ENGINEER

The Professional Bulletin of Army Engineers

January–April 2019

Headquarters, Department of the Army
PB 5-19-1 Approved for public release; distribution is unlmited

U.S. Army Engineer School

(573) 563-8080/DSN 676-8080

COMMANDANT
BG Robert F. Whittle Jr.
563-6192, <robert.f.whittle.mil@mail.mil>

ASSISTANT COMMANDANT (AC)
COL Marc F. Hoffmeister
563-6192, <marc.f.hoffmeister.mil@mail.mil>

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

REGIMENTAL COMMAND SERGEANT MAJOR (RCSM)
CSM Douglas W. Galick
563-8060, <douglas.w.galick.mil@mail.mil>

REGIMENTAL CHIEF WARRANT OFFICER (RCWO)
CW5 Jerome L. Bussey
563-4088, <jerome.l.bussey.mil@mail.mil>

DEPUTY ASSISTANT COMMANDANT (DAC) – USAR
LTC(P) Charles W. Lewis
563-8045, <charles.w.lewis36.mil@mail.mil>

DEPUTY ASSISTANT COMMANDANT (DAC) – ARNG
Major Dustin L. Berry
563-8046, <dustin.l.berry3.mil@mail.mil>

CHIEF OF STAFF (CoS)
LTC Brian P. Hallberg
563-7116, <brian.p.hallberg.mil@mail.mil>

COMMANDER, 1ST ENGINEER BRIGADE
COL Kip A. Korth
596-0224, <kip.a.korth.mil@mail.mil>

DIRECTOR OF TRAINING AND LEADER DEVELOPMENT (DOTLD)
COL Michael R. Biankowski
563-4093, <michael.r.biankowski.mil@mail.mil>

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

COUNTER EXPLOSIVE HAZARDS CENTER (CEHC)
COL Christopher T. Kuhn
563-8142, <christopher.t.kuhn.mil@mail.mil>

MSCoE CDID, RDD
COL Timothy R. Vail
563-5055, <timothy.r.vail.mil@mail.mil>

ENGINEER DOCTRINE BRANCH, MSCoE CDID, CODDD
LTC Carl D. Dick
563-2717, <carl.d.dick.mil@mail.mil>

ORGANIZATION BRANCH, MSCoE CDID, CODDD
LTC Leonard B. Scott IV
563-6282, <leonard.b.scott.mil@mail.mil>

TRADOC CAPABILITY MANAGERS (TCMs)

Maneuver Support—
COL John C. Morrow
563-7244, <john.c.morrow2.mil@mail.mil>

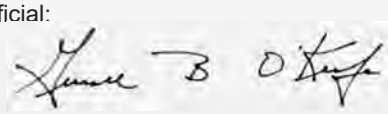
Geospatial—
COL Kevin R. Golinghorst
563-8263, <kevin.r.golinghorst.mil@mail.mil>

PERSONNEL PROPONENCY
MAJ Serafina S. Moore
563-3019, <serafina.s.moore.mil@mail.mil>

By Order of the Secretary of the Army:

MARK A. MILLEY
General, United States Army
Chief of Staff

Official:



GERALD B. O'KEEFE
Administrative Assistant to the
Secretary of the Army
1834405

Engineer (ISSN 0046-1989) is published three times a year by the U.S. Army Engineer School and the Maneuver Support Center of Excellence G-3/ Directorate of Training and Doctrine (DOTD), Fort Leonard Wood, Missouri.

Articles to be considered for publication are due 1 December, 1 April, and 1 August. Send submissions by e-mail to <usarmy.leonardwood.mscoe.mbx.engineer@mail.mil>. Due to regulatory requirements and the limited space per issue, we normally do not print articles that have been published elsewhere.

POSTMASTER: Send address changes to Engineer Professional Bulletin, 14010 MSCoE Loop, Building 3201, Suite 2661, Fort Leonard Wood, MO 65473-8702.

CORRESPONDENCE, letters to the editor, manuscripts, photographs, official unit requests to receive copies, and unit address changes should be sent to *Engineer* at the preceding address. Telephone: (573) 563-4137, DSN: 676-4137; e-mail: <usarmy.leonardwood.mscoe.mbx.engineer@mail.mil>; Web site: <https://home.army.mil/wood/index.php/contact/publications/engr_mag>.

OFFICIAL DISTRIBUTION is targeted to all engineer and engineer-related units.

PERSONAL SUBSCRIPTIONS are available for $24.00 ($33.60 foreign) per year by contacting the U.S. Government Publishing Office, P.O. Box 979050, St. Louis, MO 63197-9000. ADDRESS CHANGES for personal subscriptions should be sent to the U.S. Government Publishing Office at the above address.

ENGINEER

The Professional Bulletin of Army Engineers

Volume 49 PB 5-19-1 | Headquarters, Department of the Army | *January–April 2019*

Front cover: U.S. Army Soldiers assigned to the 91st Brigade Engineer Battalion, 1st Armored Brigade Combat Team, 1st Cavalry Division, move around the training area and take up defensive positions during Exercise Combined Resolve XI in Hohenfels, Germany. U.S. Army National Guard photo by Staff Sergeant Ron Lee.

Back cover: U.S. Army photos

DEPARTMENTS

FEATURES

Clear the Way

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

When maneuver commanders have a challenge or a problem that seems insurmountable, they ask one question: Where's my Engineer? On 16 June 1775, General George Washington made Colonel Richard Gridley his first chief engineer. Gridley's work led to engineering feats at Bunker Hill, Massachusetts; Saratoga, New York; and Yorktown, Virginia. Ever since, the Engineer Regiment has been overcoming the impossible in support of maneuver commanders. We are successful in meeting challenges because of who we are. Our people and our culture combine to create a team that the Army and our Nation can count on. The elements that create the Soldiers of the Engineer Regiment are precise:

- **We are leaders.** We recognize that leadership is influencing others to do what we want them to do. We start with ourselves by keeping our attitudes positive. We lead our peers, superiors, and subordinates. We treat others with dignity and respect and build them up, recognizing that this will inspire loyalty and bring out the best in others and ourselves.
- **We are technically and tactically proficient.** We strive for excellence. First and foremost, we have the skills to get the job done. We learn these skills through professional military education, beginning with training as privates and cadets and continuing through further professional military and civilian education. We ask ourselves one quest- when we complete a task: Is this our best work?
- **We take a seat at the table.** As engineers, we make ourselves heard by taking a seat at the table with our maneuver counterparts. It is not enough to be in the background and complete our tasks. We must be involved in all aspects of planning and execution of our higher command's mission, providing recommendations and solutions.

(continued on page 5)

Who We Are...

"Sappers are the Soldiers who make battle possible, the stagehands of the theatre of operations, without whose brave and laborious efforts, armies could scarcely find the means to come to grips with each other."[1]

- ✓ We are leaders of the greatest engineer regiment ever formed.
- ✓ We have a great attitude.
- ✓ We treat others with dignity and respect.
- ✓ We build people up.
- ✓ We are technically and tactically proficient.
- ✓ We strive for excellence.
- ✓ We take a seat at the table.
- ✓ We are problem solvers who look for solutions and provide recommendations.
- ✓ We are not arrogant; we listen to others and are open to input.
- ✓ We are masters of the unemotional argument.
- ✓ When we see a problem, we start at our own desk and make ever wider circles to determine the issues.
- ✓ We succeed by making others successful.
- ✓ We never complain about our team; instead, we make it better.
- ✓ We are professionals who live the Army values.

Lead the Way

Command Sergeant Major Douglas W. Galick
Regimental Command Sergeant Major

Greetings from Fort Leonard Wood, Missouri. I am writing this short article while in the midst of inprocessing on the installation and undergoing all the joys of unpacking household goods. As many of you know, a permanent change of station is a busy time; however, I did not want to miss my first opportunity to contribute to the *Engineer* professional bulletin.

I would like to thank Brigadier General Robert F. Whittle for selecting me to serve as the Regimental Command Sergeant Major of the U.S. Army Engineer School (USAES). I am very honored, humbled, and excited to undertake this tremendous job. Every single one of the sergeants major who interviewed for the position is immensely talented and has an impeccable reputation. I know that each of those great noncommissioned officers will be selected to serve our Army in a position of great responsibility very soon. As long as our Regiment continues to have noncommissioned officers of this caliber at our highest levels, we will be successful and will not be in want of outstanding leadership.

The previous Regimental Command Sergeant Major, Command Sergeant Major Trevor C. Walker, did an outstanding job and has set me up for success in every imaginable way. I would like to personally thank him for his service and for all the positive change he brought to the Engineer Regiment. I am committed to continuing his record of success and keeping with the tradition of being a positive and experienced senior enlisted USAES advisor.

I would also like to recognize Sergeant Major Corey B. Deibel for his tireless work over the past several months. He simultaneously performed the duties of the Personnel Development Office Sergeant Major and the interim Regimental Command Sergeant Major. Each of these jobs is individually demanding; but through his dedication and drive, he admirably filled both positions. This is reflective of his abilities and potential to serve the Regiment in the future and reaffirms his selection as a command sergeant major at Fort Bragg, North Carolina.

One of my first efforts as the Regimental Command Sergeant Major will involve increasing the efficiency of our current communication channels and looking for opportunities to open new channels. Effective and timely communication with the engineer warfighter and other engineer stakeholders is an absolute must in order for us to fulfill our responsibilities at the schoolhouse. It is incumbent upon us to reach out and solicit the information necessary to ensure that we can help develop the right solutions to the right challenges. In the near future, I will be contacting many of our engineer brigade and battalion command sergeants major to better understand their struggles and how I can assist them from this position. I am looking forward to those conversations.

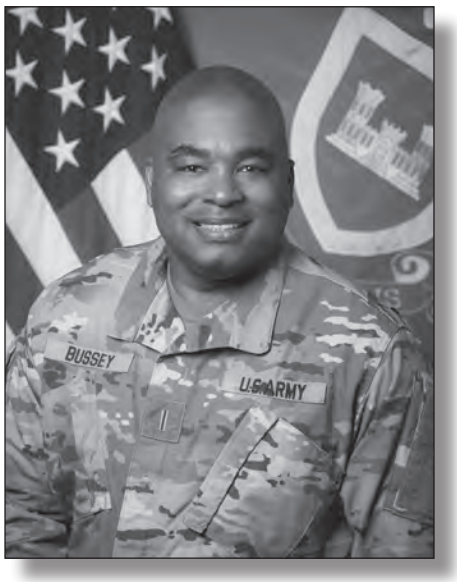
Secondly, I will be reviewing the unit and installation visits of the past 24 months to help solidify the schedule for the upcoming year. My goals are to ensure that I get out and visit some of the units that have not recently been on the schedule and visit with as many units as time and budget allow. Once the analysis is complete, I will be reaching out to organizations to coordinate appropriate visitation dates. I want to finalize these plans as soon as possible to avoid any short notices or interruptive visits to units. I am eagerly looking forward to spending time with these organizations and observing the amazing things that our Soldiers are doing every day.

I am looking forward to settling into my new position and getting to work, serving the officers, noncommissioned officers, Soldiers, and civilians of our Regiment. I am excited to be on the team, and I look forward to working for the Regiment. Thank you for all you do to make the Engineer Regiment and our Army great! *Essayons*!

"Effective and timely communication with the engineer warfighter and other engineer stakeholders is an absolute must in order for us to fulfill our responsibilities at the schoolhouse."

Show the Way

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



Greetings from the U.S. Army Engineer School (USAES). On behalf of the engineer warrant officer cohort, I would like to welcome Regimental Command Sergeant Major Douglas W. Galick to the team. Command Sergeant Major Galick brings a wealth of skills, knowledge, and experience with him. We look forward to working with him on all matters dealing with the Regiment.

I would also like to congratulate Chief Warrant Officer Three Jason G. McDowell, 130th Engineer Brigade, Schofield Barracks, Hawaii, and Chief Warrant Officer Three Augustus Wright, USAES, Fort Leonard Wood, Missouri. These fine warrant officers received the Black Engineer of the Year, Modern Day Technology Leader Award, 8 February 2019 in Washington, D.C.

The Regiment continues to move forward, toward the future; we continue to make minor adjustments to our courses to provide our students with the tools necessary to offer sound technical advice to their commanders. As we grow in strength, the U.S. Army Human Resources Command continues to balance the needs of the Army with the needs of our warrant officers. We continue to identify positions within the Regiment that require special skills and talent, and we are doing our best to match warrant officers with the skills requisite for these positions.

The Regiment has solidified three assignments for mid-grade chief warrant officer three geospatial engineers at the National Geospatial-Intelligence Agency (NGA) West, located in Saint Louis, Missouri. The purpose of these positions is to assist with teaching and managing the NGA-funded Gamekeeper Program designed to train our geospatial engineer Soldiers in digital cartographic and map-finishing skills. This program was highly praised at the 2018 Environmental Systems Research Institute Federal Users Conference in Washington, D.C. Our first warrant officer three will be assigned to NGA West this summer, and the other two will be assigned in subsequent manning cycles.

I recently visited the U.S. Army Medical Command (MEDCOM) in San Antonio, Texas, and attended a conference of MEDCOM senior leaders, held at Fort Detrick, Maryland. We discussed the roles, responsibilities, and expectations of a Military Occupational Specialty (MOS) 120A–Construction Engineering Technician in a hospital unit. In my Warrant Officer Basic Course 20 years ago, I received extensive training on how to fill the role of an engineer warrant officer assigned to combat support or a field hospital, and I received more training during my Warrant Officer Advanced Course a few years later. Over time, most of the 120A training has evolved to be geared toward warrant officers assigned to brigade engineer battalions, survey and design detachments/teams, construction units, and prime power platoons. We are conducting a critical task site selection board this spring to review our program of instruction and identify the skills needed to serve in all 120A authorized positions.

We continue to work with the U.S. Army Corps of Engineers (USACE) on assignments in USACE districts. The Chief of Engineers has authorized us to identify two to three positions that are co-located on military bases and to which we can assign mid-grade 120As. These 2-year assignments to USACE will be followed up with an assignment at an installation located in the same USACE district. Requirements for these positions will include the completion of the Warrant Officer Advanced Course and status as a project management professional. We will only send our most talented warrant officers to these positions. Look for more information from the U.S. Army Human Resources Command.

TC 3-34.80, *Army Geospatial Guide for Commanders and Planners,* was just approved for publishing and will soon be available for further understanding and leveraging the Army's geospatial assets. This is another great resource that will assist engineers in creating a shared understanding of how to fully utilize the power of geospatial assets in any Army formations.

Our warrant officer strength is steadily increasing, thanks to recruiting efforts by our warrant officers in the Regiment. We selected another 17 quality noncommissioned officers (NCOs) to join the engineer warrant officer

cohort; however, as I always say, the journey is not complete. Although, we continue to accept good NCOs to be engineer warrant officers, we are running short on predetermination packets for MOS 125D–Geospatial Engineering Technician. We are seeking sergeant first class Soldiers in MOS 12Y–Geospatial Engineer to join our cohort. Whether they have more or less than 12 years of active federal service, the opportunity exists to become an engineer warrant officer. For those who have more than 12 years but less than 16 years, I will personally request a waiver from the Department of the Army Deputy Chief of Staff (G-1) to allow the submission of a packet to the accession board. I cannot guarantee a waiver or selection, but I will advocate that the NCO be given an opportunity to compete to become an engineer warrant officer.

To provide an opportunity for all engineer NCOs to join our warrant officer cohort, we are seeking packets from MOS 12B–Combat Engineers, 12C–Bridge Crewmembers, 12D–Divers, and 12M–Firefighters for one of the next upcoming accession boards. This is a limited-time pilot program to allow engineers in other MOSs the opportunity to become engineer warrant officers. In addition to the requirements posted on the U.S. Army Recruiting Command warrant officer recruiting page, there may be additional requirements. There will be more information to follow on this initiative. In the meantime, check the following link for information and updates: <https://recruiting.army.mil/ISO/AWOR/>.

We must continue to lead, provide our technical advice, and demonstrate our steadfast commitment to our units, the Engineer Regiment, and the Army. *ESSAYONS*!

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

- **We are humble.** We recognize that when leading our superiors, peers, and subordinates, arrogance creates an immune response to our influence. We are masters of the unemotional argument, and we recognize that logic and facts are what carry the day. When we see issues, we start at our own desk to determine what the issue is, rather than blaming others. Humility opens the door to authentic communication and enables us to seek the input of others and listen to their ideas. It empowers us to give the credit for accomplishments to our subordinates.
- **We succeed by making others successful.** We are renowned for our teamwork, both with each other and with our maneuver counterparts. Engineers can always come to one another for help. In our culture we make our peers successful—that has become the building block of the Engineer Regiment's foundation. We never complain about our team; instead, we lean forward and make it better.
- **We solve problems.** This is the very definition of engineering—solving problems with math and science. It is the essence of our motto, *Essayons*: We will succeed.
- **We get out of our comfort zones.** Engineers constantly push boundaries, learn new things, and apply new ideas.
- **We do the right thing.** Doing the right thing is difficult. It takes wisdom to determine what the right thing is and then discipline to follow through and execute. We live the Army values and stay on azimuth.

The Engineer Regiment has earned its reputation as the problem solvers of the Army because of the history we made. We mapped the frontier, built the Panama Canal, designed and constructed the Washington Monument. Time and time again, we have led the way to victory for the U.S. Army in combat. These successes are due to our people and our culture. We are the Engineer Regiment of the greatest Nation on earth. *Essayons*!

Endnote:

[1]John Keegan, *Soldiers, A History of Men in Battle*, Konecky and Konecky, Old Saybrook, Connecticut, 1997.

