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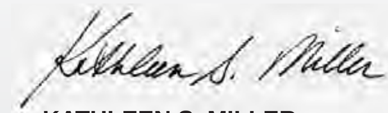

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DEPARTMENTS

FEATURES

Clear the Way

Brigadier General Robert F. Whittle Jr.
97th Commandant, U.S. Army Engineer School

State of the Engineer Regiment

To win the wars of our Nation, the Army must have a regiment that engineers solutions on the battlefield. Our Regiment stands ready to lead the Army to victory.

The most crucial asset of the Engineer Regiment is our Soldiers. Every one of our Soldiers is a leader. Engineer leaders are problem solvers who are able to leverage mathematics, science, ingenuity, and grit to provide freedom of action at every echelon. Engineer Soldiers are given a diverse mission set and a large span of control early in their careers. Those circumstances provide a crucible that makes engineers adapt rapidly and develop critical leadership skills quickly. As a result, engineer leaders are in high demand and are frequently selected to serve not only in engineer jobs, but also in maneuver positions. When confronted with a problem, Army leadership looks for an engineer to solve it.

Across the range of military operations, we assure mobility, enhance protection, enable force protection/expeditionary logistics, and build capacity/develop infrastructure. We are focused on modernizing our force and leveraging technology to increase those capabilities. Our efforts include—

- Reorganizing our sapper companies and mobility augmentation companies into combat engineer companies that have much greater capability.
- Developing a master breacher course.
- Extending the length of One-Station Unit Training (OSUT) for Military Occupational Specialty (MOS) 12B–Combat Engineer and MOS 12C–Bridge Crewmember.
- Moving all combat engineers out of the M113 armored personnel carrier and into the Bradley Fighting Vehicle.
- Converting the M58 mine-clearing line charge (MICLIC), Caterpillar® D7 bulldozer, and other breaching and bridging assets to robotics.
- Fielding the joint assault bridge to replace the M60 armored vehicle-launched bridge (AVLB) chassis with an M1A2 chassis.
- Upgrading our bridging to allow, at a minimum, tracked vehicles with a military load classification of 95 to cross.
- Increasing the number of Active Component multirole bridge companies and establishing forward-positioned bridge sets.
- Developing and fielding the Standoff Activated Volcano Obstacle (SAVO) to provide a much greater countermobility capability to the maneuver commander.
- Developing a next-generation, terrain-shaping capability.
- Leveraging 3-D printing for construction.
- Increasing our geospatial capability.
- Keeping the momentum and reinforcing successes in credentialing and talent management.

As a Regiment, we do a tremendous job of authentically networking with one another and advocating for the development of the capabilities that we need to ensure the Army will win decisively. I am amazed each and every day by the teamwork in the Engineer Regiment.

It has been an honor to serve all of you as the 97th commandant of the U.S. Army Engineer School. Many thanks to the multitude of engineers, leaders, and partners who support our mission. Please join me in welcoming Brigadier General Mark C. Quander as the 98th commandant. I know that he will do a phenomenal job of moving the Engineer Regiment forward.

"Engineer leaders are problem solvers who are able to leverage mathematics, science, ingenuity, and grit to provide freedom of action at every echelon."

Lead the Way

Command Sergeant Major Douglas W. Galick
Regimental Command Sergeant Major

The past few months in the Engineer Regiment have been great. We wrapped up the 2019 Engineer Regimental Week, and it was a tremendous success by all accounts. I would like to thank all of the engineer leaders and Soldiers from across the Army who took the time to come and share the week with us. It was an honor to host Command Sergeant Major Bradley J. Houston, 13th Command Sergeant Major of the U. S. Army Corps of Engineers (USACE), and Lieutenant General Todd T. Semonite, 54th Chief of Engineers, whose presence emphasized the importance of the week. The teamwork and comradery within the Regiment were on full display. The unique ability to cross-talk, share ideas, and solve problems across multiple components keeps us the strongest and most capable organization in the Army.

An enormous amount of effort went into pulling off the series of complicated events during Engineer Week. These events would not have been possible without the hard work and professionalism of the leaders and Soldiers of the 1st Engineer Brigade and 5th Engineer Battalion. These units were tasked to plan, organize, and execute different events throughout Engineer Week—all while continuing their mission of training our engineer Soldiers. I would like to extend my gratitude and appreciation to every single Soldier and civilian who played a part in making the week a success. You truly embody the spirt of "We WILL succeed."

The 13th annual Lieutenant General Robert B. Flowers Best Sapper Competition was one of the biggest highlights of Engineer Week. This year, we had outstanding support. Our crew from the Sapper Leader Course put together a series of grueling events that tested every aspect of a sapper leader. We began the competition with 50 teams. During the 3 days of competition, the competitors covered more than 50 miles in 50 hours, on foot. I watched in admiration as our best sappers from across the Army exhausted themselves and, yet, continually found a way to push forward. The strength and courage that it takes to attempt this challenge are amazing, and I am proud of every sapper who entered the competition. They all represented themselves and their organizations with honor and pride. However, at the end of the competition, there could be only one team that "earned the right." This year, that honor went to Team 17, which consisted of Captain John Baer and First Lieutenant Terence J. Hughes from the 39th Brigade Engineer Battalion, Fort Campbell, Kentucky. Well done, sappers! Congratulations!

Another great event during Engineer Week was the series of senior enlisted breakout sessions. We took advantage of those opportunities to discuss some of the initiatives that we are working on at the U.S. Army Engineer School (USAES). We also conducted a forum to discuss leadership and best practices of the Regiment's most senior and successful enlisted leaders. From a USAES perspective, it was an invaluable opportunity to gather feedback and ideas from the many talented sergeants major in the Regiment. We will refine this concept and continue to include these sessions in future Engineer Weeks.

With Engineer Week behind us for another year, we continue to drive ahead with USAES business and "Bridging the Gap to 2035." We are analyzing the valuable comments and input we collected over Engineer Week. This feedback is priceless, and it assists us in deciding where to focus our efforts and prioritize our energy. Whether it was through spirited debate or simple perspective sharing, the leaders from across the Regiment shared new or previously unrecognized challenges and ideas with us. We will be investigating these challenges even further and fielding solutions across the Regiment for additional refinement. The Engineer Regiment is a professional organization; we continue to learn and strive to better ourselves every single day. Thanks again for making this a great few months—and thanks for what you do to make our Regiment the best in the Army!

"The strength and courage that it takes to attempt this challenge are amazing, and I am proud of every sapper who entered the competition."

Show the Way

Chief Warrant Officer Five Jerome L. Bussey
Regimental Chief Warrant Officer

Greetings from the U.S. Army Engineer School (USAES). We continue to move forward as a team, making subtle changes throughout our journey. Our instructors continue to provide our students with world-class lessons, and the U.S. Army Human Resources Command (HRC) continues to balance the needs of the Army, units, and Soldiers.

Effective 1 June 2019, the creation of personnel/project development skill identifiers for Military Occupational Specialties (MOSs) 120A–Construction Engineering Technician and 125D–Geospatial Engineering Technician has been approved. Our warrant officers are now allowed to have an identifier to indicate what skills, certification, and/or training they possess, providing our commanders with additional information when attempting to select the right talent for the right position.

We tasked nine talented warrant officers from various organizations from the Active Army and Reserve components to conduct a critical-tasks site selection board, 25–29 March 2019, for MOS 120A. They reviewed the total task inventory and job performance data and made recommendations for task approval to the commandant. Through this process, they identified future training and education requirements for successful operation as a construction engineering technician within joint and Army environments. Their recommendations were to—

- Delete two tasks.
- Change 12 tasks.
- Consolidate 41 tasks into 11 tasks.
- Develop 15 new tasks.

The board also recommended changing the name of the MOS to 120A–Construction and Facilities Engineer Technician. Thanks to all members of the board, our training developers, and the USAES Directorate of Training and Leader Development for the hard work throughout this process.

Chief Warrant Officer Three Daniel M. Ruepong has been selected for the Training with Industry (TWI) assignment with Harris Geospatial Solutions, working with the ENVI image analysis software program. Our process of selecting the best candidate for the assignment began by identifying warrant officers who were eligible for a summer move the following year and notifying them of their eligibility. We want to limit the selection to a senior geospatial engineering technician—and one who possesses the right skills, attributes, and character needed to bring back and share what he or she has learned with the rest of the Army. The selection is made by the HRC TWI office, with endorsement by the Regimental Chief Warrant Officer. After completion of this assignment, the Soldier will be assigned to Fort Leonard Wood, Missouri, or the National Geospatial Agency, St. Louis, Missouri, to apply the knowledge gained while working with our civilian partners.

USAES selected and announced the following winners of the Outstanding Engineer Warrant Officer Award:

- Chief Warrant Officer Two William S. Test (Regular Army).
- Chief Warrant Officer Two Veloris A. Marshall IV (U.S. Army Reserve).
- Chief Warrant Officer Two Brandon E. Voss (Army National Guard).

Congratulations to these fine warrant officers. A call for nominations for next year's engineer awards is expected to be announced by 15 October 2019, and the winners will be announced during the next Engineer Week.

We continue to gain ground on assigning warrant officers to the U.S. Army Corps of Engineers (USACE) district offices. Our goal is to have a few warrant officer positions assigned to districts by the middle of next year. This won't be easy because, in some cases, the law must change; however, we continue to move forward with requesting the changes. We are now able to assign a warrant officer in lieu of an officer; however, to do this, we must be at least 100 percent manned. HRC is formulating a plan to make this happen, and we have support from some district commanders.

We are developing a glide path that will allow our warrant officers equal opportunities to be successful and will also aid us in identifying our best talent. We are trying to avoid assigning a warrant officer to the same type of organization in which he or she has already served. We are also limiting assignments to 30 months or less for chief warrant officer ones and chief warrant officer twos. Each type of organization requires different skill sets and brings different challenges for MOS 120As and MOS 125Ds. For our warrant officers to be the subject matter experts at the chief warrant officer three level, we must ensure that they serve in a variety of organizations. This will not require a permanent change of station after 24–30 months, although it will require a change of unit on the installation.

We continue to recruit quality noncommissioned officers (NCOs) to be engineer warrant officers. At the last Active Army Component board, 17 stellar NCOs were selected to be engineer warrant officers. This requires a team effort, and I appreciate the hard work that the entire Engineer Regiment is putting into recruiting the best NCOs to become engineer warrant officers.

By the time this article is published, I will no longer be the Engineer Regimental Chief Warrant Officer. My assignment has ended, and it is time for me to move on to something new. In the last 2 years, we have set our warrant officers and the Engineer Regiment on the path to success. The team here at Fort Leonard Wood, Missouri, and at the HRC has been phenomenal, and we have accomplished a lot together. I have been a warrant officer in the Regiment for more than 20 years, and I can say that there has never been a team with more drive in providing our students with world-class instruction to assist with making the Regiment better. In the process of changing our professional military education, we have changed who we are. This will enable us to be prepared for large-scale ground combat. We have recruited and trained more NCOs to be warrant officers than during any other time; we—

- Developed career tracks for all of our warrant officers to ensure their success.
- Made changes to standards of grades to support our warfighting commanders.
- Gained positions in organizations in which we did not have presence.
- Developed an assignment model and put processes in place for transparency.
- Are changing the MOS 120A–Construction Engineering Technician name to better suit what we do for the Army.
- Have instituted installation senior warrant officer advisors to assist HRC and junior warrant officer development.
- Have encouraged warrant officers to participate in the USAES credentialing program, resulting in more warrant officers earning certifications.

Our engineer warrant officers have a better understanding of what the rest of the Regiment is doing, and engineer Soldiers have a better understanding of the capability of an engineer warrant officer.

I leave this position challenging all warrant officers to know and understand what the rest of the Regiment is doing. If you don't understand bridging, route clearance, and terrain shaping, you are in the wrong regiment. You must challenge yourself to integrate your talent to best serve the Regiment in these three domains. I also challenge every NCO and officer to take the time to learn the full capabilities of an engineer warrant officer.

My thanks goes to Brigadier General Robert F. Whittle and Brigadier General James H. Raymer for giving me the opportunity to serve the Regiment as the 4th Regimental Chief Warrant Officer. Thanks to the USAES team for its hard work and dedication in making the Engineer Regiment the best regiment in the Army. And thanks to all engineer warrant officers and Soldiers for your support.

Essayons!

The 4th Regimental Chief Warrant Officer

By Lieutenant Colonel James P. Cook

Background

In May 2018, the 5th Engineer Battalion was fortunate to participate in the 1st Infantry Division, Armored Brigade Combat Team (ABCT), home station validation exercise, Operation Gauntlet. For that event, an engineer battalion task force, Task Force Fighter, was formed. It consisted of the 5th Engineer Battalion Headquarters and Headquarters Company and Forward Support Company as well as U.S. Army Forces Command (FORSCOM) multirole bridge companies (MRBCs), 50th MRBC, Fort Leonard Wood, Missouri; 74th MRBC, Fort Hood, Texas; 502d MRBC, Fort Knox, Kentucky; and 2225th MRBC, Louisiana Army National Guard.

Lessons Learned

It took the combined effort and accumulated readiness of all four of these MRBCs to build an improved ribbon bridge (IRB) that spanned more than 600 meters across Milford Lake, Kansas. The success of Operation Gauntlet is a credit to the professionalism and hard work of some of the Engineer Regiment's finest Soldiers. However, Task Force Fighter also gained invaluable insights on ways to improve MRBC collective training for future operations. Some of those insights are described in this article.

MRBCs Must Train on Unfamiliar Terrain

Unlike direct-fire range facilities, the number of gap-crossing training areas available to MRBCs on Army installations is extremely limited. Thus, MRBCs spend most of their collective training time building bridges on familiar terrain. It is perfectly normal for Military Occupational Specialty (MOS) 12C–Bridge Crewmembers to spend entire careers training only at the same six to eight locations. To some, this might seem like an advantage because MOS 12C noncommissioned officers quickly gain the knowledge and experience to master building at those sites. The downside, however, is that it is possible for units to become over-rehearsed at their normal training locations. When that happens, section and platoon leaders tend to take shortcuts around their organization's preexisting site-specific standard operating procedures. Over-familiarity with particular training areas may appear to be a unit strength when, in fact, it hampers or even impedes MRBC leader training.

The senior leaders of Task Force Fighter had not trained at the Milford Lake crossing site prior to Operation Gauntlet. This unfamiliarity forced them to rely on their technical skills to formulate tactical plans specific to their assigned tasks and, more importantly, to conduct detailed troop-leading procedures—especially issuing orders and rehearsing—in order to ensure mission accomplishment.

MRBCs Must Train on Gaps That Require the Use of at Least 80 Percent of the Modified Table of Organization and Equipment

MRBCs are huge organizations. With more than 180 Soldiers and 70 vehicles, each MRBC is capable of build-

4th MRBC Soldiers prepare equipment during Operation Gauntlet.

ing, operating, and maintaining slightly more than 200 meters of IRB. The wet-gap crossing sites suitable for training IRB at Fort Hood and Fort Leonard Wood each require less than a third of the organic capacity of an MRBC. Unless MRBC commanders diligently enforce multiple training repetitions for home station crossing events, it is possible for bridge units to declare themselves trained on their mission-essential tasks without employing all of their equipment or providing all of their junior leaders and Soldiers with sufficient on-the-job experience.

The failure to simultaneously employ at least 80 percent of the modified table of organization and equipment capacity of a bridge unit creates conditions for overconfidence and worse—establishing an informal system of tiered readiness within the platoons and company. When it takes only half of the capacity of a platoon to accomplish a typical mission, many Soldiers mentally subdivide the organization into "go-to" personnel and equipment. This effectively risks the creation of hollow units that lack the appropriate depth and experience across the entire formation.

Three MRBCs in ideal states of readiness would have had just enough capacity to close Operation Gauntlet's 600-meter wet gap. In practice, it took the combined readiness of all four assigned MRBCs to accomplish the mission. MRBC leaders found themselves working hard in their tactical assembly areas, preparing every available Soldier and piece of equipment to generate enough combat power to complete the assigned tasks. Bridge components and undertrained junior leaders who may have previously been informally relegated to second-tier status at home station were suddenly recognized as the mission-critical assets they always were.

MRBCs Must Train to Operate and Sustain Bridge Crossings for Extended Periods

A single bridge platoon can often assemble and disassemble a complete bridge within a day. And when time is not extended to allow for the crossing of non-MRBC traffic, small-unit leaders become accustomed to bridging operations that last only a few hours. MRBCs must also train to sustain and maintain a bridge site beyond the typical training of simply assembling and disassembling bridges.

At doctrinal rates, it takes an entire brigade combat team, with seven organic battalions and often two or three more battalions of attachments, multiple days to traverse a single gap, regardless of the length of the bridge. Multi-hour gaps between battalion crossings are normal, resulting in two or more days for a brigade to complete a crossing. During that time, the MRBC is likely to be the only unit available and capable of performing traffic control, engineer regulation of the crossing, and physical maintenance of the bridge. This requires company and platoon leaders to

The 5th Engineer Battalion and 50th MRBC cross Milford Lake.

manage not just the equipment, but also the work and rest cycles of the Soldiers.

Task Force Fighter kept the Operation Gauntlet bridge open for just less than 48 hours. During that time, platoons cycled through a variety of sustainment and maintenance tasks, some of which were almost as labor-intensive as the bridge build itself. In just a couple of hours, it became apparent which organizations were prepared to conduct sustained operations and which ones were not.

