/CT advises a company executive officer and first sergeant about logistic operations.



Photo by Sergeant First Class Edgar Vasquez

A Sidewinder engineer O/CT inspects the clearing line charge on an assault breacher vehicle before a live fire.

Current Requirements

Today, the Sidewinder Team primarily trains the organic BSTBs within BCTs. As the NTC maneuver support trainers, the Sidewinders provide the coaching, teaching, and mentoring needed to prepare BCTs for wide area security or combined arms maneuver operations. Furthermore, the Sidewinder Team trains the attached echelons-above-brigade assets, to include tactical explosive detection dog teams and explosive ordnance disposal teams. Training numerous military occupational specialties within the BSTB and training attached echelons above brigade contributes to the adaptive nature and versatile capabilities of the Sidewinder Team.

Another reason that the Sidewinders are so versatile is their ability to provide overall O/CT coverage to a variety of units. Most of the teams at the NTC consistently provide O/CT coverage to a particular type of battalion. For example, the Bronco Team provides coverage to BCT headquarters; the Goldminer Team coaches, teaches, and mentors brigade support battalions; the Tarantula Team covers down on airborne or infantry battalions; the Cobra Team trains with cavalry squadrons; and the Scorpion Team provides coverage to infantry battalions. Only the Sidewinder Team provides coverage to BSTBs and engineer, military police, and Stryker infantry battalions.

"As a member of this versatile team, you will have an opportunity to provide expertise and experience through coaching, teaching, and mentoring while growing professionally as an Army leader."

Future Requirements

Future changes at the NTC will require the Sidewinders to become even more versatile. When the Army stands up its brigade engineer battalions, the Sidewinders will provide the O/CT coverage for them at NTC. Generally, a brigade engineer battalion will consist of two engineer companies; a signal company; a military intelligence company; a military police platoon; and a chemical, biological, radiological, and nuclear platoon. The two



Photo by Major Todd Polk

The author facilitates an after-action review for the staff of an infantry Stryker battalion.

engineer companies will provide vertical, horizontal, route clearance, and gap-crossing capabilities, which will require O/CTs with additional skill sets in vertical and horizontal construction techniques, including theater-of-operations construction, road repair, and bridging.

In addition to continuing Operation Enduring Freedom predeployment mission rehearsal exercises, the NTC hosts BCTs to conduct contingency expeditionary-force, decisive-action training rotations. These rotations will require a BCT to simultaneously conduct offensive, defensive, and stability operations in an environment that includes conventional, guerrilla, and criminal threats. For these rotations, O/CTs will expand their coaching, teaching, and mentoring techniques to the broader array of skills required in an environment that includes simultaneous combined arms maneuver and wide area security missions.

Team Member Advantages

An assignment as a Sidewinder at the NTC is very rewarding professionally. Join us in preparing Soldiers, leaders, and units for Operation Enduring Freedom and for the wide range of contingency expeditionary-force missions facing our Army in the future. As a member of this versatile team, you will have an opportunity to provide expertise and experience through coaching, teaching, and mentoring while growing professionally as an Army leader. Life is never boring and is always rewarding when serving on the most versatile team in the desert. To join the Sidewinder Team or obtain additional information on becoming an OC/T, see your U.S. Army Human Resources Command manager, visit the Web at <*www.irwin.army.mil*>, or call (760) 380-5600.

Major Law is the battalion executive officer for training for the Sidewinder Team, Operations Group, NTC, Fort Irwin. He holds an associate's degree in welding engineering from Ricks College, Rexburg, Idaho; a bachelor's degree in industrial engineering from Utah State University, Logan; a master's degree in geology and geophysics from the University of Missouri–Rolla (now Missouri University of Science and Technology); and a master's degree in military arts and sciences, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas.

SIDEWINDER
Maneuver Support Trainers



Dedication

The following members of the Engineer Regiment have been lost in overseas contingency operations since the last issue of *Engineer*. We dedicate this issue to them.

Sergeant First Class Billy Albert Sutton	288th Engineer Company	Houston, Mississippi
Corporal Antonio C. Burnside	Company A, 1st Brigade Special Troops Battalion, 1st Brigade Combat Team	Fort Bragg, North Carolina
Specialist Junot Mevs Legrand Cochilus	630th Engineer Company, 7th Engineer Battalion, 10th Sustainment Brigade	Fort Drum, New York
Second Lieutenant David E. Rylander	630th Engineer Company, 7th Engineer Battalion, 10th Sustainment Brigade	Fort Drum, New York
Staff Sergeant Alexander Povilaitis	57th Engineer Company, 14th Engineer Battalion	Joint Base Lewis-McChord, Washington

Engineers Join in Project to Honor Vietnam Veterans

By Mr. Joseph Bonfiglio

Leaders from the U.S. Army Corps of Engineers (USACE) joined officials from the American Battle Monuments Commission, the Department of Veterans Affairs, the Hawaii Department of Land and Natural Resources, and others to break ground for the new Vietnam Pavilions Project at the National Memorial Cemetery of the Pacific in Honolulu, Hawaii, on 9 May.

"The Army Corps of Engineers (Honolulu District) has been serving our Nation for 107 years, since 1905. In that time, we've built a lot of projects in a lot of places across the Pacific. I would argue today that none of those projects is more significant or will have a more enduring legacy than the National Memorial Cemetery of the Pacific, which we constructed in the late 1940s and which first opened on July 19, 1949," said Lieutenant Colonel Douglas B. Guttormsen, commander of USACE, Honolulu District.



Photo by Mr. Joseph Bonfiglio

Officials from USACE, the Department of Veterans Affairs, the American Battle Monuments Commission, and others break ground for the Vietnam Pavilions Project at the National Cemetery of the Pacific.

"Since then, we've had the solemn privilege to manage the construction of a number of renovations and upgrades to this monument and these hallowed grounds. We're here today to break ground and bless our latest project to honor our Vietnam era veterans and their sacrifices," he said.

"With the addition of these pavilions, we will appropriately honor the service and sacrifice of those who fought in Vietnam and, in particular, those commemorated in the memorial's courts of the missing," said Mr. Michael G. Conley, chief of staff for the American Battle Monuments Commission.

According to Mr. Gene E. Castagnetti, director of the National Memorial Cemetery of the Pacific, "As a Vietnam veteran, I'd like to be the voice of those who can't be here today. Over 3.5 million American men and women served in the Vietnam Campaign. Five hundred and forty-three thousand actually fought in country [at its peak]. Of that number, 300,000 were wounded and 58,000 were killed in action. This was an enormous sacrifice. . . . Today we honor those veterans, and today's ceremony shows that they are not forgotten."

The project entails constructing two new pavilions next to the two flag poles that flank the processional stairs of the Honolulu Memorial, one of 25 federal memorials maintained worldwide by the American Battle Monuments Commission. The design of the new pavilions will be compatible with the materials, features, and architectural style of the existing structures. One of the pavilions will include Vietnam War battle maps to complement the existing World War II and Korean War battle maps. The other pavilion will serve as an orientation center for the memorial.

In addition, the project will provide exterior illumination to the pavilions; repair or replace existing walkways, drainage, and landscaping that are affected by the construction; and improve handicap accessibility to the memorial and its facilities.

The Honolulu Memorial inside the cemetery grounds was built by USACE and dedicated in 1966 to honor those missing in action from the World War II Pacific Theater of Operations and the Korean War. It contains wall-mounted battle maps commemorating famous battles, such as the Battle of Midway. The memorial was expanded in 1980 to bear the names of 2,504 missing Service members from the Vietnam War, but battle maps from that war were not included.

The Vietnam Pavilions Project is scheduled for completion in November 2012.

Mr. Bonfiglio is the chief of public affairs for USACE, Honolulu District.



USACE Doesn't Play Shell Games With Turtle Protection

By Dr. JoAnne Castagna

Several years ago, a team of biologists with the U.S. Army Corps of Engineers (USACE), New York District, were performing environmental work along a New Jersey beach that had been newly restored by the Army engineers. An onlooker approached the team to report that he had seen a baby sea turtle in the water. Because it is an endangered species rarely seen on the shore in the Northeast, the biologists got very excited and began a vain search for it in the shallows where they had been working. At the end of the day, a team member saw something in the seaweeds close to shore. He parted the weeds and found a realistic, plastic baby turtle.



Photo courtesy Engineer Research and Development Center

A ship crewman shows observers how to use a safety harness.

That episode may seem funny, but USACE takes the protection of endangered sea turtles and all marine life seriously, especially when performing beach replenishment projects. In the Northeast waters, there is a small risk that these projects can injure or kill sea turtles, including the most common endangered species in the region—the loggerhead and Kemp's ridley sea turtles.

Every time USACE begins a beach replenishment project, it takes measures that comply with environmental policies established by the National Marine Fisheries Service (NMFS) to protect sea turtles. Recently, these measures were activated for the Monmouth Beach Replenishment Project in Monmouth County, New Jersey. In the fall of 2011, USACE began the project in partnership with the New Jersey Department of Environmental Protection and a dredging contractor. That area of the shoreline was in

serious need of sand replenishment. Without a beach, waves break directly on the seawall, resulting in a shoreline that is vulnerable to storms. A beach helps protect infrastructures and homes and will also stimulate the local economy by drawing visitors to area stores and restaurants. A beach is good for the environment and is essential for the reproduction of sea turtles, which are an integral part of the ecosystem.

To replenish sand on Monmouth Beach, USACE is dredging 800,000 cubic yards of sand from an area of the ocean 2 miles offshore. The hopper dredges in use are like underwater vacuum cleaners that suck sand from the bottom of the ocean. The dredges then take the sand to the beach, where it is pumped onto the shoreline through a steel pipe and then graded to create a beach.



Photo courtesy Engineer Research and Development Center

An observer cleans lumps of clay from the screen that strains dredged material.

Unfortunately, the dredges can also take up marine life along with sand. Because of this, the NMFS developed policies that govern activities which might impact species under its protection. The New York District has been very successful in following the policies. Regulations require that USACE perform its dredging during the months of December through April, when sea turtles are not expected to be in the Northeast. If dredging must occur during the warmer months of May through November, measures must be taken to prevent harm to sea turtles. These measures include having NMFS-approved marine endangered species observers onboard the dredges around the clock.



Photo courtesy Engineer Research and Development Center

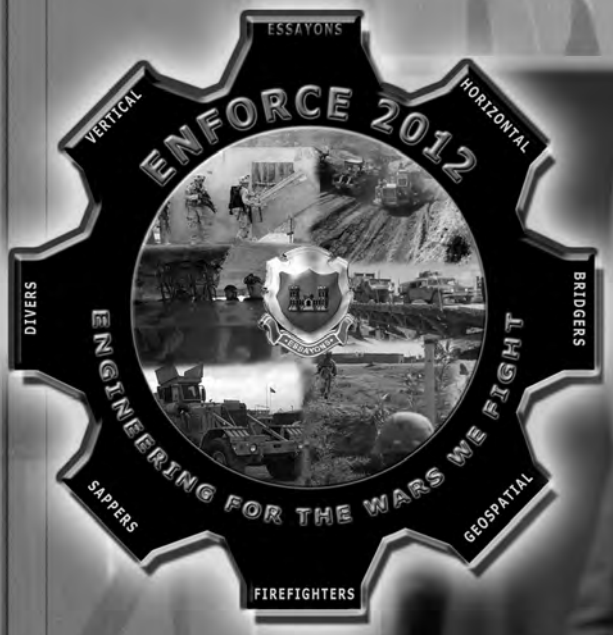
An observer climbs down a ladder wearing the required hard hat, headlamp, steel-toed boots, safety vest, and gloves.

The observers are trained and certified independent contractors who go out on the hopper dredges to observe and document any harm to sea turtles, whales, dolphins, or seals. The observers do this by monitoring the operations inside and outside the dredge. If they spot a marine animal swimming near the boat, they inform the crew so that the dredge can avoid it. If observers see a marine animal get injured, they halt the dredging operation, document the incident, and contact the proper authorities, including the USACE district, NMFS, and a wildlife rehabilitation facility. The observers submit daily reports to USACE, and the information is eventually entered into the USACE national sea turtle database.

The NMFS sets strict limits for how many sea turtles can be "taken" during dredging procedures each year. If that limit is reached, dredging operations must cease. For the past 20 years, the New York District has been very successful in protecting sea turtles, with just one possible sea turtle mortality documented. USACE, New York District, has worked with the NMFS to develop dredging methods and equipment that minimize harm to sea turtles. An increased awareness of the plight of endangered sea turtles has also led to the creation of commercial fishing gear that is more "turtle friendly." Because of these protective measures, sea turtle populations are showing signs of recovery and we may see more turtles in our waters. Although past experience shows that USACE activities in the Northeast are unlikely to affect sea turtles, engineers still go out of their way to protect the animals by continuously expanding their knowledge and improving their methods.