3D Battalion Trains New 12N Engineer Equipment Operators While Improving the Natural Environment

By Lieutenant Colonel Mac A. Griffin and Sergeant First Class Larry E. Williams

The car engine-sized boulder wobbles precariously on top of the larger boulders below. The excavator operator uses the claws of the excavator to try to delicately steady the large stone, but it inexorably rolls off the top of the makeshift monument and crashes to the ground below. Specialist Christopher L. Braman grimaces, then grins and proceeds to pick up the massive boulder to try again. Welcome to the Alabama National Guard (ALARNG) Engineer Equipment Operator, or Army Military Occupational Specialty (MOS) 12N–Horizontal Construction Engineer, Course.

The ALARNG MOS 12N Course, conducted by the 3d Battalion, 200th Regiment, leader at Fort McClellan Army National Guard Training Center (FM-ARNGTC), is a two-phase course, with Phase I consisting of 11 days and Phase II consisting of 14 days. With only 2 days of classroom instruction, the 12N Course is almost entirely hands-on. Each class has a maximum of 12 students and a minimum of three instructors. The four-to-one student-to-instructor ratio is one of the lowest in the Army Training Requirements and Resource System. Even at that ratio, instructors can be spread thin while monitoring, coaching, and correcting four students who are simultaneously operating heavy engineer equipment. Instructors maintain positive control of students during equipment operation by the use of handheld radios and hand and arm signals. In addition, the course program of instruction requires that five pieces of each type of equipment (four primaries and one back-up) be on-hand for the training.

Phase I of the course consists of a combination of classroom instruction and performance-based, hands-on

A HYEX, D6 bulldozer, and scoop loader

A HYEX instructor gives guidance to a student.

equipment training. Classroom instruction includes modules such as—

- Introduction to Safety.
- Environmental Stewardship.
- Introduction to Basic Soils.
- Introduction to Grade Stakes.
- Introduction to the Army Maintenance Management System.

During the classroom portion, students are issued laptops containing all of the course reference material and publications. They must pass the Army Maintenance Management System written examination and an earthwork principles written examination. They are allowed to use their laptops during examinations.

Phase I equipment training includes—

- Operator maintenance, starting/stopping procedures, driving operations, dumping operations, and spreading operations with the M1157A1P2 10-ton dump truck.
- Operator maintenance, starting/stopping procedures, maneuvering operations, the loading of a haul unit, clamshell operations, and stockpile maintenance operations with the 924G scoop loader.
- Operator maintenance, starting/stopping procedures, maneuvering operations, lifting operations, the replacement of attachments, excavation, and the loading of a haul unit with the LCR230 HYEX (tracked hydraulic excavator).

Phase II consists entirely of hands-on equipment training, including—

- Operator maintenance, starting/stopping procedures, maneuvering operations, leveling operations, and v-ditching operations with the 120M motorized grader.
- Operator maintenance, starting/stopping procedures, maneuvering operations, and excavation operations with the D7R crawler tractor (bulldozer).
- Operator maintenance, starting/stopping procedures, maneuvering operations, and excavation operations with the 621G motorized scraper.
- Operator maintenance, starting/stopping procedures, maneuvering operations, and excavation operations with the wheeled backhoe loader.

Students must receive a passing grade on all equipment performance evaluations on each phase, although a retest is authorized.

The hands-on portion of the 12N Course is conducted at Training Facility 23A (TF23A), the Horizontal Engineer Training Area, located on Pelham Range. The 22,000-acre compound serves as the noncontiguous field-training area for FM-ARNGTC. Pelham Range has a wide range of training facilities available for individual and collective unit training, including small-arms and crew-served weapon ranges, artillery firing points, an airborne landing zone, and specialized training facilities including, but not limited to, a simulations center, a leadership reaction course, a live-fire shoot house, a structural collapse simulator, a rock crusher site, a reverse-osmosis water purification unit water extraction site, land navigation courses, a demolitions range, a Humvee egress assistance trainer, three insurgent villages, and a 12-acre contingency operations base.

The 10 students of Class 002-18 (August 2018) represent a broad cross-section of Army National Guard and U.S. Army Reserve Soldiers of today; they come from seven states and the U.S. Virgin Islands. They represent a wide range of MOSs, including medics, wheeled and aviation mechanics, plumbers, electricians, MOS 12B–Combat Engineers, and

10T dump truck training

water treatment specialists. The youngest, Private First Class Walter D. Stanfield, is 22 years old, while the oldest, Sergeant Barry R. Winchell, is 58. The course roster even includes First Sergeant Jeff W. Shirley of the Mississippi Army National Guard. Despite the wide range in ages and experience, all of the students agree that the 12N course is like no other Army school they have ever attended.

According to Sergeant Michael G. Collazo of the 358th Engineer Company, New Cumberland, Pennsylvania, "The course, the equipment, and all the training aids are great, and the instructors really bring it all together. It is a very relaxed but focused learning environment." Staff Sergeant Stacy J. Haire, a member of the 381st Engineer Support Company, Tifton, Georgia, stated, "I was very nervous about operating this equipment because it is so huge and there are so many controls to operate. After the first day of training on the HYEX, I was doing okay but my confidence level was down. The next day, my instructor gave me more one-on-one training. At the end of the second day, my confidence level was very high regarding operating the HYEX."

The 12N Course program of instruction also includes 25 hours for an end-of-phase class project for both phases. For fiscal year 2018, the class project involves an ongoing effort to remove excess silt from Clear Creek, located on the west edge of Pelham Range. The Clear Creek Project is a joint venture between the 3d Battalion, 200th Regiment leader; the FM-ARNGTC Directorate of Public Works (DPW); the FM-ARNGTC Environmental Section; and the ALARNG Facilities Management Office. The project, originally developed by the FM-ARNGTC Environmental Section, is part of a larger effort to repair a nearby water crossing and regain access to an adjacent flooded training area by restoring the functionality of the creek system. "This would be accomplished by removing nonnative sediment accumulated in the Clear Creek channel, reconstructing the section of the channel most heavily damaged, and restoring water flow," stated Ms. Leah Storino, the FM-ARNGTC natural resources program manager. Ms. Storino added that the silt removal proj-

Using a HYEX to stack rocks

ect is part of a larger ongoing collaboration between the ALARNG, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the Anniston Army Depot to prevent flooding caused by sediment pollution of Clear Creek. The collaboration included a multimillion-dollar erosion control/sediment basin system to control sediment from entering Clear Creek on the Anniston Army Depot.

HYEX training

Each project partner contributes in his or her own specific way to project completion. DPW provides project oversight and coordination with the State Facilities Management Office and Environmental Office. The Environmental Section conducted a record of environmental consideration ("a required analysis of a federal project for any impacts that may occur to the environment and subsequent compliance with permitting requirements," according to Ms. Storino) as a part of the larger effort. In addition, it is providing on-site observation at Clear Creek during project execution to ensure that the project intent is met and that the sensitive creek bottom and banks are properly remediated and stabilized. Ms. Storino explained that the Environmental Section will continue to conduct "water quality monitoring . . . until the creek system is considered stabilized."

The project, originally initiated by the 877th Engineer Battalion, Haleyville, Alabama, with companies throughout the state, is being continued by the 12N Course students under the watchful supervision of 3d Battalion instructors, led by Sergeant First Class Larry E. Williams and Sergeant First Class Shane Cochran. "The students," stated Sergeant First Class Cochran, "enjoy having a real-world project to sink their teeth into. The project allows them to see how the different pieces of equipment work together while getting additional stick time."

The Clear Creek silt mitigation project is fairly simple. It allows for multiple pieces of engineer equipment to be used simultaneously. First, an operator uses a D6 bulldozer to carefully push excess silt into piles along the creek bottom. The excess silt is then removed from the creek bed by an excavator working from the bank or in the creek. The excavator transfers the silt to piles on the adjacent dirt road, where it is scooped up by a 2.5-yard loader and loaded into 10T dump trucks. The loaded trucks move back to TF23A, where the dump truck operators spread the silt to dry in the hot Alabama sun. After the silt is dry, it is added to the existing spoil stockpiles to be used for future operations training in future 12N courses. "The project is a win-win for all participants, as it addresses a real-world environmental issue while creating an opportunity for our students to practice their new operator skills and also providing a fresh stockpile of material to be used by future 12N classes," said the 3d Battalion 12N course manager, Sergeant First Class Williams.

"One of our goals was to find engineer projects on FM-ARNGTC and Pelham Range that will benefit the battalion, the regiment, and the training site (land manager) while giving our students opportunities to operate the 12N Course engineer equipment in a complex project setting. In addition, these projects give our noncommissioned officer instructors an opportunity to hone their project management skills, including planning, resourcing, safety, execution, environmental stewardship, and quality control," said Lieutenant Colonel Mac A. Griffin, commander of 3d Battalion. By working together, the Clear Creek project partners are having a greater impact on the natural environment and the quality of the training areas used by Soldiers every day. This 12N Course project clearly illustrates the notion that the whole is greater than the sum of its parts.

Lieutenant Colonel Griffin is the commander of 3d Battalion, 200th Regiment, ALARNG Regional Training Institute. He holds a bachelor of architecture degree from Mississippi State University, Starkville. He is a registered architect in the state of Alabama.

Sergeant First Class Williams is the 12N Course manager for 3d Battalion, 200th Regiment.

Theater Construction:

What You Need to Know

By Lieutenant Colonel Gerald S. Law

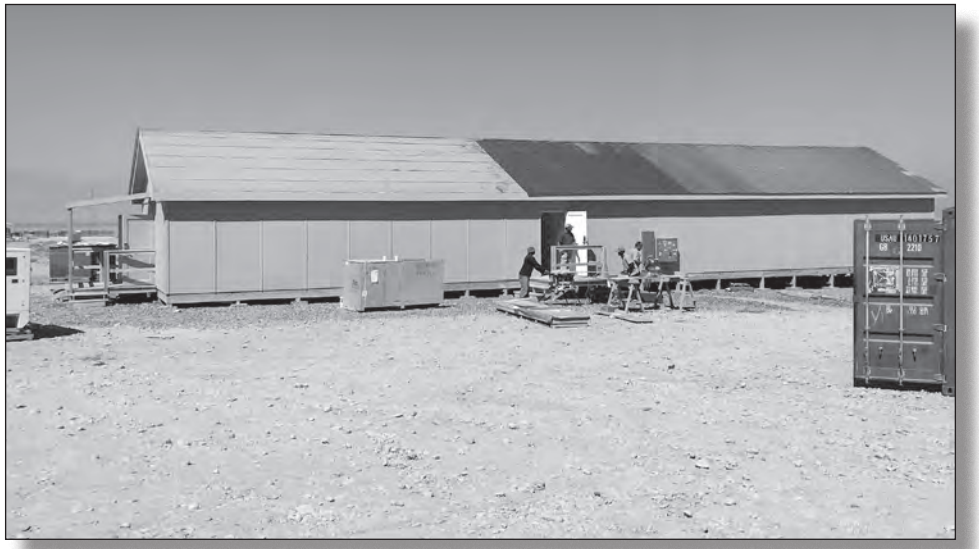
Most task force engineers and their units arrive in-theater unprepared to integrate military engineers and performance contractors to plan, build, and oversee construction projects throughout the theater of operations. Specifically, they do not understand how construction projects are identified, funded, and generated under the Logistics Civil Augmentation Program (LOGCAP).

LOGCAP is largely based on requirements and funding; therefore, it remains consistent throughout the world. Joint Publication (JP) 4-0, *Operational Contract Support*, states that "The continual introduction of high-tech equipment coupled with force structure and manning reductions, mission-specific force cap restrictions, and high operating tempo mean that contract support will augment military forces in most operations."[1] Therefore, task force engineers must understand how contract support and Army engineer capabilities augment construction and service requirements.

This article provides a description of the construction and service procurement process currently used by LOGCAP and identifies key terms used in the LOGCAP process. Engineers and their units are responsible for identifying project requirements, determining initial costs, and gaining approval from senior leaders in-theater. Consequently, task force engineers must also understand LOGCAP roles and methods in order to properly validate requirements and allocate resources.

Most task force engineers do understand Army engineer capabilities; however, these engineers make up only a small portion of the construction capability and capacity available in-theater. LOGCAP provides base life support, sustainment, and construction capabilities to meet tactical and operational requirements. According to Army Regulation (AR) 700-137, *Logistics Civil Augmentation Program,* LOGCAP is a Department of the Army regulatory program to augment the force by "providing a service capability to meet externally driven operational requirements for rapid contingency augmentation support."[2] Therefore, LOGCAP personnel plan for and execute contracted support services through preselected performance contract companies to conduct logistics and construction.

A chapel and a Morale, Welfare, and Recreation building built by Army engineers in Afghanistan



A mayor cell building built by a performance contractor through LOGCAP in Afghanistan

The preselected companies reinforce military assets on forward operating bases (FOBs) around the world with construction, logistics, and sustainment services. Therefore, Army engineers must understand the LOGCAP processes to be effective facilitators and integrators of construction assets.

There is a four-step LOGCAP process in most theaters of operation. Step 1 consists of determining new requirements. The unit and the task force engineer determine construction requirements for their FOB. Once complete, the task force engineer and the commander decide who will build the project based on criteria such as time, cost, force protection, security, and complexity.[3] Construction projects are built by Army engineers or outsourced through LOGCAP to a performance contractor.

In Step 2, the task force engineer compiles a construction packet for board approval. The packet generally includes a statement of work, which describes the project; building procedures; and a bill of materials.[4] In addition, a letter of justification explains the need for the project and includes an initial concept plan that shows the location, basic layout, and dimensions. Finally, an independent government cost estimate specifying the cost of the project using government procurement assets and procedures generally completes the packet.[5] However, if the task force engineer selects a performance contractor to construct the project, then a project planning request and project planning estimate (PPE) are required. LOGCAP management personnel issue a project planning request, which directs the performance contractor to prepare a PPE. The PPE presents the performance contractor's cost estimate at the time of the request. Once prepared, the PPE is sent back to LOGCAP personnel for review and they conduct a technical evaluation.[6] Later, the task force engineer, the performance contractor, and LOGCAP personnel review the technical evaluation and, if acceptable, the packet goes forward for validation, approval, and funding. All of these documents must be carefully developed by the task force engineer and LOGCAP personnel to accurately present the justification, concept, and cost prior to board approval.

Step 3 consists of board approval. There are generally two types of senior-level boards in-theater—the joint requirement review board and the joint facilities utilization board. The purpose of the joint requirement review board is "to determine if a requirement is valid."[7] The joint requirement review board "recommends approval or disapproval of specified projects, purchases, services, and leases for time, purpose, and amount."[8] Services may include facility operations, maintenance, food service, laundry, and movement control. Task force engineers usually have minimal input to this board, but LOGCAP representatives and sustainment Army leaders regularly contribute, with outcomes that directly affect the construction efforts on the FOB.

The joint facilities utilization board validates requirements and approves all construction projects built by Army engineers and performance contactors. The purpose of the joint facilities utilization board is "to provide a validation avenue for all military construction, repair, and maintenance projects within USFOR-A Headquarters and subordinate units."[9] A senior officer chairs the joint facilities utilization board and is accompanied by senior staff members who approve or disapprove each construction project based on its validity and estimated cost.

The joint facilities utilization board is critical for task force engineers because it usually falls on the unit and the task force engineer to develop the construction packet for the project. Additionally, the task force engineer briefs the project to the approval authority and to the joint facilities utilization board. This can be difficult if the task force engineer and unit are unfamiliar with the LOGCAP process.

Most theater headquarters conduct a joint facilities utilization board working group several days prior to the joint facilities utilization board meeting. This allows the task force engineer and the unit to brief the construction project to the senior staff only. The senior staff then provides feedback to the task force engineer in the form of questions, comments, and recommendations to facilitate project validation and approval with the joint facilities utilization board.

Following validation and approval, Step 4 involves the movement of Army engineers or contractors to procure materials and begin construction. If a performance contractor is selected to conduct the construction, then LOGCAP personnel issue a change order directing the contractor to begin construction. However, if Army engineers are selected, then orders directing movement and construction are

An office building built by Army engineers in Afghanistan

published. Regardless of who constructs the project, the task force engineer maintains involvement from the beginning to conclusion of the project.

Finally, task force engineers must understand the LOGCAP master schedule of work (sometimes referred to as the density list), which is a compilation of all completed FOB construction projects that are maintained by a performance contractor through LOGCAP. If a facility or project is not on the master schedule of work, then military personnel are responsible for maintaining the project. It is important for the task force engineer and unit commander to manage the number of projects that are not on the master schedule of work.

Numerous projects not on the density list consume a high level of military capacity and capability on a daily basis and, therefore, affect mission accomplishment. Consequently, task force engineers and unit commanders must work to maintain a proper balance between projects maintained by the performance contractor versus projects maintained by military personnel.

If a performance contractor constructs a project, then that project is automatically placed on the master schedule of work. However, if Army engineers build the project, then the project requires a technical inspection before it can be placed on the master schedule of work. LOGCAP personnel issue a letter of technical direction to the performance contractor, directing the contractor to conduct the technical inspection. Next, the performance contractor conducts the technical inspection to ensure that the project was built to construction code.[10] If the project passes the inspection, it is then placed on the master schedule of work. However, if the project fails, then Army engineers are required to correct any deficiencies identified during the technical inspection.

Too often, Army engineers and their units arrive in-theater with little understanding of the LOGCAP, resulting in confusion, construction delays, and the improper allocation of resources. Commanders and task force engineers utilize LOGCAP through performance contractors and Army engineers to provide base life support, sustainment, and construction capabilities in a theater of operation. However, engineers and their units are responsible for identifying requirements, determining initial costs, and gaining approval from senior leaders while utilizing LOGCAP and Army engineer capabilities.

Task force engineers and their units must understand how construction and services are identified, funded, approved, and built under the LOGCAP. It is critical for all Army engineers to understand this process to properly integrate construction assets, validate requirements, and allocate resources while in a theater of operations.

Endnotes:

[1]JP 4-10, *Operational Contract Support*, 16 July 2014.

[2]AR 700-137, *Logistics Civil Augmentation Program,* 23 March 2017.