MRBCs Must Train to Employ Permanent Anchorage Systems

The atypical size of the Operation Gauntlet bridge gap required a significantly more robust bridge anchorage system than most companies were prepared to emplace and maintain. Even though a supplementary bridge anchorage set is part of the MRBC MTOE, MRBCs rarely train with it. This is a direct result of the small, short-duration bridge builds that MRBCs normally conduct for collective training. In the same way that real combat scenarios force an MRBC to build larger bridges than it typically does at home station, they also tend to require that those bridges be kept open for days or weeks at a time. This means that MRBCs must construct and maintain permanent IRB anchorage systems.

Training on complex anchorage systems not only tests MRBC leader and Soldier skills, but also stresses their ability to procure and appropriately use construction materials. While the supplementary bridge anchorage set includes most of the tools and many of the supplies necessary to construct permanent anchorage, site-specific requirements inevitably demand more material than an MRBC typically has on hand.

Perhaps the riskiest technical aspect of Operation Gauntlet was the bridge anchorage system. It took days of refinement and practice for Task Force Fighter to finalize a viable anchorage plan, and that plan was almost exclusively reliant on the experience of a single senior MOS 12C noncommissioned officer. As a Regiment, engineers owe it to themselves and to the Army to acquire more experience on this critical aspect of IRB employment.

Summary

When maneuver commanders require gap-crossing capability, they appropriately rely on MRBCs to conduct every aspect of their assigned mission-essential task list by employing the full capacity and all of the capabilities inherent to the company. And, as Task Force Fighter learned during Operation Gauntlet, there are some aspects of an MRBC portfolio that are not trained frequently enough or at a sufficient scale. The 5th Engineer Battalion has already begun incorporating these lessons learned into future training plans for MRBCs and recommends the same to the entire Engineer Regiment.

Lieutenant Colonel Cook was the commander of the 5th Engineer Battalion at Fort Leonard Wood, Missouri, from June 2017 to June 2019. He holds a bachelor's degree in civil engineering from the U.S. Military Academy–West Point, New York, and master's degrees in civil engineering from the Missouri University of Science and Technology at Rolla (formerly known as the University of Missouri) and the University of Minnesota, Minneapolis. He is a licensed professional engineer in Missouri.

Operation Border Support

By First Lieutenant Alan D. Koepnick

In late October 2018, Soldiers from the 541st Engineer Company, 19th Engineer Battalion, 20th Engineer Brigade, Fort Knox, Kentucky, deployed to Donna, Texas, in support of Operation Border Support. The objective was simple—assist U.S. Customs and Border Protection (CBP) in reinforcing the U.S.–Mexico border from an approaching migrant caravan by any means necessary. By this time, the number of migrants in the caravan was in the thousands and the caravan was projected to arrive at the border in less than a month. Recognizing the seriousness of the situation, CBP and U.S. Army North devised a plan to reinforce the southern U.S. ports of entry along the Texas, Arizona, and California borders.

Task Organization

The 541st initially fell under Task Force Griffin, which was attached to the 89th Military Police Brigade, Fort Hood, Texas, while conducting missions along the south Texas border. Approximately 3 weeks into the deployment, the 541st was reassigned to reinforce the Calexico, California, border under Task Force East, which was attached to Special-Purpose Marine Air-Ground Task Force 7. The 541st reinforced more than 10 ports of entry along the Texas and California borders.

541st Capabilities and Accomplishments

The 541st is a mechanized sapper company that specializes in obstacle reduction and engagement area development. There were 110 Soldiers assigned to the 541st during the deployment, with 84 enlisted Soldiers, 20 noncommissioned officers (NCOs), and six commissioned

A Soldier builds a culvert denial system in Laredo, Texas.

officers. The company's mission-essential task list included conducting reconnaissance planning, providing engineer support for mobility operations, providing support to counter-mobility operations, and conducting expeditionary deployment operations.

The 541st emplaced more than 30,000 meters of triple-strand concertina wire between Texas and California, finishing 11 days ahead of schedule. The determination and work ethic of the sappers enabled the 541st to place an average of 1.2 miles of concertina wire per day, as well as set an Army record for the most triple-strand concertina wire emplaced in a single day at 5,141 meters. The 541st milestones were accomplished by three under-strength platoons, operating only during daylight hours, on a 2-day-on, 1-day-off work-rest cycle.

A Soldier ties in friendly side barbed wire in Calexico, California.

Project Scope

The 541st set many milestones while reinforcing the southern U.S. border, and the deployment highlighted substantial differences between the company's production rates and construction material (Class IV) usage as compared to Army doctrine recommendations. Using the Army recommendations, the platoons calculated the supplies necessary to complete their assigned obstacle frontage the night before each mission. However, they consistently ran out of Class IV materials before completing the obstacle frontage for the day. Based on the collective effort with CBP, the 541st decided to document its production rates and Class IV construction supply usage during a practical exercise for one 300-meter section of triple-strand concertina wire to improve engineer doctrine and future countermobility efforts. The exercise took place on 4 December 2018 at El Centro Naval Base, California. The soil at the naval base and in the surrounding area consists of silty clays that allow for relative

The 1st Platoon emplaces concertina wire on the Gateway to the Americas International Bridge, Laredo, Texas.

ease of driving pickets into the ground. The uniform for the exercise consisted of a Kevlar® helmet, a load-bearing vest, gloves, eye protection, and an improved outer tactical vest. A single platoon consisting of three 7-Soldier squads with two embedded Military Occupational Specialty 12T–Technical Engineers was used for the exercise. Each squad possessed a singular picket pounder and NCO. A heavy, expanded-mobility tactical truck was used for supply drops along the 300-meter obstacle during the exercise.

Sappers constructed the 300-meter obstacle using the same methodology used to construct the triple-strand concertina wire barrier along the border. The enemy side pickets were emplaced, followed by concertina wire, barbed wire, friendly side pickets, concertina wire, barbed wire, a top row of concertina wire, and wire tie-ins. All participants knew their respective roles and responsibilities prior to execution of the exercise. (The role selection process plays a substantial role in the efficiency and productivity of the platoon.) Soldiers who are below average height face difficulty in attempting to pound the 8-foot-long pickets into the soil. To reduce fatigue and the possibility of injury, each picket-pounding team consisted of two Soldiers—one to hold the picket and another to drive the picket into the ground. The two Soldiers alternated positions every 10 pickets.

Above: 3d Platoon emplaces concertina wire along the Rio Grande River in Laredo, Texas.

Below: Teams of two emplace pickets along the Calexico, California, border.

Lessons Learned

The exercise started at noon on 4 December 2018 and lasted 70 minutes. In total, the 300-meter triple-strand concertina wire obstacle required 162 long pickets, four short pickets, two reels of barbed wire, and 71 rolls of concertina wire to construct. Although it is possible to stretch the wire a distance of 5 meters between each picket instead of the recommended 3.8 meters, it is not recommended that it be stretched past 4.2 meters, as the obstacle then loses structural integrity and effectiveness.

Conclusion

Operation Border Support strengthened the relationship between the U.S. Army and CBP. The 541st's construction of the obstacle will have a lasting impact on the security of our Nation's borders. The challenges and lessons learned in working with CBP demonstrate that Army engineer and CBP programs across the U.S.-Mexico border are vital. The 541st was assigned a challenging mission with real-world effects that ultimately illustrated the necessity to update current engineer doctrine.

First Lieutenant Koepnick is a sapper platoon leader with the 541st Engineer Company. He holds a bachelor's degree in environmental engineering from the U.S. Military Academy–West Point, New York.

Employment Obstables of Title 10 Responders to Homeland Disasters:

A Qualitative Case Study

By Lieutenant Colonel Mark P. Michels

Background

As a former defense support to civil authorities (DSCA) cell officer in charge at Joint Task Force–Civil Support, Fort Eustis, Virginia, I learned many lessons from Title 10, U.S. Code (USC), *Armed Forces*; Title 14, USC, *Coast Guard*; and Title 32 USC, *National Guard*, and gained a new perspective on how each Service or title authority deploys and employs its forces.[1, 2, 3] I have planned for, and deployed to, supported national special security events (NSSEs). Supporting NSSEs takes coordination and dedication to ensure that deployment and employment plans are ready to be executed with several contingencies in place. Staff planning for NSSEs requires coordination among military and civilian responders from federal, state, and local agencies.

Planning for NSSEs such as hurricanes, snow storms, floods, and other natural disasters requires quick, agile planning and coordination. Lessons learned from Hurricane Katrina highlighted many failures of command authority, command and control, the *Posse Comitatus Act, the Stafford Relief and Emergency Assistance Act* (*Stafford Act*), and the *Economy Act*.[4] Nevertheless, the military and civilian responder communities banded together to mitigate human suffering and prevent further property damage.

After Hurricane Katrina came Hurricane Sandy. Hurricane Sandy swept across the northeastern United States and, with storm surges and 13-foot-high waves, caused damage along the coastal communities.[5] New York Harbor experienced 30-foot waves; in Atlantic City, New Jersey, the waves topped 40 feet.[6] Seven states received more than 5 inches of rainfall in a short time.[7] Hurricane Sandy illustrates the possible destruction of a natural disaster, which can cause floods and destroy homes, businesses, roads, and general utility infrastructure. One command and control lesson learned involved unity of effort and the development of the dual-status commander (DSC) concept.[8] Brigadier General Michael C. Swezey, assistant adjutant general of the New York Army National Guard, was the first "no notice" DSC for Hurricane Sandy.[9]

After leaving Joint Task Force–Civil Support and starting a new position at Fort Leonard Wood, Missouri, I began a 3-year study to define the problems of Title 10 responders and contemplate a suitable and feasible solution.

Research Method

Using a holistic, single case study, a qualitative study was designed to analyze military and civilian perspectives to answer four questions:

- What were the constraints or obstacles encountered by Title 10, 14, and 32 responders during the Hurricane Sandy response?
- How were the constraints or obstacles different according to title perspectives?
- How did Title 10, 14, and 32 military and civilian responders adapt to overcome the restraints and obstacles during the Hurricane Sandy deployment?
- How do military leaders and staff members, civilian counterparts at the command, and supervisory and tactical-level government responders plan to mitigate obstacles for future natural disaster responses?

With time and travel constraints, a structured telephone interview survey was chosen as the means to gather data over distances. Each individual interview was recorded and transcribed into a social science software program. The transcribed data was entered into the program, analyzed, interpreted, and organized, into main themes and subthemes. Table 1 illustrates the distribution of survey participants.

Main Themes

Five main themes (shown in Table 2) were discovered, and these themes are interrelated. For instance, legal constraints of Title 10 are codependent on the main theme of inter-/intra-Service communications and requests for action (RFA) and mission assignment (MA) procedures. More than 51 percent of participants mentioned a theme in their survey responses.

Political Environment. The first and most prevalent theme among participants was that of constraints or obstacles caused by the political environment. Several high-level decisions that affected military and civilian responders in New York and New Jersey were made. It may seem that political pressure would only affect the strategic and operational forces; however it also affected responders at the tactical level.

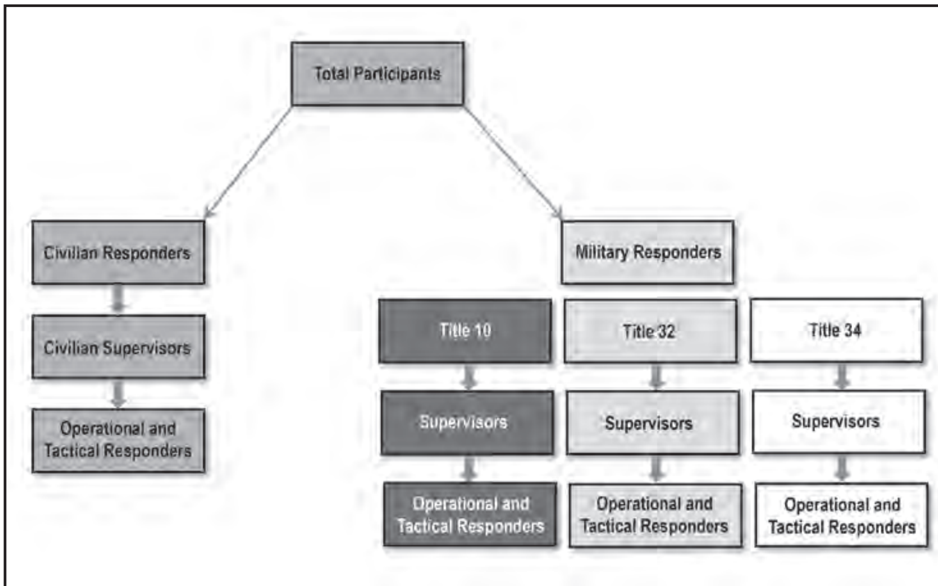

Table 1. Distribution of Survey Participants

Inter-/Intra-Service Communication. The lack of inter-/intra-Service communication was the second-most-prevalent theme among participants. Data analysis led to the conclusion that most misinterpretations and lack of communication were made at the strategic or operational response levels. At the tactical level, communication issues were virtually nonexistent.

Federal Capabilities Pushed Forward Without Proper RFAs/MAs. Title 10 assets moving to Fort Dix, New Jersey, were misunderstood by Soldiers under Title 32 civilian responders and planners. The participants who were not under Title 10 considered the forward deployment to be the military or federal government overstepping their boundaries. Title 10 USC requires official requests for assistance or forces and a Presidential proclamation.

Legal Constraints. Because of fiscal constraints and the *Posse Comitatus Act*,[10] Title 10 military personnel cannot often take part in large DSCA training and real-world exercises. Fiscal constraints and the *Posse Comitatus Act* further separate Title 10 military personnel from performing law enforcement tasks. Civilian planners have little knowledge of Title 10 procedures, and they were unsure if Title 10 military personnel would know how to handle U.S. citizens (as part of the use-of-force continuum), which is a legal requirement when dealing with U.S. citizens with constitutional rights.

Mission Assignment Procedures. Leadership pairs Title 10 Soldiers with Title 32 Soldiers for a variety of tasks and deliverables that staff planners develop for response solutions. Although combining personnel under different titles into various staff sections can help develop better courses of action, the consensus of all participants was that the integration prolongs the time it takes to make and implement response decisions. Several participants also stated that MAs take too long for the Title 10 chain of command to assign; Title 10 MA processes do not keep pace with the operational tempo of Title 32 and Title 14 responses.

Findings and Implications

Researchers who studied Hurricane Sandy and the mishaps that plagued military forces deployed to support civilian authorities.[11–14] Military personnel and civilian responders saw adversity and overcame obstacles while organizing the response to mitigate suffering. Due

Main Themes	Number of times mentioned	Percentage of population that mentioned the theme
Political environment	88	100
Inter-/Intra-Service communication	48	85
Federal capabilities pushed forward without proper RFAs/MAs	48	79
Legal constraints (Title 10)	45	72
Mission assignment procedures	38	64

Table 2. Main Theme Statistics

to the possibility of large-magnitude homeland disasters, it is imperative that local, county, state, and federal assets be prepared to mitigate the devastating effects to people and property.[15]

Political Environment. Based on the research findings, the primary Title 10 obstacle was the political environment. All of the participants highlighted the need to restrict political interference when inappropriate requests were made for personal gain or when the requests were not for the good of the operation. Military forces—in conjunction with local, county, state, and federal responders who were trained to respond to natural and man-made disasters—were experts in planning and execution. Participants gave personal accounts of how the political environment adversely affected response operations. Although some participants recognized the political pressure as an obstacle and successfully dealt with situations as they developed, others found themselves in circumstances in which political pressure inhibited timely decisions, slowed response times, and wasted financial resources. According to some participants, these situations were clear violations of the *Stafford Act*[16] and the *Economy Act*.[17] The results of this study are consistent with current DSCA research, which shows that—

- Strategic leadership can hamper response operations based upon incorrect or mismanaged information.
- Despite the enactment of the *Stafford Act*, political pressure can force Title 10 operations within the homeland without a *Stafford Act* request for assistance.[18–22]

Additionally, the results are consistent with those of other DSCA researchers who have identified restrictions of Title 10 authority. According to many participants, the restriction of Title 10 authority was unnecessary.

Inter-/Intra-Service Communication. The second main theme of the responses was inter-/intra-Service communications, which was mentioned by 85 percent of the participants. Two separate foci of this theme emerged:

- The need for standardized communication equipment.
- The necessity for military branches to communicate with each other.

The findings confirmed that communications are an obstacle for military and civilian personnel. Furthermore, researchers found that communication problems occur between agencies and Services.[23–24] This reinforces the requirement to plan by learning from past mistakes.

By standardizing the responders' lexicon through the use of the National Incident Management System (NIMS) and the Incident Command System (ICS), responders from different locations were able to speak the same language; the fielding of compatible communication equipment will allow communication between military and civilian personnel.[25] However, financial constraints have made implementation slow.

Federal Capabilities Pushed Forward Without Proper RFAs/MAs. Federal capabilities and resources involving military units are sometimes used without the proper request or mission assignment. Title 10 restricts the use of military personnel and resources without going through the correct channels.