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The Extraordinary Career of Lieutenant General Frank A. Camm—

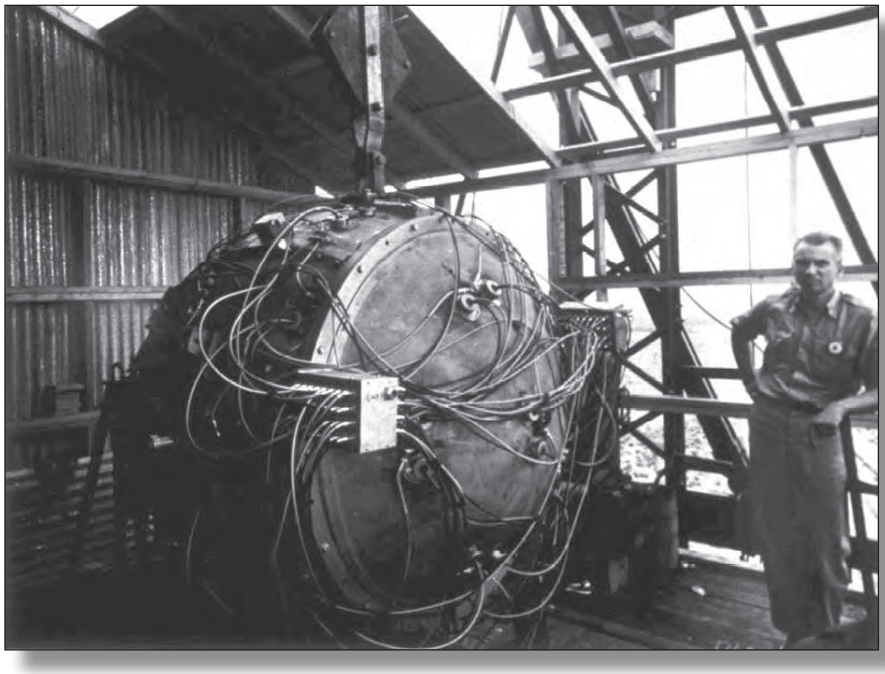
Three Tenets for Building Great Engineers

By Colonel Paul B. Olsen

Brigadier General Bryan G. Watson, former commandant of the U.S. Army Engineer School, is fond of asking audiences to identify the most important piece of a picture puzzle. After allowing himself a smirk at the cautious pause that always ensues, he offers that the most important piece is the box top because every successful project needs a vision. I would like to think that when he was leading and refining our "Building Great Engineers" campaign plan, in his mind's eye he saw the likeness of Lieutenant General Frank A. Camm as among the greatest engineers on that "box top."

I had the honor of meeting Lieutenant General Camm and his wife Arlene during the Chief of Engineer's 2008 holiday reception. In short order, I recognized that this humble officer's career was nothing short of remarkable. During World War II, he fought in an engineer company as infantry during the Battle of Huertgen Forest and the Battle of the Bulge and led the first unit to cross the Rhine River with all its equipment—an accomplishment of which he was singularly proud.[1] Following the war, he led a nuclear weapons assembly team at Sandia Base, New Mexico, since the civilian engineers of the Manhattan Project had returned to industry and academia.[2] During the Korean War, Lieutenant General Camm commanded the 2d Engineer Battalion. He returned to combat again during the Vietnam War, where he served as the project manager for the "McNamara Line," an effort to create an extensive system of sophisticated electronic sensors along the demilitarized zone separating North and South Vietnam. Lieutenant General Camm also commanded the 521st Engineer Group and the South Pacific Division of the U.S. Army Corps of Engineers. Mixed within these commands, he gained advanced degrees and held strategic planning and policy positions for the Department of the Army and the Office of the Secretary of Defense.

Following a military career that culminated with service as the deputy commanding general of the U.S. Army Training and Doctrine Command at Fort Monroe, Virginia, Lieutenant General Camm held a series of federal positions of



Norris Bradbury stands next to a partially assembled atomic bomb atop a test tower. LTG Camm worked for Bradbury as a Sandia Pioneer, 1946–1950.

even greater strategic responsibility, including senior aide to the director of the Central Intelligence Agency (CIA); associate director for plans and preparedness for the Federal Emergency Management Agency; and director of military applications for the Atomic Energy Commission. Upon retirement in 1981, he led pro bono projects, including the Herbert Hall Alumni Center at the U.S. Military Academy and The Fairfax, a retirement community in Alexandria, Virginia, for military officers and their families.

Because I live near The Fairfax, I would see Lieutenant General Camm at the local supermarket, gas station, and other nearby stores. We struck up a friendship and enjoyed discussing Army engineering challenges—past, present, and future. I was personally and professionally saddened to read of his recent passing in the *Washington Post*.[3] I have reflected on his extraordinary career because I believe it contains three foundational tenets for building great engineers.



LTG Camm's C Company, 303d Engineer Battalion, constructed this footbridge across the Sieg River in 1945.

Leadership Opportunities

Providing early leadership opportunities is clearly the first tenet. Because Lieutenant General Camm was a decorated combat leader of three wars, I will not relate how combat experiences helped to forge him into one of our Nation's greatest military engineers; regimental historians and his own memoirs do him far more justice than my pen ever could. Rather, I will argue that his Advanced Civil Schooling (ACS)—coupled with his master-apprentice opportunities—provided the less visible, but critical, foundation for his successful career.

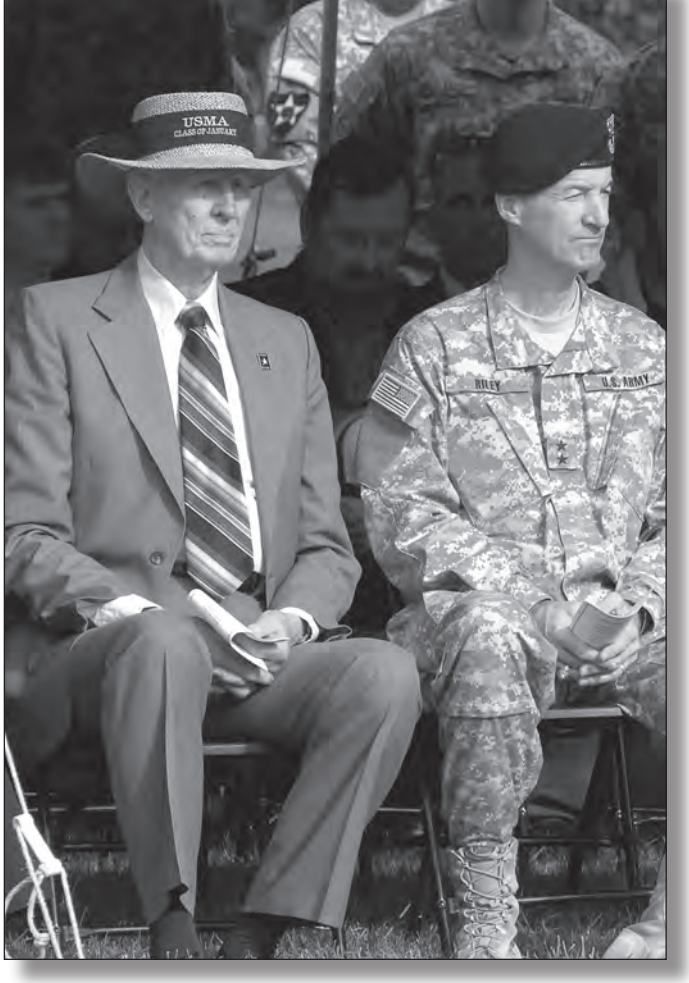
Lieutenant General Camm's academic accomplishments were impressive. In addition to graduating from the U.S. Military Academy, the U.S Army Command and General Staff College, and the National War College, he earned master's degrees in civil engineering from Harvard University and international relations from George Washington University. As his dossier suggests, those graduate degrees were critical enablers for future assignments.

Funded Graduate School

In order to build great engineers today for tomorrow's strategic assignments, the second foundational tenet is to make ACS the norm—not the exception—for senior company grade and junior field grade officers. We need not wait for the future to reap the dividends of ACS because skilled engineer leaders, capable of thinking on their feet, are essential during today's simultaneous offensive, defensive, and stability operations. It is often said that a military trains for certainty and educates for uncertainty.[4] Many recent battlefield and disaster relief successes attributed to our engineers are not merely a result of institutional training, but are a direct result of the insight that comes with advanced academic study.

Critics argue that ACS requires an enormous investment of time; they hold a solid position, but this is nothing new. Just as it did during Lieutenant General Camm's early years, today's Army forges new leaders from the fires of combat and contingency operations. Despite operational demands, the Army provided Lieutenant General Camm with the ACS opportunities he would need to succeed in future strategic assignments. The argument for ACS is stronger because the education it provides aids critical thinking and seeds an individual's mental agility, allowing the individual's service to transcend military engineering and complement other aspects of national power.

"But in his view, there [were] limits," according to Dr. Frank Camm Jr., the general's son. According to Dr. Camm, "The Army wanted to send him back to school for a Ph.D. in nuclear engineering so that he could return and teach at West Point. He declined, saying he had joined the Army to be a Soldier, not a teacher." I think Lieutenant General Camm truly believed in the merits of advanced education, but did not want to be pigeonholed as an instructor. I often sense that there is still some stigma attached to the pursuit of advanced degrees by officers even in today's technologically adaptive Army.



Lieutenant General Camm and Major General Don T. Riley at the 2010 C Company, 249th Engineer Battalion, activation ceremony.

I was disappointed during a recent briefing by our engineer branch chief to hear of his difficulties filling our regiment's authorized ACS slots for graduate schooling. I hope this trend reverses because arming leaders in such fields as engineering, economics, and international relations would greatly improve counterinsurgency operations by ensuring that leaders understand the sociopolitical needs of indigenous populations.

Master-Apprentice Assignments

As presented in tenet one, engineers learn to be leaders at lower echelons. However, engineers learn to be critical thinkers from leaders at higher echelons. Thus, the third foundational tenet for building great engineers is to ensure that young leaders serve in high-echelon supporting positions. In doing so, the leaders would experience what the trades call the *master-apprentice relationship*, which results from working directly with a master of the trade. This dynamic could be put in place as part of engineer career progression. However, during the first 10 or so years of service, most engineers prefer to serve in lower echelon assignments—that is to say, to stay as close as possible to Sappers. While I have often heard this is a great personal assignment strategy, I have not observed that it is the case with many senior engineer leaders at the general officer and senior executive service levels.

Consider again the career of Lieutenant General Camm. Following World War II, he left his wartime command to assume duties as one of the Sandia Pioneers[5] (formerly the Manhattan Project), where he undoubtedly learned a thing or two about engineering from the leading nuclear engineers and physicists of the time. He then returned to command a battalion in Korea, followed by a Pentagon assignment writing war plans. He returned to command an engineer group, followed by a senior policy position at the Office of the Secretary of Defense. After this tour, he commanded an engineer division. This pattern repeated until his military retirement as the deputy commander of the U.S. Army Training and Doctrine Command.

If Lieutenant General Camm's career were plotted with *Time* along the x-axis and *Echelon* along the y-axis, the pattern may be best described as an elevating sine wave. One can observe a similar career pattern with CIA Director David H. Petraeus. When General Petraeus was not serving as low as operationally possible, he was on the staff of a "master" such as General John R. Galvin, General Gordon R. Sullivan, or General John M. Keane in an "apprentice" role. These master-apprentice opportunities groomed him well to serve as the CIA director.

The sine wave career pattern of General Petraeus and Lieutenant General Camm suggests that these officers refined their leadership skills through a hands-on approach by interacting with Soldiers at lower echelons and garnered intellectual skills through ACS and a master-apprentice approach by working directly for senior leaders at higher echelons. The Engineer Regiment could help build great engineer leaders, ensuring that as many as possible are provided a master-apprentice assignment opportunity within the first 10 years of service. These master-apprentice opportunities need not be formal. In his memoirs, Lieutenant General Camm reflected on one example that provides a model which may apply for the Engineer Captains Career Course:

> *In April 1951, Major General Patrick Tansey pulled me from my class to be his officer aide-de-camp during a visit to the Far East and Alaska on behalf of the new Chief of Engineers, Major General [Samuel D.] Sturgis [Jr.]. Tied to Washington for congressional hearings in the spring of 1952, General Sturgis could not make the usual visit to overseas engineer units upon becoming Chief. Therefore, he asked his fellow engineer and good friend, General Tansey, who was about to retire from a logistics job, to go in his stead. Unable to obtain an officer aide in the Office of the Chief of Engineers, General Tansey declared that a student in the Engineer Advanced Course would learn more going with him than he would in class.*[6]

The adoption of the master-apprentice strategy will require a realignment of our culture. It has been my experience that most rank-and-file officers view the positions of aide-de-camp, executive officer, and speechwriter to a general officer or senior executive as undesirable.[7] This is unfortunate, because an engineer leader in these positions becomes

exposed to wicked problems and must internalize the complex actions of his or her senior leader and understand how these actions affect the total force. Lieutenant General Camm's memoirs illustrate this point. Recalling one such conversation between Major General Tansey and Major General Arthur G. Trudeau, then commanding general of the 25th Division fighting in Korea, he wrote, "Oh! How I wished for a tape recorder on which to retain this friendly and erudite discussion between two highly intelligent warriors!"[8]

The deliberate assignments of junior leaders to at least one high-echelon, or master-apprentice, assignment early in their careers will provide opportunities for invaluable engagement experiences such as those given to General Petraeus, Lieutenant General Camm, and other great leaders. It will also help dispel some of the cultural myths and false stigma surrounding these assignments and make them more attractive to future leaders as developmental assignments.