[3]Army Techniques Publication (ATP) 4-10.1, *Logistics Civil Augmentation Program Support to Unified Land Operations*, 1 August 2016.

[4]Headquarters, U.S. Forces–Afghanistan, Publication 1-06, *Money as a Weapon System—Afghanistan*, 7 December 2016.

[5]Ibid.

[6]ATP 4-10.1.

[7]Headquarters, U.S. Forces–Afghanistan, Publication 1-06.

[8]Ibid.

[9]Ibid.

[10]ATP 4-10.1.

Lieutenant Colonel Law serves as the area support group engineer, Bagram Airfield, U.S. Forces–Afghanistan. He holds a bachelor's degree in industrial engineering from Utah State University; a master's degree in geology and geophysics from the Missouri University of Science and Technology at Rolla; a master's degree in military arts and science from the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas; a master's degree in adult, occupational, and continuing education from Kansas State University; and a master's degree in strategic studies from the U.S. Army War College, Carlisle Barracks, Pennsylvania.

BEB Sustainment: Keys to Success at the National Training Center

By Lieutenant Colonel Nicholas O. Melin, Captain John D. Bolan, and Captain Tucker W. Solt

Brigade engineer battalions (BEBs) face significant challenges in logistically supporting enablers in decisive actions. The BEB is routinely tasked with receiving and integrating most brigade combat team (BCT) echelon above brigade enablers, resulting in an extensive amount of personnel and equipment for one unit to manage. When on the battlefield, the task organization becomes decentralized and dispersed, but the ownership ultimately remains with the BEB and its commander to ensure that enablers are supported and conducting their mission. Even with well-defined command and support relationships across a brigade, the most challenging problem facing the BEB in combat operations is providing support to organic and attached elements in the consolidation area while also supporting enablers that are task-organized to other units.

The 23d BEB experienced this problem set during National Training Center (NTC) Rotation 18-06. The BEB integrated 1,056 Soldiers with 29 unique unit identification codes and modified tables of organization and equipment, relocated the battalion headquarters approximately every 24 hours, operated across an entire brigade area of operations (AO), supported tracked assets within a Stryker BCT, and provided logistical redundancy when other units' lack of priority of support endangered an enabler's mission. This article captures lessons learned from the 23d BEB decisive-action rotation at NTC and offers recommendations for cross-level understanding of enabler capabilities in the brigade, disposition of organic and attached logistical assets, anticipation of operational transitions, and synchronization of assets to operations.

Shared Understanding

Setting successful conditions on the battlefield does not mean that the BEB waits on the operation order from the brigade. Rather, violence of action is required. The BEB is composed of several highly specialized units, and the BEB commander knows how to use the BEB and its assets to their full potential. The BEB unit needs to provide the brigade with input on how best to employ enablers. To enable shared understanding on the battlefield, a BEB must conduct collaborative planning and battle tracking with the brigade, establish clear task organization and support relationships, ensure that maneuver units understand enabler requirements, and enforce reporting.

The 23d BEB commander challenged the battalion staff to collaborate with brigade planning personnel to ensure that all enablers were effectively utilized. The battalion staff had a protection warfighting representative who attended battalion synchronization meetings and who voiced concerns to the battalion staff and was involved in the military decision-making process. The staff met with brigade counterparts to address concerns and affect operation order production to influence maneuver units and their attached enablers. Preventing enablers from being arbitrarily task-organized by brigade planners was key. The 23d BEB ensured that higher echelons understood logistical requirements and that enablers had buy-in from brigade leadership if there were issues. Most importantly, command support relationships were refined and communicated across echelons before issuance of a brigade operations order or in the next fragmentary order.

The 23d BEB was tasked with receiving and integrating all brigade level enablers during reception, staging, onward movement, and integration. In order to quickly and effectively integrate all enablers within the given time constraints, the BEB used a comprehensive enabler integration checklist that delineated expectations and requirements when integrating with other units. The same tactics, techniques, and procedures were also used by organic companies, as task organization was constantly changing during field operations.

Maneuver units must understand the capabilities and requirements of enablers attached to their formations. This requires proactive collaboration on behalf of the BEB. In this way, the BEB can ensure that enablers are being effectively used and can even influence priority of support within a battalion and brigade. With an enabler checklist, both the enablers and the maneuver units have a framework from which to derive quick, meaningful data in a high-tempo environment. Enablers can submit their checklists to the new battalion tactical operating center (TOC), and that battalion can instantly understand the strengths and weaknesses of the incoming unit. The checklist also outlines what the maneuver unit owes the enabler. Both units must give and take to ensure effective integration.

"The BEB was also responsible for to logistically supporting the brigade TOC, which was the most critical mission command node in the brigade AO."

Placing emphasis on reporting requirements and communications was critical to sustaining enablers. In addition to the enabler checklist, all enabler units were handed copies of the battalion and brigade tactical standard operating procedures (TACSOPs) during reception, staging, onward movement, and integration. The 23d BEB exercised dual reporting requirements in accordance with the TACSOPs. Units were required to dual-report to both the 23d BEB and its attached maneuver unit. All reports were meticulously tracked by the battalion TOC, and units were held accountable if any were missing. The S-6 worked long hours to ensure that each unit moving independently on the battlefield had operational communications and reported to the battalion TOC. Immediately upon arrival of a unit and its equipment at logistical support area Warrior, reporting requirements were exercised to build muscle memory among members of subordinate units. This proved invaluable during the rotation. With timely and accurate reporting, the BEB could track sustainment issues as they arose as well as anticipate future issues and mitigate them as necessary.

Dispersion of Logistical Assets and Leaders

Logistical assets and leadership were dispersed across the brigade AO, with the core idea of logistical redundancy across the battlefield. The BEB simultaneously conducts stability operations in the rear area and executes offensive and defensive operations forward in the fight with maneuver units. Sustaining the BEB in a brigade AO requires logistical redundancy across the battlefield, in which logistical assets and leaders are carefully dispersed from the brigade support area to the front line.

In order to provide redundancy of support in a brigade size AO, the Echo Forward Support Company (FSC), 23d BEB, needed to execute split operations with an attached tracked maintenance platoon from the 253d FSC, Arizona Army National Guard. The FSCs split the unit maintenance collection point between the combat trains collection point (CTCP) and the field trains collection point (FTCP). If the battalion was displaced every 24 to 48 hours, the amount and quality of maintenance would be unsatisfactory. With permission from both the brigade support battalion (BSB) and BEB commanders, the decision was made to split maintenance and security assets between two locations across the battlefield. With equipment from the 253d and Company E, assets were evenly divided between the two maintenance nodes.

The CTCP consisted of the FSC commander and first sergeant, along with the field feeding section, distribution platoon, and a section of the maintenance platoon. The CTCP was collocated with the battalion TOC to decrease logistical and security requirements; both remained within 5–10 kilometers of the brigade TOC. The FTCP remained collocated with the brigade support area (BSA). The BSA, which included the rest of the maintenance section, was led by the company executive officer and the battalion maintenance technician. The 253d was consolidated at the FTCP because it had the ability to repair tracked vehicles, which typically took longer than 24 hours and required specialized repair parts.

The BEB was also responsible for logistically supporting the brigade TOC, which was the most critical mission command node in the brigade AO. To avoid any disruption in operations, the FSC provided a dedicated fueling and logistics package consisting of a fueler and a maintenance team with a contact truck. When a prime mover for intelligence or communications systems goes down at the brigade TOC, that quickly becomes a top priority for the FSC. Dedicating on-site assets addresses an inevitable problem.

For engineer assets detached from the 23d BEB, the FSC attached one or two engineer mechanics with both engineer companies to provide quick maintenance troubleshooting and expertise forward with the maneuver units. Precious time can be saved if a maintainer in direct proximity can quickly inspect or even prevent maintenance issues. If passback maintenance were required, it could be coordinated through the maneuver FSC, the BEB FSC, or even the BSB, depending on available assets.

At the battalion TOC, battalion supply personnel remained collocated with the operations office and battalion executive officer to maintain a common operational picture at all times. Because the CTCP was always collocated, battalion supply personnel and the FSC commander met in person twice a day to plan LOGPACs for the following 72 hours, review current recovery operations, and mitigate anticipated issues. Meeting at the battalion TOC allowed for the receipt of instant feedback from operations office personnel in the TOC and was critical in synchronizing sustainment with operations. Whenever assets needed to be quickly synchronized to operations, the TOC was collocated in the proximity to coordinate assets across the brigade.

Because 23d BEB logistic assets were organized across the battlefield from the BSA to the forward line of troops, the FSC had great flexibility in coordinating logistics and recovery assets, making sure that they were where they needed to be in a timely manner. If the unit was short on assets, coordination with another FSC or the BSB was required to fill the gap in support.

Anticipation of Transition

When conducting offensive and defensive operations as a BEB, the challenge of maintaining the tempo with maneuver units is consistently demanding.

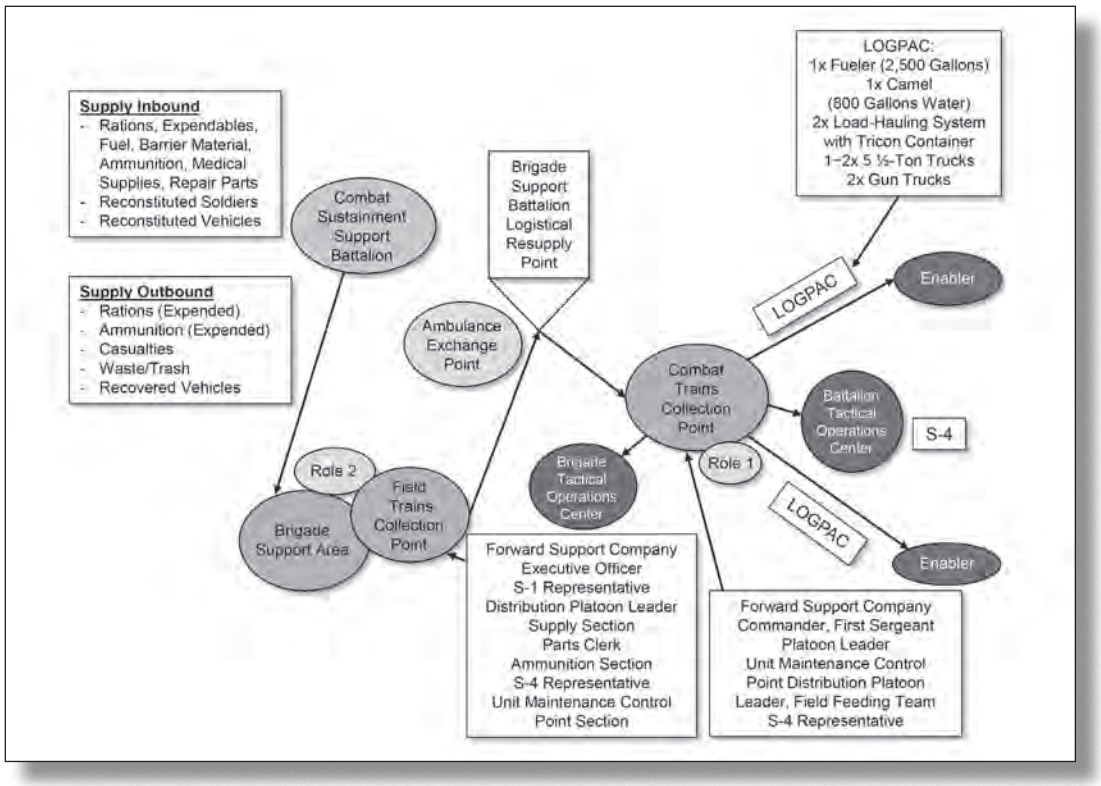


Figure 1. Sustainment disposition

The BEB must manage bulk Class IV and specialty Class V supplies to ensure that survivability and countermobility operations are successful for the brigade (Figure 1). If the tempo is not maintained, commanders are forced to reevaluate courses of action with the enablers supporting their units. This renders enablers largely irrelevant on the battlefield and poses risk to missions for the brigade. By anticipating offensive and defensive transitions when conducting planning, a BEB can remain flexible, quickly adapt to the fight, and accomplish the mission. The following should be considered when planning:

- **Loadout.** During reception, staging, onward movement, and integration, each battalion in the brigade received its own protective obstacle packages. Its FSCs staged flat racks at the Class IV yard, and they were loaded prior to Day 2. Each battalion received a combat-configured load (CCL), approximately 120 concertina rolls, and 320 pickets. This is important because if battalions do not have adequate Class IV supplies, they may take them from the CCLs designated for engineer missions.
- **Flexibility.** Class IV and specialty Class V supplies were moved around with flexibility in the brigade AO because supplies were not unnecessarily staged too far forward at lower echelons. A decisive-action environment is highly dynamic; and unless intelligence and planning are perfect, flexibility with employed Class IV and Class V supplies ensures that time and resources are effectively used at the right locations. Relocating misallocated CCLs from one battalion to another affects tempo and momentum.
- **CCL ownership.** Engineer-specific CCLs were built and managed by the BEB for the brigade to ensure that engineer units were supplied with Class IV and specialty Class V supplies at the right time and location. These CCLs consisted of a flat rack with a package of Volcano reloads (CCL A), M58 mine-clearing line charge reloads (CCL B), antitank ditch packages (CCL C), and 600 meters of triple-strand concertina wire (CCL D). These CCLs were included in the brigade TACSOP and briefed to other units to ensure that units in the brigade understood what constituted a CCL A, B, C, or D when these packages were shuffled into another unit AO (Figure 2, page 16).
- **CCL disposition.** The disposition of CCLs across the brigade AO was handled by the FSC and the BSA, which retained control of what needed to go where. All engineer companies in the BEB entered the fight with a combination of antitank ditch and triple-strand CCLs. This provided them with immediate assets to begin obstacle emplacement, while CCLs were transported to the engineer resupply point. For the Volcano and M58 mine-clearing line charge, CCLs were spread between the FSC at the BSA and the CTCP. The employment of Volcanos and M58 mine-clearing line charges usually requires additional planning. When moving out of logistical support area Warrior, CCLs were held by the combat sustainment support battalion (CSSB) because there were not enough haul assets to move that many supplies at a time. After the first CSSB executed a transportation movement request (TMR), the BSB assisted with moving CCLs forward, as necessary.

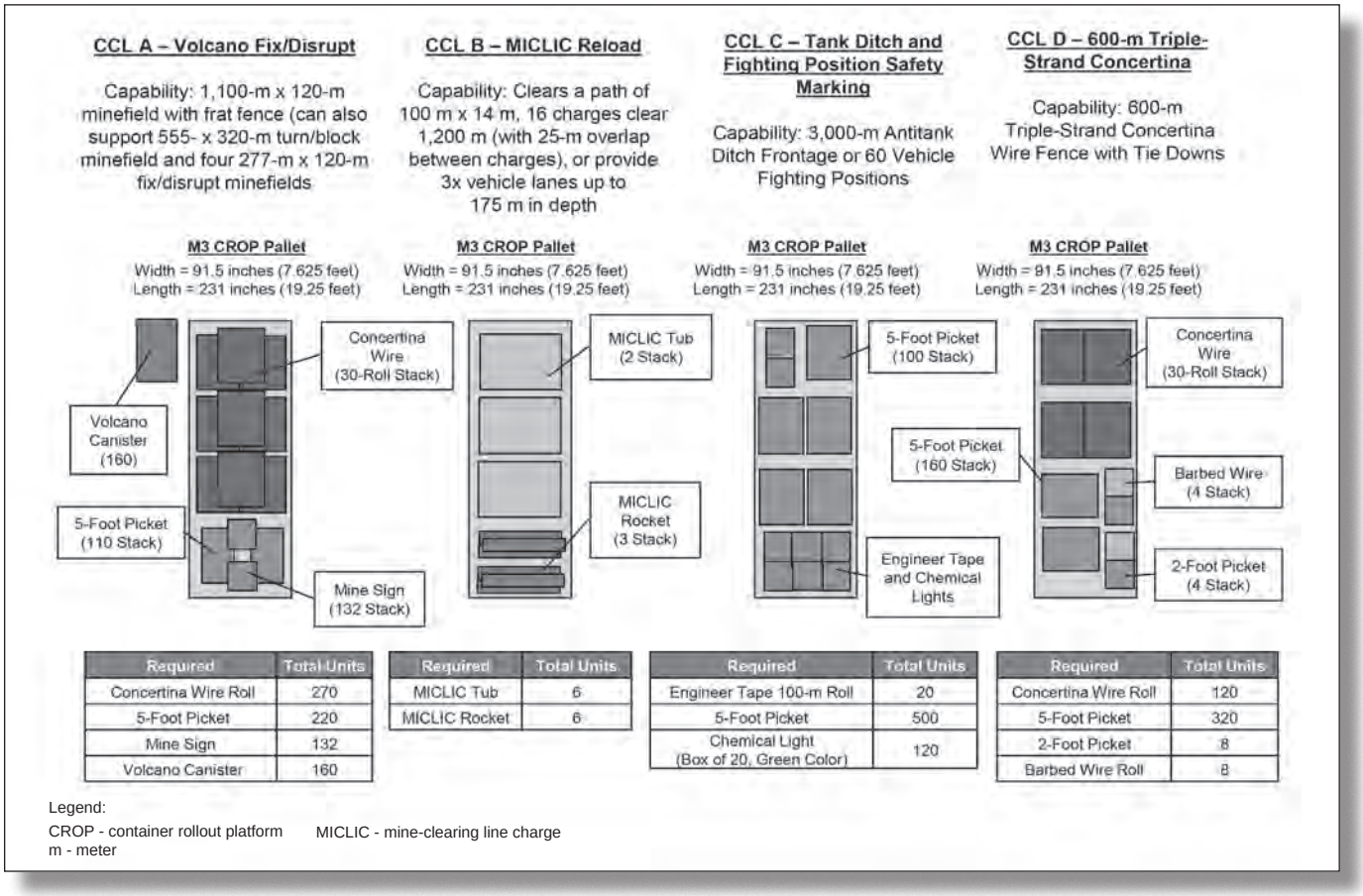


Figure 2. Combat-configured loads

- **Communication.** Coordination for the BSB worked well because communications to and from the BEB and BSB were expertly facilitated. The BSB outfitted a portable shelter at the BSA, with communication systems serving as a platform for all FSCs to use for coordination. This worked remarkably well because communication was streamlined with the other unit FSCs. If assistance with maintenance recovery or movement of CCLs was needed from the BSB or another FSC, a consolidated forum was available to request that assistance. The FSC commander was on the ground at the FTCP with a joint capabilities release communication system and served as the logistical liaison for the unit at the BSA. His leadership at the BSA was critical in ensuring that what was coordinated with the battalion TOC was what was actually happening.
- **Brigade buy-in.** Brigade and BSB support during offensive and defensive operations was conducted in different modes to best support the mission. The BEB coordinates for multiple preplanned engineer resupply points in the brigade AO for the offensive and subsequent defensive operation. The movement of CCLs centered around these resupply points, which were closely planned in conjunction with brigade staff. These common reference points were briefed in every brigade operation order and rehearsal to ensure that all units knew where they were located. A BEB representative usually briefed the location of all enablers and resupply points. The BEB forced itself into the brigade planning process to ensure that requirements were supported and that other units had an understanding of the enabler concept of operation.