Legal Constraints. The fourth main theme was that the federal government, specifically the Title 10 military, was forward deployed and actively looking for MAs. Although active Title 10 forces can deploy to a federal installation without an MA or a request for forces from local, state, or federal emergency management systems, local and state responders considered this move to be acting without requests from civilians and Title 32 personnel.[26] Although the situation did not involve the violation of any local or state statute (because it could be considered pre-positioning or even training), Title 10 units are not allowed to employ their capabilities without proper requests from local, state, or federal civilian responders unless the unit deploys under immediate-response authority.[27] Furthermore, there is a time limit associated with the commander's immediate-response authority. Others have discussed the limitations of the military during DSCA missions, and have not explained the differences between deploying to an operational area and employing federal capabilities within the operational area.[28–31]

Understanding the distinction between deployment and employment is critical in order for non-Title 10 responders and emergency managers to avoid conflicts with the *Stafford Act* and the *Economy Act*.[32] Through analysis of discussions with interviewees, it is clear that the federal forces were "going out and looking for MAs to be conducted by Title 10 responders"—a nonstandard practice for Title 10 responders. In accordance with the *Stafford Act*, the standard practice for Title 10 employment to a response involves following the statutory framework governing the act of declaring presidential emergencies.[33] After the presidential declaration of emergency is complete, federal resources may then be used pursuant to the emergency declaration.

A total of 79 percent of participants in this study reported several clear instances of attempts to influence the MA process to receive Title 10 resources. The reason for this high percentage is not because state responders were unable to handle the response, but because of political pressure. This pressure, from the highest levels of government, was placed on the military leadership at the tactical level. Although political leaders may have had good intentions, the constant push for Title 10 MAs inhibited planning and made mission execution more difficult for Title 32 Soldiers and civilian responders.

Mission Assignment Procedures. The last theme identified involved the MA process. This process concluded through Title 10 channels seems to be calculated and methodical. First, the process ensures that the requested mission is validated to be within the capabilities and legal authority of the unit of execution. Second, the process acts as an accounting tool for expenditures of resources and future monetary reimbursements. And finally, the process is codified (within NIMS and the ICS) for requesting capabilities and resourcing the requests through local and state agencies before Title 10 resources are used.

The downside of the Title 10 channel is that the MA process is too rigid and, in some cases, takes too long to change. For example, an Army Reserve unit was tasked to pump water and sludge out from under buildings for several days; but when the unit completed the MA earlier than expected and went back to a staging area to stand by for further orders, the DSC of New York wanted to repurpose the asset. However, the process took so long that the MA was eventually assigned to another unit while the Title 10 unit was still on standby. This demonstrates noneffective and nonefficient use of Title 10 personnel and equipment. Eventually, other Title 32 resources needed to be diverted to the same task. This was a waste of time, man-hours, and money. Other researchers have also expressed difficulties with the Title 10 MA process and use of authority and the implications of delayed responses to save lives and prevent further property damage.[34–39]

Recommendations

Political Environment. Regardless of intentions, elected and appointed officials can often hamper response operations. The ICS was designed so that the units that use it would have a common lexicon and would understand the duties and responsibilities of each response person, as well as specific universal unit classifications.[40] The ICS has a structure similar to a military chain of command, but it is adaptable to suit the duties and responsibilities of civilian response personnel. When responders adhere to the requirements of the ICS, any influences that could negatively affect a response are limited. It is difficult to avoid political influence, but sticking to NIMS and ICS can potentially mitigate some of the negative influences—at least at the tactical level.

Inter-/Intra-Service Communication. The second theme revealed was overcoming inter-/intra-Service communication problems, which can be divided into two categories: the equipment used to communicate between Services and normal military protocol. This study revealed the importance of communication and the way in which political influencers can positively or negatively affect response operations. A simple solution to the problem posed by the first category is to standardize the equipment used during DSCA missions. However, understanding the fiscally restrained acquisition process and acquiring the same radios, software, and training for all disaster response units would take time and would need to be budgeted over several years. The U.S. Northern Command (USNORTHCOM) is responsible for military disaster response and recovery operations within the continental United States and the military actions coordinated within political boundaries. Understanding who owns the operational response space and maneuvering within it are governed by standard military protocol. According to the majority of study participants, the deployment of U.S. Marine Corps and U.S. Navy forces to New York and New Jersey without an MA or request for forces violated several acts. To explain just how wrong this movement and employment of Title 10 troops was, all that would be necessary would be to move the scenario to the Central Command (CENTCOM) area of responsibility (AOR). The CENTCOM AOR is commanded by a ground combatant commander; units passing through the region or having a need to operate within the designated CENTCOM boundaries must communicate their intent to the commander in charge of that area. These standard military movement protocols are generally understood by Title 10 planners, commanders, and responders. According to the majority of study responses, if military commanders had thought of the USNORTHCOM AOR as the CENTCOM AOR, there would be little chance that the Marine and Navy assets would not have deployed to the Hurricane Sandy response area without permission.

Federal Capabilities Pushed Forward Without Proper RFAs/MAs. The recommendation for solving the issues with the third theme is to mitigate federal forces pushing forward in advance of the formal request for support. Because there was no prestaging of resources, response times to Hurricane Katrina were slow.[41] After Hurricane Katrina and during Hurricane Sandy, the military prepositioned resources (food, communication equipment, pump units) at federal military bases. According to study participants, standard practice is to deploy to an area of operations to prestage resources—but it is only after a presidential disaster proclamation has been published and a request for assistance has been submitted that they can be employed. Balancing funding, personnel, and equipment demand planning for the probable request of federal assistance requires the quick deployment of liaison officers to key locations. Advanced notice of the request for federal assistance shortens the time to alert, assemble, and deploy resources. However, without official documentation, federal forces must develop courses of action to deploy assets to federally owned locations and develop contingencies to employ assets until official documentation is obtained.

Legal Constraints. Legal constraints restrict the use of Title 10 resources during the response. This study has discovered the same legal constraints as many other studies that highlighted Title 10 impediments during domestic responses have, mostly with the restriction of the *Posse Comitatus Act*.[42–44] The *Posse Comitatus Act* restricts Title 10 personnel from conducting law enforcement activities under normal circumstances.[45] The President can, for a short time, authorize Title 10 troops to protect federal assets (such as nuclear power plants) or the rights of citizens when they are violated.[46]

Because of Hurricane Katrina, the counsel of governors developed the DSC concept, wherein a Title 32 general officer is trained and certified by USNORTHCOM to command Titles 32 and 10 forces during disaster response. The DSC concept was executed in New Jersey and New York. However, the DSC in New York needed to divert Title 32 forces to accomplish law enforcement activities when Title 10 resources were not actively engaged.[47] According to several study participants, this diversion of Title 32 forces to other missions due to title authority was a waste of time and resources. The DSC concept increases unity of effort at the tactical level; however, joint planners need to learn to develop plans and execute them using Titles 10, 14 and 32, instead of following just one title.

A clear recommendation involves switching from Title 10 to Title 14 responders. Title 14 is the legal authority under which the U.S. Coast Guard responders are governed.[48] Title 14 authority is not restricted to the state from which the forces originate; but rather, to the continental United States.[49] When Title 10 forces serving along with planning staff under a DSC are converted to Title 14 forces, all of the federal forces can be used for law enforcement and non-law-enforcement activities. Under this recommendation, the planning staff would not need to find a unit with the proper title authority. Converting Title 10 responders to Title 14 responders could make use of unit-specific capabilities. For example, a Regular Army military police unit performs daily law enforcement functions and would be a better choice for law enforcement tasks than a Title 32 unit with no training in law enforcement activities.

Mission Assignment Procedure. The MA process can be a waste of manpower and money. It is recommended that Title 10/14 resources be assigned to the DSC for a period of time just long enough to fulfill an initial MA. The DSC could then use these assets within the limits of the resource. For example, if a horizontal-engineering unit finishes a road construction early, a DSC could repurpose that unit to execute health and welfare checks without attaining another MA. This would involve a policy change in which military personnel vet requests for assistance, but would also allow commanders of these units to make decisions about whether or not the assigned unit could effectively conduct the mission.

Future Research

Future research could help improve the speed and effectiveness of civilian and military responders who participate in disaster response by effecting policy and doctrine changes that would allow leadership to reorganize and eliminate Title 10 obstacles.

Conclusion

This study is the first qualitative project in which obstacles to federal responders during hurricanes were explored. Possible solutions for the mitigation of Title 10 obstacles during disasters are offered. Through semistructured interviews with civilians and military members of Title 10, 14 and 32 units, the way in which these obstacles affected the integration and effectiveness of the response to Hurricane Sandy using Title 10 assets was examined.

The qualitative case study utilized a modified interview instrument.[50] This instrument allowed the gathering of necessary data from military and civilian participants from New York, New Jersey, and Virginia. Data was collected through 14 telephone interviews from current and past civilian and military responders, planners, and leaders who were deployed in support of Hurricane Sandy. The interviews provided detailed primary descriptions regarding the obstacles for which these personnel had planned during and after the response. In addition to providing a method of data collection, the qualitative case study design also provided a way to analyze data pertaining to the topic of interest. A comprehensive approach to exploring Title 10 obstacles that affected Titles 10 and 32 forces and civilians is provided. Through in-depth interviews, the data was analyzed and categorized into five main themes and 24 subthemes.

Clear recommendations are provided for military and civilian leaders; planners from local, state, and federal agencies; scholars; and policy makers who are interested in improving joint response operations. These recommendations are designed to encourage other researchers to delve deeper into the issue of military deployment of resources. This study could also contribute to improving training and education among military and civilian responder communities. The merits of this study can be used as input for table top exercises, with alternative means of responding to requests for assistance. New response measures, such as the use of Title 14 authority, can be exercised in real-world field training. The resulting field training analysis should yield improved response times during operations to protect property from further damage as well as save lives.

During extreme disasters requiring federal assistance, military assistance should always be included in planning for current and future resources. Using economy-of-effort techniques and policy changes would surely improve the ability to save human lives and prevent further property damage. This objective should be a top priority in the strategic-to-tactical planner and responder communities. Finding ways to mitigate obstacles that inhibit these tasks should be funded, exercised, and practiced because human life is precious.

Endnotes:

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[31]Michael Bently, "The Role of Military Forces in Disaster Response: Remove the Impediments," *Homeland Defense and Civil Support Journal*, 2013, <dtic.mil/cgi-bin/GetTRDoc?AD=ADA560882>, accessed on 26 March 2019.

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NONSTANDARD IRB ANCHORAGE IN AUSTERE ENVIRONMENTS

By Captain Daniel E. Kitchell

In early 2018, the 36th Engineer Brigade was presented with the unique challenge of emplacing a full closure improved ribbon bridge (IRB) at Milford Lake, Fort Riley, Kansas, in support of a 1st Infantry Division pre-combat training center external evaluation (EXEVAL). This mission, Operation Gauntlet, would serve not only as the maneuver brigade validation exercise, but would also include a full-scale, combined arms gap crossing as part of the final offensive phase of the operation. While every multirole bridge company (MRBC) included in the engineer task organization Task Force Fighter had completed a wet-gap crossing in support of a maneuver unit within the previous 12 months, none had attempted an exercise of this scale and complexity. While the mechanics required for an exercise of this size to be successful were widely understood, there was one unknown that continuously challenged Task Force Fighter throughout operations: How can the task force anchor a 600-meter IRB for 96 hours of continuous use?


A Soldier receives a back-briefing from a cabling team.

On 6 March 2018, key Task Force Fighter leaders from the 50th MRBC, Fort Leonard Wood, Missouri; 74th MRBC, Fort Hood, Texas; 502d MRBC, Fort Knox, Kentucky; and 2225th MRBC, Louisiana Army National Guard, traveled to Fort Riley to conduct an initial leader reconnaissance of the training area that would be used for Operation Gauntlet. The leaders were tasked to determine the feasibility of emplacing a semipermanent (more than 96-hour) IRB that could be emplaced and maintained in a tactical environment according to the five phases of wet-gap crossing operations in support of the 1st Infantry Division pre-National Training Center validation exercise.

The first challenge facing Task Force Fighter was simple: scale. During the reconnaissance, a laser range finder recorded the range control-approved gap at Milford Lake at 590 to 600 meters, depending on the centerline selected and current water levels. Based on the size of the gap, it was determined that traditional overhead anchorage systems would not be viable due to the following factors:

- The size of the cable required for a 600-meter span would have limited workability because the weight per foot would prevent tactical emplacement of the bridge.
- There was a lack of the required number of fully-mission-capable bridge supplementary sets across all MRBC formations.
- Supplementary sets were deemed inadequate during earlier testing and are currently being redesigned by the Engineer Research and Development Center with the 502d MRBC; and in many cases, there were critical shortages.

With the task force unable to count on the organic anchorage capability as well as a lack of shared understanding and Soldier level training over the emplacement of the overhead anchorage system in the supplementary sets, there was an elevated level of tactical and administrative risk during the anchorage of the full closure.

Due to these constraints and limitations, each company was tasked to develop an anchorage plan that would make use of available wire rope and wire rope kits and would rely on the tactical emplacement of a deadman anchor on the nearside and far side shores. During reconnaissance, 5th Engineer Battalion operational planning construction (S3C) personnel collected soil samples for sieve analysis from along the nearshore and far shore of the crossing site. It was initially determined that if the soil was suitable, deadman anchors would be dug along the nearside and far sides, enabling the first 100 meters of bridge to be stabilized on the nearside and far sides and the remaining 400 meters would be stabilized by MKII and M30 bridge erection boats (BEBs) (14 BEBs at four-bay spacing). While there was concern about the existing soil conditions and rock formations on shore, the initial plan included the removal of large quantities of rock and soil; however, removal was later denied for environmental compliance reasons and to maintain tactical realism for the adjacent forces participating in the exercise.

Each company returning to home station submitted its anchorage designs to the 5th Engineer Battalion and Task Force Fighter to be vetted by S3C personnel and Engineer Research and Development Center personnel. Based on resources available at Fort Riley, each unit chose to use the approximately 3,000 to 4,000 pound concrete deadman anchors, which would be available for pick up during training. Units also requested 0.5-inch to 0.625-inch wire rope, based on the number of wire ropes that would be used. The deadman anchors would be connected to the interior and ramp bays via the sling load points spaced from 0 to 100 meters, and the deadman anchors would be placed 3 to 8 feet apart (design-dependent) using each unit's organic hydraulic excavator (HYEX). Once each deadman was emplaced, the anchor would be covered and compacted and the unit would use wire rope tensioners to tighten each wire to adjust slack in the anchorage. All units loaded materials according to this plan and prepared for execution at Fort Riley.

Upon arrival at Fort Riley, Task Force Fighter experienced a number of materiel, environmental, and regulatory limitations and safety constraints, which required that the anchorage plan be adjusted accordingly. For example—

- Wire rope and additional construction materials required for anchorage were not readily available at Fort Riley. These items were ordered through the Army supply system; but due to volume and size requirements, local purchases were required.
- The slip and adjacent shore proved to be less homogenous than initial soil tests had indicated, and digging in the rocky conditions with a HYEX proved to be more time-consuming and less predictable than would be allowed in a tactical setting.
- Due to state erosion regulations, Fort Riley Range Control and the Environmental Department required that the task force disturb no more than 1 acre of topsoil. This limited the use of the anchorage to the rocky shoreline, preventing additional movement corridors for construction equipment.

A Soldier from the 74th MRBC support platoon conducts a briefing on the anchoring operation.

- Concerns about risk elevated the priority of the anchorage plan, requiring that the anchorage be validated prior to final emplacement.

These constraints and limitations drove the task force to develop a new anchorage system that would mitigate or eliminate these problems.

With limited time and resources available, Task Force Fighter tasked the companies to develop a new method of anchoring the proposed 600-meter IRB. First Sergeant Jason E. Malek, 74th MRBC, recommended that the task force use the available concrete deadman anchors and recently ordered wire rope to create a system that mimicked the kedge anchor system. His proposal was based on on-site reconnaissance conducted by the 50th MRBC, which made use of new M30 BEB depth finders. Reconnaissance determined that the average depth along the centerline was only 15 feet and that the river bottom was composed of a thick, clay-based soil. The shallow depth meant that the unit could use a HYEX and wire rope to emplace and retrieve the 3000- to 4,000-pound concrete deadman anchor from the roadway surface over the side of the bridge via the sling load points. The Soldiers estimated that 2–3 feet were needed on each end of the wire rope for hook-up points and to allow Soldiers to disconnect via three 0.625-inch wire rope clamps. Since the HYEX had a maximum boom height of 30 feet under an 8,000-pound maximum load, it was estimated that this system would function in any area where the water depth was less than 26 feet. In order to eliminate the risk of mud on the river bottom creating a suction force that would exceed the 8,000-pound maximum load during retrieval, First Sergeant Malek recommended that a sacrificial wooden pallet, attached with parachute cord that could breakaway, be attached to the bottom of each deadman anchor.

A cabling team moves a chain from the HYEX to the deadman anchor system.

With the plan formulated and materials collected, the 74th MRBC went through several iterations of rehearsals and a proof of concept in order to develop a scheme of movement that would allow for the system to be emplaced in an efficient and tactical manner. It was determined that, based on the 600-meter gap and placment of anchors every third bay, a total of 28 anchors would be needed. Three HYEXs were available, and a common bridge transport with flat rack could accommodate exactly nine deadman anchors. Therefore, the task force needed to task-organize equipment to create three anchorage teams, which were responsible for the collection of materials in the tactical assembly area (TAA), prefabrication and rehearsals in the TAA, and final emplacement of the anchors

With materials gathered and Soldiers briefed on the construction priorities of work, the 74th MRBC support platoon began the process of developing and executing rehearsals for the final emplacement of the anchors. Task Force Fighter was allowed a 72-hour window for the emplacement of the full closure. Leaders worked quickly to task-organize across the task force to ensure that all available HYEX, common bridge transport, and cabling crews were consolidated and well-rehearsed. After a rapid orders process, elements from each MRBC began to consolidate in the 74th MRBC area of operations to begin rehearsals. 74th MRBC elements had already created the mock raft that was required and had conducted a proof of concept within the TAA. All that was left was the final rehearsals for emplacement.