Changes Underway

I believe that these three developmental tenets may help the Engineer Regiment build great engineers: leadership opportunities; funded graduate school; and upper-echelon, master-apprentice assignments. Our regimental leaders have made many of these same observations, and positive changes are currently underway, from professional certification of Army engineer officers[9] to the recent implementation of Green Pages℠, a professional Army engineering social networking site similar to LinkedIn®. However, the onus of this effort will always reside with the individual, for the most powerful tool any engineer carries is not his weapon, but his mind. All of these concepts were captured by Lieutenant General Thomas G. Bostick at the 2012 Black Engineer of the Year Awards Conference when he said, "[developing engineers] takes a significant amount of energy and people and time and money, but mostly it takes people with ingenuity and creativity and a willingness to chase their dreams, [to] chase their passion, and to help solve very difficult problems."[10]

I last saw Lieutenant General Camm during the 2010 activation ceremony of C Company, 249th Engineer Battalion. The unit fought heroically during the Battle of the Bulge in World War II, losing its commander in the fight. I felt that Lieutenant General Camm's presence at the ceremony would add that measure of history to the ceremony that is so precious to our Regiment. But rather than relating stories of his time at the Bulge, the old engineer directed probing electrical engineering questions to the prime power production specialists and smiled with humility as he listened to their responses. His whole life, he remained intellectually humble and academically curious. I do not believe one finds these traits often these days, but they both seem commonplace among the great engineers with whom I have served. Lieutenant General Camm's leadership, legacy, and vision live, while his spirit imbues our Regiment, now and forever.

Author's note: Lieutenant General Camm passed away peacefully on 17 January 2012 at The Fairfax with Arlene, his beloved wife of 64 years, at his side. Funeral services were held on 8 May 2012 at The Old Chapel, Fort Myer, Virginia, followed by interment at Arlington National Cemetery with full military honors.

Endnotes:

[1]Frank A. Camm, Lieutenant General (Retired), personal conversation with author, winter 2008.

[2]"The Personal Memoirs of Frank A. Camm," <*http://www.62vgd.de/78th/Frank_Camm/*>, accessed on 24 February 2012.

[3]"Frank A. Camm, Army Lieutenant General," *Washington Post*, 6 February 2012, <*http://www.washingtonpost.com/local/obituaries/frank-a-camm-army-lieutenant-general/2012/02/06/gIQAvjfquQ_story.html*>, accessed on 24 February 2012.

[4]"U.S. Army Command and General Staff College Principles," <*http://usacac.army.mil/cac2/cgsc/principles.asp*>, accessed on 24 February 2012.

[5]James L. Abrahamson, "The Sandia Pioneers," *American Diplomacy*, July 2002, <*http://www.unc.edu/depts/diplomat/archives_roll/2002_07-09/abrahamson_sandia/abrahamson_sandia.html*>, accessed on 24 February 2012.

[6]"The Personal Memoirs of Frank A. Camm."

[7]Many readers may agree that this concept is well-captured in the comic strip "Doctrine Man," Thom Shanker, "Masked Military Man Is Superhero for Troops," *The New York Times*, 18 November 2010, <*http://www.nytimes.com/2010/11/19/us/19pentagon.html*>, accessed on 24 February 2012.

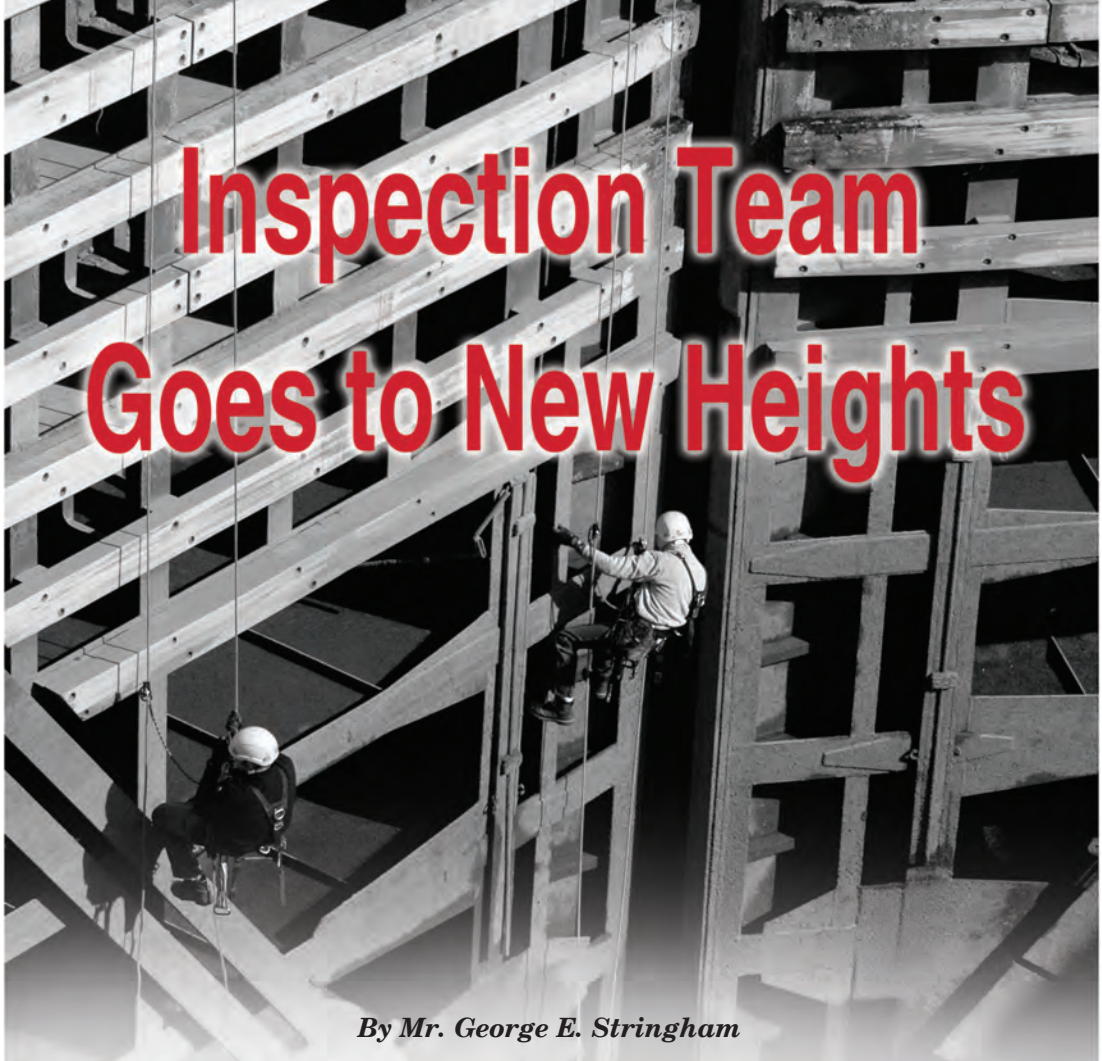
[8]"The Personal Memoirs of Frank A. Camm."

[9]Kelcey R. Shaw, "Professional Certification of Army Engineer Officers," *Engineer*, September–December 2011, <*http://www.wood.army.mil/engrmag/PDFs%20for%20Sept-Dec%2011/Shaw.pdf*>, accessed on 24 February 2012.

[10]Rob McIlvane, "Army Mentors Students on Track for Engineer Careers," *Army News Service*, 19 February 2012, <*http://www.army.mil/article/74157/Army_mentors_students_on_track/_to_engineer_careers/*>, accessed on 27 February 2012.

Colonel Olsen commands the U.S. Army Corps of Engineers, Norfolk District. He is a registered engineer in the Commonwealth of Virginia and holds master's degrees in civil engineering, business management, and national security studies. He previously commanded the 249th Engineer Battalion and was the commandant of the U.S. Army Prime Power School.





Inspection Team Goes to New Heights

By Mr. George E. Stringham

As U.S. infrastructure gets older, structural materials deteriorate due to weather, loads, and damage through use. The ability to perform critical and detailed inspections of structures has become a high priority; and the U.S. Army Corps of Engineers (USACE), St. Louis District, has a structural inspection team that does this in an unusual manner—via ropes. The St. Louis District has a large group of USACE structural engineers who are trained in rope access techniques to inspect hydraulic steel structures and bridges. Typical hydraulic steel structures in the St. Louis District are tainter, miter, and lift gates; culvert valves; and bulkheads.

In the past, it was difficult or impossible for structural engineers to inspect some portions of large steel or concrete structures because they could not get to the areas that required inspection. To get a floating plant or a crane to move inspectors to the required inspection positions on the structures was prohibitive because of the cost and was sometimes impossible to achieve. Eight years ago, two USACE structural engineers, both avid mountain climbers and accomplished structural steel designers, suggested that rope access techniques could provide safe access to inspect large steel structures. Since then, six more structural engineers from the St. Louis District have achieved their certification, bringing the total to eight personnel who are qualified to perform rope access inspections. There are only a few USACE districts that have engineers certified to conduct these types of inspections.

The structural inspection team performs rope access, rather than using more traditional methods like scaffolding, cradles, or equipment (scissor lifts, cherry pickers) for three primary reasons: it is safe, versatile, and economical.

First and foremost, it's safe. A two-rope system is used, with one rope serving as the working line to support the worker and the other rope acting as a safety line to provide complete independent redundancy. This is similar to the way climbers ascend the steep rock faces of mountains, except they use a single line.

The method is versatile, allowing the inspector the freedom and mobility to move around more easily than other methods. Regulations require inspectors to get "up close and personal" with structures. The rope access technique allows them to get close enough to look at critical areas closely, take pictures, and perform other inspection tasks they wouldn't otherwise be able to do.

The rope system is also economical because it can be installed and dismantled quickly. This allows inspection teams to move from one portion of the job to the next more quickly than using other methods. By using the rope access technique, inspectors also minimize many of the mobilization and setup costs associated with the other methods.



A structural engineer and certified rope access technician from the St. Louis District prepares to inspect the top chords of the railroad truss at the Holston Army Ammunition Plant in Tennessee.

The team has not used their expertise to benefit the St. Louis District alone, though. They've also performed inspections for a four-span railroad bridge at the Holston Army Ammunition Plant in Kingsport, Tennessee; at tainter gates on dams in the Kansas City District; and at tainter gates on Missouri River dams for the Omaha District.

After the record-setting floods on the Missouri River in 2011 and given the elevated pool levels that the dams withstood, the Northwestern Division and Omaha District of USACE were eager to have the six dams on the main stem of the river inspected as soon as possible. The St. Louis District rope access team was called on to perform this task, which primarily encompassed 95 gate structures at the six dams. The timeline to complete the work was tight, so they reached out to certified rope access technicians of the Philadelphia and New England Districts. Engineers from the St. Louis and Philadelphia Districts inspected the Garrison and Fort Randall Dams together. This established continuity between the two teams, making sure that they were addressing the same issues and noting discrepancies or concerns in a similar manner. The teams split up the remaining work, with the St. Louis District taking the Big Bend and Oahe Dams and the Philadelphia District taking the Gavins Point and Fort Peck Dams. A certified inspector from the New England District also assisted at Fort Peck.

To the relief of the Northwestern Division and Omaha District, no major deficiencies were discovered on those main stem dams. The quick collection of data was critical, said a spokesman for the Northwestern Division. The floods were a record event and USACE needed to find out as soon as possible how the dams performed and how they would perform during the next flood season.



Technicians inspect one of four tainter gates on the Clarence Cannon Dam at Mark Twain Lake in Missouri.

The St. Louis District team has expanded in the following significant areas:

- Types of structures inspected.
- Composition of the team.
- Variety of customers served.
- Use of partnering concepts with other rope access-trained districts.

The team's willingness to share the knowledge of this type of inspection, coupled with the willingness and planning to inspect new and larger types of structures, reflects the regional and national stature of this effort.

Mr. Stringham is a public affairs specialist with USACE, St. Louis District.