Moving several flat racks of Class IV and Class V supplies proves challenging when hauling assets are limited. The BEB handled this problem in two ways: first, by relying on other units through transport movement requests and second, by using internal haul assets or requesting additional haul assets without reliance on another unit with many other priorities.

For the brigade defense following the first offensive operation, the CSSB submitted and executed the TMR to move approximately 10 CCLs to a designated engineer resupply point. The BSB could not execute this request; therefore, it relied on higher echelons. This was a high risk to the mission due to the lack of control with CSSB assets. This risk was mitigated by executing the TMR toward the end of the first offensive operation. Timing the execution of the request is important and requires a balance of mission, enemy, terrain, troops, and time available. Haul assets cannot be committed too close to the forward line of troops, but classes of supply need to be forward as soon as possible to give engineers as much time as possible to emplace a defense. Multiple destinations were planned for the TMR; however, the trigger was operationally dependent.

(continued on page 20)

FIGHTING WITH (OR WITHOUT) OBSTACLES

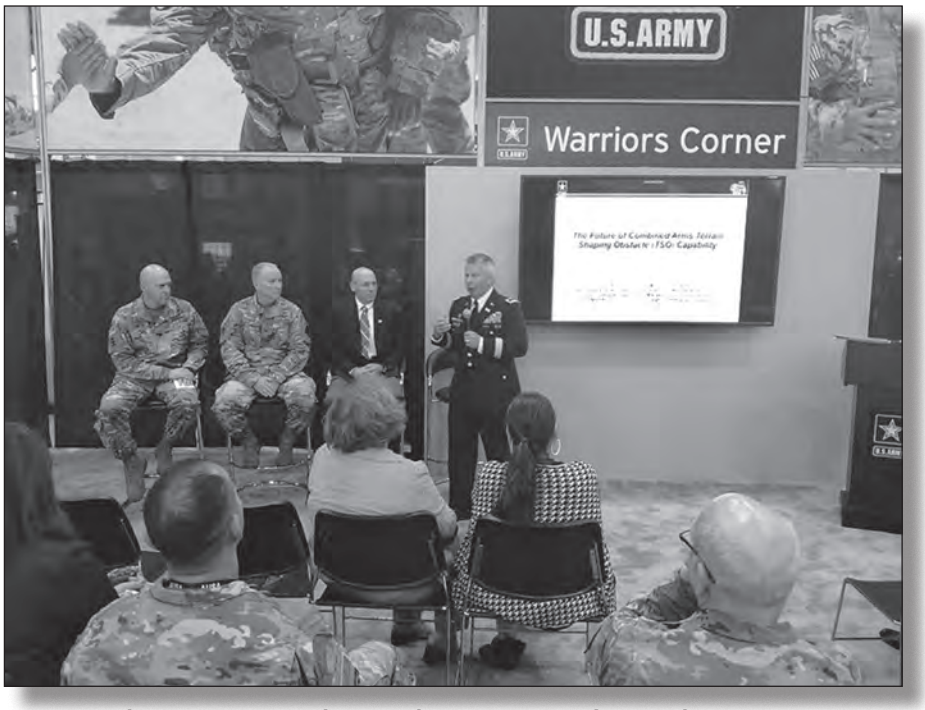
By Major Spenser H. Bruning and Mr. James R. Rowan

In a future high-intensity conflict, the Army must be ready and equipped to fight and decisively win against peer and near-peer threats. The *2018 National Defense Strategy*[1] underscores this requirement, outlining the need for a more lethal and ready force to compete, deter, and win in a changing strategic global environment. In contrast to post-9/11 contingency operations in Iraq and Afghanistan, large-scale ground combat operations have become the focus of the Army for operational design, force structure, training, and equipment modernization to build warfighting readiness and increase lethality.

This renewed focus provides an excellent opportunity for the Engineer Regiment to again demonstrate our diverse portfolio of engineer capabilities—most notably, our expertise with terrain-shaping obstacles (TSOs). Unfortunately, our ability to shape terrain has been degraded over the last 2 decades due to operational requirements, policies, training atrophy, and unreliable equipment. Unless actions are taken now, this trend will continue for the foreseeable future.

The Engineer Regiment is pursuing a plan to modernize our TSO capabilities to allow for a more lethal warfighting force, enhancing the Army's ability to win decisively in a complex environment and to support the joint force. On 8 October 2018, the 54th Chief of Engineers, Lieutenant General Todd T. Semonite, presented "The Future of Combined Arms Terrain Shaping Obstacle Capability" at the Warriors Corner during the 2018 Association of the U.S. Army Conference in Washington, D.C.[2] Lieutenant General Semonite and a team of experts from the U.S. Army Engineer School, Fort Leonard Wood, Missouri, along with product manager close-combat systems personnel and personnel from the Office of the Chief of Engineers, educated Army leaders on our current challenges in shaping terrain and proposed solutions to support the Army of 2028 and beyond.

To help the joint force achieve and maintain a relative advantage in this complex environment, Army engineers must effectively visualize, understand, and shape terrain, allowing joint force commanders time and space to employ forces and capabilities to gain multidomain superiority and overmatch. Obstacles are natural or man-made and lethal or nonlethal. An effective and proper obstacle integration plan for shaping terrain remains a long-standing doctrinal goal for Army engineers.



Lieutenant General Semonite presents at the Warriors Corner.

Terrain Shaping Over Time

It is important for Army engineers to understand the problem with TSOs over time. Figure 1, page 18, shows TSO capabilities from the 1980s to 2010, today, and into the future.

The panel on the left depicts a division in deliberate defense from 1980 to 2010. It illustrates how TSOs are employed throughout the entire depth of the battlefield to shape the environment and achieve desirable effects—influencing enemy movement and maneuver to friendly advantage, increasing the effectiveness of friendly

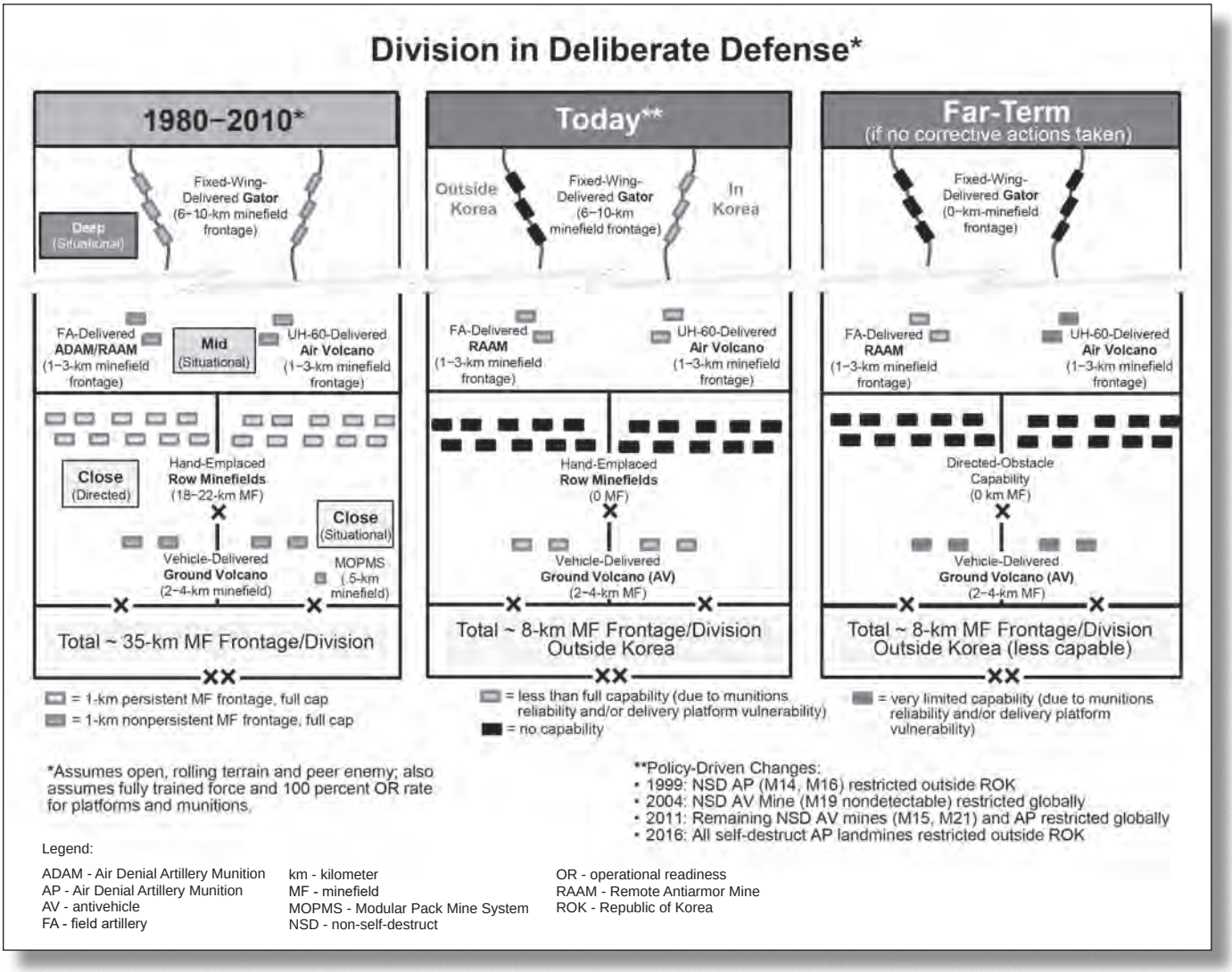


Figure 1. TSOs: the problem

weapon systems, and protecting friendly forces. We have historically used a variety of methods of employment—fixed wing, rotary wing, vehicle, and hand-emplaced. The panel contains a doctrinal depiction of a division in open and rolling terrain, with two brigade combat teams (BCTs) abreast and approximately 35 kilometers of lethal obstacle frontage. A typical division obstacle plan includes 6–10 kilometers of deep Gator minefields, 1–3 kilometers of mid-range minefields from artillery and air family of scatterable mines, 18–22 kilometers of directed obstacles in the close fight, and 2–4 kilometers of vehicle-delivered ground Volcano situational obstacles. This combined obstacle frontage allows two BCTs to achieve the combat power of three BCTs, allowing for a commander to mitigate risk and support historical minimum planning ratios required to accomplish an assigned offensive or defensive task.[3]

Today's Environment

The center panel of Figure 1 depicts the serious degradation of our Army's ability to shape terrain over the last 2 decades. Based on recent policy directives, we are no longer allowed to employ antipersonnel landmines outside of Korea.[4] This means that we have no deep delivered capability (as Gators are mixed antipersonnel/antivehicular landmines), and our inventory of artillery and air family of scatterable mines systems is severely limited (as most of those systems are mixed antipersonnel/antivehicular landmines) outside of the Korean peninsula.

Lieutenant General Semonite said that "You talk about readiness and modernization; you talk about engineers. I can't think of a bigger gap we have on the battlefield right now than terrain shaping. We have done very well on construction equipment. We've done well in our ability to counteract improvised explosive devices. We've done well in bridging. But this is a gap that's going to get Soldiers killed in our inability to be lethal on the battlefield."[5]

In the close fight today, the 18–22-kilometer area of minefield frontage—the portion of the obstacle plan where we once heavily relied on row minefields—is the gap that must immediately be filled. There are currently no fielded mines or munition systems that can close the massive gap

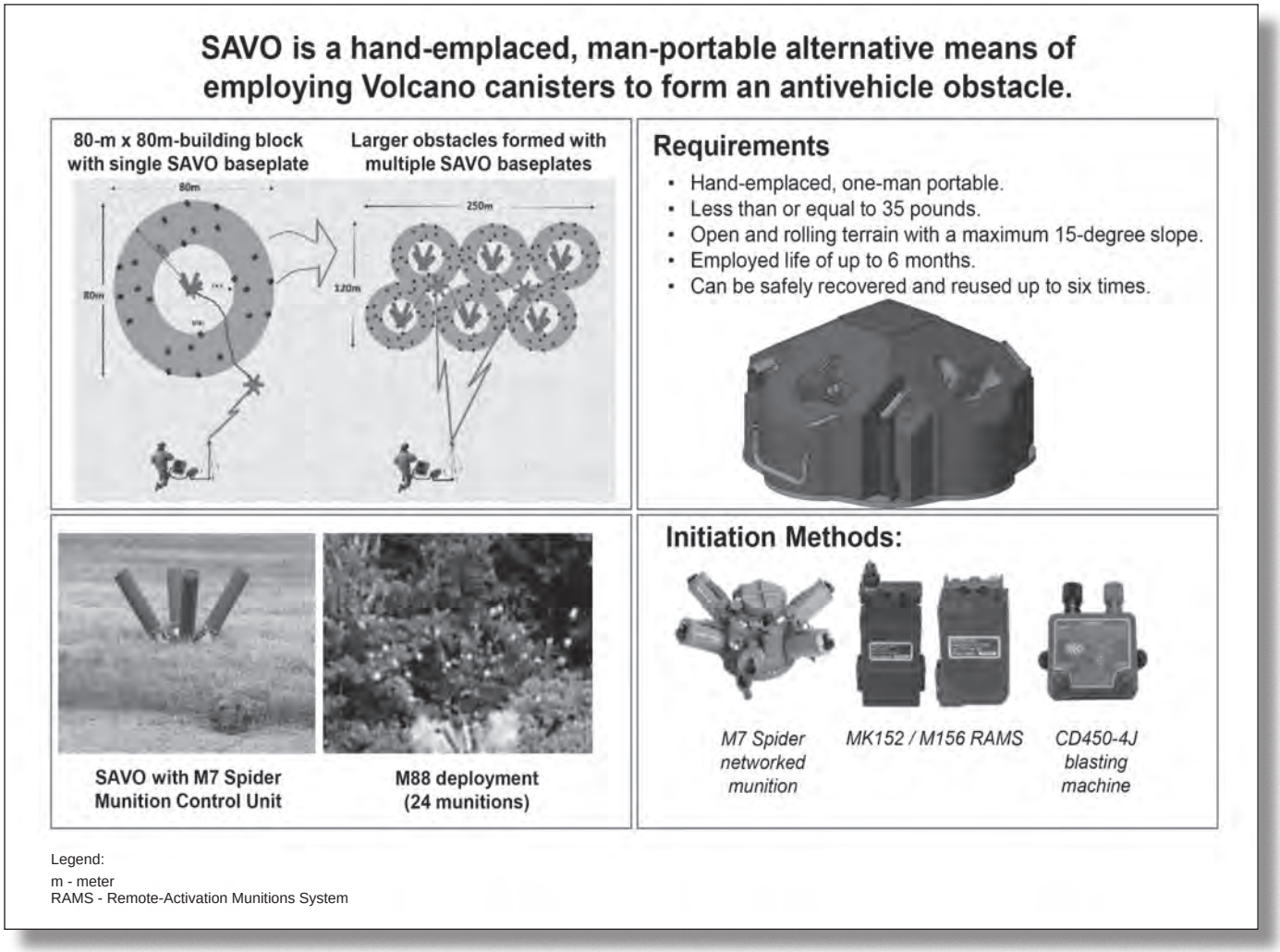


Figure 2. SAVO

in the close directed obstacle frontage doctrinally required for a division size mechanized force defending in open and rolling terrain. In the past, persistent antivehicular landmines, such as the M15 and M21, were emplaced as directed obstacles in the close fight. In January 2011, U.S. landmine policy restricted the global use of these mines.[6] Constructed obstacles, such as tank ditches and wire obstacles, are available but are problematic and do not achieve the same effects. Therefore, units have been forced to use the ground Volcano in a role for which it is not well-suited.

Far-Term Outlook

The panel on the right in Figure 1 illustrates that unless immediate actions are taken, our TSO capabilities will weaken in the next decade due to munition unreliability and delivery platform vulnerability. Ground and air Volcano-dispensing systems are in urgent need of a maintenance overhaul following 15 years of limited use due to the focus on stability and counterinsurgency operations. To support the future operational environment, we must build a new, more flexible TSO capability that takes into account the realities of a complex world, future threats, and benefits of new technologies.

TSO Way Forward

The Engineer Regiment is currently working on a two-pronged approach to TSO modernization. The Regiment is focusing on incremental improvements to existing TSO systems. This "fight tonight" plan will quickly close existing gaps by executing a service life extension program of air and ground Volcano systems while also fielding the new Standoff Activated Volcano Obstacle (SAVO). Already in the developmental and acquisition process, the SAVO is a clever use of several existing systems that include antivehicular landmine-pure Volcano canisters and several initiation systems to replace the directed obstacle capability in the close fight. The proof of concept is complete following successful employments at two of the combat training centers. The SAVO is shown in Figure 2.