After several iterations of rehearsals and a live proof of concept on the water, the "Malek anchor system" was validated and prepared for final emplacement. However, on the morning of the final construction, a HYEX broke down and the final anchorage plan was adjusted so that two teams emplaced a total of 20 anchors, with the remaining BEBs to stay in place in case of anchorage slippage. With two teams on the bridge, all 20 anchors were emplaced in less than 2 hours.

Holding the centerline on a 600-meter span with more than 35 BEBs operating simultaneously proved to be difficult. Several times, the anchorage team emplaced an anchor and then had to adjust by looping a shackle around the line and slightly pulling the anchor off of the river bottom to allow the BEB operators and raft commanders to pull their sections back onto the centerline.

(continued on page 23)

A Soldier guides a HYEX operator loading a deadman anchor onto a pallet.

Getting the Right ACS for USACE Utilization

By Lieutenant Colonel Erik C. Backus (Retired) and Captain Kevin T. Park

Envision yourself as a captain in the U.S. Army, having just taken company command. Congratulations! Now is the time to start thinking about your future career. You ask yourself: Where do I want to go? What do I want to do? Well, have you thought about a tour with the U.S. Army Corps of Engineers (USACE)? Maybe you read an article in a previous issue of *Engineer* and that has you excited about the possibility.[1] Like any good Engineer Captain's Career Course (ECCC) graduate, you apply the Army problem-solving method and recognize that you need Advanced Civil Schooling (ACS). We will attempt to spell out how to prepare for the ACS requirement and subsequent USACE utilization tour.

USACE as an Option

While in company command, the standard career progression pathway starts to diverge. You have gone through the gauntlet of serving as a platoon leader and executive officer and in various staff positions. Much of your work history has been preprogrammed and without many choices. Once you leave command, you are faced with a large number of choices and how you prepare is critical for the future. When you are in the commander's seat and you receive Branch notifications that you will be a "mover" in the upcoming manning cycle, you think to yourself: Is the end of company command already here?

While in command, you need to set some clear goals for career progression. There are numerous paths that you can pursue. For example, you can serve as an observer controller at a combat training center, which leads to operational assignments and/or future U.S. Army Training and Doctrine Command opportunities. One option unique to engineer officers is a tour with USACE, which is a great place to continue to hone your project management and technical skill sets as well as expose yourself to an area of the Engineer Branch that is completely different from that of a traditional Army engineer unit. Most engineer officers are aware that they support USACE; but until they have worked in a project manager or project engineer position at a USACE district office, they are not familiar with the specific functions of USACE. The needs of the Army during any manning cycle dictate the specific assignments that are available for branch-qualified captains; there is no guarantee that you will land a coveted USACE slot, but the possibility is worth considering and preparing for. To that end, you need to think about ACS.

ACS

One way that an engineer officer can earn a fully funded master's degree is by becoming an instructor with the U.S. Military Academy–West Point, New York. Another way to earn a master's degree—and, at the same time, be guaranteed a USACE assignment following command—is through ACS. In fact, an assignment with USACE is a requirement for engineer officers who earn a master's degree through ACS. Completing a master's degree through ACS and becoming an instructor at West Point involve two separate programs, but they bear some similarities. The initial part of the ACS process is relatively straightforward; it involves corresponding with the Branch manager and submitting a packet containing Army forms, your transcripts, your Graduate Record Examination (GRE) scores, and a list of universities and programs to which you intend to apply. It is recommended that you take the GRE prior to taking company command; even if the school to which you are applying does not require the GRE score, it is still a required part of your branch ACS packet.

Once your desire to compete for ACS has been established, you work with your commander to align your permanent change of station with the start of the fall or spring semester at your chosen institution.

The Institution

Once you receive formal branch notification that you have been accepted to the ACS program, you must then be accepted to a university. You need to invest

"The opportunity to serve with USACE is unique and coveted. Properly preparing yourself for your tour is critical. Choosing the right university, the right program, the right cost, and the right director/advisor is very important."

time and effort to ensure your success in the educational program and beyond (in your utilization tour). Some primary questions to ask during your decision-making process include—

- **What is the financial cost?** Once you have been accepted into a program, you must negotiate with the higher-education institution to lower the tuition to the low-cost category. This may sound intimidating; but based on experience, school administrators provide information on combinations of scholarships to meet this requirement.
- **What is the program like?** You should select a program based on the needs of your assignment. Clarkson University in Potsdam, New York, offers a master's degree in civil and environmental engineering with a concentration in construction engineering management. This kind of program enables growth in the technical skill set, especially for engineer officers who do not have a bachelor's degree in engineering. Officers who do not have a science, technology, engineer, or mathematics (STEM) bachelor's degree might take advantage of the technical background offered by the Missouri University of Science and Technology program through the U.S. Army Engineer School, Fort Leonard Wood, Missouri, combined with general engineering courses available at ECCC. This, along with a project management professional credential, should put the officer on a trajectory to success with additional graduate work in engineering disciplines. The program that you choose should prepare you for the desired assignment. Part of the master's degree requirement at Clarkson University is the completion of a project. That culminating project is done in conjunction with, and for the benefit of, a USACE district. This kind of experience enables you to get a head start on your follow-on utilization tour.
- **What is my advisor's background?** A benefit of the engineering program at Clarkson University is that the program director was once an engineer officer. Someone with that type of first-hand knowledge can counsel you in academic matters and your military career and guide you through the curriculum.

Do not be discouraged. If you do not have a bachelor's degree with a hard science background, you can still be competitive with ACS. It often takes direct correspondence with a university to explain that you have the necessary tools to be successful in its program based on your military training and work experience.

School Success

Once your ACS packet has been completed, you have received orders, you have completed the permanent change of station, and the U.S. Army Student Detachment at Fort Jackson, South Carolina, has received your complete in-processing packet, it is time to start school. Talk about a culture shock! You are accustomed to being a company commander and holding your daily synchronization meetings at 0600, standing in formation at 0630, and doing physical training for 90 minutes before moving on to whatever else you have scheduled for the day. Instead, you attend class, physically train on your own, and spend substantially more time with your Family.

It is mandatory that ACS participants volunteer with the Reserve Officers Training Corps (ROTC) and periodically check in with the professor of military science at the ROTC program (if present) or other Army activity to see where you can contribute. Having an advisor and academic program director who was once a battalion commander ensures that you have an advocate to maintain the necessary balance between your duties.

The Clarkson University construction engineering management curriculum offers a combination of engineering courses (18 credits), coupled with business courses (9 credits) and a master's project (3 credits), for what Captain Park wanted to do. The program is unique because it can be completed as a resident, through distance learning, or a combination of both. The technical and business skills lend themselves well to an assignment at USACE.

The alignment between the USACE district and your project may not be perfect, but it can be helpful, as the Branch wants to align needs with those who are best suited. Captain Park ultimately was assigned to the New York District, so he benefited from having previously worked with that district throughout the course of his project.

Model for USACE Utilization

Based on our observations as engineer officers who were ACS students, we recommend that, in order to provide the maximum benefit for USACE and its officers attending ACS, USACE adopt a model that is similar to that employed by the U.S. Military Academy–West Point when selecting prospective faculty. An officer is first selected as a prospective faculty member in a specific department at West Point. Following that selection, the officer then pursues a graduate degree in the subject that he or she has been selected to teach. The degree program and coursework may be tailored to the subject that has been selected to teach. Once the degree program is complete, the officer proceeds to the academy as an instructor. If a USACE district knows which schools its potential officers are attending, it can provide guidance concerning specific engineering courses to be taken to pertain to the specific needs of that district. For example, a district that manages a great deal of coastline could encourage students to take courses specific to coastal engineering. This allows the officer to gain exposure to the specifics about construction and engineering in that particular region. Tailoring the coursework to the needs of the district provides the officer with greater insight into how the district works. Early contact can open dialogue with the district commander, civilian engineers, and project managers and can reduce start-up time once the officer reports for duty.

Graduation and Beyond

The opportunity to serve with USACE is unique and coveted. Properly preparing yourself for your tour is critical. Choosing the right university, the right program, the right cost, and the right director/advisor is very important. The time to start planning your career is now. Is a future USACE district command possible? Absolutely! And using ACS to travel down that road can be the lynchpin for the opportunity of a lifetime.

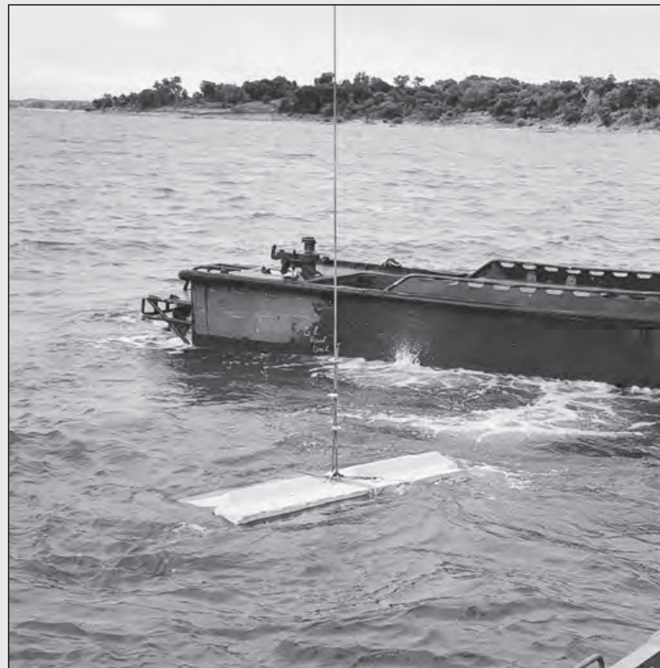
Endnote:

[1]Spencer Diamond and Daniel Powell, "What to Expect When You're Expecting to Work with USACE," *Engineer*, September–December 2018, pp. 25–27.

Lieutenant Colonel Backus (Retired) is an engineering officer who has served in command and staff assignments at all levels of the Army. He is a licensed engineer in Missouri, a Leadership in Energy and Environmental Design-accredited professional, an envision sustainability professional, and a facility management professional.

Captain Park is the deputy, resident engineer assigned to Southern Resident Office, New York District, USACE, Joint Base McGuire-Dix-Lakehurst, New Jersey.

("Nonstandard IRB Anchorage," continued from page 20)



A deadman anchor is lowered into Milford Lake.

The steps of the recovery process were the reverse of those for emplacement. Emphasis was on the BEB operators and raft commanders to maintain the centerline at all times to prevent the bridge from bowing and possibly damaging lower lock drives.

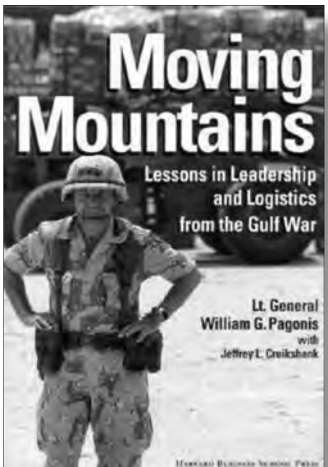
After the successful execution and emplacement of the Malek anchor system during Operation Gauntlet, leaders looked for ways to improve either the anchors or the emplacement methods. Any number of materials, such as light-weight composite rope or specially designed wedge concrete anchors, could improve this system. While each improvement contributed to the overall merit of the system, what actually made the system work so well was simply risk mitigation and the use of available materials.

In the end, 20 anchors were emplaced on alternate sides of the bridge within 2 hours and the bridge withstood high-wind loads in excess of 20 miles per hour for 72 hours, allowing the 77 vehicles of the task force to cross. The Malek anchor system proved that—despite detailed planning, resourcing, and preparation—there will always be a need for the Engineer motto *Essayons* to ensure mission accomplishment. Without the hard work and dedication of Task Force Fighter and all subordinate units, the emplacement of the Gauntlet Bridge may never have occurred.

Captain Kitchell was the commander of the 74th Multirole Bridge Company, 62d Engineer Battalion, Fort Hood, Texas. He holds a bachelor's degree in civil engineering from the U.S. Military Academy–West Point, New York, and a master's degree in engineering management from Missouri University of Science and Technology at Rolla.

Book Review

Book reviews are a feature in each issue of *Engineer*. Authors of book reviews summarize the contents of books of interest and point out the key lessons to be learned from them. Readers who wish to submit book reviews may forward them to <usarmy.leonardwood.mscoe.mbx.engineer@mail.mil>.



Moving Mountains: Lessons in Leadership and Logistics From the Gulf War by William G. Pagonis, Harvard Business Review Press, 1992, ISBN: 0875843603.

Reviewed by Mr. James E. Mc Carthy

In *Moving Mountains: Lessons in Leadership and Logistics From the Gulf War*, Lieutenant General William "Gus" Pagonis (Retired) describes leadership lessons learned over his career, but primarily during the Gulf War. Pagonis relates his early career, highlighting the development of his work ethic and relationships with key leaders via several anecdotes. Both familial and professional examples form his world view, with credit for his success going especially to his wife; his first lesson in leadership is to marry well.

While the Army's preoccupation with stability operations over the last decade may have limited the utility of Pagonis's work to some extent, the leadership lessons learned are valid in any operational environment. Certainly, as the Army turns its focus back to large-scale, ground combat operations, *Moving Mountains* rises in value to Army leaders of today. And while a study of logistics might seem a bit misplaced in an engineer professional journal, the leadership lessons that Pagonis documents are universal and his observations on logistics are valuable to all Army professionals.

Pagonis describes his early career in a bit of an "aw, shucks" fashion, but some key events and positions shaped his career. Pagonis was famous for the use of 3-inch by 5-inch index cards for notes, prompts, and staffing sheets. His technique originated in 1955, while he was a lieutenant in a mechanized infantry battalion waiting to brief his battalion commander in Germany. After cooling his heels for more than 4 hours, Pagonis hand-wrote his readiness numbers on an index card and handed it to the operations sergeant, explaining that he was going back to his unit. Instead of receiving the admonishment he expected, Pagonis's boldness earned him a commendation from the commander.

The conflict in Vietnam provided Pagonis with the opportunity to develop and refine his skill in establishing ad hoc formations and building strong teams. Pagonis also commanded the most decorated transportation unit of the conflict in Vietnam. In the Mekong Delta in 1967, Pagonis relied upon the Office of Military History and his ability to improvise to figure out how to mount howitzers on boats as he served as a part of a riverine task force in support of the 9th Infantry Division. Pagonis concluded his multiple tours of duty in Vietnam by serving as the battalion executive officer of the 2d Battalion, 501st Infantry Regiment, which had lost multiple officers in the defense of Firebase Ripcord in 1970. Pagonis took professional risk with the career managers of the Transportation Branch and, through this fortuitous assignment, became a master of combined arms operations, creating lasting relationships that positively influenced his career.

"Logisticians deal with unknowns," writes Pagonis. Logisticians solve real-world problems in war and peace. There was probably no greater problem for the Army in the post-World War II environment than the standing start deployment in support of the Gulf War because logistics determine the operational limit of the campaign. Serving as the U.S. Army Forces Command Chief of Staff (G-4) in 1990, Pagonis was beginning to reflect on the possibility of retirement; however, fate has a way of intervening.

Likening the Gulf War deployment, in terms of personnel and vehicles, to a task to relocate the city of Richmond, Virginia, to the Saudi desert, Pagonis describes the flurry of initial activity in the short week between the Iraqi invasion of Kuwait on 2 August 1990 and his personal deployment on 8 August 1990. The keys to success in developing a concept of logistical support were his close personal relationships with the U.S. Army Forces Command and U.S. Army Central Command commanders, Major General Edwin H. Burba and Lieutenant General John J. Yeosock, respectively. His reputation as a sterling logistician allowed Pagonis to take advantage of Chief of Staff of the U.S. Army Carl E. Vuono's offer to select personnel by requesting a team of 20 senior (chief warrant officer three to colonel) logistics experts to form the nucleus of his ad hoc staff in Saudi Arabia.

Pagonis describes the challenges of resourcing the crush of deploying forces that filled the Saudi desert in the fall of 1990. An Army has a "constellation of needs" that logisticians must provide, and good logisticians leverage existing and newly developed personal relationships to help. Pagonis describes the process of negotiating contracts, which eventually numbered more than 70,000 for the deployed force. Initially operating with five aides from a contracted staff car at the aerial port of debarkation, Pagonis expanded his element on the fly, while Soldiers were deploying.

Pagonis was dual-hatted as Commanding General, 22d Support Command (SUPCOM), and G-4, U.S. Army Central Command, with more than 81,000 Soldiers (70 percent in the Reserve Component) in his force. For planning, Pagonis utilized a return of forces to Germany (REFORGER)-in-reverse model, focusing on reception, onward movement, and sustainment (now doctrinally captured as reception, staging, onward movement, and integration [RSOI]). Some surprising (for the times) trends such as the scarcity of lumber (new for a generation of leaders raised in Vietnam and accustomed to Europe), the reliance upon contracting and host nation support, and the sheer volume of personal mail (500 tons daily) surfaced during the Gulf War. The use of index cards for notes that were later turned into staffing actions continued, with more than 1,000 cards generated across 22d SUPCOM daily, with 10 percent usually reaching the boss himself. Insistence that the command's official position was conveyed by the daily situation report was an excellent practice. Pagonis also proved himself an innovator, establishing a tire recap shop in-theater to mitigate the large amount of tactical vehicle tire wear.