Project Management in Afghanistan

By Captain Kathryn A. Werback

Have you ever wondered why the burn pit was located right next to the ammunition and fuel points? Or why the chow hall stood next to the wastewater storage area? When Soldiers arrive at their deployment site and settle in, there is little thought about how their living and working conditions came to be. The 243d Engineer Detachment (Construction Management Team [CMT]), 18th Engineer Brigade, is deeply involved in meeting the facility requirements of Soldiers, from identifying the basic living needs to providing quality assurance during construction. The detachment, based in Heidelberg, Germany, is currently deployed to Forward Operating Base Sharana, Afghanistan, with its organic parent unit, the 18th Engineer Brigade (Task Force Sword). The decisionmaking and project management processes are imperative in achieving the facility requirements.

For any new construction, such as a combat outpost or rebuild site where enemy action has rendered the old construction unusable, the requesting unit identifies the need for construction. Initial builds that are meant for short-term use may receive wooden tent decks for billeting, while sites meant for long-term use might receive hardstand billeting and work areas. Once the need is identified, an engineer work request is submitted to the higher headquarters. To facilitate quick processing of the work request, it should list specifics such as the number of Soldiers supported and the size, purpose, and location of the structure. Simply identifying a need for a "B-Hut" or a "SEA hut" is insufficient. These are simply types of buildings, with no specific size indicated.

After the work request is approved by the division engineer, it is sent to the engineer brigade, which publishes an order tasking the 243d Engineer Detachment (CMT) to provide program management and project overview and assigns an engineer unit to perform the construction.

As program managers, the 243d conducts mission analysis on the specific mission. Although we use the military decisionmaking process, the factors we are concerned with are slightly different. We work with the mayor's cell at the site of the proposed construction to understand the current and future composition of personnel and the specific operational requirements at the site. The calculations for billeting and other structural requirements are based on construction and base camp development standards in the U.S. Army Central Command "Sand Book" to ensure that the minimum military requirement is met. The minimum military requirement is a standard which ensures that construction capacity is maximized for the greatest number of personnel instead

"Being able to provide the most complete site layout with accompanying construction directives to the engineer unit sets the construction mission up for success."

of overbuilding one site while giving another site less than effective support. The Sand Book provides standards for living conditions based on the number of personnel at the site, such as the square footage of open-bay space that each person is entitled to and the size of the recreational facility that a site should have. Sand Book standards also enable the detachment to produce standard drawing sets.

After the project manager identifies the Sand Book requirement for the project, the requesting unit is responsible for getting the project funding approved through the joint facilities utilization board. This board can contract materials for troop labor to construct, contract construction of the entire project, or contract partial construction through local national contractors. If necessary, this is the point at which the requesting unit submits a land acquisition request. The land acquisition request should be approved before construction starts, although time does not always allow this.

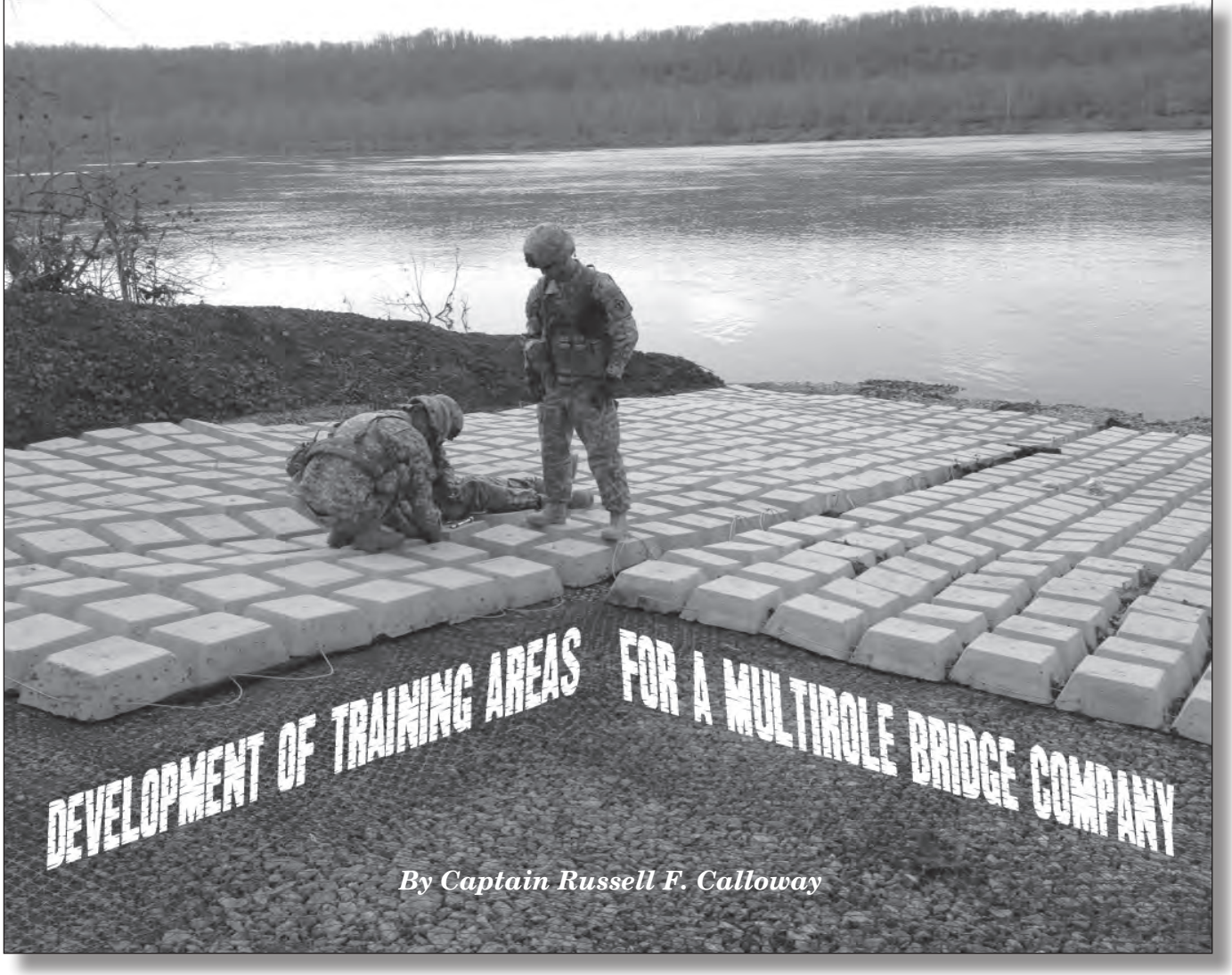
While the project is being funded, the project manager works with surveyors, designers, and technical master planners to understand and maximize the available space. Surveyors survey the current buildings to describe the current site layout, to include buildings and topography. The new build is plotted on this layout to ensure that everything fits and that the necessary standoff distances have been established. Once a site layout has been created, the project manager works with the requesting unit or the customer to ensure that all needs are being met. It is beneficial during this time for the project manager to conduct a site reconnaissance to fully understand the available working area. An additional benefit to this is the opportunity to meet the customer and discuss specific needs and issues.

The project manager also works with entities such as the appropriate prime power detachment and the Logistics Civilian Augmentation Program. At the start of the project, prime power engineers conduct an electrical load assessment of the current power supplies. They can identify additional power requirements and create plans to contract the installation of new power grids for large construction. If the construction site is contracted for operations and maintenance through the Logistics Civil Augmentation Program, the contracted agency needs to be involved in the process early to perform inspections during construction so that the buildings can be added to the density list upon completion. Once the construction is added to the density list, it is the responsibility of the contracted agency to maintain it.

(continued on page 41)



An inspector from the CMT discusses design execution with the noncommissioned officer in charge of the site.



DEVELOPMENT OF TRAINING AREAS FOR A MULTIROLE BRIDGE COMPANY

By Captain Russell F. Calloway

In Field Manual 7-0, *Training for Full Spectrum Operations*, General Martin E. Dempsey stated, "Training has to be credible, relevant, and rigorous to make the scrimmage as hard as the game."[1] To make this a reality, units must have access to training areas that support their mission-essential task list to prepare for real-world missions. Many Army units face this challenge due to relocations caused by base realignment and closure actions and the buildup of brigade combat teams, which has overwhelmed limited training resources. Other units face the challenge because of special requirements associated with their mission-essential task list.

Facing Challenges

The 502d Multirole Bridge Company (MRBC) is one of five MRBCs in the Regular Army. The unit relocated from Hanau, Germany, to Fort Knox, Kentucky, in 2008. Following the move, the unit deployed to Afghanistan to support Operation Enduring Freedom. The 502d MRBC was the first bridging company in theater and established the theater bridging infrastructure by conducting multiple bridging and rafting operations across Afghanistan. Following its redeployment in 2010, the unit reestablished its extensive training program, focusing on maintaining individual and collective gap-crossing training proficiencies.

MRBCs are responsible for wet and dry gap crossings and have the equipment to complete these tasks, including dry support and improved ribbon bridges and bridge erection boats. The bridge crewmembers of an MRBC are responsible for the construction and dismantling of fixed bridges, which are semipermanent structures that provide lines of communication for units on the ground. The MRBC must be proficient on fixed bridges such as the Mabey-Johnson®, Acrow®, medium girder, and Bailey bridges. Fort Leonard Wood, Missouri, is currently the only installation able to support training on all mission-essential tasks of an MRBC, which include installing, anchoring, and inspecting float and fixed bridges.

Identifying Needs

When the 502d MRBC returned from Afghanistan, it became essential to establish training locations at Fort Knox. To meet this requirement, the 19th Engineer Battalion began coordinating with the Fort Knox Directorates of Public Works and Plans, Training, Mobilization, and Security and the post range division to develop wet and dry gap training sites. The search for training locations at Fort Knox came at an ideal time since the U.S. Army Armor School had begun moving from the installation to Fort Benning, Georgia, leaving numerous areas available.



Dry support bridge

Identifying a Wet Gap Training Site

The search for a wet gap training site identified an old boat slip (known as Pilcher's Landing) along the Ohio River. None of the organizations on Fort Knox had used the site for decades, and the slip would require a large amount of work to make it a sustainable training location. Fortunately, the 19th Engineer Battalion also has the 15th Engineer Company (Horizontal) and the 72d Survey and Design Detachment. The battalion recognized that the construction of a new boat slip was an opportunity for high-quality, multifunctional training and a chance to develop a training area specifically designed to fit the needs of the 502d MRBC. The site would include an area large enough for combat bridge transporters to maneuver and a slip that could sustain constant abuse from the loading and unloading of bridge erection boats and the launching of improved ribbon bridge bays. The design chosen included the use of ArmorFlex® mats and geotextiles, demonstrating the desire of the 19th Engineer Battalion and Fort Knox to create a sustainable training area. Construction began in August 2011 with the approval of the U.S. Army Corps of Engineers, Louisville District.

Identifying a Dry Gap Training Site

The Fort Knox range division also recommended a location for dry gap operations training. The site was originally part of an armor crewman training area. It required a significant amount of work before it would meet the commander's intent, which included constructing a site that could handle the deployment of dry support bridges of various lengths and heights. The 19th Engineer battalion construction management and reconnaissance sections worked with the range division to develop a design that would meet this intent. The design would also be able to handle other fixed bridges, such as the medium girder and Bailey bridges. The result of the plan was a site valued at more than $400,000 and capable of deploying four dry support bridges simultaneously. Construction by contractors began in January 2012.

The 19th Engineer Battalion, working with agencies on Fort Knox, has established world-class bridge training areas for Regular Army and Reserve Component MRBCs. The training areas will help bridging companies prepare for future missions. The 19th Engineer Battalion is now better prepared to complete assigned missions due to the efforts it took to design, build, and coordinate the development of bridging training facilities on Fort Knox.

Reference:

[1]Field Manual 7-0, *Training for Full Spectrum Operations*, 12 December 2008.

Captain Calloway graduated from the U.S. Military Academy at West Point in 2008 with a bachelor's degree in civil engineering. He was the executive officer of the 502d MRBC and is now attending the Engineer Captains Career Course at Fort Leonard Wood.

Capacity Builders and Developers:

A Case for Theater-Enabling Engagement Engineers in Security Cooperation Operations

By Colonel Bruce A. Estok

Beyond the traditional World War II era functions of combat and general construction engineering supporting friendly forces described in the venerable tome *Builders and Fighters*,[1] today's U.S. Army engineers also must build capacity and foster development in other nations during war and peace. Army engineers can contribute significantly to the achievement of national security and foreign policy goals in the preconflict permissive environment of theater campaign plan (TCP) Phase 0 through foundational engagement activities such as security cooperation, partner capacity-building, and humanitarian assistance—shaping regions to prevent conflict and promote U.S. interests without force.