Lieutenant Colonel Mark Himes, former Regimental Engineer Squadron Commander, 2d Cavalry Regiment, stated, "We employed the [SAVO] in numerous training events through Europe, including several Joint Multinational Readiness Center rotations. From a tactical perspective, I can tell you that it absolutely increases lethality and if you're not sure, just ask the opposing force in

Hohenfels, Germany. From our first employment during a decisive-action rotation, the opposing force was caught off-guard. It was caught off-guard by the simplicity, by the speed of employment, and by the speed of activation. From my experience in Europe, it's exciting to have this new tool as a responsible terrain-shaping tool that works."[7]

To meet future requirements, our long-term solution focuses on developing the next generation of common top- and bottom-attack TSO munitions that will increase our lethality while remaining U.S. policy-compliant. The Regiment is working with the requirements community, the acquisition community, and several of our industry partners to develop and test new technologies to provide ground force commanders greater flexibility and control.

Leaders at all levels are encouraged to review Lieutenant General Semonite's Warriors Corner presentation so that they can understand and clearly articulate the current situation and the efforts underway to close the terrain-shaping gap. A video of the presentation is available at <https://www.dvidshub.net/video/631839/ausa-2018-warriors-corner-16-future-combined-arms-terrain-shaping-obstacle-capability>.

Endnotes:

[1]*2018 National Defense Strategy*, U.S. Department of Defense, 2018, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>, accessed on 8 January 2019.

[2]Todd T. Semonite, "The Future of Combined Arms Terrain Shaping Obstacle Capability," Warriors Corner, 2018 Association of the U.S. Army Conference, Washington, D.C., 8 October 2018.

[3]Field Manual 6-0, *Commander and Staff Organization and Operations,* 14 May 2014.

[4]Ashton Carter, "DOD Implementation of U.S. Landmine Policy," Department of Defense, Washington, D.C., 2 December 2016.

[5]Semonite.

[6]Ibid.

[7]Mark R. Himes, "The Future of Combined Arms Terrain Shaping Obstacle Capability," Warriors Corner, 2018 Association of the U.S. Army Conference, Washington, D.C., 8 October 2018.

Major Bruning is a strategic planner for the Office of the Chief of Engineers at the Pentagon, Washington, D.C. He holds a bachelor's degree in international relations from George Washington University, Washington, D.C., and master's degrees in geological engineering from Missouri University of Science and Technology at Rolla and in policy management from Georgetown University, Washington, D.C.

Mr. Rowan is the deputy commandant of the U.S. Army Engineer School, Fort Leonard Wood, Missouri. He has served at the Engineer School headquarters for the past 8 years and was previously the commander of the 1st Engineer Brigade and the Engineer Research and Development Center.

(BEB Sustainment," continued from page 16)

The BEB waited for key terrain to be seized by the brigade and confirmed the avenue of approach, which the brigade committed to before initiating the TMR. Giving 24–48 hours lead time allowed enough time for supplies to be sent for the brigade defense.

Going into the brigade live-fire exercise, multiple engineer resupply points were planned for two main avenues of approach used by the brigade. Much like the brigade defense, 23d BEB needed to quickly transition from offense to defense during the live-fire exercise and ensure that conditions were set to emplace a brigade defense. The FSC borrowed haul assets from the BSB to allow the internal movement of CCLs around the battlefield and increase flexibility. Although multiple obstacles were planned in both avenues of approach, CCLs and haul assets were kept at a forward logistical element centrally located in the brigade AO until the battle unfolded during the offensive operation and the unit knew where to commit the bulk of CCLs. CCLs were planned for each company that was task-organized to a maneuver battalion based on mission requirements. Again, some CCLs were held in reserve and were operationally dependent. In a brigade size AO, there would not have been time to transport CCLs from one battalion to another on the other side of the AO if resources were committed incorrectly. Through either internal assets or additional assets, relying on another unit to deliver resources in the fight was not the most effective method of moving CCLs across the battlefield. Having the BSB as a backup is prudent, but careful planning should be considered to allow the FSC to deliver the resources straight to enablers if required.

A BEB is unique in the brigade because it possesses many small, highly specialized units. Ultimately, it is up to the BEB staff and leaders to ensure that other units know how to integrate, employ, and support the enablers on the battlefield. Setting conditions by inserting staff into the brigade military decision-making process is critical in shaping how the brigade plans to use and fight with enablers. The BEB delivers to the brigade a clear task and purpose for enablers, integration of enablers, synchronization of assets to operations, and deliverance of logistics to enablers with redundancy. By providing these, the BEB maintains its relevancy in the brigade order process, influences planning, ensures a shared understanding of assets across the brigade, and maintains the tempo with appropriate logistical support. The maneuver units can focus on their task to close in and destroy the enemy with effective combat support.

Lieutenant Colonel Melin is the commander of the 23d BEB. He holds a bachelor of science degree from the U.S. Military Academy–West Point, New York, a master's degree in military arts and science from the U.S. Army Command and General Staff College, and a doctorate degree in engineering science from Oxford University.

Captain Bolan serves as the forward support company commander for the 23d BEB. He holds a bachelor's degree in church ministries from Trinity Baptist College, Jacksonville, Florida.

Captain Solt is the supply officer for the 23d BEB, 1-2 Stryker BCT. He holds a bachelor of arts degree in political science from the University of Colorado, Boulder.

A Community of Leaders for Leaders

By the Center for Junior Officers

Engineer junior officers: Are you looking for a professional space to connect with like-minded leaders about improving yourself and making your unit more effective? Check out Junior Officer (JO) at <http://jo.army.mil>, your dedicated space for professional development.

What is JO?

JO is an online space dedicated to the professional development of Army junior officers and the organizations they lead. In JO, junior officers can find a wide array of leader development resources, including—

- **Blog posts**—original articles on topics relevant to junior officers. New content from junior officers is welcome!
- **Document database**—a repository of professional documents authored by other junior officers and shared to help others.
- **Company Commanders' Leader Professional Development (CCLPD) modules**—mobile-friendly leader professional development modules with short videos, articles, and discussion questions.
- **Online Leader Challenge**—a means to put yourself in the shoes of a junior officer facing a tough dilemma with no clear correct answer.
- **Online forums**—a members-only space where junior officers can share ideas and insights.

Online is Great, but What About Face to Face?

For organizations looking to professionally develop their junior officers in person, the Center for Junior Officers will provide a custom training package. Options include—

- **Leader Challenge**—a video-based leader development program with discussion.
- **Great Teams Exercise**—a means of sharing and learning from the experiences of others on a great team.
- **Dog Tag Exercise**—an exercise that can be used to build a visual plot of professional experience to reveal new aspects and talents of your team members.
- **Third-Generation Leadership Talk**—a concept that focuses on impacting future leaders entering into Service.
- **Company Level Leader Interviews**—a way to share your experience with a leadership challenge.
- **Leader/Visual Metaphor Exercise**—an exercise used to identify current values reflected in the organization and to discuss future development.
- **Leadership Psychology Talk**—a presentation on a wide range of topics related to the psychology of leadership.

The Center for Junior Officers is an Army-sponsored unit that supports junior officers across the force. To find out more, contact the Center for Junior Officers by e-mail at <info@jo.army.mil>.

See you on JO!

Beyond the Black Book
A Look at U.S. Army Reserve Engineer Talent Management Initiatives

By Major Steven A. Keister

The audacity that led Major George C. Marshall to pull on the sleeve, and demand the attention, of General John J. Pershing in 1917 also led, in short order, to Marshall's appointment as Perishing's aide. And that, in turn, led Marshall to great insight into the varying levels of success of senior officers. Applying the same observations to junior officers, Marshall developed a keen eye for recognizing talent.

It has been widely reported that Marshall kept a "black book" containing the names of up-and-coming officers. Thomas E. Ricks refutes the existence of such a book in his study of post-World War II general officers, entitled *The Generals: American Military Command From World War II to Today*.[1] However, according to a 2014 biography of George Marshall, "Marshall kept track of men who impressed him."[2] Regardless, Marshall was introduced to a number of talented junior officers throughout his career. During his assignment as the assistant commandant of the U.S. Army Infantry School, Fort Benning, Georgia, Marshall's cadre of instructors included Majors Omar Nelson Bradley, Dwight D. Eisenhower, Joseph Warren Stilwell, and James Alward Van Fleet and Captains Joseph (Lightning Joe) Lawton Collins and Walter Bedell Smith. Marshall's experience with these young officers enabled him to understand their strengths and, later, to determine how to employ them under the most trying of times—during war.

Following World War I, this core group of officers observed a change in warfare. Those with foresight noticed how technology and doctrine were changing. They saw the failures of the Treaty of Versailles and began preparing for the next war.

After the 7 December 1941 attack on Pearl Harbor, Hawaii, these mid-grade officers became wartime senior officers. Because Marshall knew these officers, he appointed them to positions of his choosing when he became Chief of Staff. Marshall selected General Dwight D. Eisenhower to oversee operations in North Africa, France, and Italy. Eisenhower was a peculiar choice; however, Marshall considered him "a coordinator, a planner, and a conciliator."[3] Marshall knew that these skills would be required of a leader of combined forces who would be working with the likes of Winston Churchill.

A certain amount of perspective regarding the situation at that time is required to understand how Marshall was able to keep track of officers. Marshall came of age in an interwar period—a time when the entire Army was much smaller than the U.S. Army Reserves of today. With such a small force, it was possible for Marshall to interact with a wide range of officers. He was able to personally meet the officers and learn about their strengths and weaknesses. He saw them in school, in the field, and as command staff officers.

Following 17 years of the War on Terrorism, modernity required a reevaluation of our personnel systems. The *Army Talent Management Strategy* (*ATMS*), published in September 2016, is moving the personnel system from an industrial-based system to an *ATMS*-based one.[4] The *ATMS* outlines and implements ways to develop senior leaders. This article discusses the lines of effort involved in the *ATMS*.

Today, the U.S. Army, including the Regular Army, Army National Guard, and U.S. Army Reserve, is nearly one million strong. The sheer size increases the difficulty of getting to personally know officers. Additionally, *The National Security Act of 1947*,[5] and the *Goldwater-Nichols Department of Defense Reorganization Act of 1986*[6] pushed for a joint relationship and the total number of Service members increased. But despite efforts to integrate the Services, they continue to remain largely independent. Opportunities to work together exist with deployments and in schools. However, it is up to individuals to maintain any relationships. Promotion rates are a factor in who and how many Service members have a chance to become senior officers. This turbulence also causes some of the best Soldiers to leave the Service and to pursue civilian careers. Fortunately, this has been recognized and initiatives for the development of future senior leaders are in motion.

The *ATMS* task force is a general officer-led organization with members from Headquarters, Department of the Army, and the Office of the Chief of Staff, with the sole purpose of developing senior leaders. One of the highlights associated with the task force is a YouTube© channel that explains the initiatives.[7] The task force has developed four lines of effort to support the strategy of growing future senior leaders—acquire, develop, employ, and retain a high-quality force.

The *ATMS* defines each of those lines of effort using sets of major objectives:

- ***Acquire***. Identify and recruit diverse talents required for the current and future force, develop those talents for initial entry into one of the Army workforce segments, and set conditions for their optimized employment. Acquisition includes the marketing, recruiting, and selection of quality candidates to serve in the Army; and the onboarding of talent and subsequent job placement ensure that the Army is diverse and inclusive.
- ***Develop.*** In collaboration with each individual, identify employment, training, and opportunities to extend his or her talents and optimize performance. Increase the rigor associated with the training, education, and credentialing of Army professionals, aligning certification with demonstrated and measurable expertise rather than time in grade, service, or position. Development includes career planning and subsequent career management to enhance individual talents that contribute to the readiness of the Army.
- ***Employ***. Optimize the productivity of each Army professional by aligning unique individual talents against organizational talent demands for the mutual benefit of the Army and the individual. Align personnel to the right job at the right time, assigning them where their contributions can be maximized. Employment includes the advancement of personnel through job placement and succession planning.
- ***Retain.*** Identify individuals with talents that are in demand, and engage them with an integrated mix of opportunities and incentives as part of a tailored labor contract. This includes migration across Army workforce segments (permeability). Retention includes talent differentiation and competitive compensation for talent, whereby the workforce is engaged for a lasting commitment to the Army. Retention allows for flexible career paths so that personnel can serve where they can best contribute and provides transition benefits and services to those individuals whose talents are no longer in demand within the Army workforce.

Together, these lines of effort comprise a system for the Army to develop talent through all ranks. The means are still under development and will need refinement in order to be integrated with the overall *ATMS*. The map contained in the *ATMS* (Figure 1, page 24) outlines supporting objectives—market, educate, align, and engage. Despite a cynical few, the members of our institution generally support the initiative—and leaders across all ranks must also do their part to support the *ATMS* system. This includes upholding the standards of counseling and evaluations, adopting new perspectives, and changing the way things are done.

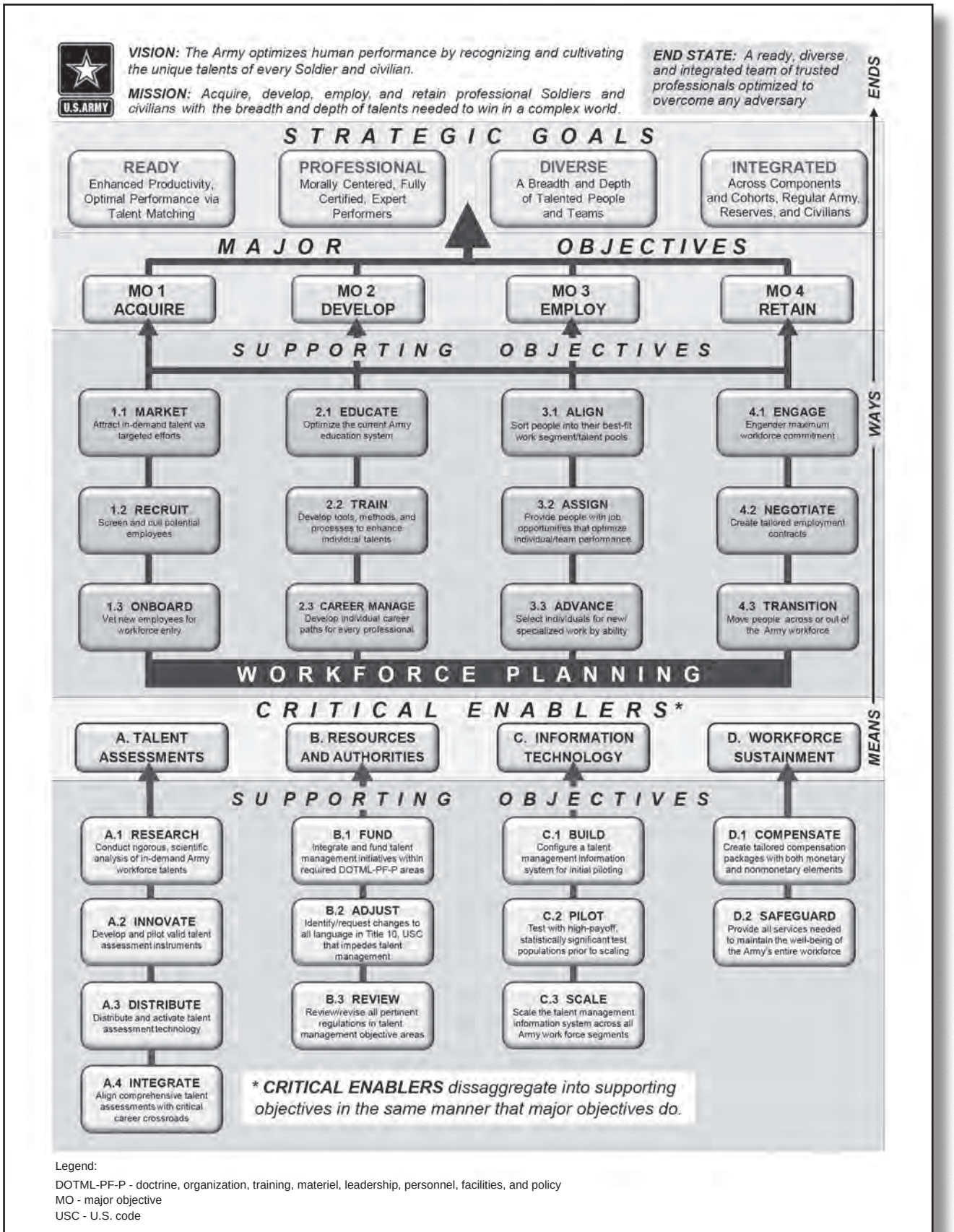
The Army Reserve portion of the Engineer Regiment has developed an operational planning team (OPT) to take a hard look at officer talent management. The OPT has pushed several initiatives that are currently making a difference. This team has the support of senior leaders of the Engineer Regiment, to include theater engineer commanders, commanding generals, and the Chief of Engineers.

When this OPT was initiated in early fiscal year 2017, a desired end state was set. This system of synchronized processes ultimately provides Army Reserve engineers with career opportunities to develop and broaden individual knowledge, skills, and abilities (KSAs). KSAs allow senior leadership to grow with an array of competencies, experience, and education to meet future operational and strategic requirements and challenges. While this end state is associated with all the right goals, the question is: How will the OPT meet this end state? What processes can be used to develop senior leaders?

Sessions with the OPT and innovative, experienced, and intelligent individuals resulted in answers via an operational approach (Figure 2, page 25). Objectives derived from this operational approach included an update of the career map in Department of the Army (DA) Pamphlet (Pam) 600-3, *Commissioned Officer Professional Development and Career Management*.[8] The outdated career map, consisting of the standard table organized by rank, presented a lock-step approach to rising in the ranks. Focusing on the Soldier, the OPT developed a flexible career path, or swim lane. The flexible career path chart provides a different perspective on rank progression and shows different ways to reach the top based upon the needs, wants, and desires of the individual and the Army. The standard operational career path is presented, and the gates to broaden and deepen as the officer advances are shown. Individuals can then assess their goals and customize their career paths to help meet those goals.