22d SUPCOM was well-positioned and fully capable of supporting the Central Command (CENTCOM) weighting of the left flank—the "Hail Mary" maneuver—by establishing small and mobile logistical bases to facilitate the movement of a corps. Pagonis was justifiably confident that he could support the maneuver commander when called out by the CENTCOM commander, noting on his briefing charts, "Logisticians will not let you or your Soldiers down." Remarkably, the days with supplies on hand actually increased for each division during the 100-hour war.

Moving Mountains concludes with a substantial recitation of Pagonis's leadership lessons. Unfortunately, the narrative becomes somewhat of a laundry list, as Pagonis relates many (more than 20!) lessons learned in his time in military service. Notable among these is: "Know yourself, augment yourself, and present yourself," in which the logistician recommends awareness of one's own skills and weaknesses, knowledge about how to fill one's own capability gaps, and understanding about how to communicate to internal and external constituencies. Pagonis considers introspection a critical element of this process and admonishes young leaders to fight for the time to think and reflect. He urges leaders to build their organizations for maximum flexibility, accepting the sacrifices in efficiency that it sometimes brings. Most importantly, Pagonis cites the importance of a leader's vision for the organization, which in the case of 22d SUPCOM, was "Good logistics IS combat power!"

Although not typical fare for an engineer, if it is true that "Amateurs talk about tactics, but professionals study logistics," then *Moving Mountains* is extremely relevant for today's leaders and planners.[1] Large-scale, ground combat operations and the potential deployment of large force packages to Europe and Asia are hot topics. As old things become new again, perhaps it is time to revisit history at a level deeper than that of vignettes in a seldom-read field manual.

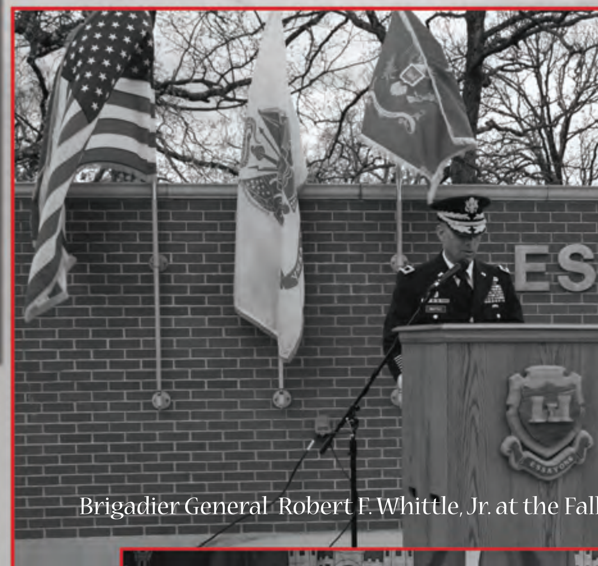
Endnote:

[1]Robert H. Barrow, "Impromptu Remarks," 1980, <https://www.military-quotes.com/forum/logistics-quotes-t511.html>, accessed on 18 April 2019.

Mr. Mc Carthy is a retired infantry officer and avid history buff. He serves as the U.S. Army Forces Command engineer analyst at the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri.

Engineer Regimental

Soldier at Amy Engineer Association vendor display



Brigadier General Robert F. Whittle, Jr. at the Fall

Helocast event at the Best Sapper competition

2019 Best Sapper winners

Soldiers display colors in front of Engineer Castle.

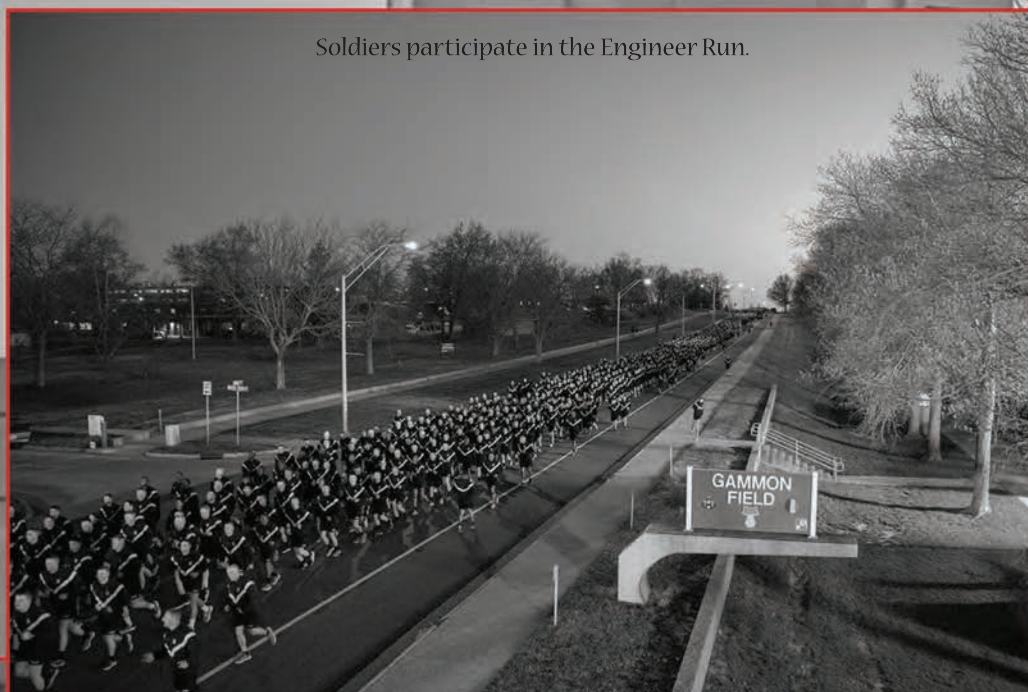
Week 2019

Mr. James R. Rowan receives Gold Order of the de Fleury medal.

Spouse's Day event

…den Sapper Tribute

Engineer Ball



Soldiers participate in the Engineer Run.

Fallen Sapper Tribute at the memorial wall

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 is eligible to 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. Throughout their careers, they will carry the distinction and recognition of being the best and brightest of the Engineer Branch. Following are the results of the 2018 selection boards for the Itschner, Outstanding Engineer Platoon Leader (Grizzly), Outstanding Engineer Warrant Officer, Sturgis Medal, Engineer Soldier of the Year (Van Autreve), and Outstanding Civilian Awards.

Regular Army

Itschner Award: 161st Engineer Support Company, 27th Engineer Battalion (Airborne), Fort Bragg, North Carolina.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Jacob F. Wilson, Company A, 41st Brigade Engineer Battalion, Fort Drum, New York.

Outstanding Engineer Warrant Officer Award: Chief Warrant Officer Two William S. Test, 2d Power Station, 249th Engineer Battalion (Prime Power), U.S. Army Corps of Engineers, Fort Bragg, North Carolina.

Sturgis Medal: Sergeant First Class Shane R. Payne, 523d Engineer Support Company, 84th Engineer Battalion, Schofield Barracks, Hawaii.

Engineer Soldier of the Year (Van Autreve) Award: Private First Class David C. Cox, Battalion Support, Company C, 1st Engineer Brigade, Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri.

Army National Guard

Itschner Award: 2061st Multirole Bridge Company, Burlington, Kentucky.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Matthew T. Scharn, Detachment 1, 842d Engineer Company (Horizontal), Sioux Falls, South Dakota.

Outstanding Engineer Warrant Officer Award: Chief Warrant Officer Two Brandon E. Voss, 842d Engineer Company (Horizontal), Sioux Falls, South Dakota.

Sturgis Medal: Staff Sergeant Garrett M. Temple, 1138th Engineer Company (Sapper), Farmington, Missouri.

Engineer Soldier of the Year (Van Autreve) Award: Specialist Bailey C. Ruff, 842d Engineer Company (Horizontal), Sioux Falls, South Dakota.

U.S. Army Reserve

Itschner Award: 449th Mobile Augmentation Company, 478th Engineer Battalion, Fort Thomas, Kentucky.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Colton J. Maher, 449th Mobile Augmentation Company, 478th Engineer Battalion, Fort Thomas, Kentucky.

Outstanding Engineer Warrant Officer Award: Chief Warrant Officer Two Veloris A. Marshall, Headquarters and Headquarters Company, 420th Engineer Brigade, Bryan, Texas.

Sturgis Medal: Sergeant First Class Jeremy M. Eanes, Headquarters and Headquarters Company, 244th Engineer Battalion, Denver, Colorado.

Engineer Soldier of the Year (Van Autreve) Award: Specialist Gabriel D. Jeronimo, 449th Mobile Augmentation Company, 478th Engineer Battalion, Fort Thomas, Kentucky.

The Outstanding Civilian Award Committee selected the following nominee for the *Outstanding Civilian Award*: Mr. Jamie M. Evans, P.E., U.S. Corp of Engineers, Memphis District, Memphis, Tennessee.

THE U.S. ARMY CORPS OF ENGINEERS
RESPONDS TO THE AFTERMATH OF HURRICANE FLORENCE

By Captain Eric P. Ng

On 30 August 2018, Hurricane Florence began as a tropical depression near Cape Verde on the western coast of Africa, an area where some of the strongest hurricanes on record have originated. Over the next 2 weeks, then Tropical Depression Florence gained and lost strength, ultimately peaking as a Category 4 hurricane on the Saffir-Simpson Hurricane Scale, with estimated sustained winds of 130 miles per hour.[1] On 14 September 2018, Hurricane Florence made landfall near Wrightsville Beach, North Carolina, as a Category 1 hurricane, still powerful enough to cause extensive damage to roads, buildings, trees, and infrastructure along the Atlantic seaboard, with high winds and torrential rain exacerbated by the relatively slow velocity of the storm, which allowed it to absorb warm water from the Atlantic gulf stream and produce rainfall over a localized area for several days. The combined factors of wind and rainfall directly or indirectly contributed to 55 deaths and approximately $24 billion in property damage and economic loss in the Carolinas.[2]

Several Department of Defense facilities and assets were heavily affected by the hurricane, including major installations such as the Military Ocean Terminal Sunny Point (MOTSU), Southport, North Carolina. MOTSU is the largest military terminal in the world. It is the key Department of Defense ammunition shipping point on the Atlantic coast and the Army's primary east coast deep-water port, and it is located in one of the fastest-growing regions in North Carolina.[3]

The U.S. Army Corps of Engineers (USACE), in support of the U.S. Army Northern Command, immediately jumped into action, using all available resources and working with local, state, and federal agencies to start rebuilding efforts. The 161st Engineer Support Company, 27th Engineer Battalion, 20th Engineer Brigade (Airborne), deployed to MOTSU within days and immediately began emergency construction and repair work under the direction of the USACE Savannah District (SAS), whose leadership established and commanded Task Force MOTSU. This task force

Colonel Hibner (left) discusses the recovery progress from damage from Hurricane Florence on MOTSU with Major General Anthony C. Funkhouser, USACE Deputy Commanding General for Military and International Operations, and Clarence G. Lahl, MOTSU Chief of Police.

represented the first known instance of a Regular Army unit task-organized under a USACE district to accomplish a complex mission under extremely difficult circumstances. It will serve as a model for future disaster response on federally owned installations.

Landfall and Effects on MOTSU

As Hurricane Florence made its way through the Carolinas, the U.S. Army Corp of Engineers Operations Center (UOC) tracked dozens of incoming damage reports and assessments from across the Southeast, managing and redirecting resources in near real time, with key leaders and technical experts responding to areas with the greatest requirements. As the operational picture developed, it became clear that the high winds and excessive rainfall had caused extensive damage on MOTSU, jeopardizing the ability of installation personnel to accomplish their critical missions. Sections of perimeter fencing, railway lines, security systems, and fire suppression systems had been damaged or destroyed during the storm. The immediate and resource-intensive response required involved elements from the Army and operational forces, among others. The actions coordinated at the headquarters level can be broken down into four distinct but parallel lines of effort, all of which were simultaneously conducted to regenerate the MOTSU capability. These lines of effort included—

- A USACE division and district boots-on-ground response.
- UOC and headquarters management and information distribution.
- Coordination between the Office of the Chief of Engineers (OCE) and the U.S. Army Forces Command (FORSCOM) and elements of the Army staff.
- Development and implementation of the short-order contracts required to fund the mission.

USACE South Atlantic Division and Savannah District

The USACE South Atlantic Division (SAD) and one of its subordinate commands, the SAS, spearheaded the early response to the hurricane from inside the affected area. Immediately following initial damage reports from MOTSU, USACE Chief of Operations, Colonel Daniel H. Hibner, seized the initiative by deploying a rapid-assessment team. The team, consisting of Colonel Hibner; the Deputy for Programs and Project Management, Erik T. Blechinger; the Chief of Construction, Kenneth F. Gray; the Chief of Engineering, Tracy L. Hendren; and a structural engineer from the SAS Engineering Division, established a forward operations center on the ground. Flooded roads, washed-out highways, and debris prevented the team from accessing the installation for the first 24 hours, but coordination between SAD and the Customs and Border Patrol enabled SAD Commander, Brigadier General Diana M. Holland, and Captain Kerry Horan, project engineer from the USACE Los Angeles District, to obtain air transport within hours. This early contact and leader reconnaissance represented the first USACE presence on MOTSU and set conditions for follow-on assets to arrive.

The presence of USACE subject matter experts, many of whom brought with them extensive experience in disaster response in the affected area, ensured that the information and assessments coming from MOTSU were relevant, technically sound, and timely. An accurate understanding of the situation on the ground provided input for the common operating picture at the USACE headquarters level, which increased the quality of support provided by all agencies involved. This information supported the decision-making processes throughout the Department of Defense, including the Army Materiel Command, Military Surface Deployment and Distribution Command and many others.

UOC Headquarters Management and Information Distribution

During a typical hurricane season, USACE regularly tracks potentially significant systems from the UOC, which is manned 24 hours per day, 7 days per week, and acts as the informational center of gravity during any USACE emergency response operation. Anticipating significant effects from Hurricane Florence, the UOC issued its first operations order the evening of 10 September 2018, pre-positioning USACE assets to assist local first responders and the Federal Emergency Management Agency along the east coast.

Under Section 5 of the Flood Control Act of 1941, Public Law 84-99, USACE has the authority to act as a component of the Department of Defense and as the designated lead agency in support of the Federal Emergency Management Agency for Emergency Support Function Number 3, Public Works and Engineering.[4] This authority allows USACE to rapidly respond to developing emergency situations in the areas of disaster preparedness, emergency operations, rehabilitation, restoration, drought assistance, and emergency water assistance, working with local agencies to prevent and mitigate damage due to natural disasters. Using the provisions of Public Law 84-99, the Chief of Engineers, Lieutenant General Todd T. Semonite, directed the pre-positioning of planning response teams and five Emergency Support Function Number 3 team leaders in support of USACE North Atlantic Division and South Atlantic Division.[5] The 249th Engineer Battalion (Prime Power) also deployed subject matter experts throughout affected areas.

In addition to deploying dozens of personnel before landfall, USACE leadership deployed or prepared to deploy a suite of deployable tactical operations systems (DTOS), providing mobile command and control over response assets across the area of operations.

During this time, UOC, led by Colonel Hibner, focused its attention primarily on the safety of military, public, and private dams that, if they failed, could have catastrophic effects on other large Department of Defense installations such as Fort Bragg, North Carolina, and Fort Jackson, South Carolina. The efforts in support of other installations across the Atlantic seaboard consumed valuable UOC resources, yet the operations team was still able to skillfully manage the mission.

OCE and Army Staff Coordination

Traditionally, the U.S. Army National Guard or Army Reserve is mobilized for domestic missions after a natural disaster. It is not unusual for Regular Army forces to assist in large-scale disaster response efforts around the world; however, it is unusual for Regular Army units to be task-organized under a USACE district—a traditionally separate chain of command that intersects only at the OCE. In recent history, Army service component commands supporting unified combatant commands have leveraged units from Fort Bliss, Texas; Fort Bragg, North Carolina; and

Paratroopers from the 161st Engineer Support Company use heavy equipment to repair erosion after Hurricane Florence.

Major General Funkhouser (foreground), observes damage caused by Hurricane Florence.

elsewhere around the world to provide humanitarian and logistical support in the aftermaths of Hurricane Harvey in Texas and Hurricane Maria in Puerto Rico. The ability for governors to activate the Army National Guard, combined with the familiarization of local units whose Soldiers are intimately familiar with the area, make the Army National Guard an attractive and usually quicker option in situations where response time is crucial. However, complications arise when dealing with damage to installations or federal properties. The differences in authorities between the Army components can create significant challenges when selecting which assets are appropriately suited for the mission. Matching the capability and the requirement within the correct component was one of the major obstacles that OCE, FORSCOM, and Army staff needed to overcome in order to expeditiously deploy the 161st Engineer Support Company to the affected area.

Every year, FORSCOM places multiple units throughout the Army on prepare-to-deploy orders so that they are ready to provide support across the country in the event of a natural disaster. In 2018, the 161st Engineer Support Company was designated as the supporting engineer element for U.S. Army Northern Command. Given the time available and the scope of the mission to provide engineer support to MOTSU and the equipment required for a ground convoy from point of origin to MOTSU, the 161st Engineer Support Company was determined to be the most ready and capable force. Therefore, OCE worked with FORSCOM engineers to release the company from its prepare-to-deploy orders and issue new orders to deploy to MOTSU. Initially, questions were raised about whether such a task organization was possible and if it would conform to the specific authorities and regulations, given the circumstances. Planning and coordination between all units involved during the orders process mitigated the time spent sorting out the order itself, enabling the 161st to be ready to deploy as soon as the order was published.