To more broadly employ engineer forces requires the Army to eliminate an undocumented theater army (TA) mission command gap among existing echelons-above-brigade (EAB) combat team engineer headquarters to best support geographic combatant commander and country team national security and foreign policy execution. Specifically, it should designate the EAB theater-enabling engagement engineer (TE3) headquarters responsible for, and empowered to, undertake the full breadth of Army engineer activities consistent with geographic combatant commander and TA TCPs. TE3 headquarters would exercise mission command for Army engineer engagement rather than just serve as force providers. Assigned active theater engineer brigades in U.S. Army Pacific and U.S. Army Europe and a newly forming active brigade in U.S. Army Central, coupled with aligned reserve theater engineer commands (TECs) supporting U.S. Army South and U.S. Army Africa, meet the mark.[2]

Geographic combatant commanders focus on normal and routine military and various interagency activities in Phase 0 to shape perceptions, influence behavior, and deter conflict.[3] Within the peacetime military engagement operational theme, Army engineers assist in shaping the security environment, maintaining presence, and fostering military-to-military cooperation.[4] Key programmatic activities include exercise-related construction and forces for Joint Chiefs of Staff exercises, construction under humanitarian assistance, humanitarian civic assistance, civic action teams, global peace operations initiative authorities, and unit exchanges under the defense and military contacts program. Operations among all of these program areas routinely entail a 1- to 2-year, joint event life cycle at a level of complexity and detail best managed by a dedicated headquarters with planning and operational capabilities.[5] Presently, engineer headquarters are involved with, but not fully responsible for, engineer engagement. With an ability to tangibly deliver, as measured by the lifespan of a structure and the activities it enables when compared to more fleeting engagements, engineers should be among the first units that the Army dedicates to this role.

Current Situation

Assessing current doctrine and forces reveals an undocumented Army engineer mission command deficit for TCP operations. EAB engineer headquarters are either missing at the TA level, or they are subordinate to the theater sustainment command (TSC). Their primary focus is internal and on missions assigned by higher headquarters. Their secondary focus is on the TCP and the support of external units. In either case, the deputy chief of staff, engineering (DCSENG), as the TA engineer coordinator, is the special staff element responsible for planning across multiple operational themes, arriving at force employment concepts and synchronizing the overall effort.[6] Programming, planning, and coordinating engagement events to employ engineer units in support of the TCP typically requires considerable effort by DCSENG staffs, whether or not it is a specified mission-essential task.[7] DCSENG staffs, however, are not resourced at the level for programmatic oversight and project planning for the number of events maximizing TCP engagement.

The EAB engineer command headquarters suitable for a TE3 role are the engineer brigade and the TEC. In fact, capacity-building is among five unified land operations mission-essential tasks for both organizations, with the TEC emphasizing planning and the brigade emphasizing execution.[8] TECs possess the capability, but lack sufficient depth to support all TA headquarters peacetime, military engagements. While designed to command engineers at the EAB level across the spectrum of conflict, the Army's two TECs (in the Reserve Component) do not directly align with any

"Army engineers can contribute significantly . . . through foundational engagement activities such as security cooperation, partner capacity-building, and humanitarian assistance—shaping regions to prevent conflict and promote U.S. interests without force."

TA headquarters, do not have the capacity to support all TAs, and lack forward presence.[9]

Regular Army engineer brigades are well postured to provide TE3 support, particularly when assigned to a specific theater, as in the Pacific and Europe. Achieving this entails charging them with theater-wide engineer engagement missions. Army engineer and operations doctrine allows the streamlining of the engineer brigade reporting chain directly to the TA, but the TSC could serve as a suitable intermediate headquarters between the TA and the proposed TE3 brigade. A brigade-resourced technical plug similar to the premodular, five-person assistant division engineer cell (with communication among the brigade, DCSENG, and TSC) and the passing of the engineer engagement mandate from the TA through the TSC could posture this arrangement for success. It is also consistent with joint doctrine, which considers engineering a core logistic capability and creates vertical alignment with the geographic combatant commander joint staff logistics directorate, where logistics, engineering, and security assistance are nested.

Challenges

Designating TE3s for each TA Phase 0 TCP entails a total Army approach acceptable in light of current and future force structure, management, and generation considerations. Making a decision on TE3 in 2012 yields a glide slope toward the earliest implementation in 2015. Peacetime engagement missions can be developed and validated in the Joint Capability Requirements Manager System and then sourced through Global Force Management.

Aligning the TECs for theater engagement enables the recently formed U.S. Army Africa and resource-challenged U.S. Army South. Each 244-person TEC can provide regionally focused planning support from among its full-time staff and Reserve Component training days to one TA's peacetime engagement requirements, while also exercising training and readiness oversight over subordinate units and sustaining its own readiness for global contingencies. TEC responsibility for U.S. Army Africa and U.S. Army South is consistent with the emerging vision at U.S. Army Forces Command and the Office of the Chief of Army Reserve.[10] Technical support for program and project management details can be provided to the TEC headquarters by subordinate forward engineer support teams–main and forward engineer support teams–augmenting or by U.S. Army National Guard construction management sections, depending on the training needs of the units and Army force generation cycles.

Additional challenges to employing the TECs and subordinate U.S. Army Reserve and National Guard brigades include the need to rework the State Partnership Program between the U.S. Army National Guard and partner nations and possible objections by the U.S. Army Reserve Command to aligning TECs with specific TA areas of responsibility. Doctrinally, the informal nature of an aligned relationship affords TECs the flexibility to balance regionally focused theater engagement activities with global responsibility inherent in their core mission to operate as the senior engineer headquarters in a theater of war.[11]

The risk of TECs being less ready for worldwide deployment is mitigated by committed Regular Army brigades in theaters where TECs are not resident. Preserving TECs solely for worldwide wartime theater employment is inefficient and inconsistent with the Quadrennial Defense Review priority objective to preserve the all-volunteer force by seamlessly integrating an operationally effective reserve.[12, 13] When contingencies require a TEC, the assigned TE3 brigade develops the situation beyond Phase 0 and then transitions responsibility to the TEC as its early entry, functional, and mission command modules arrive in the time-phased force deployment flow.[14] The TEC's associated redirection from the prevent-and-deter activities of ongoing military engagement to pressing operational needs is a basic, force-planning tenet.[15, 16, 17]

Three of the soon-to-be six Regular Army engineer brigades should be redesignated as "theater enabling" units. Also appropriate is formally tasking the brigades in Hawaii and Germany with the TE3 mission through their parent TSC and fully empowering them for the missions that they already partially perform. A third engineer brigade should be reassigned as the U.S. Army Central TE3 unit and stationed at Fort Jackson, South Carolina, near Shaw Air Force Base. Adding a new, nine-person construction management section and restationing a 14-person survey and design section from among the 12 in the active inventory is also required.

The TE3 construct employs Regular Army engineer brigades consistent with their doctrinal and experiential

capabilities in deployed operations. These headquarters can lead two to five subordinate units using up to two scalable deployable command posts. Their span of control is extremely relevant since the established Army force generation process, maturing brigade combat teams engineer battalion initiative, and an emerging U.S. Army Forces Command proposed modular force mission command plan adaptation may lead to more TCP engagement rotation missions by engineer units lacking a parent engineer brigade headquarters. The resident TE3 brigade, with a reduced training readiness authority role and an increased latent span of control owing to potential conversion of subordinate units into brigade engineer battalions, would be pivotal in setting conditions for the success of rotating units and maintaining consistent standards across the theater. Furthermore, TE3 formations also provide an operational node where U.S. Army Corps of Engineers field force engineering assets can plug in to add technical depth.

Implementation

The maturing engineer engagement program of U.S. Army Pacific illustrates linkages with national security and highlights a need for dedicated engineer theater-level headquarters leadership. The 412th TEC's 2010 transformation and recall of its Hawaii detachment stymied the U.S. Army Pacific's desire for an aligned engineer command concurrent with the 130th Engineer Brigade's return from combat deployment to its Pacific theater assignment in 2010. While not designated a TE3 unit, the brigade assumed a major TCP role by transitioning a series of engagements from planning to execution, providing the TSC with a small engineer plug to ensure engineer expertise on the staff and facilitate communication among the TSC, brigade, and TA DCSENG and operations directorates.

Ten company equivalent, bilateral or multilateral events in 2011 emerged from 2 years of collaboration between the U.S. Army Pacific DCSENG, the command's security cooperation division, and U.S. Pacific Command program managers working with U.S. diplomatic missions. Partner nations vary from those with mutual defense treaties to others where the United States is vying with China for influence. A biannual field exercise with India—increasingly important geopolitically—added a combat engineer platoon to a troop list that included the largest Stryker deployment outside Iraq and Afghanistan during its last iteration.[18] Two-thirds of the events were performed by the brigade units, and the balance by U.S. Army Reserve units. Events included school construction, a 6-month civic assistance deployment, and the brigade's command post serving as a combined, joint, civil-military operations task force headquarters leading coalition construction, training, medical, and veterinary missions.

While geographic combatant commander and TA staffs historically performed the majority of engagement program development with brigades responsible for execution, the robust modular brigade headquarters and an Army-wide "flattening" trajectory that will emanate from the new "Army operating concept" and related idea of "mission command" portend the TE3 era. Specifically, the Army operating concept includes "sustained engagement focused on developing partner capacity" as a TA level mission, while "mission command" relies on the "role of the commander in building teams with joint, interagency, intergovernmental, and multinational partners" and emphasizes "pass[ing] resources and responsibility 'to the edge' " while recognizing "that the best understanding comes from the bottom up."[19] The engineer brigade headquarters in a TE3 role represents one way to make the new doctrine operational and potentially achieve significant results at the low end of the spectrum of conflict.

Conclusion

Empowered TE3 headquarters have a role to play on the 21st century defense, diplomacy, and development team in shaping operations that prevent and deter conflict. As part of the TA, they provide an ability to build partner nation capacity by performing traditional construction tasks in support of, and in partnership with, local, regional, and national entities to support geographic combatant command national security and country team foreign policy execution. Despite suitable organizations, a heretofore undocumented gap exists since they lack a TA level mandate to exercise mission command for Army engineer engagement, rather than just provide forces to it. Making organization, mission, and resource decisions in 2012 puts Army EAB combat team engineers on a glide path to contribute substantially starting in 2015, as engineer combat operational tempo declines and civilian power growth portended in the Quadrennial Diplomacy and Defense Review increases. Ultimately, the proposed TE3 construct bridges an undocumented—but important—engineer mission command gap, mobilizing latent modular control capability and capacity for theater-wide peacetime engagement.

(This article was composed by Lieutenant Colonel Mark A. Winkler and Mr. James R. Rowan, from the U.S. Army Engineer School, Fort Leonard Wood, Missouri. It is an abridged version of the original. For the full text, go to <*https://www.us.army.mil/suite/doc/36715702*>.)

Endnotes:

[1]Barry W. Fowle, *Builders and Fighters: U.S. Army Engineers in World War II*, University Press of the Pacific, 28 March 2005.

[2]Patrick M. Cronin and Brian M. Burton, "Beyond Borders: Developing Comprehensive National Security Policies to Address Complex Regional Challenges," Center for a New American Security, Washington D.C., December 1991, p. 10.

[3]While beyond the scope of this endeavor, the reality of time-phased force deployments dictates that TE3s will be the de facto theater-enabling engagement engineer headquarters beyond Phase 0 in many contingency response cases.

[4]Joint Publication 3-0, *Joint Operations*, 17 September 2006.

[5]Army Tactics, Techniques, and Procedures (ATTP) 3-34.23, *Engineer Operations–Echelons Above Brigade Combat Team*, 8 July 2010, para. 4-14.

[6]Chairman of the Joint Chiefs of Staff, "The Joint Training System: A Primer for Senior Leaders," Chairman of the Joint Chiefs of Staff Guide 3501, 31 July 2008.

[7]Julian Smith, "Deputy Chief of Staff, Engineering Mission-Essential Task List Review Back Brief," U.S. Army Pacific, Fort Shafter, Hawaii, 1 October 2010.

[8]ATTP 3-34.23, paras. 3-4, 4-2.

[9]Bob Kaiser, "Engineer Directorate Mission-Essential Tasks," U.S. Army Africa, Heidelberg, Germany, July 2010.

[10]U.S. Army Maneuver Support Center, "Approved Engineer [Theater Engineer Command] Brigade Full Spectrum Operations Mission-Essential Task List AMRB 10-01 MANSCEN/ENGR-001 and -0022," Fort Leonard Wood, Missouri, 2010.

[11]ATTP 3-34.23, paras. 3-4, 4-11.

[12]Michael Hoffman, "Officials Seek to Keep 'Operational Reserve,' " *Army Times*, 17 November 2010.

[13]Field Manual 3-0, *Operations*, 27 February 2008.

[14]U.S. Army Maneuver Support Center, 2010.

[15]U.S. Department of Defense, "Quadrennial Defense Review Report," p. 53.

[16]ATTP 3-34.23, para. A-2.

[17]U.S. Department of Defense, p. 44.