Assignments alone do not make a senior leader. The OPT methodology supports this. The Army Reserve *ATMS* methodology combines the experiences, education, and KSAs to provide a comprehensive understanding of what it takes to become a senior leader. This methodology recognizes the key developmental positions deemed important in order for Soldiers to acquire the requisite KSAs and experience expected of senior leaders; however, it also integrates the developmental and broadening experiences on the path. Multitudes of engineer-specific assignment possibilities are available.

About 40 percent of engineers in the Army Reserve serve in nonengineer units. A recognition of the vast number of engineers serving in nonengineer units is important in gaining the broadening experiences outlined in DA Pam 600-3. There is concern that these officers are not receiving the guidance they need from their chains of command or from the Engineer Regiment. Troop program unit officers are not



Legend:

DOTML-PF-P - doctrine, organization, training, materiel, leadership, personnel, facilities, and policy
MO - major objective
USC - U.S. code

Figure 1. *ATMS* map

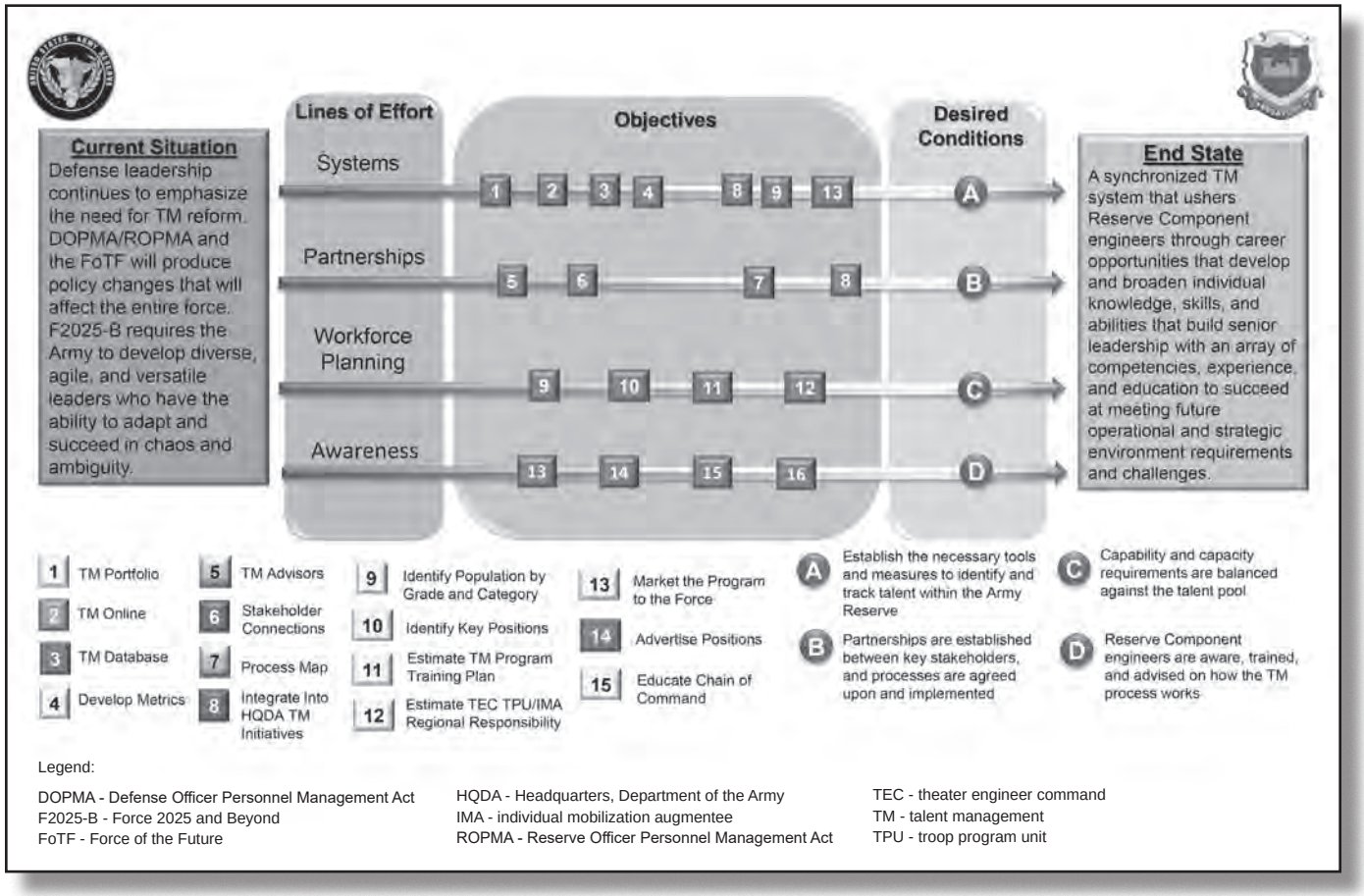


Figure 2. Army Reserve Engineer Regiment talent management operational approach

centrally managed, which limits functions to get them back into engineer units to attain key developmental experiences. To help foster mentor/mentee relationships, OPT developed the Talent Management Advisor (TMA) Program.

The voluntary TMA Program creates a conduit back to the Regiment. Under the TMA Program, leaders in the ranks of major through colonel are trained on the most current doctrine and policy. These advisors are paired with junior officers who are part of the 40 percent of engineers assigned to nonengineer units. The advisors serve as a nonbiased third party to provide guidance, support, and information about what is available for junior officers' career goals. The TMA Program is not designed to replace the chain of command or undermine the rater/ratee relationship. Instead, it augments senior-level guidance and provides a direct link to the Regiment. TMAs are only a telephone call away from direct answers provided by the U.S. Army Human Resources Command, the Office of the Chief of the Army Reserve, or the Office of the Chief of Engineers.

TMAs stay in contact with one another so that they may reach out to other seniors who have been through similar experiences and can provide development guidance. TMAs and their populations are organized by geographical location; this network also aids the officer when his or her civilian career requires moving across the country. When a Reserve officer needs a new unit assignment, the TMA network works with the Army Reserve Careers Division to find the best fit for the officer to advance his or her Army career as well.

TMAs also distribute information. The Regiment recently recognized that the Reserve Component Engineer Captains Career Course curriculum is the same as that of the resident Engineer Captains Career Course but that the Reserve Component Engineer Captains Career Course was not included in the cooperative degree program that allows students the opportunity to earn master's degrees. Now, Reserve Component Engineer Captains Career Course students have the opportunity to complete distance-learning programs to earn master's degrees in conjunction with military education courses. The advisors receive this type of information and send it out to Soldiers in the field.

The OPT meets monthly and has expanded to include leaders in the warrant officer and noncommissioned officer ranks. Recognizing that a talent management system does not apply only to commissioned officers, the OPT is developing similar objectives to support the entire Engineer Regiment.

ATMS has come a long way from the days of a senior officer monitoring juniors to fill positions based on the senior officer's personal knowledge. The method of Marshall's "black book" is not the way to place senior leaders in the Army today. The *ATMS* initiative is a great start to a future of effective personnel management. The lines of effort of

(continued on page 28)

Beyond the Horizon:
Combined Joint Engineer Exercise in Central America

By Captain Marie A. Adams, Captain Nicholas M. Fasanella, First Lieutenant John D. Crawford, and First Lieutenant Alabi Montoya

Every summer, approximately 1,800 U.S. Army engineers, U.S. Marine Corps engineers, U.S. Navy Seabees, and members of the U.S. Air Force Red Horse Squadron (RHS) can be found in the jungles of Central America. This mixture of Regular Army Soldiers, Reservists, and National Guard Service members comes together to form Task Force Engineer (TFE), the command and control agency responsible for conducting Exercise Beyond the Horizon (BTH). BTH was inaugurated in 2008 as a U.S. Southern Command humanitarian and civic assistance training exercise in Central America and the Caribbean.

Each year, engineer units conduct 2- to 3-week rotations for 3 to 4 months. Their goals are to provide professional development, increase technical proficiency, enhance partner nation capacity, and develop relationships with the partner nation by working alongside military engineers from the host nation. Over the last decade, BTH has partnered with host nation militaries from Belize, the Dominican Republic, El Salvador, Guatemala, Honduras, Panama, and Trinidad and Tobago. Together, this combined joint task force (JTF) has upgraded and/or built barracks,

JTF engineers sign over the buildings and extra materials to the El Salvador Ministries of Education and Health at an El Salvador military base during BTH 2018.

Before (top) and after (bottom) construction of the school in San Marcos De La Cruz, El Salvador, during BTH 2018

clinics, medical wards, orphanages, restrooms, schools, water towers, and other facilities. Additionally, BTH has included medical personnel who provide family care and dental, optometry, and veterinary services.

Exercise BTH 2018 TFE involved a number of different units from all Services. The Regular Army was represented by the 615th Engineer Construction Company, Fort Carson, Colorado. The U.S. Army National Guard unit that participated was Joint Force Headquarters, 83d Troop Command, 50th Regional Support Group, Saint Augustine, Florida. Army Reserve units that participated were the 380th Engineer Company, Greenville, Tennessee, and the 390th Engineer Company, Chattanooga, Tennessee. The U.S. Marine Corps Forces Reserve from the 6th Engineer Support Battalion, Portland, Oregon participated. Air National Guard units that participated were the 201st RHS, Fort Indiantown Gap, Pennsylvania; the 202d RHS, Camp Blanding, Florida; and the 203d RHS, Camp Pendleton, Virginia. Partner nation engineers from El Salvador and Peru also made up the TFE team. In addition, at each site, a number of partner nation engineers worked with U.S. Service members to support each other's construction activities and develop best practices, creating a diverse combined JTF.

The mission of the engineers involved in BTH 2018 was to conduct a humanitarian and civic assistance training exercise with partner and host nation military forces. The exercise consisted of completing new construction projects to improve the readiness of U.S. forces and provide a long-lasting benefit to the people of El Salvador.

U.S. engineer units conducted realistic, mission-essential task list-driven training by constructing four schools, four kitchens, three latrines, and one clinic. Engineers improved their proficiency throughout the duration of all of the major milestones, which included site preparation; the pouring of concrete foundations; the laying of concrete blocks; the setting of roof trusses; and door, window, roof, electrical, and plumbing installation. The Service members contributed more than 47,000 man-hours to the projects, which collectively totaled $700,000. Service members at each site also completed a number of additional projects depending on

project schedules and the availability of materials. These included a gravity-fed hand-washing station, a volleyball court, a soccer field, and a pergola. Damaged roofs were also repaired.

The El Salvador army engineers spent a little more than 3 months as part of the combined JTF BTH 2018. First Lieutenant Alabi Montoya from the El Salvador army, said, "My experience working together with members of the 390th Army Engineer Company from Chattanooga, Tennessee, and Bridge Company B of the 6th Marine Corps Engineer Support Battalion was a very rewarding opportunity in both my professional and personal life. We shared the objective of building and improving public schools in rural areas of El Salvador to help more than 600 children by providing them with a dignified place to receive their basic academic studies. The combination of the three engineering units of the two countries was necessary to achieve this objective. This integration was a success, creating an efficient team with diverse knowledge, skills, and technology. This presented a unique opportunity to learn and train by doing, while actively working together and learning from each other. Being a part of BTH 2018 was a great experience."

TFE overcame many hurdles, including late deliveries of materials from local contractors, a language barrier with the local population, an unfamiliar task force structure with U.S. and partner nation branches, and the heat of the summer in El Salvador. The Service members involved overcame the various obstacles, learned from each other, and completed the mission together.

Back in the United States and Honduras, U.S. Army South and the Engineer Section, JTF Bravo, are hard at work as BTH 2019 quickly approaches. Planning conferences and operational site selections have already commenced. Clinics and schools will be built in the southwestern region of Guatemala. U.S. Army South will maintain administrative responsibilities for BTH 2019, while JTF Bravo takes over the execution operations. Together, these two organizations will work to incorporate after action reviews, improve site-specific plans, and ensure that contracts meet the building timeline and other requirements.

Captain Adams is an engineer project officer for JTF Bravo, U.S. Army South, Southern Command, Soto Cano Air Base, Honduras. She holds a bachelor's degree in civil engineering from Santa Clara University, California.

Captain Fasanella was the TFE S-3 for BTH 2018 and is currently the commander of the Headquarters and Headquarters Company, 50th Regional Support Group, Florida National Guard, Homestead, Florida. He holds a bachelor's degree in history from the University of South Dakota, Vermillion.

First Lieutenant Crawford was the TFE contracting officer representative for BTH 2018 and is currently the executive officer for the 868th Engineer Company, 83d Troop Command, Florida National Guard, Live Oak, Florida. He holds a bachelor's degree in business management from Saint Leo University, Florida.

First Lieutenant Montoya was the El Salvador army engineer project manager in El Amate for BTH 2018. She currently works as the chief of administration at the El Salvador Language School for Officers.

("Beyond the Black Book," continued from page 25)

acquiring, developing, employing, and retaining talent encompass the life cycle of an officer.

The Army Reserve Engineer Regiment OPT for *ATMS* is showing what a dedicated group of leaders can accomplish by creating initiatives that may be replicated by other branches. Time will tell how far these objectives and efforts will go—but at least all ranks will have a seat at the table when it comes time to develop future senior leaders. In the meantime, these initiatives keep us excited about the future of our Army!

Endnotes:

[1]Thomas E. Ricks, *The Generals: American Military Command from World War II to Today,* Penguin Books, New York, 2012.

[2]Debi Unger et al., *George Marshall,* Harper Collins, New York, 2014.

[3]Ibid.

[4]*U.S. Army Talent Management Strategy Force 2025 and Beyond*, Department of the Army, 26 September 2016.

[5]*A Look Back . . . The National Security Act of 1947*, Department of the Army, 30 April 2013, <https://www.cia.gov/news-information/featured-story-archive/2008-featured-story-archive/national-security-act-of-1947.html>, accessed on 15 January 2019.

[6]H.R. 3622—99th Congress, *Goldwater-Nichols Department of Defense Reorganization Act of 1986,* <https://www.govtrack.us/congress/bills/99/hr3622>, accessed on 23 October 2018.

[7]*U.S. Army Talent Management*, <Youtube.com>,<https://www.youtube.com/channel/UCXJPHjSjolwhys2oKw9PJ2A>, accessed on 15 January 2019.

[8]DA Pam 600-3, *Commissioned Officer Professional Development and Career Management*, 3 December 2014.

Major Keister serves at the Joint Training and Exercises Directorate, North American Aerospace Defense Command and U.S. Northern Command. Major Keister previously served as the Army Reserve, Active Guard Reserve engineer assignment officer at the U.S. Army Human Resources Command, Fort Knox, Kentucky. He holds a bachelor of science degree from the University of Toledo, Ohio, and a master's degree in public administration from Webster University. He is a graduate of the Joint Forces Staff College, Norfolk, Virginia, and the Army Command and General Staff College, Fort Leavenworth, Kansas.

ENGINEER WRITER'S GUIDE

Engineer is a Department of the Army-authenticated publication that contains instructions, guidance, and other materials to continuously improve the professional development of Army engineers. It also provides a forum for exchanging information and ideas within the Army engineer community. *Engineer* includes articles by and about commissioned officers, warrant officers, enlisted Soldiers, Department of the Army civilians, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to engineers. Articles may share good ideas and lessons learned or explore better ways of doing things. Shorter, after action type articles and reviews of books on engineer topics are also welcome.

Articles should be concise, straightforward, and in the active voice. Avoid using acronyms when possible. When used, acronyms must be spelled out and identified at the first use. Avoid the use of bureaucratic jargon and military buzzwords. Text length should not exceed 2,000 words (about eight double-spaced pages).

Articles submitted to *Engineer* must be accompanied by a written release from the author's unit or activity security manager before editing can begin. All information contained in an article must be unclassified, nonsensitive, and releasable to the public. It is the author's responsibility to ensure that security is not compromised; information appearing in open sources does not constitute declassification. *Engineer* is distributed to military units worldwide and is also available for sale by the Government Publishing Office. As such, it is readily accessible to nongovernmental or foreign individuals and organizations.

Authors are responsible for article accuracy and source documentation. Use endnotes (not footnotes) and references to document sources of quotations, information, and ideas. Limit the number of endnotes to the minimum required for honest acknowledgment. Endnotes and references must contain a complete citation of publication data; for Internet citations, include the date accessed.

Include photographs and/or graphics that illustrate information in the article. Graphics must be accompanied by captions or descriptions; photographs should also be identified with the date, location, unit/personnel, and activity, as applicable. Do not embed photographs in Microsoft® PowerPoint or Word or include photographs or illustrations in the text; instead, send each of them as a separate file. If illustrations are created in PowerPoint, avoid the excessive use of color and shading. Save digital images at a resolution no lower than 200 dpi.

Copyright concerns and the proliferation of methods used to disseminate art, illustrations, and photographs require that the origin of any graphics be identified. If a graphic is copyrighted, the author must obtain copyright approval and submit it to *Engineer* with the proposed manuscript. As a general policy, *Engineer* will not use artwork that cannot be attributed.

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

When an article has multiple authors, the primary point of contact should be clearly designated with the initial submission. The designated author will receive all correspondence from *Engineer* editors and will be responsible for conferring with coauthors concerning revisions before responding to the editors.

Engineer will notify each author to acknowledge receipt of a manuscript. However, we make no final commitment to publish an article until it has been thoroughly reviewed and, if required, revised to satisfy concerns and conform to publication conventions. We make no guarantee to publish all submitted articles, photographs, or illustrations. If we plan to publish an article, we will notify the author. Therefore, it is important to keep us informed of changes in e-mail addresses and telephone numbers.