According to the FORSCOM Deputy Engineer, Lieutenant Colonel Michael L. Sellers, the process went as quickly as could reasonably be expected. Large-scale situations that do not fit neatly into any single mission category must be addressed individually, which can cause delays at the interfaces between separate entities. However, the execution of this process and the lessons learned will certainly help facilitate future operations.

Short-Order Contracts

One of the most complicated and difficult aspects of any major operation of this scale is funding. The scope of the recovery requirement, which changed rapidly based on real-time updates from the assessment team, dictated the magnitude of the cost and priority of effort, which affected the types of funding that could be used and how quickly money could be obligated—a major factor in this event. While these actions are often transparent to those executing the mission, they play a critical role in enabling every step of the mission.

> ***"The response was a masterful demonstration of the use of all available assets to solve a strategic-level problem by leveraging organizations at the tactical and operational levels."***

The end of the fiscal year presented the biggest challenge to the contracting teams, which arrived 2 weeks after landfall. In order to use appropriated funds from fiscal year 2018, it was necessary to complete the entire contracting process in less than 14 calendar days. This process, which normally takes 6 months or longer to complete, includes the development of the scope of work, assessments, solicitation, negotiations, evaluations of proposals and, finally, the development and signing of the contract itself.

The contracting team at the Savannah District, led by Ms. Paige H. Blechinger and Lieutenant Colonel Thomas D. Kelley, used every vehicle available to make sure that the responders on the ground had adequate capabilities to execute their mission in an unimpeded fashion. This included using government purchase cards at local retailers as they slowly began to reopen and restock and taking advantage of specific provisions in contracting law that allowed them to award expedited contracts to companies that met certain criteria. They also used existing installation support contracts from the Omaha District, the Huntsville District, the Wilmington District, and the Army Contracting Command, allowing them to tap into money already earmarked for operations and maintenance at MOTSU.

The emphasis placed on these efforts at every level from all commands involved, along with the extraordinary teamwork displayed by all of the contracting offices involved, led to the near-seamless execution of short-order contracts, providing the materials, labor, and life support required to return MOTSU to full operational capacity.

Conclusion

The individual Herculean efforts of any one of the four lines of effort would not have succeeded in accomplishing the mission at MOTSU; the cooperation and coordination of the other three were required. The response was a masterful demonstration of the use of all available assets to solve a strategic-level problem by leveraging organizations at the tactical and operational levels.

Natural disasters of the scale of Hurricane Florence devastate communities and infrastructure. Decades of planning, development, and culture can be irreparably damaged in hours or days. However, these events also provide a venue for the professionals of the Army, the Engineer Regiment, USACE, the Federal Emergency Management Agency, and local civilian agencies to showcase the true depth of capability and expertise that can be brought to bear. Although the story of MOTSU is, in many ways, an unfortunate one, everyone involved in the response and recovery came away better prepared for the next event, which will undoubtedly come sooner than anyone would like.

Endnotes:

[1]Robbie Berg and Jamie Rhome, "Hurricane Florence Advisory Report Number 26," 5 September 2018, <https://www.nhc.noaa.gov/archive/2018/al06/al062018.public.026.shtml>, accessed on 8 April 2019.

[2]"Assessing the U.S. Climate in 2018," 6 February 2019, National Centers for Environmental Information, <https://www.ncei.noaa.gov/news/national-climate-201812>, accessed on 8 April 2019.

[3]"Military Ocean Terminal Sunny Point, North Carolina," Department of Defense, <http://www.oea.gov/project/military-ocean-terminal-sunny-point>, accessed on 10 April 2019.

[4]"Public Law 84-99, Section 5 of the Flood Control Act of 1941," 20 December 2011, <https://www.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/475476/emergency-response/>, accessed on 8 April 2019.

[5]Ibid.

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U.S. Army photos by Russell A. Wicke

SOLDIERS ASSESS THE STANDOFF ACTIVATED VOLCANO OBSTACLE AT FORT LEONARD WOOD

By Mr. Charles R. McGinnis

The U.S. Army Maneuver Support Center of Excellence Battle Laboratory, in partnership with the U.S. Army Training and Doctrine Command (TRADOC) Capability Manager–Maneuver Support and U.S. Army Combat Capabilities Development Command (CCDC) Armaments Center (AC), conducted a Standoff Activated Volcano Obstacle (SAVO) focused assessment at Fort Leonard Wood, Missouri, 3–14 December 2018. The purpose of the SAVO focused assessment was to assess and improve proposed SAVO tactics, techniques, and procedures (TTP); SAVO training support packages; and doctrine and tactics training and to gather information on the human system integration of the current SAVO baseplate prototype and system as a whole. Initial findings for this focused

Soldiers prepare to initiate a SAVO minefield with a Spider.

Soldiers install SAVO baseplate and Volcano canisters to form a SAVO pod.

assessment indicate that U.S. and United Kingdom (UK) soldiers were able to successfully—

- Employ SAVO using multiple means of initiation.
- Validate SAVO combat-configured loads.
- Recover, reuse, and repack SAVO system components.
- Validate the installation of SAVO minefields and gain control of the SAVO baseplates with installed Volcano canisters (pods) portion of the engagement area development process.

Participating Soldiers provided recommendations to refine SAVO in the categories of training, TTP, SAVO baseplate, and ancillary equipment design. These recommendations will influence future SAVO capability development; and ultimately, SAVO will provide brigade combat team (BCT) commanders with the means to emplace recoverable and reusable tactical obstacles in the engagement area.

SAVO combines components of the fielded systems of the M7 Spider, MK152 Remote Activation Munition System (RAMS), standard Army blasting machine (with one low-risk developmental component), SAVO baseplate, and M88 and M89 practice mine canisters to provide maneuver commanders with a recoverable and reusable tactical obstacle capability to supply a BCT with an area obstacle. Soldiers participating in the SAVO focused assessment assessed the following fielded system components:

- **M7 Spider.** The Spider networked-munitions system provides a safe, effective alternative to persistent antipersonnel land mines. The Spider is a portable, remote-controlled, human-in-the-loop protection and area denial munition system. The Spider consists of a remote-controlled station, a repeater, and munition control units. The repeater is a relay device used to extend the control range in difficult terrain. Each munition control unit is capable of using six miniature grenade launchers that provide the organic lethality for the Spider. Munition control units are also capable of using six munition adapter modules with the M18A1 Claymore mine, the M5 Modular Crowd Control Munition, and other electronically initiated munitions.
- **MK152 RAMS.** The MK152 RAMS provides wireless capability to initiate explosives, demolition materials, and munitions through natural and man-made media.
- **Standard Army blasting machine.** Blasting machines provide the electric impulse needed to make electric blasting caps function.
- **SAVO baseplate.** The SAVO baseplate is a hand-emplaced component positioned to create minefield building blocks and obstacles. The baseplate launches Volcano mine canisters. SAVO baseplates are stackable for convenient transportation.

A Soldier prepares to initiate a SAVO minefield with RAMS.

Soldiers connect a SAVO point and disrupt minefield with firing wire.

- **M88 practice mine canister.** The M88 practice mine-training canister is an expendable item consisting of an aluminum tube and breech assembly containing six dummy mines. A dispersion strap and propulsion system are also housed in the canister.
- **M89 practice mine canister.** The M89 practice mine-training canister is a reusable, inert canister. The major components of the canister are a breech and connector assembly; a heavy wall tube; an end cap; a switch mounting plate; a rotary, four-position switch; resisters; and a fuse. The M89 training canister is physically comparable to the M87 and M88 canisters.

TRADOC Capability Manager–Maneuver Support training cadre and the Armament Research, Development and Engineering Center conducted new-equipment training with U.S. Soldiers from the 5th Engineer Battalion and UK soldiers from the 3d Armored Engineer Squadron. New-equipment training, conducted from 3 to 7 December 2018, consisted of technical preparation and operator training. Technology providers and training cadre provided technical and tactical training on the operation and emplacement of SAVO to SAVO operators and squads. The new-equipment training resulted in operators and squads being fully trained in the planning and emplacement of SAVO point-and-disrupt minefields and on the preparation of combat-configured loads for the minefields using U.S. and UK initiators.

The Maneuver Support Battle Laboratory collected qualitative and quantitative data during the assessment week, which took place 10–14 December 2018. Soldier and squad abilities to emplace SAVO as described in Army Techniques Publication (ATP) 3-90.5, *Combined Arms Battalion*,[1] were assessed with surveys and study questions. Analysts and training cadre collected data through direct observation of Soldiers emplacing SAVO and from Soldier feedback through daily after action discussion reviews and completed surveys in the categories of training, TTP, SAVO baseplate, and ancillary equipment.

Soldiers quickly learned about the SAVO and provided excellent feedback. The feedback provided valuable insights that met SAVO focused assessment study objectives. Squads successfully emplaced SAVO and demonstrated the ability to create tactical obstacles by employing point-and-disrupt minefields, as would be required in support of a BCT according to Army doctrine.

Soldiers emplace a SAVO point-and-disrupt minefield.

A SAVO is initiated during a demonstration.

U.S. Soldiers safely activated point-and-disrupt minefields using alternate means of initiation, to include the M7 Spider, MK152 RAMS, and standard Army blasting machine. UK soldiers safely activated point-and-disrupt minefields using alternate means of initiation with their respective initiators.

Squads successfully demonstrated the ability to recover, repack, and reuse all emplaced SAVO components to a pre-initiation state. Soldiers thought that recovery, repacking, and reuse were practical and valued for all components except the electrical firing wire. Soldiers noted that recovery and reuse of electrical wire are difficult and time-consuming, introducing potential faults in the system and resulting in longer redeployment time.

The TRADOC Capability Manager, in coordination with the CCDC AC, is in the process of assessing and incorporating key Soldier recommendations to improve and enhance SAVO in the following categories:

- **Training.** Develop a reloadable Volcano practice canister with inert mines for training.
- **TTP.** Do not reuse electrical firing wire in a tactical/operational environment.
- **SAVO baseplate.** Develop a two-action (locking and arming) lever that is more strategically positioned on the baseplate so that it does not interfere with the stakes that anchor it to the ground.
- **Ancillary equipment.** Develop a wire spool (with a round design and handle) that holds 80 meters of electrical firing wire and a wire reel with a double-lead electrical firing wire.
- **Rigid stake.** Develop a rigid stake with a larger strike surface to easily anchor the SAVO baseplate to the ground.

Squads successfully validated countermobility TTP, planned and integrated obstacles, emplaced SAVO minefields, and gained control of SAVO pods using an M7 Spider remote-controlled station, as described in Army Doctrine Reference Publication (ADRP) 1-03, *The Army Universal Task List*.[2]

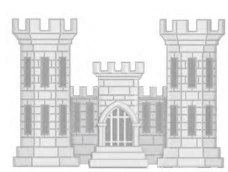
Working with system integrators and capability developers, Soldiers will continue to test, evaluate, and improve SAVO through future assessments. The SAVO baseplate is a low-risk, low-cost solution that pulls together existing systems and creates a greatly needed obstacle capability. Ultimately, SAVO will give BCT commanders the means to emplace recoverable and reusable tactical obstacles in the engagement area. Success in the engagement area depends on how effectively the commander can integrate the obstacle plan, the direct/indirect fire plan, and the terrain.

Endnotes:

[1]ATP 3-90.5, *Combined Arms Battalion*, 5 February 2016.

[2]ADRP 1-03, *The Army Universal Task List*, 2 October 2015

Mr. McGinnis is an operations research analyst for the U.S. Army Maneuver Support Center of Excellence Battle Laboratory, Fort Leonard Wood, Missouri. He holds a bachelor's degree and a secondary teaching credential in physical science from Humboldt State University, Arcata, California, 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
G-3/Directorate of Training and Doctrine (DOTD)

Publications Currently Under Revision

Publication Number	Title	Description	Tentative Publication Date
FM 3-34	*Engineer Operations*	This update focuses on engineer support to large-scale ground combat operations and will nest with, and incorporate topics from Field Manual (FM) 3-0, *Operations*. It will also incorporate and subsume Army Techniques Publication (ATP) 3-34.23, *Engineer Operations–Echelons above Brigade Combat Team*.	4th quarter, fiscal year (FY) 2019
ATP 3-34.22	*Engineer Operations–Brigade Combat Team and Below*	This update will incorporate FM 3-0, *Engineer Operations–Brigade Combat Team and Below*, and will focus on large-scale ground combat operations, including task force engineer tasks, enabler integration and updates to brigade engineer battalion, and echelon above brigade unit capabilities.	1st quarter, FY 20
TM 3-34.85/ MCRP 3-17A	*Engineer Field Data*	This multi-Service publication will be updated with great input and support from the small-group leaders within the U.S. Army Engineer School (USAES) Department of Training and Leadership Development.	2d quarter, FY 20

How can you provide feedback to doctrinal publication reviews?

As Soldiers and civilians, you have the opportunity to provide feedback on our doctrinal publications as well as those staffed across the Army. For existing publications, please e-mail us directly with your feedback. For doctrinal publications that are under assessment or revision, the staffing process includes a 45-day period for comments, which are accepted regardless of rank or position. However, there are requirements associated with the *level* of comment. Below are the descriptions associated with *critical*, *major*, *substantive*, and *administrative* comments. We have added additional notes annotating the rank equivalent associated with the level of comment.

C—**Critical.** Contentious issue that will cause nonconcurrence with the publication; requires general officer level backing.

M—**Major.** Incorrect material that may cause nonconcurrence with the publication; requires colonel level or above backing.

S—**Substantive.** Factually incorrect material.

A—**Administrative.** Grammar, punctuation, and style issues.

Regardless of the level of comment, we welcome feedback to ensure that the information that we are capturing for the Regiment is current, relevant, and useful for the force.

Engineer Doctrine Update

U.S. Army Maneuver Support Center of Excellence

G-3/Directorate of Training and Doctrine (DOTD)

New Engineer Publication Highlights

Training Circular (TC) 3-34.80, *Army Geospatial Guide for Commanders and Planners*, was published to the Army Publication Directorate (APD) Web site, <https://armypubs.army.mil>, on 14 February 2019. Updates to this TC consist of a compilation of tactics, techniques, and procedures to help engineers, commanders, and staff planners understand the capabilities of geospatial engineering.

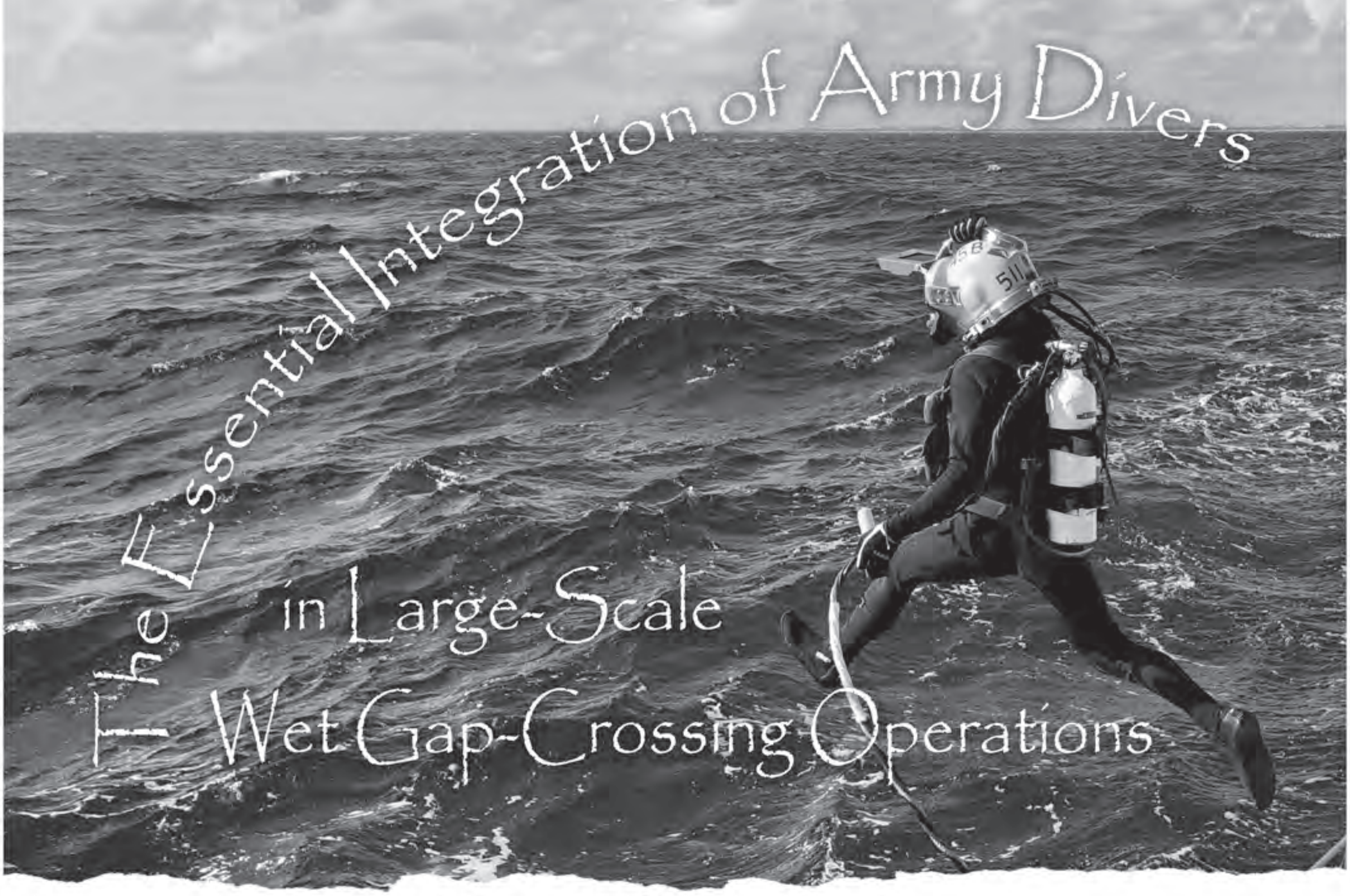
Technical Manual (TM), 3-34.56, *Waste Management for Deployed Forces*, was published to the APD Web site on 29 March 2019. Updates to this TM focus on the brigade level and below and provide best practices and techniques for conducting waste management activities while deployed. The TM describes the waste streams that are generated and provides guidance on minimizing the harmful effects of waste on human health, the environment, and the mission. TM 3-34.56 also describes the planning necessary to estimate generated waste based on unit functions and activities and provides guidance on generating and implementing waste management solutions to fulfill immediate and long-term waste requirements. This publication includes a compilation of techniques and procedures found in doctrine, lessons learned, and other reference material; it serves as a how-to guide for managing waste generated at the tactical level.