[18]Embassy of the United States, New Delhi-India, "U.S.–Indian Army Exercise Yudh Abhyas Underway," 19 October 2009, *<http://newdelhi.usembassy.gov/pr101909.html>*, accessed 31 May 2012.

[19]U.S. Army Training and Doctrine Command Pamphlet 525-3-1, *The Army Operating Concept: 2016-2028*, 19 August 2010, pp. 14, 21.

Colonel Estok commands the U.S. Army Corps of Engineers, Seattle District after a year as a National Security Fellow at Harvard University's Kennedy School of Government where the full version of this article was written. He served as engineer plans and operations chief for U.S. Army Pacific from 2008 to 2010 and as commander and district engineer for the U.S. Army Corps of Engineers, Albuquerque District from 2006 to 2008. He holds a bachelor's degree in aeronautical engineering from the U.S. Military Academy and a master's degree in civil engineering from the Georgia Institute of Technology.



("Project Management," continued from page 35)

During the site layout approval process with the customer, the site design goes through a vetting process. The specific project determines who needs to vet it, but some of the more common venues are antiterrorism/force protection, communications, explosives safety (for ammunition handling or supply points), fire, and aviation (for airfields and helipads). This addresses topics ranging from the maximum occupancy of a bunker to the standoff distances required for air assets. Once the site plan has been vetted and the drawings for structures approved, the project manager will produce a construction directive for the constructing unit. This details the construction requirements and identifies who is responsible for each specific task. For example, the emplacement of concertina wire is not an engineer task; it is a basic Soldier task that can be completed by personnel other than engineers. Included in the construction directive are details for the construction, site layout, construction drawings, and inspection checklists. When published, the construction directive is distributed to the engineer brigade, the requesting unit (which is usually the customer), and any other units in the task force that might have an interest in the construction. This allows the person in charge on the ground to know exactly what is required to complete the mission.

During mission execution, the 243d conducts milestone quality assurance inspections that augment the inspections completed by the constructing unit to ensure that the project is being built to life, health, and safety standards. After every site visit and reconnaissance, the 243d Engineer Detachment (CMT) produces a memorandum that details what was seen, what was fixed, and any outstanding issues. This is also disseminated to the lowest level to ensure that lessons are learned, outstanding issues are addressed by the appropriate personnel, and all personnel involved receive project updates.

Upon completion, the customer signs a completion memorandum to inform all parties that the construction has been completed. The customers can then move in and begin operations, while the construction engineers move on to the next project.

The 243d Engineer Detachment (CMT) completed several significant missions at locations such as Combat Outposts Dashe Towp and Sayed Abad. The greatest lesson learned from those experiences was to attain open communication with the customer and mission-related experts at the earliest possible time. Being able to provide the most complete site layout with accompanying construction directives to the engineer unit sets the construction mission up for success.

Captain Werback is the 605th Engineer Detachment (CMT) public works officer, currently deployed in support of Operation Enduring Freedom. She is a graduate of the Engineer Captains Career Course and holds a bachelor's degree in civil engineering from the University of California, Davis and a master's degree in engineering management from Missouri University of Science and Technology at Rolla.

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 engineer manual 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:** To be revised 2d quarter, fiscal year (FY) 13.
ATP 3-34.22	*Engineer Operations–Brigade Combat Team and Below*	Feb 09	This revision is pending Headquarters, Department of the Army, approval of the brigade engineer battalion. **Status:** To be published 2d quarter, FY 13.
ATP 3-34.23 (ATTP 3-34.23)	*Engineer Operations–Echelons Above Brigade Combat Team*	Jul 10	This manual will undergo review and update as required. **Status**: To be published 3d quarter, FY 13.
ATP 3-90.61 (FM 3-90.61)	*Brigade Special Troops Battalion*	Dec 06	This manual will undergo review and update as required. **Status:** To be published 3d quarter, FY 13.
Combat Engineering			
ATP 3-34.20 (FM 3-34.210)	*Explosive Hazard Operations*	Mar 07	This will be a multi-Service, full revision of Field Manual (FM) 3-34.210, *Explosive Hazards Operations*. **Status:** To be published 3d quarter, FY 13.
ATP 3-37.34 (FM 5-103)	*Survivability Operations*	Jun 85	This will be a full revision of FM 5-103, *Survivability*. **Status:** To be published 4th quarter, FY 12.
ATP 3-90.4 (ATTP 3-90.4) (FM 3-34.2) (FM 3-90.12)	*Combined Arms Mobility Operations*	Aug 11	This was a full revision, to include the renaming and renumbering of FM 3-34.2, *Combined Arms Breaching Operations*, and FM 3-90.12, *Combined Arms Gap Crossing*. Changes in the force structure have required adjustment of the tactics, techniques, and procedures (TTP) associated with breaching and clearance operations. It redefines mobility operations and includes six primary mobility tasks. **Status:** Anticipate a change document to convert the manual from Army Tactics, Techniques, and Procedures (ATTP) 3-90.4 to Army Techniques Publication (ATP) 3-90.4 1st quarter, FY 13.
ATP 3-90.8 (FM 3-90) (FM 5-102) (FM 90-7)	*Combined Arms Countermobility Operations*	Mar 85	This will be a full revision that includes the consolidation of FM 3-90, *Tactics;* FM 5-102, *Countermobility*; and FM 90-7, *Combined Arms Obstacle Integration*. This will be a multi-Service manual that 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:** To be published 3d quarter, FY 13.

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)
Combat Engineering (continued)			
ATP 3-90.37 (FM 3-90.119) (FMI 3-34.119)	*Combined Arms Improvised Explosive Device Defeat Operations*	Sep 07	This will be a multi-Service, full revision of FM 3-90.119, *Combined Arms Improvised Explosive Device Defeat Operations*, and Field Manual Interim (FMI) 3-34.119, *Improvised Explosive Device Defeat*. **Status:** To be published 2d quarter, FY 14.
General Engineering			
ATP 3-34.5 (FM 3-100.4)	*Environmental Considerations*	Feb 10	This manual will undergo review and update as required. **Status:** To be published 3d quarter, FY 13.
ATP 3-34.40 (FM 3-34.400)	*General Engineering*	Dec 08	This manual will undergo review and update as required. **Status:** To be published 4th quarter, FY 13.
ATP 3-34.45 (FM 3-34.480)	*Power Generation/ Distribution*	Apr 07	This manual will undergo review, renaming from FM 3-34.480, *Engineer Prime Power Operations*, and update as required. **Status:** To be published 3d quarter, FY 14.
ATP 3-34.81 (FM 3-34.170)	*Engineer Reconnaissance*	Mar 08	This manual will undergo review and update as required. **Status:** To be published 2d quarter, FY 14.
ATP 3-37.10	*Base Camps*	New	This will be a multi-Service manual. It will be targeted for all branches (not an engineer manual solely for the use of engineers). It is a compilation of TTP found in doctrine, lessons learned, and reference material that provides an integrated systematic approach to base camps. **Status:** To be published 1st quarter, FY13.
Geospatial Engineering			
ATP 3-34.80 (FM 3-34.230)	*Geospatial Engineering*	Mar 08	This manual will undergo review and update as required. **Status:** To be published 1st 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 June 2012.

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.

Engineer Doctrine Update

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

In order to keep the field informed of the most current Doctrine 2015 updates, the commanding general of the U.S. Army Combined Arms Center has established a Web site <*http://usacac.army.mil/cac2/Doctrine2015/index.asp*> that contains the most recent developments.

There is also a milWiki standing operating procedure (SOP) portal <*https://www.milsuite.mil/wiki/Portal:Standard_Operating_Procedures*> that provides a baseline for developing new SOPs. There are tabs for a tactical SOP and SOP examples. Soldiers are encouraged to use this site to download or upload unclassified SOP examples.

To clarify commonly misused terms, note the following:

Scheme of engineer support (formerly known as SOEO), is found in ATTP 5-0.1, *Commander and Staff Officer Guide*, dated 14 September 2011. This manual addresses the "how to" details for the exercise of mission command. It is holistic and lays out more than staff responsibilities, the military decisionmaking process, troop leading procedures, running estimates, plans, and orders. The Engineer Annex format and instructions are in Annex G and contain applicable appendices.

The phrase *battlespace owner* was rescinded in Army and joint doctrine 4 years ago since it was rarely used correctly. It became a synonym for *area of operations*, but was meant to be a much broader term. One cannot "own" battlespace, but can "own" an area of operations.

Intelligence, surveillance, and reconnaissance (ISR) became synonymous with the technical methods of collection and caused many to overlook the importance of ground reconnaissance and human collection methods. Now, specific collection means (reconnaissance, surveillance, human intelligence, and so on) will be spelled out.

Information engagement. The correct term is *inform and influence activities (IIA)*.

Information operations (IO). The Army supports joint IO, but does not recognize IO as a type of Army operation. Similar to ISR, the components of IO should be addressed as separate types of operations with different proponents and different staff sections responsible for them.

Kinetic/nonkinetic. The terms have been rescinded and replaced by *lethal* and *nonlethal*. Nonlethal effects can be kinetic, and nonkinetic effects can be lethal.

Command and control. This term has been rescinded and replaced with *mission command*.

Full spectrum operations. This term has been replaced with *unified land operations* as the Army operational concept or by *decisive action* for combining defense, offense, stability, or defense support of civil authorities.

For questions about doctrinal information, contact the Engineer Doctrine Branch at <*usarmy.leonardwood.mscoe.mbx.cdidcodddengdoc@mail.mil*>.

U.S. Army Engineer School History Office. This office maintains a multimedia collection of historical materials on the Engineer School and the Engineer Regiment. The collection—which consists of more than 17,000 manuals, 21,000 photos, 800 videotapes, and three million pages of documents on engineer history—includes information on units, equipment, organizations, and operations that can support mission requirements and analysis efforts. The office is seeking to expand its holdings on engineer units and requests that copies of photographs, videos, or documents that are generated by units be sent to: History Office, U.S. Army Engineer School, 320 MANSCEN Loop, Suite 043, Fort Leonard Wood, Missouri 65473, or to <*leon.usaeshistory@conus.army.mil*>. The History Office also maintains a milBook page at <*https://www.kc.army.mil/book/groups/engineer-historian*> and a Web page at <*http://www.wood.army.mil/wood_cms/usaes/2332.shtml*>.

Any questions should be directed to Dr. David Ulbrich at (573) 563-6365.

Linking the Three Legs of the Stool



By Major Robert R. Phillipson

"No matter what the environment, if expectations are not clear, unambiguous, explicit, and inflexible, standards will always slip. At best it can be described as human nature. Over time, people begin to accept a slowly declining status quo as they slip into the comfort zone."

—Chef Gordon Ramsay[1]

The Army does not do a good job of monitoring or controlling officer development. This has resulted in a desynchronization of institutional education, unit training, and self-development. The tool that should link these three legs of the stool—Department of the Army (DA) Form 67-9, *Officer Evaluation Report (OER)*[2]—does not possess the depth or structure to describe professional development. The regulations governing professional development have no teeth and so remain neglected. Raters and senior raters are not required to elaborate on how they developed the rated officer; the OER merely states the rated officer's achievements. With downsizing on the horizon and debate on talent retention in full swing, I offer a possible method for developing solid performers and identifying those who are not. If we break down a rating into its key components, the rating process is not limited to an annual, concise verbal statement that sums up the rated officer. That may be the core outcome, but the peripheral tasks leading up to the rating are just as crucial.

We can assess the performance and potential of the rated officer and the rater as well. In doing so, we can leverage the existing regulations, thereby further preparing junior officers for their upcoming schools and creating more quantifiable standards for promotion and course attendance. Principally, this solution seeks to link the first two branch-specific Officer Education System courses, ensuring that only qualified officers attend captains career courses and ascend to the rank of captain through the development and enforcement of the Officer Foundation Standards (OFS). The selection for these will require an OER that can illuminate professional development (guided and self-directed) and that accurately feeds the system. The way ahead is the creation of a "digital age" OER that tracks a rated officer's professional development and illuminates the manner in which raters and senior raters helped develop their charges.

Soldiers must acquire the habits of lifelong learners. Army training, education, and experience domains require a holistic integration and clearly defined paths to achieve outcomes at each stage of a Soldier's career.

—Training and Doctrine Command (TRADOC) Pamphlet (Pam) 525-8-2[3]

As a small group leader at the Engineer Captains Career Course (ECCC), I can poll students to discover how many have formal, professional development plans established and enforced by their rating chains. The result is usually less than 25 percent. As a result, few have any background in additional language training, despite current opportunities. Even fewer are well-read or able to write effectively.

"Having rated officers see their raters as more than just signature blocks will promote excellence. Rated officers may feel a higher degree of loyalty to the organization if raters are intimately involved in their future."