Manuscripts submitted to *Engineer* become government property upon receipt. All articles accepted for publication are subject to grammatical and structural changes as well as editing for length, clarity, and conformity to *Engineer* style. We will send substantive changes to the author for approval. Authors will receive a courtesy copy of the edited version for review before publication; however, if the author does not respond to *Engineer* with questions or concerns by a specified suspense date (typically five to seven working days), it will be assumed that the author concurs with all edits and the article will run as is.

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

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

Obstacle Recording, Reporting, and Transfer

By Captain Justin J. Vogt

The 6 October 2017 publication of Field Manual (FM) 3-0, *Operations*,[1] precipitated a dramatic shift in the thinking of Army leaders at all echelons: We can no longer afford to focus on a stability fight against a lesser enemy; we must begin to train our eyes on peer- and near-peer competitors with the potential for overmatch at the division and corps levels. This cognitive shift led to some unexpected realizations pertaining to combined arms obstacle integration doctrine. While examining large-scale ground combat operations through the lens of multidomain battle, the following three things became readily apparent:

- Tactical obstacles would be necessary in order to create windows of superiority in which to maneuver.
- Obstacles would need to be transferred from the emplacing unit to another unit (potentially another brigade combat team [BCT], a different division, or a unified action partner) after emplacement.
- Army engineers have lost their doctrinal foundation for this process over the last 17 years of conflict. To be more specific, we have lost the ability to record and report obstacles on a paper form.

Recording and reporting tactical obstacles is a critical function for effectively transferring those obstacles. This institutional training and doctrinal gap is quickly becoming problematic as we develop innovative methods for employing controllable scatterable minefields and will only continue to grow as we develop new capabilities. This article discusses why we lost our obstacle recording and reporting capability and presents an actionable solution to bridge the gap.

To understand why a doctrinally based obstacle transfer is necessary, you need look no further than Army Techniques Publication (ATP) 3-90.8, *Combined Arms Countermobility Operations*.[2] This publication states, "Certain actions must occur when an obstacle is turned over or transferred to ensure that obstacle effectiveness or integration is not degraded. Obstacle transfer ensures that the commander who is gaining ownership of the obstacle is familiar with the obstacle characteristics and features and that the responsibilities for maintaining obstacle integration are understood."[3] The characteristics and features that must be passed on include obstacle data (number, grid location, emplacement date and time, dimensions and composition, anchor points, lane-marking data, intended effect, strengths, and weaknesses). Details about friendly and enemy activities near the obstacle, areas for enemy observation, points of breach, and fire control measures must also be passed on to the gaining unit. While a BCT tactical standard operating procedure may fulfill this need for obstacle transfer between units within its own task-organized formations, there is no accommodation for transfer between units from non-task-organized elements. Obstacle transfer may also transcend the inherent responsibilities between U.S. forces to now include multinational units and, in some instances, be transferred to state governments for disposition.

It is highly likely that during large-scale ground combat operations, tactical obstacle transfer will be required. The risks of failing to record and report are too high to disregard. Current battlefields do, and future battlefields will, include the employment of explosive obstacles to mitigate the effects of peer- and near-peer enemy action. Obstacle-reporting creates a historical record of the existence of the obstacles.

Obstacle-reporting concerns include awareness for integration, effectiveness against enemy forces, civilian casualty mitigation, and fratricide avoidance. The loss of integrity or fidelity for even the smallest portion of the obstacle information may well have catastrophic consequences. Department of Defense (DOD)-wide forms and report formats are necessary to ensure that all obstacle information is captured. Those forms and formats once existed in doctrine. What happened to them?

Seventeen years of stability operations and new policies regarding doctrine, joint and multinational operations, and restrictions on the use of landmines are what happened. In 2005, one could open now-obsolete FM 20-32, *Mine/Countermine Operations,*[4] and find now-obsolete Department of the Army (DA) Forms 1355, *Minefield Record,*[5] and 1355-1, *Hasty Protective Minefield Record,*[6] for recording row and standard pattern minefields. Also, Chapter 2 contained the *Obstacle Turnover/Transfer Report.*[7] By 2016, with the publication of ATP 3-34.20, *Countering Explosive Hazards*,[8] all three of those documents were gone. Here's how it happened . . .

When ATP 3-34.20 *Countering Explosive Hazards,*[9] was published, it superseded FM 3-34.210, *Explosive Hazards*,[10] which itself superseded FM 20-32. DA Forms 1355 and 1355-1 were carried over and placed in Appendix G. However, the *Obstacle Turnover/Transfer Report* was not carried over because North Atlantic Treaty Organization (NATO) Standardization Agreement (STANAG) 2989, *Transfer of Barriers,*[11] had been ratified and it included a *Transfer Procedure Checklist,* which became the DOD standard for obstacle transfer, making the report format found in FM 20-32 obsolete.

The story behind DA Forms 1355 and 1355-1 is a little more complicated. DA 1355 disappeared the same way the *Obstacle Turnover/Transfer Report* did—with the ratification of another STANAG, STANAG 2036, *Land Mine Laying, Marking, Recording, and Reporting Procedures.*[12] The U.S. Army *Minefield Record* form was adopted as the NATO standard and can now be found as the *NATO Minefield Record*.[13] As for DA 1355-1, it has simply been renumbered. When ATP 3-34.20 was published with the Marine Corps as a joint Service manual, it could no longer remain as a DA form; it had to be assigned a DOD number. It can now be found as Department of Defense Form 3007.[14]

The predominant logic behind these changes, which took place while the majority of the force was focused on countering insurgencies and terrorist threats, is as follows:

- Row mining is no longer conducted. Row mining is now forbidden in the international community due to the risk of collateral damage. In addition, it is extremely time consuming and there will not be enough time in the highly fluid multi-domain operation environment.
- The Army does not operate as a single Service. We conduct joint operations with unified action partners in foreign countries.
- By moving the forms and report formats up the doctrine hierarchy, we have not lost them; instead, we have expanded their use to the entire force and to allied nations to ensure the necessary standardization.

Yes, you got me! I just debunked my own hypothesis. There is no doctrine gap—just a perceived one. Or is there? Although we have not actually lost our forms, are they sufficient for our use in the future? I postulate that the answer is no. The traditional formats of recording and passing on information that is pertinent to conventional minefields lack the flexibility required to capture all the data needed for current munition systems and next-generation terrain-shaping obstacles. The title of DD Form 3007, *Hasty Protective Row Minefield Record,* should be changed to *Protective Obstacle Record,* and the fields should be expanded to include networked munitions. Also, a new form for next-generation tactical obstacles in the close, mid, and deep areas should be developed to include transfer procedures so that details on arming procedures and deployment codes are not lost. Finally, the locations and retrieval procedures for these forms and formats should be referenced in doctrine.

Until such time as any changes are realized—if at all—fear not! The forms you need for your training on obstacle emplacement and transfer are available. STANAGs 2989 and 2036 are available on the NATO Standardization Office Web site at <https://nso.nato.int/nso>, and DD Form 3007 can be accessed through the Army Publishing Directorate Web site at <https://armypubs.army.mil>.

Endnotes:

[1]FM 3-0, *Operations,* 6 October 2017.

[2]ATP 3-90.8, *Combined Arms Countermobility Operations,* 17 September 2014.

[3]Ibid.

[4]FM 20-32, *Mine/Countermine Operations* (now obsolete).

[5]DA Form 1355, *Minefield Record* (now obsolete).

[6]DA Form 1355-1, *Hasty Protective Minefield Record* (now obsolete).

[7]FM 20-32 (now obsolete).

[8]ATP 3-34.20, *Countering Explosive Hazards*, 21 January 2016.

[9]Ibid.

[10]FM 3-34.210, *Explosive Hazards*, 27 March 2007 *(now obsolete)*.

[11]STANAG 2989, *Transfer of Barriers*, 19 March 2007.

[12]STANAG 2036, *Land Mine Laying, Marking, Recording, and Reporting Procedures*, 27 January 2005.

[13]*NATO Minefield Record,* 27 January 2005.

[14]DD Form 3007 *Hasty Protective Row Minefield Record*, 1 December 2015.

Captain Vogt is an engineer doctrine writer/analyst with the Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri. He holds a bachelor's degree in athletic training from the University of Nevada, Las Vegas, and a master's degree in geological engineering from the Missouri University of Science and Technology at Rolla. He is a project management professional.

Implementation Plan for Your Professional Reading Program: Find—Fun—Fast!

By Colonel Paul J. Kremer

The value of a professional reading program is well understood. Additionally, there are numerous book lists recommended by key business and military leaders. The biggest challenge is the implementation plan, which describes the actual start-up and continuous effort involved in a professional reading program over an extended period of time. The purpose of this article is to describe how to develop an implementation plan for a professional reading program. I have had some success with reading programs at various points in my career; however, it has only been in the past few years that I have experienced success on an advanced and consistent basis. There are some important components when beginning a professional reading program—finding a book mentor, finding sufficient time, making it fun, and completing it quickly. Find–Fun–Fast!

Find a Book Mentor

It was not until I became an executive officer to a general officer in a combat zone that I had the opportunity to watch a senior leader in action from a close vantage point. I closely observed my boss as he fit a professional reading program into his incredibly demanding schedule. Like any quality mentor, he encouraged everyone on our small team, regardless of rank, to read. Furthermore, he cared enough to pass what he learned on to his staff. He described what he read during those few precious minutes between meetings and, most often, very late at night. More importantly, he implemented the best ideas into his work. Based largely upon my observation of his personal actions, I was inspired to restructure my own reading program. Having the general officer as my book mentor changed my behavior and enhanced my reading program beyond what I ever thought possible. It was cool to read; it was cool to learn. We were nerds!

Find Sufficient Time

A lack of time is probably the No. 1 excuse that individuals give for not having a professional reading program. Everyone is busy, but today's leaders are no more active than those of 50 years ago. Therefore, this excuse should be rejected. Leaders must make strategic choices for their time, as this implementation guidance does not add more hours to the day. As with any resource challenge, prioritization is key. The first step that I took was

"Everyone is busy, but today's leaders are no more active than those of 50 years ago. . . . Leaders must make strategic choices for their time. . . . As with any resource challenge, prioritization is key."

to decrease the time I spent watching television and movies. While initially challenging, this move saved at least 30 minutes each day. As the father of a large Family, I also spent time transporting kids to events, waiting at pick-up points, and sitting in the stands at practices and games. The next step I took was to put down my cell phone and pick up a book during those times. This added more than 30 additional minutes a day to the time available for my reading program. One last technique I used was dedicating 3 hours every weekend to my reading program. I accomplished this by watching one less football game, getting up earlier on Saturday morning, or making use of weekend coffee time.

It's possible to really burn through some pages during the weekend!

Make it Fun

Having fun is an essential part of a professional reading program. If reading becomes work, then the likelihood of success is dismal. If you read books only from senior leader book lists, then you are reading what interests them—not you. Reading must be enjoyable; otherwise, you will stop before you finish the first book. Do not start your reading program by reading *War and Peace.*[1] It may be a classic, but it is not a beginner's book. Instead, take baby steps and read short, exciting books such as *The Martian,*[2] *This Kind of War*,[3] *Who Moved My Cheese*?[4] or *It Doesn't Take a Hero.*[5] Build momentum by reading books that grab your attention quickly and are of great interest to you. Determining the initial reading list is one of the critical tasks of a book mentor. Your mentor should know you and have insight into your motivation and interests.

An important tip that applies to any tough challenge is to set a big goal, announce it, and talk about it. Make the goal interesting and meaningful. My personal goal over the past several years has been to read 50 books per year—almost one book per week. This year, I decided to stretch myself and go for 60 books. I use <www.goodreads.com>[6] to set and track my goals, plan my future reading list, and share book reviews with others. The Web site is free, and easy and fun to use.

A final tip is to seek diversity. I occasionally review the types of books I have read, I and have typically found that nearly 75 percent involve history. The reason is simple: I like history. While this interest fits nicely with many military senior leader reading lists, I do try to expand my intellect and I deliberately plan future readings to cover other areas such as business, economics, science, and fiction. While I keep true to myself by maintaining a healthy dose of historical readings, I deliberately plan to read about other subjects to become more well-rounded. For example, I read fiction to gain insight into potential future events. History describes the past—fiction is a potential window to the future. Furthermore, reading about science is key to understanding how life and nature work. Reading about these other subject areas allows me to expand my comfort zone and enhance my self-development.

Make it Fast

We generally start and finish a movie within a couple hours and, thus, gain a sufficient understanding of the characters and the crises they face. But imagine watching a movie in intervals of 10 minutes at a time over a period of 1 or 2 months until you had finished. How would you ever appreciate the character development or get into the action or drama that unfolds? Reading a book for only 10–15 minutes per day over a month's time does not allow for any depth in the experience. The outcome will be woefully unfulfilling, likely leading to the end of your reading program. Consequently, read the book faster.

Fast reading, however, does not equate to speed reading. I do not recommend speed reading, as it leads to skipping sentences and even entire paragraphs and does not allow sufficient time for the brain to process the material. If significant portions of text are skipped, the message is lost. Another tip is to avoid the exclusive use of audio books. While audio books can be an essential element to a reading program, I struggle to remember the details of the material after listening to an audio book. I find that when I engage multiple senses by reading a physical book (seeing the words and hearing myself read the words in my mind), I am better able to write a short note about what I learned after completing the book. I use audio books on long drives and while commuting to and from work—and largely for my fictional reading, as I don't need to highlight and remember key lines or concepts word for word. With leadership, business, and history books, I want to retain key concepts and I find that reading a physical book is best. The goal of a professional reading program is additional knowledge—not a specific number of books read. My self-evaluation metric is simple: Can I write a paragraph or two documenting my thoughts after reading the book? If I cannot remember enough to write coherent thoughts, then my retention was poor and I wasted my time.

Use these tips in developing your implementation plan for a professional reading program! Don't start with 50 books per year; start by reading two books this month. To enhance your odds of success, remember: Find–Fun–Fast!

Endnotes:

[1]Leo Tolstoy, *War and Peace*, Vintage Classics, 1869.

[2]Andy Weir, *The Martian*, Broadway Books, Danvers, Massachusetts, 2014.

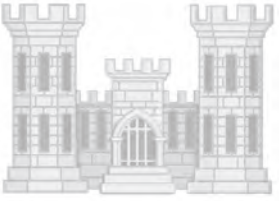
[3]Theodore Reed Fehrenbach, *This Kind of War,* Potomac Books, Lincoln, Nebraska, 1963.

[4]Spencer Johnson, *Who Moved My Cheese*? G. P. Putnam's Sons, New York, 1998.

[5]Norman Schwarzkopf, *It Doesn't Take a Hero*, Bantam Books, New York, 1992.

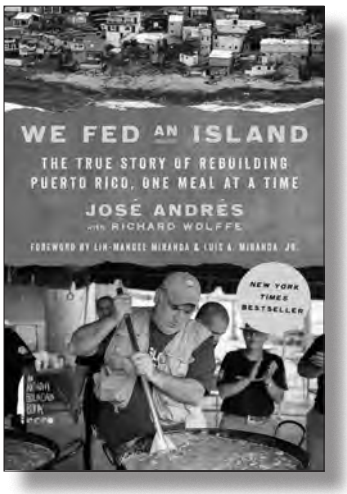
[6]"GoodReads," <www.goodreads.com>, accessed on 4 December 2018.

Colonel Kremer serves as the deputy commander of the Great Lakes and Ohio River Division, U.S. Army Corps of Engineers. He holds a master's degree in human resources development from Webster University and is a certified project management professional.



Book Reviews

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>.



We Fed an Island: The True Story of Rebuilding Puerto Rico, One Meal at a Time by Jose Andres with Richard Wolffe, Harper Collins Publisher, 2018, ISBN: 0062864483.

Reviewed by Mr. James E. Mc Carthy

At first glance, *We Fed an Island: The True Story of Rebuilding Puerto Rico, One Meal at a Time* may seem an unusual choice for a review in a professional military bulletin. But when considered as a case study, several key lessons for engineer planners in a defense support of civil authorities (DSCA) situation emerge. Lessons learned on engineer reconnaissance, cartography and geospatial mapping, information sharing, and disaster relief planning abound—even if the author does not overtly call them out.

Chef Jose Andres is an award-winning chef who heads multiple businesses and food-related charities. A naturalized American citizen born in Spain, Andres has a natural affinity to the island of Puerto Rico, as well as business interests there. He is also a controversial figure, immersed in immigration politics.[1] Regardless, his expertise in delivering food on a large scale was sorely tested by the operational environment of Puerto Rico, post-Hurricane Maria.

Hurricane Maria struck Puerto Rico on 20 September 2017 as a Category 4 hurricane, hard on the heels of Hurricane Irma having struck a glancing blow to the island 2 weeks earlier. Death toll estimates range from an initial number of 64 to a later number of more than 5,000, and they were heavily politicized. The damage to the island infrastructure was severe and estimated at more than $90 billion. One week after the hurricane, 95 percent of the island was still without electricity.[2]

Into this scene stepped Chef Andres. Struck by the powerful images of misery in the aftermath of Maria, Andres immediately decided to become personally involved in the situation in Puerto Rico. No stranger to disaster relief, Andres' World Central Kitchen came into its own during the Haitian earthquake of 2010. Andres immediately began serving and preparing meals in Puerto Rico, using lessons learned in Haiti, his local business connections, and his own cash reserves to prepare 21,500 meals in the first 4 days after his arrival and more than 3,000,000 meals by the time he ceased operations 60 days later. Andres argued that in times of trouble, people want comfort food and that "[meals ready to eat] would never represent real food to anyone." Andres' time on the island was marked by his impatience with bureaucracy and his refusal to take no for an answer. His incredible ability to join systems together in a network provided relief at the most local of levels. Andres wrote that he drew inspiration from Martin Luther King Jr's belief in the "fierce urgency of now."