Joint Publication (JP) 3-15.1, *Counter-IED Activities*, had an expiration clause of July 2019; however, the joint staff agreed to keep this manual. The Department of Defense (DOD) Threat Reduction Agency (DTRA) and the joint staff will be the lead agents for future reviews.

Relevant Center for Lessons Learned (CALL) engineer resources, including Catalog 19-10, *Set the Theater and Wet-Gap Crossing Catalog* (coming soon), are available on the CALL Web site at <https://usacac.army.mil/organizations/mccoe/call/publications>.

Please contact us if you have any questions or recommendations concerning engineer doctrine:

Lieutenant Colonel Carl D. Dick, Telephone: (573) 563-2717; Mr. Douglas K. Merrill, Telephone: (573) 563-0003; Engineer Doctrine Team, e-mail: <usarmy.leonardwood.mscoe.mbx.engdoc@mail.mil>.



The Essential Integration of Army Divers in Large-Scale Wet Gap-Crossing Operations

By Captain Brian T. Kloiber

From 11 to 16 June 2018, Task Force Fighter, 5th Engineer Battalion, conducted a 600-meter wet-gap crossing at Fort Riley, Kansas. Task Force Fighter consisted of the Headquarters, Forward Support Company; 50th Multirole Bridge Company (MRBC), and three additional MRBCs for which the 5th Engineer Battalion had operational control to provide a proof of concept for projection of combat power across large-scale wet gaps.

My professional background is largely rooted in engineer diving operations. When I learned that my first duty position upon completion of the Engineer Captain's Career Course could be closely tied with water operations, I jumped at the opportunity to be involved. The 5th Engineer Battalion was 1 month away from departing home station at Fort Leonard Wood, Missouri, when I arrived at the unit. Our mission was to support the 1st Infantry Division's Operation Gauntlet at Fort Riley. On Day 1, my first question to the executive officer and the staff planning cell was, "Which of my fellow diving officer detachments will be supporting this major bridging operation?" Unfortunately, I learned that, although the

A surface-supplied diver deploys from a pier.

Soldiers jump from a helicopter into the water during helocasting operations.

20th Engineer Brigade had been requested to send divers to support the mission, it was unable to do so.

As the task force logistics officer, I had an inside perspective on the planning and execution of the bridge construction. In the original manifestation of the 600-meter bridge construction plan, the MRBCs were to construct and hold the bridge in place with bridge erection boats. According to MRBC doctrine, the bridge erection boats are intended to hold any bridge (up to its full load capacity) in place for up to 72 hours. However, by the time the task force reached Fort Riley, the plan had morphed into an exercise demonstrating an anchorage plan for a bridge in place for more than 72 hours. Although the bridge was intended to be in place for only 48 hours at most, the added anchorage served as reassurance to our supported maneuver brigade that the bridge would be as safe as possible. Our anchorage plan consisted of 28 individual concrete blocks secured with half-inch-diameter wire rope and lowered into the water from the boom arm of a hydraulic excavator (HYEX). The wire rope would be fastened to the side of the bridge, and the concrete blocks would be recovered via hydraulic excavator and brought back to the surface from the lake bed.

From the perspective of an engineer diving officer, there were many issues with this plan. The overarching planning shortfall throughout the operation was the absence of divers during a task force level training mission in support of an armored brigade combat team, executed primarily in and around water. Without the aquatic salvage expertise of divers, the task force disregarded the impact of the mud on the anchorage system. Suction occurs when a heavy object sinks to the lake bottom and the weight buries the object into the mud or silt. This creates a vacuum when trying to remove the object from the mud. This effect is not a factor for typical planning within an MRBC; however, accounting for the factor is second nature for a salvage diver.

Failure to consider the mud suction during planning can have many effects on attempts to recover sunken objects. The additional force required to pull out the sunken object without

Soldiers participate in helocasting operations.

Divers deploy from an Army vessel.

dredging around it can over-strain equipment, causing damage. Likewise, on an unstable lifting platform such as an interior bridge bay, there is a heightened risk of tilting the lifting surface by exerting a perpendicular force at a distance away from the center of gravity of the HYEX, which could capsize the floating bridge. Luckily, neither of these major consequences impacted the success of our mission.

On the off chance that there would be too much mud suction, MRBC Soldiers fastened wooden pallets to the concrete blocks with parachute cord during emplacement to create sacrificial bottoms that would break free long before the wire rope would break.

My concerns about the mud suction in the lake bed merited minimal consideration during the planning process. The pallets beneath the concrete blocks seemed like an excessive planning factor that would not actually be needed. During the proof of concept portion of the anchorage plan, the MRBC conducted testing of the anchorage with 12 pallet anchors, as previously described. The anchors went down with pallets tightly secured beneath them; on the same day, we recovered the anchors. Only one pallet returned to the surface. The remaining 11 pallets were subject to the aforementioned mud suction and did not return to the surface. Retrieving the pallets will be the objective of a future mission.

This test run of the anchorage plan was not ideal. From operational and environmental perspectives, it is rarely acceptable to bring consumable supplies to a training site, lose them, and walk away—although, given the conditions, there was nothing more that we could safely do. According to historical maps, the lake was 15 to 18 feet deep at the deepest points. We did not have the capability of determining how the pallets were situated. But because the parachute cord had been snapped, we could safely assume that the pallets were essentially planted in the lake bed and literally became “sticks in the mud.”

Operationally, we determined that significant mud suction occurred after just a few hours on the lake bed. The bridge, in comparison, would be in place for 48 hours. For a division wet gap-crossing operation, this could have been a decision point/trigger to commit divers to the operation in order to properly maintain and recover all of the bridging assets. Instead, with no on-site dive support, the task force assumed risk in emplacing the full bridge closure across the wet gap. Without conducting an underwater reconnaissance, the risk that was accepted included the ability to verify depth, lake bed composition, and the presence or absence of obstacles. Fortunately, we were successful with the bridge closure and the 1st Infantry Division wet-gap crossing. However, the risk could have been mitigated and the operation could have been significantly enhanced with on-site dive capability.

An Army engineer dive detachment has organic capabilities that would be extremely useful in a bridging operation involving anchorage and overall safety support around the water. First, with regard to training, conducting operations around water is dangerous for personnel and equipment. As a task force, we mitigated the risk to personnel by requiring life jackets for everyone who came near the

Operation Gauntlet

water and annual Army Combat Water Survival Test certification for all MRBC personnel. However any equipment dropped into the water might as well have been sent to the moon because the search for, and retrieval of, underwater equipment in unknown bottom conditions is risky. According to U.S. Navy Publication Number SS521-AG-PRO-010, U.S. Navy Diving Manual, any underwater military dive requires stringent manning and qualification standards.[1] While considering a breath-hold dive to retrieve lost equipment may seem a viable back-up plan given the relatively shallow overall depth of the water beneath the bridge, it is against diving regulations. Breath-hold diving is reserved solely for confidence building in highly controlled training conditions at the U.S. Naval Diving and Salvage Training Center, Panama City Beach, Florida, and is not an option for commanders in retrieving equipment.

Operationally, divers provide the engineer task force commander and the maneuver commander with more fidelity and assurance that a wet gap is crossable by maneuver units and that the equipment is rapidly recoverable to maintain operational tempo. Before deploying the bridge, a dive detachment can conduct a reconnaissance of the planned bridge enclosure site to collect bottom samples, predict mud suction, conduct a hydrographic survey, use side-scan sonar to map the lake bed topography, and visually clear the area. Divers can also monitor antiswimmer nets and emplace protective water obstacles to prevent sabotage from enemy divers or the interference of debris with the bridge anchorage.

In the event that plans call for a bridge to remain in place for 72 hours or more and anchorage is employed beneath the surface of the water, divers are a necessity. The mission is entering another domain that requires the involvement of divers who can place and maintain anchorage in the water. Without underwater capability, the commander has no assurance that the anchorage remains intact and free from disruption or any guaranteed manner of recovering equipment from beneath the water because land-based equipment is not capable of visualizing and effectively influencing underwater.

From my perspective as a diving officer, the biggest takeaway going forward from Operation Gauntlet is the necessary integration of divers in operations involving long-duration float bridges. If conducting a wet-gap crossing in which the bridge is intended to remain in place for lines of communication and sustainment, plans to include divers in the task organization are necessary. Doctrine already identifies divers as an essential component of a combined arms wet gap-crossing operation. As we refocus training efforts toward large-scale, direct-action operations such as combined arms wet-gap crossings, we cannot neglect the lessons learned by previous Army generations.

In training, it is not feasible to require that MRBCs have an on-site, supporting dive detachment. Divers are a scarce resource, and their mission set is more diverse than the tasks that they would conduct to support wet-gap crossings. However, it is beneficial for MRBCs and maneuver forces to build relationships with dive detachments. Such familiarity will allow them to expand their influence beyond the surface of the water and more wholly affect their environment and the battlefield.

Endnote:

[1]U.S. Navy Publication Number SS521-AG-PRO-010, *U.S. Navy Diving Manual,* Revision 7A, 30 April 2018, <https://www.navsea.navy.mil/Home/SUPSALV/00C3-Diving/Diving-Publications/>, accessed on 10 April 2019.

Captain Kloiber is the support operations officer for the 5th Engineer Battalion, Fort Leonard Wood, Missouri. He holds a bachelor's degree in nuclear engineering from the U.S. Military Academy–West Point, New York.

Army Corps Dive Team Delivers Expertise Worldwide

By Mr. Richard A. Benoit

Initiated in 2012, the Forward Response Technical Dive Team includes approximately 20 engineers, biologists, geologists, program and project managers, and technicians from throughout the U.S. Army Corps of Engineers (USACE). Members are stationed at districts throughout the United States (in Concord, Massachusetts; Buffalo, New York; Philadelphia, Pennsylvania; Portland, Oregon; and Saint Paul, Minnesota); the Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi; and the North Atlantic Division, Fort Hamilton, Brooklyn, New York. Since inception, this elite team has safely assisted with and executed more than 100 missions worldwide. The team performs certified structural inspections on bridges, piers, wharfs, docks, and seawalls for ERDC and the Army Installation Management Command.

Preparing a diver for a December splash in the Potomac River

In 2017, the team performed dive operations at USACE dams, locks, and channels throughout the United States, including Alaska, Connecticut, New York, Oregon, and Pennsylvania; Pier 8, Busan, South Korea; and Camp Darby Livorno, Italy, and provided on-site dive planning and safety oversight at Mosul Dam in Iraq.

During 2018, members of the USACE Forward Response Technical Dive Team spent 36 hours traveling 13,000 miles over a period of 6 days for a 2-week mission to the Republic of the Marshall Islands. The team executed its mission of performing underwater reconnaissance, bottom surveys, and inspections in support of a $52-million pier rehabilitation project at U.S. Army Garrison–Kwajalein Atoll, Republic of the Marshall Islands. "It is the diversity of our dive team that creates a synergy, which is the hallmark and catalyst of our program," said team safety officer Mr. Darryl D. Bishop, dive supervisor during the Kwajalein mission.

The team logged a total of more than 100,000 miles in 2018. They brought specialized individual and collective engineering expertise to underwater missions the world over. Team members closed the exceptionally hectic 2018 schedule with December dive missions, inspecting piers and wharfs in the frigid Potomac River, Fort Belvoir, Virginia, and in the icy New York Harbor at Naval Weapons Station Earle, across from Sandy Hook Peninsula, New Jersey. "We have been a very busy team the past 12 to 24 months," said co-team lead Mr. Steven M. England, a USACE diver and dive supervisor for nearly 20 years. "However, this is exactly the way we all like it," he continued, "We are busy, but we safely and efficiently execute critical underwater inspection missions as well as manage dive operations to evaluate the structural integrity of essential waterfront facilities and coastal infrastructure."

"Diving is only a collateral duty—not a full time job—second in priority to our primary responsibilities, which makes missions especially challenging," said England. "I am not complaining; we dive because of its importance to the USACE mission and because we love diving," he added.

Mr. England works as a hydraulic engineer with the Philadelphia District, where he specializes in scour analysis. He indicated that missions can last anywhere from 1 day to 1 month. Additionally, he explained that preparation time is needed to pull together a qualified team. Researching and writing a working dive plan, checking equipment, making travel arrangements, and traveling to the site are very time-consuming. Once the underwater work is completed, outbriefings and technical reports must be written.

The team began 2019 with some time-critical post-hurricane inspections—one at Galveston Bay, Moses Lake, near Texas City, Texas, in January and another at a levee flood gate at Guajataca Dam, Quebradillas, Puerto Rico, in February.

In Puerto Rico, team members from the Buffalo District completed underwater inspections of Guajataca Dam using a remotely operated vehicle (ROV) and divers. This mission required the collection of structural details, measurements, and descriptions of conditions from 75 feet underwater in support of the Jacksonville District and Federal Emergency Management Agency assignments to repair the aged structure damaged by Hurricane Maria. "An extraordinary amount of planning and coordination were dedicated to this critical dive and ROV operation. There were so many unknowns going into the mission," said Ms. Shanon A. Chader, the Guajataca Dam dive team lead. Chader, who also served as the mission safety officer, dive supervisor, and a diver, added, "Our team worked closely with the Jacksonville District to ensure we understood the job at hand, which allowed us to safely and efficiently complete our task." Chader explained, "During the week-long mission, divers inspected and measured underwater gates as well as trash rack approaches, channels, and wing walls; all information was vital to effectuating repairs."

Forward Response Technical Dive Team members at Kwajalein Atoll, the Republic of the Marshall Islands

"We have a can-do attitude when it comes to accepting missions and accomplishing the tasks at hand," said diver and dive supervisor Mr. John R. Bull III, Vicksburg, Mississippi. "We have an outstanding group of highly skilled engineers and divers who work very well together. We look out for each other and keep everyone safe. If we cannot ensure safety and look out for each other, we will not accept the job," Mr. Bull added.

Diving to depths of 110 feet, sometimes in near-freezing, turbid conditions, divers share the water with predators such as alligators, sharks, and snakes, which they sometimes cannot see. Dive teams use shore spotters; underwater high-intensity lights; and poke rods, as needed, against predators. The team utilizes a variety of job-specific

A diver is prepared for an inspection and repair dive.

underwater methodologies. For example, surface-supplied air (SSA) equipment, which is often used by the team, includes a helmet attached to a hose that delivers unlimited amounts of air to the diver to breathe. SSA equipment has a communication/video line coupled with the air line. This enables divers to be hard-wired to the surface to provide real-time live sight and sound, which allows divers to communicate with their teammates on the surface as well as send live-time video of their work area. SSA enables divers to remain in the water longer, allowing flexibility to perform a variety of underwater work, including maintenance and installation of equipment, visual inspection, and nondestructive testing. The team also conducts ship husbandry, surveys, and salvage; eradicates invasive species; and develops and repairs fish habitat.

"Our team has the ability to mobilize with a wide variety of gear, which meets our most unique and demanding mission needs anywhere in the world," explained equipment manager Mr. Weston P. Cross from the Buffalo District. "During a 3-week period in 2018, we inspected nearly 15,000 linear feet of seawall and piers at three sites in Okinawa, Japan. The work required multiple mobilizations of dive, safety, and inspection equipment, which allowed divers to complete difficult underwater visual, tactile, and nondestructive testing surveys, providing information leading to critical repairs," he said.

"I believe one of the greatest values of our team is that we bring to missions a highly experienced, well-rounded, multifaceted team," said Mr. Adam W. Hamm, Chief, New York and Pennsylvania Operations and Management. Hamm, a diver and dive supervisor, was a diver during a 10-day June 2018 mission to Kure, Akizuki, and Hiro Ammunition Depots in Hiroshima, Japan. "We have the capability to physically perform the underwater inspections, and we also have years of engineering experience and technical background to come up with valuable repair alternatives and cost estimates for our clients," stated Hamm.

A diver surveys and records video of a critical structural deficiency in a concrete seawall during inspections.

Mr. Benoit is an emergency management specialist at the North Atlantic Division, Fort Hamilton, Brooklyn, New York. He is a founding member of the USACE Forward Response Technical Dive Team, a dive subject matter expert, and a certified National Association of Underwater Instructors with more than 40 years of combined commercial, government, and recreational diving experience.