While they may be courageous warriors, they lack intellectually broadening experience commensurate with their rank. They may have deployed, but they are not required to show competence in the English language. For the most part, the officers have not been required to perform any unit level tasks other than prepare for deployment, deploy, or return from deployment.

This description is the polar opposite of where professional officers need to be to support Joint Force 2020. In a 3 April 2012 mission command white paper from General Martin E. Dempsey, chairman of the Joint Chiefs of Staff[4] he states that trust is a key component of mission command. If there is a general sentiment that young officers lack many professional aspects, how can commanders trust those officers to the extent that General Dempsey expects them to? TRADOC Task Order IN120182[5] contains an example of how far the Army has displaced the responsibility for the professional development that would enable the trust that commanders need. This order proposes to expand developmental responsibilities in captains career courses. It seeks courses of action to "address gaps in midgrade officer capabilities" by lengthening captains career courses or by adding distributed learning portions to them. Aside from expanding the institutional training as one of the recommended courses of action, the document also discusses the return of the old Combined Arms and Services Staff School.

The perceived inability of officers to communicate effectively is one important gap in midgrade officer capabilities. I would argue that any unit that is disappointed by a captain who cannot communicate effectively was let down by the officer's previous unit, which failed for 3 years to teach and coach that captain on communication skills. Why should the Army create a completely new bureaucracy just to displace responsibility? The distrust of the abilities of young officers likely stems from a distrust in their development. From an institutional standpoint, the lack of development has made it increasingly difficult to teach many of the lessons required in the captains career course because so much time is spent teaching lessons that units and raters should have required.

The U.S. Army Learning Concept for 2015[6] describes the core competencies required of the 21st century Soldier—

- Character and accountability.
- Comprehensive fitness.
- Adaptability and initiative.
- Lifelong learner (includes digital literacy).
- Teamwork and collaboration.
- Communication and engagement (oral, written, negotiation).
- Critical thinking and problem solving.
- Cultural and joint, interagency, intergovernmental, and multinational competence.
- Tactical and technical competence (unified land operations-capable).[7]

The current OER only captures these competencies if the rater or senior rater is willing or able to articulate them to a selection board. Further, the promotion of a first lieutenant to captain using the "fully qualified" definition does not require the first lieutenant to complete any of the training or academic requirements that would support these competencies.[8] Block d of Part IV on the form asks the rater if the rated officer completed developmental tasks and if those tasks were recorded on DA Form 67-9-1a, *Developmental Support Form*.[9] I challenge raters to reflect on that block and identify what tasks they are confirming when they sign their name to the OER. There are required tasks, but since there is no requirement to document anything beyond the rated officer's duty performance, the Officer Education System then bears the sole responsibility for educating and assessing the bulk of administrative and knowledge-based tasks. This is not correct or sustainable. Schooling such as the Engineer Officer Basic Leadership Course (EOBLC) and ECCC teach theory, not administration. Administration is something that junior officers should learn by doing—at their units. By regulation, a large portion of this responsibility is shared with the rating chain of the company grade officer.

Leaders can find a list of position requirements for career advancement in the regulations. However, finding a list of universal tasks that a junior officer must complete is becoming increasingly difficult. DA Pamphlet 350-58, *Leader Development for America's Army*, states that OFS "provide the foundation for progressive and sequential training within the institutional pillar. OFS are linked to leader development through the efforts of school commandants."[10] Properly developed and enforced, the OFS can serve as requirements for promotion and for Officer Education System attendance. The standards bridge the gap between the basic and career

courses. The menu of items required for advancement to captain should be prescriptive and should be in line with the 21st century Soldier competencies. Some of the administrative tasks required for captains to understand include—

- Conducting an inventory.
- Conducting an investigation.
- Reading a book and writing a review.
- Writing an order.
- Briefing an order.
- Planning and supervising a range.

In addition, requiring distance course work and professional reading that reinforce EBOLC learning outcomes could open the door to concepts instructed at the ECCC and serve two purposes: reduce the time spent repeating EBOLC concepts and introduce the officer to thinking from the perspective of the next higher echelon. These OFS should be a direct result of a critical task selection board. At this board, responsibilities are directly assigned to the institution, to the unit, or to self-development. Formalizing responsibility is essential. With no oversight, professional development becomes a barstool with OES institutions as the only leg.

Four things belong to a judge: to hear courteously, to answer wisely, to consider soberly, and to decide impartially.

—Socrates[11]

Part IV of DA Form 67-9 is a series of blocks that express the professionalism of a rated officer through the selection of "yes" or "no" on 23 categories. I would like to see this section substituted with a section that links the Army Career Tracker (ACT) and some aspects of the Noncommissioned Officer Evaluation Report. The ACT is now online and is in use by the Noncommissioned Officer Corps. It has much more potential than what some may currently envision. Because it recognizes the user's common access card certificates, ACT can pull personal data from multiple digital data sources. It allows the user to select raters and mentors who have informal overwatch of the user's professional development. I propose formalizing the interfaces and linking them to the OER form.

I would add a dashboard to the ACT that reflects the performance of the rated officer and includes a window that also portrays the officer's administrative prowess. The ACT can track professional development and, in the case of this discussion, the OFS. Based on the rated officer's certificates, which include specialty and rank, a menu displays the training or education required to advance to the next grade or course. This menu displays a red-amber-green status until requirements are satisfied and the officer's promotion pushes them past those requirements. The block would ask if the officer has completed the OFS. The answer would be directly tied to promotion and/or captains career course attendance. The same window would allow senior raters to track the ability of raters to develop their subordinates. For example, if senior raters saw that most of the officers they rate were in "red" status after being in the unit for more than a year, they could determine if the raters were unable to develop the rated officers or if the rated officers were simply apathetic.

Another tool that could feed into the ACT and become a block in this section is the Multi-Source Assessment and Feedback (MSAF) tool.[12] Users select a number of superiors, peers, and subordinates who will submit anonymous evaluations of the user. MSAF has the potential to develop an officer more than any other tool I have seen. If we ensure that the correct populations receive MSAF requests, the tool will provide an officer with a perspective that is not easily captured by the rater or senior rater. If the rater then exploits the traits exhibited by the officer and develops the deficiencies identified by the MSAF data, true counseling and professional development can take place. The rater would also be able to make informed recommendations to the senior rater about the rated officer's short-term potential, leadership strengths, and best pairing with a noncommissioned officer counterpart. The OER must quantify how well officers challenge and develop subordinates and interact with peers. Subordinates and peers contribute to this more than the rater.

Having rated officers see their raters as more than just signature blocks will promote excellence. Rated officers may feel a higher degree of loyalty to the organization if raters are intimately involved in their future. On the other hand, if raters only interface with rated officers during the rating season, the amount of honest feedback they can give will be limited. General Omar Bradley reminds us "always to remember that an essential qualification of a good leader is the ability to recognize, select, and train junior leaders."[13]

The timeframe between second lieutenant and captain is a factory whose final product is an ECCC graduate who is ready to serve competently. The culmination of EBOLC, unit training, and ECCC is an agile and adaptive leader who is able to lead tomorrow's Engineer Regiment. For now, the way ahead is straightforward, but will require discussion and commitment to synchronize the different commands. EBOLC and ECCC should be analyzed to find the critical tasks that bridge the two courses, enabling enhanced learning at ECCC. This task list becomes the required professional development for ECCC attendance. To ensure that these tasks are tracked, a digital OER should be linked to the ACT. Finally, TRADOC, in collaboration with U.S. Army Forces Command and U.S. Army Corps of Engineers, must create a menu of virtual courses to sustain or enhance existing knowledge.

The Army is winding down from its current operational tempo and faces a future of budget and force structure cuts. An intellectually honest way to promote and retain talent starts with the basic interactions of the rated with the rater. It continues with identifying, promoting, and using that talent in the best interests of the organization. Without a regulatory structure to require this interaction, it becomes "optional" at a critical time when the best officers must be identified, groomed, and retained.

Endnotes:

[1]Jason Moore, "3 Leadership Lessons from Chef Gordon Ramsay," 25 January 2010, <*http://newrulesofwork.net/blog/2010/01/leadership-lessons-from-chef-gordon-ramsay/*>, accessed 08 March 2012.

[2]DA Form 67-9, *Officer Evaluation Report*, October 2011.

[3]TRADOC Pam 525-8-2, *The U.S. Army Learning Concept for 2015*, 20 January 2011, p. 14.

[4]Joint Chiefs of Staff, "Mission Command White Paper," 3 April 2012.

[5]TRADOC Task Order IN120182, 18 January 2012.

[6]TRADOC Pam 525-8-2, p. 18.

[7]"Unified land operations" substituted for the rescinded term "full spectrum operations."

[8]Army Regulation 600-8-29, *Officer Promotions*, 25 February 2005, para. 1-36a(2).

[9]DA Form 67-9-1a. *Developmental Support Form*, March 2006.

[10]DA Pam 350-58, *Leader Development for America's Army*, 13 October 1994, p. 17.

[11]IWISE, Wisdom On-Demand, <*http://www.iwise.com/ASHiz*>, accessed on 8 March 2012.

[12]Multi-Source Assessment and Feedback, <*http://msaf.army.mil/LeadOn.aspx*>, accessed on 8 March 2012.

[13]DA Pam 600-65, *Leadership Statements and Quotes*, 1 November 1985, p. 3.

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U.S. ARMY GEOSPATIAL CENTER PROVIDES FREE MODELING AND SIMULATION TERRAIN DATABASES

From U.S. Army Geospatial Center

The U.S. Army Geospatial Center, Alexandria, Virginia, is now distributing modeling and simulation (M&S) terrain databases along with operational geospatial products on its Common Map Background Web site with the goal of providing a single repository for all geospatial products. There are 161 free, synthetic terrain databases that support live, virtual, and constructive simulations used in training, testing, and experimentation hosted on the site. The M&S terrain databases are available in multiple formats suitable for use in Joint Semi-Automated Forces, One Semi-Automated Forces, Virtual Battle Space 2, and other Department of Defense simulations. Available terrain databases include selected U.S. Army training areas and areas of recent Army deployments.

The terrain databases are available at <*https://agcwfs.agc.army.mil/cmb_online/Default.aspx*> for free downloading to Department of Defense users with common access cards. The graphical interface of the Common Map Background program is easy to use, and users can select M&S terrain databases using a simple map interface. The site also provides contact information to request new M&S terrain databases. Other M&S terrain database producers who wish to use the Common Map Background program to redistribute their databases should contact the U.S. Army Geospatial Center Geospatial Acquisition Support Directorate using the contact information on the Web site.

The U.S. Army Geospatial Center coordinates, integrates, and synchronizes geospatial information requirements and standards across the Army, develops and fields geospatial enterprise-enabled systems and capabilities to the Department of Defense, and provides direct geospatial support and products to warfighters. To learn more about the center, visit <*www.agc.army.mil*>.

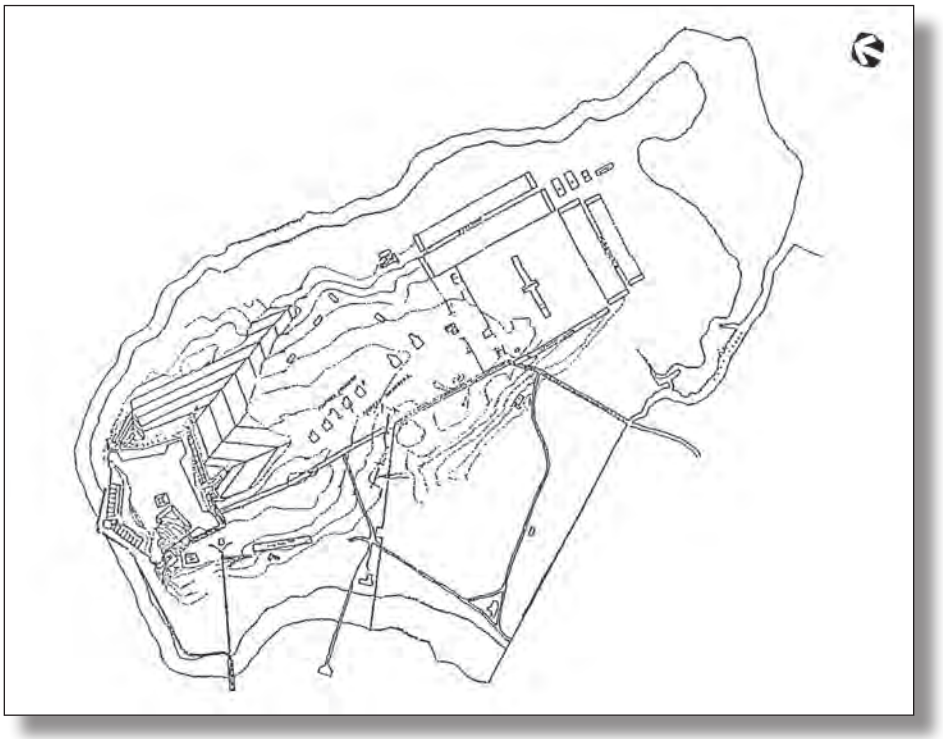
The Engineer School of Application at Willets Point 1866-1901

By Mr. Gustav J. Person

In 1866, the U.S. Military Academy at West Point, New York, was reorganized. The Corps of Engineers lost control of the facility; and the first nonengineer, Colonel Thomas Pitcher, 44th U.S. Infantry, was appointed as superintendent. Additionally, the Engineer Depot was moved from West Point to a new home at Willets Point, New York. When the Army of the Potomac was mustered out of service, the question arose of what to do with the U.S. Engineer Battalion, which had rendered distinguished service during the Civil War. At Willets Point, temporary buildings at the wartime Grant General Hospital were deemed suitable to provide immediate accommodations for the troops and their equipment and instruments. An independent engineer post was created under the direct control of the Chief of Engineers. Company A of the battalion was initially dispatched back to West Point and, later, to Willets Point in September 1867. Companies B, C, and D were stationed at Willets Point; while Company E was sent to Jefferson Barracks, Missouri, which would provide storage space for the accumulation of engineer property remaining after the discharge of the western armies. Subsequently, Company D was transferred in August 1867 to Yerba Buena Island in California and Company E was restationed at West Point.[1, 2]

The installation at Willets Point occupied a 136-acre site in northern Queens County, on a peninsula jutting into Long Island Sound. The fortification, originally called the Fort at Willets Point, had been established in 1857 as a major component of the defense system of New York Harbor. The property had been originally purchased in 1829 by Charles Willets. The Willets family sold the property to the federal government in 1857 for $200,000. Its surviving—although uncompleted—fortification displayed the features of the last phase of the "Third System" of coastal fortifications, an important period of American military construction. The surviving fortification at the north end of the peninsula was planned as the counterpoint to Fort Schuyler on Throggs Neck in Bronx County to guard the Long Island Sound entrance to the East River and New York Harbor. Although the fort, begun in 1862, was never completed because of advances in weaponry during the Civil War, the post retained its importance as the site of advanced training for Army engineers and research in military technology and medicine. During the early years of the Civil War, a number of volunteer regiments—including the 15th New York Engineers—organized and mustered into federal service there. The 15th New York Engineers later served alongside the U.S. Engineer Battalion in the Army of the Potomac.[3]

In October 1866, Brigadier General Andrew A. Humphreys, the newly appointed Chief of Engineers, inspected



An 1866 map of the Engineer School of Application at Willets Point



Major Henry L. Abbot in a photograph taken while serving as the second commandant of the Engineer School of Application

Willets Point with a view toward stationing engineer troops and storing their equipment there. He appointed Major James C. Duane as commander of the post. However, Major Duane was in poor health so the principal work to be done was assigned to Major Henry L. Abbot. As a young lieutenant, he had assisted Brigadier General Humphreys during the extensive hydrographic study of the Mississippi River delta in the 1850s. While Major Duane functioned as post commander, Major Abbot took command of the U.S. Engineer Battalion on 1 June 1866, a position he maintained until October 1886. Under his supervision, the engineering skills of the troops were soon called upon to renovate the buildings, maintain their equipment, and inaugurate the Engineer School of Application.[4]

Humphreys began operating the school in the summer of 1867. Its purpose was to continue the training of West Point graduates who had been commissioned into the Corps of Engineers. The initial program was for 2 years, but it later expanded as a postgraduate course that included the writing and reading of professional papers on current engineering practices as well as classroom work. The school would also become the laboratory for the Corps where, with the assistance of officers and enlisted men, "any investigation requiring experimental research could be done." All of the student-officers served with the companies of engineer troops at Willets Point.[5]

Founded by Major Duane and Major Abbot, the Essayons Club was composed of officers on the post and had a wide honorary membership. It met weekly on Monday evenings during the winter to discuss scientific subjects. Members prepared reports on a variety of technical and military topics and presented them for discussion. The scientific researches of the Essayons Club, plus a summer training program, constituted the Engineer School of Application in its embryonic stage. A total of 50 papers were presented and printed on the battalion press during the lifetime of the club. Major Duane presented the first paper on 28 January 1868 on experiments to develop the best pattern of ponton bridge train for the Army. As the technical work of the school increased, meetings were held at longer intervals and the club finally suspended operations in 1882.[6, 7]

The location of the post was well-suited for the practical instruction of the officers and troops in siege operations (including landmining, bridge construction, and military surveys of the surrounding country) to serve as a basis for the study of defensive lines. For example, during the winter of 1873, each officer was required to submit "a detailed project for a line of field works extending from Willets Point to Jamaica Bay, designed for the defense of Brooklyn against an anticipated sudden invasion by a well-equipped army of 100,000 men, landing on the east end of Long Island." These projects were later forwarded to the Chief of Engineers for his review.[8]

A school for enlisted men was ordered by an Act of Congress on 28 July 1866. Attendance was voluntary and proved highly successful. Three departments were organized to teach mathematics, English grammar, French, Spanish, history, law, geography, and penmanship.[9]

Although the engineers at Willets Point concentrated on scientific research and learning engineering skills, troops were often dispatched on military duties outside Willets Point. Rifle shooting was an important part of their training. To counteract the notion that engineers could not fight, Major Abbot saw to it that much attention was given to marksmanship; and engineer troops often entered and won shooting matches held around the country. In 1869, one of the engineer Soldiers won the Army's silver medal for shooting. In the first 13 years of the annual military shooting competitions at Creedmoor, a few miles south of Willets Point, engineers won 117 prizes. And in 1882, Sergeant Charles Barrett of Company B, competing in the prestigious, biannual Army and Navy Journal matches at Fort

"By 1889, because the word 'Application' in the school title was considered redundant, the name was changed to read 'United States Engineer School.' "

Leavenworth, Kansas, won the first-prize gold medal. Major Abbot stated in several of his annual reports that the reputation of the engineers was greatly enhanced by this shooting excellence.[10, 11]

In December 1869, the U.S. Engineer Battalion was ordered with other troops to Brooklyn, New York, to suppress numerous illicit distilleries near the Navy Yard. They performed a similar duty in November 1870. During the Great Railroad Strike of 1877, the battalion proceeded to Baltimore in July to relieve National Guard troops and then transferred to Philadelphia to assist in riot control. The bearing and discipline of the battalion were admirable throughout their service and received the highest commendation from Major General Winfield Scott Hancock, the commanding general of the Army's Division of the East. The battalion formed part of the escorts at the funerals of famous Civil War officers Major General George H. Thomas and Admiral David G. Farragut and held the right of the line at the funeral of Major General George G. Meade, whom it had served in the Army of the Potomac.[12]

In June 1889, the battalion assisted in relief efforts after the Johnstown Flood in Pennsylvania. Ponton boats and bridging equipment were transported to the site by train to erect a 200-foot wagon bridge and another 320-foot bridge to provide supply and vehicular support for relief operations.[13]

The Engineer School of Application functioned unofficially as a graduate school until it was formally recognized by the Army in 1885. In that year, the school was officially recognized by the new Chief of Engineers, Brigadier General John Newton, and Secretary of War Robert T. Lincoln, who had visited the post in July 1884. Secretary Lincoln also immediately authorized the expansion of the U.S. Engineer Battalion from 200 to 450 officers and men. The school was divided into the following five departments:[14]

- **Submarine Mining** concentrated on studies of electricity, internal and foreign systems of defensive torpedo (mine) warfare, and modern explosives. Extensive research into these fields continued throughout the 1870s and 1880s. The enlisted personnel at Willets Point were also instructed in torpedo work. They were taught to load the torpedoes, electrically charge the junction boxes, make joints in the electric cables, and operate the telegraph used to fire the torpedoes.



The Officers Mess Hall and Club at Willets Point, built in 1887, was modeled after the stone library at West Point.

- **Military Engineering** concentrated on operations of armies in the field, seacoast defense, modern siege operations, and modern ordnance.
- **Military Photography** included all methods of map multiplications in the field and the use of the camera. After a long wait, funds were appropriated and a modern photographic laboratory was completed and opened in November 1882.
- **Practical Astronomy** included the best methods and the use of instruments employed in important boundary surveys. The existing facilities were small, and the instruments were obsolete. An adequate set of instruments was loaned temporarily by Professor William H.C. Bartlett from the U.S. Military Academy in 1868. They were replaced in 1879 by a new astronomical outfit and observatory building, constructed almost wholly by the engineer Soldiers. The students undertook a study of the aurora borealis in 1881, and one student discovered a new comet. Major Abbot observed that the discovery of the comet brought much notice to the school and its work.
- **Civil Engineering** undertook practical surveying, river and harbor improvements, and barometric hypsometry, defined as the science of measuring heights with reference to sea level.

The length of the course of study for officers was now set at 2½ years. Examinations were held twice a year for the student-officers during their first, second, and final years. The examinations were carried out by the academic staff and the Board of Visitors. The Board of Engineers for Fortifications in New York, together with such other officers of the Corps of Engineers above the rank of major as were stationed in New York City, constituted the Board of Visitors. The board visited the school at least twice per year to make a thorough and detailed inspection of everything connected with it, submitting a report to the Secretary of War, through the Chief of Engineers.[15, 16, 17]

In the mid-1870s, Dr. Walter Reed served as post surgeon at Willets Point, where he began studies into advances in military medicine. In the following decade, infantry, cavalry and, especially, artillery officers were assigned to Willets Point for training and familiarity with submarine mining.[18, 19]

In 1886, Lieutenant Colonel Abbot completed his long and highly significant tour of duty as commandant of the Engineer School of Application. He had guided the school's destiny and fixed its policies throughout the critical formative period and justly can be called the "Father of the Engineer School" in much the same way that Sylvanus Thayer is regarded as the "Father of the Military Academy." Lieutenant Colonel Abbot was replaced by Lieutenant Colonel Cyrus B. Comstock.[20, 21] By 1889, because the word "Application" in the school title was considered redundant, the name was changed to read "United States Engineer School."[22]

In 1898, the United States went to war with Spain, and the students and faculty were ordered to duty with units preparing to take part in operations. The operation of the school was thus suspended on 4 April. The fortifications which made up a part of the physical plant of the fort were then occupied by artillery units for the duration of the war. Immediately after the end of hostilities, the school reopened at Willets Point until 3 September 1901, when it was officially transferred to Washington Barracks (now Fort McNair) in the District of Columbia.[23]

Endnotes:

[1]Brevet Brigadier General Henry L. Abbot, "Early Days of the Engineer School of Application," *Occasional Papers, Engineer School of Application*, Number 14, 1904, pp. 2–3.

[2]Michael M. Harman, "The Formation of the Engineer School of Application and Its Early History, 1866–1898," master's thesis, George Washington University, Washington, D.C., 1995, pp. 5–6.

[3]Marjorie Pearson, "Fort Totten Historic District Designation Report," New York City Landmarks Preservation Commission, New York, New York, June 1999, pp. 2, 11–14.

[4]Harman, pp. 17–18.

[5]Ibid., pp. 18–19.

[6]David M. Dunne, "The Engineer School—Past and Present," *The Military Engineer*, Vol. XLI, Number 284, November–December 1949.

[7]Abbot, p. 9.

[8]Ibid., pp. 4, 10–11.

[9]Ibid., p. 8.

[10]Harman, pp. 34–35.

[11]Abbot, pp. 28–30.

[12]Ibid., pp. 26–28.

[13]Harman, pp. 62–64.

[14]Abbot, pp. 35–37.

[15]Ibid., pp. 11–14, 17–21, 35–37.

[16]Harman, pp. 30–31.

[17]Department of War, "Annual Report of the Chief of Engineers, United States Army, to the Secretary of War for the Year 1883," 1883.

[18]Pearson, p. 27.

[19]Harman, pp. 30, 60.

[20]Ibid., p. 56.

[21]Dunne, p. 412.

[22]Ibid., p. 66.

[23]Harman, pp. 66–67.

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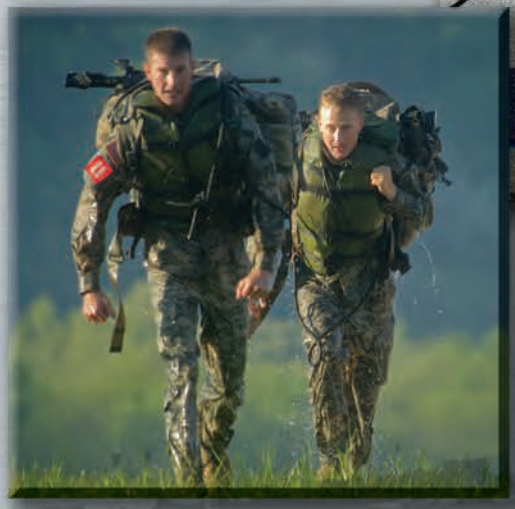












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