Facilitating the Future: Why Overengineering Should be the Military Norm

By Captain Aaron C. Miley

While on my most recent tour to the Republic of Korea, I discussed the costs of one of our projects with a peer, and I quipped about how much we had saved the government by completing the project far under budget. My peer accurately responded that, unfortunately, not spending the money would not save it. In the civilian sector, the profit margin is generally tied directly to the difference between the negotiated price of a project and the final cost. Although the military does not work for profit, any money left over at the end of a project is returned to the Department of Defense coffers to be redistributed and spent during the period in which it was allocated—usually within 1 to 5 years. In many aspects, the military struggles to keep up with its civilian counterparts in the construction industry. However, due to the distinct differences in financing, we have the opportunity to be on the cutting edge of change in the practice of engineering. If we can change the way we design and build projects so that we always utilize our entire budget, rather than finishing under it, we will be able to provide something that truly saves taxpayer dollars: facilities that are built to last.

Historically, some of the worst profit margins in industry are found in the area of construction, with quarterly highs of roughly 5 percent compared to 9 percent for the average private U.S. company.[1, 2] With clients who usually want to see an immediate return on investment and with the lowest bid technically acceptable frequently winning contracts, negotiating additional capital for sustainable buildings continues to be a struggle. Over the life cycle of a structure, operation and maintenance costs run an average of five times as much as the initial costs of construction, increasing as the structure reaches the end of its service life and continuing until the expense of maintenance and need for modernization drive reconstruction.[3] Yet, even when life cycle costs are properly analyzed, many facilities are not replaced when they are initially planned for replacement. And the military is one of the worst offenders.

Airmen reconstruct a facility in Korea.

The military makes use of four construction levels: initial, temporary, semipermanent, and permanent. The field force engineer usually builds in the temporary to semipermanent range, with facility life expectancies of 5 to 25 years; anything with a greater life expectancy is considered permanent. Facilities located on established installations and having well-managed maintenance plans and budgets are reportedly made up of structures with an average age of between 35 and 40 years.[4] Most Soldiers who have deployed have stayed or worked in a building that was built to last 5 years and is currently in its 15th year of use. Still more of our infrastructure outside the continental United States was established during the Cold War. The military spends vast amounts of money trying to perform upkeep on structures that should have been replaced long ago. While this problem continues, we can do our part now to prevent future problems by maximizing the funds that we have allocated to each project.

An Airman demolishes a concrete pad during deployment to the Republic of Korea.

Being an engineer requires a unique understanding of the environment and respect for the power of nature. Our designs must take massive floods, catastrophic earthquakes, frigid temperatures, and tempest winds into account. Always building for a worst-case scenario is uneconomical and wasteful; it makes little sense to create a structure that is designed to withstand a 100-year storm for a 5-year mission. The American Society of Civil Engineers (ASCE) 7-10, *Minimum Design Loads for Buildings and Other Structures*, for instance, calls for snow loads to be determined based on a 2 percent chance of being exceeded in 50 years.[5] We always assume risk, then do our best to mitigate its effect. Overdesign is planned into every calculation. Design loads should be multiplied by a risk factor and load case combination and then multiplies it again for a factor of safety. Engineering is the science of counterbalancing uncertainty. Because no material is ever truly homogeneous and no force is ever constant, we tip the scales to compensate for the unknown.

To help strike this balance, we design structures to withstand environmental loads based on historical data for the region in which they are to be constructed. Using this information, engineers predict the most likely scenario and the worst-case scenario for the life cycle of a facility. History has been the primary teacher for successful construction around the world; but even the lessons we have learned are based on small data sets in the grand scope of time, and we are presently facing the reality that they may no longer be accurate. Professor Bilal M. Ayyub, PhD, Professional Engineer, discusses this very concern as a guest on *The Civil Engineering Podcast*.[6] Changing climates are beginning to shift the frequency and magnitude of major events, driving a change in new-construction design philosophy. Designs that are adaptive to variability and infrastructure that can be strengthened without a complete rebuild can ensure the longevity of a structure with the least amount of economic risk.[7] Without concern for profit, military engineers can often provide this enhancement through means such as overstrength footers and stiffer columns.

Maybe more than any other type of engineer, military engineers must be flexible and innovative. Strict codes dictating construction in the United States may need to be set aside in favor of rapid solutions to enable military mission success. The International Monetary Fund (IMF), which oversees the international monetary system and monitors the economic and financial policies of its member countries, ensures the stability of the international monetary system. Of the 189 IMF member countries, 39 are classified as having advanced economies, with the remainder considered emerging or developing.[8] It is these other 150 countries for which the military engineer must consistently provide an expedient design, relying on local materials and labor that are typically below U.S. construction standards. Military

Walls for a new laundry and latrine facility

Airmen assist in reinstalling a barrier-arresting kit at Kunsan Airbase, Korea.

engineers must plan for the variables of host nation materials and contractors. And even in booming economies, quality controls that are taken for granted in the United States are frequently nonexistent.

A resilient design that can accommodate unexpected deficiencies enables project completion and guarantees the lifespan of a facility. As an example, concrete is a product widely used by countries that do not follow U.S. construction codes. Rarely is there time to remove and rebuild a structure if the concrete is understrength. Likewise, there is often not time to turn away multiple trucks hauling materials that do not meet minimum slump testing standards. Furthermore, bringing legal action against foreign contractors is not easy. Planning to build stronger structures from the onset safeguards the engineer and the mission as a whole.

With increasing demands on infrastructure to keep up with the ever-changing world, the military must adapt its engineering processes to protect the investment of federal dollars. We have an opportunity to change how we manage our budgets and financial thresholds to build facilities that will sustain our future needs. By accepting greater initial project costs, long-term costs such as operations and maintenance costs will be greatly reduced, less rebuilding of facilities will be required, more facilities can be adapted rather than demolished, and design strength will better offset variability in quality. In lieu of evaluating a project as successful if it is under budget, the baseline should be set at 90 percent of programmed costs and utilization of as close to 125 percent of the budget as possible (as authorized by law), should be the goal.[9]

Demolished concrete pad

Endnotes:

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[6]Bilal M. Ayyub, "TCEP 087: How Civil Engineers Can Adapt to Climate Change and Its Effects on Infrastructure," Anthony Fasano, interviewer, 18 June 2018.

[7]Ibid.

[8]"WEO Groups and Aggregates Information," World Economic Outlook Database, <https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/groups.htm>, accessed on 1 May 2019.

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Building the ARSOF Bench

By Captain Nathan E. Hall

In his February 2019 testimony to the Senate Armed Forces Committee, General Raymond A. Thomas III, commander of the U.S. Special Operations Command (USSOCOM), identified the role of special operations forces in the larger picture of the National Defense Strategy, specifically the directive to "[build] a more lethal force."[1] Key to this effort is the ongoing effort to "recruit, assess, select, and retain the Nation's finest human potential . . . to solve some of the most complex and dangerous mission challenges."[2] Any of these complex and dangerous missions will entail some degree of engineer support. Despite this integral relationship, junior engineer officers are underresourced in preparing to support Army Special Operations Forces (ARSOF). Doctrine covering engineer involvement in special operations is intentionally cursory; Field Manual (FM) 3-34, *Engineer Operations,* alludes to a variety of tasks in a single paragraph:

> *"Engineers support Army special operations forces through a number of unique capabilities and tasks that include geospatial information and services, infrastructure development, facility construction and maintenance, training an indigenous population on how to construct protective obstacles, supply mobile electric power, and facility hardening. . . . Support to special operations tends to require smaller elements with multifunctional capability."*[3]

In most cases, junior officers are not afforded the time and training required to become fully proficient across the engineer portfolio. However, there are steps that newly minted engineers, as well as their organizations and the enterprise at large, can take to improve multifunctional capability and build a bench of competent candidates for supporting ARSOF operations.

Risk Mastery

Junior officers are familiar with the basics of risk assessment. Most have some degree of experience from their commissioning source, time on staff, and time as a platoon leader—identifying hazards, assessing basic likelihood and impact, and determining the means of mitigation. A knowledge of the fundamentals of risk management is necessary, but not sufficient, for engineer support to ARSOF, where operational complexity and tempo require a higher-level fluency with risk. Are you comfortable with converting identified risks and data into risk information? Are you confident in your understanding of your commander's risk tolerance? Can you evaluate the effectiveness of proposed risk controls? Do you understand mitigating risk versus transferring risk versus avoiding risk? If your answer to any of these questions is "no," then you have an opportunity to improve your expertise in risk management—a skill that will serve you well in any job in the Army. Start with a review of Army Techniques Publication (ATP) 5-19, *Risk Management,*[4] and then seek resources other than Army doctrine to broaden your competence in the risk domain.

Engineers supporting special operations are routinely asked to make rapid assessments, with strategic consequences. Junior engineer officers who can succinctly describe risk information in terms of risk to mission and risk to force and then propose a means of addressing the source, mechanism, or outcome are an asset to ARSOF leaders and to organizations Army-wide. To this end, commanders can develop lieutenants and, in the process, better manage risk to their own organizations by raising the acceptable standard for risk assessment and management. Do not allow a cookie-cutter Department of Defense (DD) Form 2977, *Deliberate Risk Assessment Worksheet,*[5] to satisfy the risk management requirement for training, and do not allow risk aversion to supplant risk management. Expect junior officers to think critically about risk as a tool to help balance Soldier welfare with mission accomplishment.

ARSOF engineers on a project site

Technical and Operational Breadth

High-level risk analysis requires a grasp of operational context beyond the unit level. Army officers should seek to broaden their view of the battlefield to include the "bigger picture"; but ARSOF demands a particularly wide view commensurate with its disproportionate impact. Simply put, to frame risk information in terms of risk to mission, you must understand the mission two or more levels up. A brigade staff performing the military decision-making process may have half a dozen staff members assessing the operational environment and risks over multiple iterations; an ARSOF engineer may have mere minutes to execute an abridged version of the same process, understanding mission effects on civilian populations or on tense political power balances (frequent features of ARSOF missions). Reading extensively and broadly, from the well-worn classics to contemporary resources (for example, "The Strategy Bridge"[6]), helps with strategic understanding, as commanders through the ages—with their ubiquitous reading lists—can attest. The onus of responsibility for operational context, on the other hand, lies mostly with unit leaders. Battalion and company commanders should be mentoring their young engineers, helping them understand the maneuver picture and how mobility, countermobility, and survivability apply in a variety of operational environments. ARSOF engineers—even those operating at the tactical level—deliver strategic-level effects when working with infrastructure. Proper mentorship will guide those engineers in advising maneuver commanders on how strategic engineer effects can best be achieved.

Also fundamental to engineer support to ARSOF is the expectation that relatively junior officers will be familiar with a wide province of technical knowledge. Spending time as a platoon leader in a sapper company is no excuse for a lack of understanding about construction sequencing, nor is an engineer spared questions about power generation because his or her degree is in civil engineering. ARSOF organizations assume that engineers can assess diverse, unfamiliar infrastructure for a variety of sustainment and operational requirements. As a junior engineer, seize opportunities to talk to experts in different engineering domains. You may be asked to determine the electrical needs of a city based on a meeting with the civil council or assess the capacity of nonstandard bridging for critical logistics convoys. You may be asked to evaluate an existing structure for its suitability as a tactical operations center or be confronted with an entirely unique, unprecedented problem set. You may simply be asked to restart a troublesome generator—a mundane task that, nonetheless, reveals your competence in the eyes of the organization. At a minimum, learn enough about a variety of technologies and infrastructure that you may encounter that your requests for technical support from the U.S. Army Corps of Engineers (USACE) or other government entities are pertinent and complete.

Effective Communication

The nature and pace of special operations often dictate rapid communication, with little room for misunderstanding or error. Mastering the concepts of risk to mission and risk to force, contextualized in a broader operational picture, is only valuable if you can translate those concepts into a succinct analysis. Calls for improved writing skills are as old as the Regiment, but the point bears repeating—if you cannot write effectively, the important material that you have to communicate will be compromised

An ARSOF engineer evaluating key infrastructure with local engineers

in transit. The same holds true for digital and graphical representations; effective engineer support requires versatility in presenting spatial information. The mission may call for base camp planning, geospatial analysis, computer-aided design structural mock-ups, or a litany of other presentation forms; an engineer should be at least familiar with them all.

Expect your initial e-mail or report to be distributed far beyond your intended recipients. ARSOF is composed of organizations that pride themselves on being nonhierarchical or "flat," so the chances of a hasty report ending up in the hands of a theater commander are higher than you may expect. Fortunately, opportunities for writing improvement abound as a lieutenant. Practice organizing your thoughts in a structure that demonstrates expertise but is not weighed down by technocratic engineer lingo. Define a problem, and clearly present your assessment and/or proposed solutions. In this domain, as in the domain of building operational awareness, the commander's involvement is key; commanders should hold their junior officers to a high-quality standard of writing and actively mentor their lieutenants on structurally improving their writing, rather than simply proofreading for errors. Of course, interpersonal verbal communication is very important to the ARSOF engineer as well. Contractors, partner forces, and maneuver commanders each necessitate a unique style of interaction for best results.

The Regiment

Just as individual junior officers can better prepare to support ARSOF, so too can the Engineer Regiment better prepare its young leaders. The U.S. Army Engineer School (USAES), Fort Leonard Wood, Missouri, may pursue institutional or administrative actions by—

- **Implementing an additional skill identifier (ASI)**. Select components of the ARSOF community are lobbying to establish an engineer special operations force ASI for officers who have served in an ARSOF role. The new ASI would allow the Engineer Branch to better track and assign officers who display a predilection for special operations for later utilization (or for teaching/mentoring positions in which the staff may be lacking ARSOF experience). USAES and the Regiment should champion this effort, both in support of special operations and as part of the ongoing Branch improvements in talent management.
- **Teaching infrastructure assessment.** The Engineer Basic Officer Leaders Course (EBOLC) provides a primer for bridge assessment and route reconnaissance; but as megacities and subterranean warfare loom in the Army portfolio, engineers across the force will need to become more familiar with a wider range of infrastructure. Recognizing this capability gap, USAES should establish a mobile training team for infrastructure assessment. A 40- to 80-hour course on field-expedient infrastructure and technical assessment could address new and deteriorated structures, review bridge work, and introduce electrical systems. There is also potential for instruction on quality assurance and quality control. Relevant and useful course content, which is limited only by the time available, could directly affect life, health, safety, and mission effectiveness for supported units in the future.

Conclusion

These recommendations for personal and institutional improvements do not imply the absence of progress. The recent USAES focus on credentialing leaders supports the goal of broadening technical knowledge.[7]

Under the direction of Major Niall McCracken, EBOLC has undergone substantial modernization for the hybrid warfare era. Course modifications include improvements in the horizontal- and vertical-construction blocks of instruction, improved project management training, and interactive utilities inspections. Graduates of the course are better prepared for follow-on development at their gaining units, where they can further build their risk mastery, technical breadth, and communication skills.[8]

ARSOF engineers training to provide basing support

There is also a benefit for the Regiment writ large for building the ARSOF bench. Providing motivated junior officers with the opportunity to support special operations helps to retain those who might otherwise pursue special forces assessments and selections or other pipelines out of the Engineer Branch. Efforts to improve individual risk mastery and written communication skills will develop better staff officers and platoon leaders. What commander wouldn't want training that was planned by officers who are proficient in risk assessment or a standard of cohesive, applicable, after action reports? Institutional efforts to broaden understanding of diverse infrastructure and engineer effects on operations are crucial to an improved supply of task force engineers for the brigade combat team.

Of preparing his lieutenants for jobs in maneuver units, Major Randy M. Schultz, 39th Brigade Engineer Battalion, Fort Campbell, Kentucky, writes, "To enhance the integration of its officers into the task force . . . it was important for the brigade engineer battalion officers to arrive with skills and certifications that would fill anticipated capabilities gaps. Providing these capabilities to the task force ensured that the engineer officers were recognized as a valuable addition."[9] In many ways, a task force engineer is meant to fill capabilities gaps that are, if not the same as, at least complementary to, those in ARSOF formations: assessing and describing risk to mission, managing disparate engineer assets to support maneuver objectives, and sufficiently understanding operational context to effectively apply limited engineer resources. USAES is clearly attempting to address, in part, a question posed to the Regiment over a decade ago: "Do we have the right engineer individuals to deliver full spectrum engineering at every organizational level, in every mission environment, for all engineer mission requirements?"[10] If we build a junior officer bench of competent candidates who can excel in support of ARSOF, the answer will be a crucial step closer to "Yes."

Endnotes:

[1]*United States Special Operations Command and United States Cyber Command Hearing,* U.S. Senate Armed Services Committee, 116th Congress, 1st session, Washington, D.C., 14 February 2019, <https://www.armed-services.senate.gov/hearings/19-02-14-united-states-special-operations-command-and-united-states-cyber-command>, accessed on 16 April 2019.

[2]Ibid.

[3]FM 3-34, *Engineer Operations,* 2 April 2014.

[4]ATP 5-19, *Risk Management*, 14 April 2014.

[5]DD Form 2977, *Deliberate Risk Assessment Worksheet*, 1 September 2014.

[6]"The Strategy Bridge," Web site, <https://thestrategybridge.org/>, accessed on 16 April 2019.

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[8]Niall T. McCracken et al., "Training Engineer Leaders of the Future: Engineer Basic Leaders Course Modernization," *Engineer*, Volume 48, September–December 2018, pp. 13–15.

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