We Fed an Island documents Andres' efforts; and if DSCA planners can look past the impatient and often somewhat sanctimonious tone, they can find many valuable lessons. Andres noted that cold cash, foodstuffs, and water filters (vice bottles, which cause their own long-term waste issues) were invaluable in establishing his food relief effort. Andres demonstrated his ingenuity when he convinced the island's secretary of education to use school cafeterias to prepare food for local distribution. Arena kitchens were even better. Andres created impromptu relationships with local police, Federal Emergency Management Association (FEMA) officials, Army National Guard Soldiers, and local businessmen to quickly turn bulk foodstuffs into nourishing meals with an accompanying distribution network. In one notable incident, Andres showed FEMA and state government officials a U.S. Army Corps of Engineers-provided map annotated with detailed food locations, populations in need, kitchens, and road conditions to explain how he brought everything together. FEMA was initially not particularly glad to hear this, although later acknowledged that only World Central Kitchen was able to offer hot meals from the start.

Andres highlights several issues for DSCA practitioners, such as the need for local water purification (preferably, solar-powered) to free up scarce distribution assets. Relief workers needed usable and sharable information; Andres even remarked about how useful a digital rendition of current conditions (a common operating picture) would be. A need for small-scale point generation emerged. The author suggests combining the food intelligence of local chefs in disaster areas with the distribution expertise of the Southern Baptist Convention, another relief organization of which he speaks highly—even if its presence in Puerto Rico was limited. He cited the Southern Baptist Convention as an example of emergency feeding teams capable of entering the stricken zone in the first 24 hours. Andres also notes that disaster relief efforts should not stay active beyond the point at which local providers and distributors cannot restart their business due to the government-subsidized relief. DSCA planners should realize that a host of nongovernmental organizations sometimes provides or attempts to provide relief even as a weather event winds down and that the military must contend with other resource consumers in a stricken zone.

Although *We Fed an Island* is well sourced, it is important to remember that it is a first-person account written by an advocate for food relief. *The Daily Meal* calls Andres "The Face of American Disaster Relief."[3] The book is highly critical of governmental and large nongovernmental organizations and is never dispassionate. Andres' personal political beliefs abound. In his acknowledgements, the author does thank "the map makers from U.S. Army Corps of Engineers, whose skills are under-appreciated but still incredibly valuable." For a quick read guaranteed to spur thought about food relief in time of disaster and to contain practical tips for disaster planners, *We Fed an Island* is well worth the time of DSCA professionals.

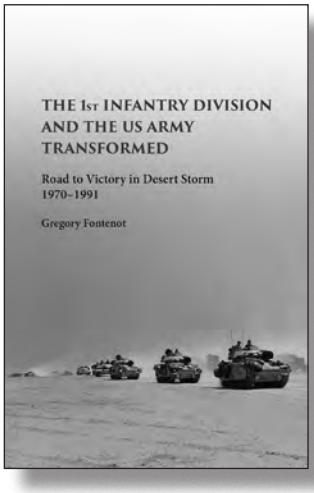
Endnotes:

[1]Joanna Fantozzi, "Chef V. Chief: The Feud Between José Andrés and Donald Trump Continues," *The Daily Meal*, 1 March 2017, <https://www.thedailymeal.com/news/eat/chef-v-chief-feud-between-jos-andr-s-and-donald-trump-continues/030117>, accessed on 9 January 2019.

[2]"Major Hurricane Maria," 20 September 2017, <https://www.weather.gov/sju/maria2017>, accessed on 9 January 2019.

[3]Elizabeth Licata, "José Andrés is Now the Face of American Disaster Relief in Puerto Rico," *The Daily Meal*, 1 October 2017, <https://www.thedailymeal.com/jose-andres-puerto-rico-disaster-relief/10117>, accessed on 9 January 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.



The 1st Infantry Division and the U.S. Army Transformed: Road to Victory in Desert Storm, 1970–1991, by Gregory Fontenot, University of Missouri, 2017, ISBN: 9780826221186.

Reviewed by Mr. Stephen V. Tennant

The Persian Gulf War was the defining conflict for a generation of Soldiers who served after the Vietnam War. These Soldiers built the U.S. Army into the preeminent military power of its era. When the country called, their response was spectacular but rapidly forgotten as our Nation focused on pursuing a peace dividend following the Cold War. The attacks on 11 September 2001 pushed their accomplishments further into the background. This is understandable and regrettable. The story of U.S. Army divisions that so decisively won the Persian Gulf War is worth remembering. Colonel Gregory Fontenot (Retired) provides a well-researched and compelling history of the 1st Infantry Division (1ID) journey from the immediate aftermath of the Vietnam War to the decisive victory of Operation Desert Storm in this excellent recounting of the experience. This book is clearly a labor of love for Fontenot, who commanded Task Force 2-34 Armor during the Persian Gulf War. His personal experiences contribute to the narrative.

The book is well organized and presented in a clear, readable style. It contains a narrative history that describes the post-Vietnam Cold War story of the 1ID in two distinct parts. In the first two chapters, Fontenot describes the 2 decades following the return of 1ID from Vietnam and the transformation of 1ID (and the Army) to an all-volunteer force. He reviews key actions in the reformation of 1ID, including the adoption of air-land battle doctrine and the acquisition and fielding of new combat systems as well as the revolution in training and readiness resulting from combat training rotations at the National Training Center, Fort Irwin, California, and participation in the return-of-forces-to-Germany exercises. Although a small part of the overall book, this element of the story provides the context that allows the reader to appreciate the readiness of 1ID and

the challenges faced prior to the Iraqi invasion of Kuwait on 2 August 1990.

The majority of the book is focused on the story of 1ID preparation, deployment, and integration into the VII Corps combat operations during the defense of Saudi Arabia and offensive operations to liberate Kuwait. In a departure from the typical Persian Gulf War narrative of a 4-day ground war, Fontenot recounts the 1ID combat experience of conducting security operations, defensive operations, and reconnaissance between 25 January and 24 February 1991, dubbed G-Day (the terminology used for the day the ground campaign officially began). He then describes the extraordinary requirements placed upon 1ID during the high-tempo offensive operations that followed.

The accomplishments of 1ID during the ground offense were remarkable. After 24 hours, the unit had completed a penetration, breached Iraqi defenses, and established a bridgehead line. After 48 hours, it had successfully conducted a passage of lines for the entire 1st Armoured Division from the United Kingdom and three VII Corps artillery brigades; assumed the mission of corps reserve; and began a 100-kilometer movement to make contact with, and pass through, the 2d Armored Cavalry Regiment in order to carry out a corps contingency plan. By 72 hours, it had completed a forward passage of lines into contact, followed by a hasty attack to seize Objective Norfolk—all at night, with very low visibility and in foul weather. At the end of 96 hours, 1ID had transitioned from exploitation into pursuit, continuing to attack through a second night, culminating along the Basra Highway in the drive to "go for the blue on the map." Fontenot brings these accomplishments to life while highlighting the difficulties of synchronization, the need to operate and sustain formations over long distances, the difficulties with communicating the status of the tactical situation, and the tragedy of fratricide.

The 1st Infantry Division and the U.S. Army Transformed is a must-read book for military professionals. As the Army reorients its institutional focus from an extended period of counterinsurgency and stability operations to large-scale combat operations, the parallels to the story of the 1ID recounted by Fontenot are remarkable. Fontenot's narrative, derived from contemporary documentary sources and personal interviews with participants, provides perspective and rich detail that yield valuable insight regarding the operations of a division in large-scale combat operations. The challenges of synchronizing tactical actions, sustaining tactical operations over great distances, and maintaining situational understanding that he describes should encourage a contemporary effort to develop new doctrine to deal with near-peer threats. They should also encourage efforts to acquire and field new systems and emphasize the need for training for the challenges of large-scale combat operations.

Mr. Tennant is an assistant professor at the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas. He holds a bachelor of science degree in civil engineering from the Virginia Military Institute, Lexington; a master of science degree in civil engineering from the Georgia Institute of Technology; and a master of public administration degree from the University of Kansas. He is a doctoral candidate in political science at the University of Kansas.

Using Lean Thinking to Increase Training Readiness

By Major Chad A. Apple, Major Kyle P. Moore, and Captain Brenton A. Wheaton

Like most other engineer battalions in the Army National Guard, the 112th Engineer Battalion is staffed and trained in accordance with the Sustainable Readiness Model.[1] In late 2017, the unit was notified of significantly increased readiness objectives for training year 2018. To achieve these new objectives, the battalion staff conducted a command post exercise with a newly formed team. The execution and evaluation of mission-essential tasks to a standard that demonstrated the proficiency expected at the new, increased readiness objective levels with newly integrated staff members proved difficult. To address these difficulties, the team turned to an approach that is frequently successful in industrial settings: Lean Thinking.

One problem the team immediately sought to overcome was procedural waste—unfortunately, a common issue in many staff organizations throughout the Army. While it may be difficult to recognize in the moment, waste can manifest itself in all aspects of staff operations. It can be particularly prolific in a battalion staff, where most officers lack formal training and prior practical experience in the military decision-making process as compared with higher echelons. From an operations officer paging through numerous references in an attempt to find the correct standard to use in planning operations to a logistics noncommissioned officer transferring data from one format to another, seemingly commonplace activities are often wasteful, provide no value to the end users (the commander and subordinate units), and burden the mental capacity of the staff. Over time, this waste adds up. Members of the staff become overburdened when, in addition to analyzing the mission and

The battalion plans officer points to key terrain on a terrain model during an operations order briefing.

Members of the battalion staff participate in a sustainment working group while executing the military decision-making process.

environment and developing and analyzing plans, they must also use their mental capacity on wasteful activities. This overburden nearly always leads to undesirable results from the decision-making process. Streamlining processes within a battalion staff is crucial for overall operational understanding and success.

The core idea of Lean Thinking[2] involves streamlining processes by eliminating any unnecessary (wasted) efforts that do not produce value for the end user or customer. Lean Thinking is commonly paired with Six Sigma[3] (a process for efficiently solving a problem) and referred to as Lean Six Sigma. With Lean Thinking, waste is broken down into three main categories:

- **Muda—**consuming additional resources without translating them into additional value.
- **Mura—**causing unevenness in operation.
- **Muri—**overburdening equipment or personnel.

Within a military staff organization, overburden is an area of special concern. Lean Thinking-related literature often lists three main causes of Muri that place overburden on members of the staff conducting the operations process: lack of proper training, poor or no standards to follow, and use of the wrong tools for the job.[4]

A properly crafted and maintained standard operating procedure (SOP) serves as an essential tool for reducing procedural waste within a military organization. Nearly every military member has, at some point, been told that having a unit SOP is necessary; however, the reason is rarely explained in depth. The importance is that standardizing procedures can significantly reduce all three main causes of overburden as well as Muda and Mura. With a limited opportunity to train prior to execution, waste reduction was a top priority for the 112th Engineer Battalion as it was developing the plans SOP. A well-crafted SOP enhances the executive officer's ability to train the staff by allowing the team to focus more on value-added training activities during the limited time available, resulting in less wasted effort.

An important aspect of creating an SOP is incorporating lessons learned from previous successes that should be repeated in the future and, perhaps more importantly, from previous failures that should be avoided going forward. One critical element in effectively learning from failures is the creation of a culture in which Soldiers feel comfortable identifying process mistakes and pointing out tasks that they feel are inappropriate or unnecessary. In Lean Thinking, processes—not people—are at fault. To succeed in creating this environment, we must reframe the way that we think about failure. When a process generates a mistake, we must investigate how and why the individual was placed in a situation in which making such a mistake was possible in the first place. Is it possible to rewrite the procedure so that the individual is no longer forced to take an action that results in an error? Can we write success directly into the process? More information on the process-oriented learning environment is available in the article "Mura, Muri (and Muda) in Healthcare" at <http://www.theleanthinker.com>.[5]

Captain Wheaton monitors the operation from an M1068 command post track during field training.

When crafting the plans SOP, the 112th Engineer Battalion sought to clearly define the roles and expectations of every member of the staff throughout the entire operations process. The SOP answers such questions as: Who will print how many copies of the higher-headquarters orders? and To where they will be distributed during mission analysis? With input from all members involved in the process, the SOP was reviewed, tested, revised, and implemented several times in its formative stages to capture the

A Soldier receives a radio report during field training.

most efficient way to produce the best product possible. In the end, all involved were properly trained on their scope of involvement, their points of contact for coordination, and the locations of the necessary tools. This alleviated the need to waste mental energy, enabling the staff to focus on critical questions about the operating environment without experiencing overburden.

The end result for the battalion was a military decision-making process that took less time, required less effort, resulted in fewer errors, and guaranteed a higher quality product for the end users. A team that was formed only a few working days prior to the evaluation not only participated but also excelled at the decision-making process. The staff achieved the required level of proficiency in the limited timeframe, clearly demonstrating the power of a properly crafted SOP.

Endnotes:

[1]U.S. Army National Guard, "ARNG 4.0 Fact Sheet—Total Readiness for 21st Century," <https://www.nationalguard.mil/Resources/ARNG-Readiness/Fact-Sheets/FileId/172141/>, accessed on 3 January 2019.

[2]"What is Lean?" <https://goleansixsigma.com/what-is-lean/>, accessed on 3 January 2019.

[3]"What Is Six Sigma?" <https://goleansixsigma.com/what-is-six-sigma/>, accessed on 3 January 2019.

[4]"Muda, Mura, Muri," Lean Enterprise Institute, <https://www.lean.org/lexicon/muda-mura-muri>, accessed on 3 January 2019.

[5]Mark Rosenthal, "Mura, Muri (and Muda) in Health Care," <http://theleanthinker.com/2008/01/29/mura-muri-and-muda-in-health-care/>, accessed on 3 January 2019.

References:

Earl Miller, "Here's Why You Shouldn't Multitask, According to an MIT Neuroscientist," 8 December 2016, <http://fortune.com/2016/12/07/why-you-shouldnt-multitask/>, accessed on 3 January 2019.

Tracey M. Richardson and Ernie Richardson, *The Toyota Engagement Equation: How to Understand and Implement Continuous Improvement Thinking in Any Organization,* McGraw-Hill Education, New York, 2017.

James P. Womack and Daniel T. Jones, *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, Free Press, New York, 2003.

Major Apple supervises the establishment of the battalion main command post during field training.

Major Apple is the operations officer and administrative officer of the 112th Engineer Battalion. He is a graduate of the Ohio Military Academy Officer Candidate School and holds a bachelor's degree in accounting from Cleveland State University, Ohio.

Major Moore is the executive officer of the 112th Engineer Battalion in Brook Park, Ohio, and a Lean Six Sigma Black Belt. He is a graduate of the Army Reserve Officer Training Corps (ROTC) Program at Marquette University, Milwaukee Wisconsin. He also holds a master of business administration degree from Pennsylvania State University and a master of science degree in engineering from Missouri University of Science and Technology at Rolla. In addition, he holds the project management professional certification.

Captain Wheaton is the tactical command post officer of the 112th Engineer Battalion. He is a graduate of The Ohio State University Army ROTC Program. He also holds the project management professional certification and is trained in Lean Six Sigma.

REVOLUTIONARY ADVANCES IN TERRORIST ORGANIZATIONS

By Major Frederick T. Fell

Terrorist organizations such as al-Qaida and the Islamic State in Iraq and Syria (ISIS) have conducted a devastating war against the world that has proven difficult to stop despite the absence of a long-standing state or nation to help develop their military capabilities. Modern terrorist organizations have not only used the lessons learned from several military revolutions, but have also improved upon them, taking them to levels that have never before been seen. They have used the military revolutions of the 17th century (in the creation of the modern state and modern military institutions) and French revolutions to create a multitiered international financial system, conscript a multinational force, establish international training camps, and produce fighters who are willing to live and die for an ideology.

Since its inception in Afghanistan in the early 1980s, al-Qaida has grown significantly.[1] Now, nearly 17 years after the war in Afghanistan began, al-Qaida has strong bases of operations in 21 nations.[2] Many terrorist organizations, including ISIS, have ties to al-Qaida. ISIS leaders began swearing allegiance to al-Qaida before breaking away to create their own organization in October 2006.[3] Now al-Qaida and ISIS pursue their own agendas and promote terrorist activities around the world. Their attacks have killed more than 201,000 people in 10 years (2007–2016).[4] Those deaths, along with a loss of $554 billion due to property damage and loss of production, show how devastating terrorist activities have been.[5]

Terrorist organizations use long-standing, modern, and innovative ways to finance their war efforts. They use ransom payments, looting, and extortion to fund their activities, much like the early war financing of the pre-17th century military revolution in Europe. The practice of taking prisoners to be held for ransom as a way to pay for warfare was common until the English armies under King Edward changed the focus of warfare in the 14th century.[6] Prisoners were typically rich nobles or royal leaders who could pay high ransoms. Similarly, the terrorists of today target Westerners and business employees to pay high ransoms.[7] They collected $20–45 million in ransom payments in 2014.[8] However, unlike the days of old, terrorists engage in torture, mutilation, and death to motivate the payment of ransoms.[9]

Al-Qaida and ISIS are well known for selling historical artifacts on the black market. It is estimated that ISIS made $100 million in a 12-month period by doing this from mid-2014 to 2015.[10] Pillaging financial institutions in

"Terrorist organizations such as al-Qaida and Islamic State in Iraq and Syria (ISIS) have conducted a devastating war against the world that has been proven difficult to stop despite the absence of a long-standing state or nation to help develop their military capabilities."

conquered territories has also made millions for ISIS, with some estimates between $500 million and $1 billion in 2014 and 2015.[11]

Blending old and modern forms of financing, terrorist organizations use a modified form of taxation to pay for war. Taxation was an advent of the 14th century as the cost of warfare exceeded the personal treasuries of nobles or kings to pay for war.[12] However, Louis XIV used regular payments from a conquered territory to finance his war.[13] These payments were obtained under the threat of violence, forcing businesses and individuals to pay the conquering army. Using methods similar to taxation, terrorist organizations such as ISIS extort civilians and businesses, forcing them to pay recurring fees under the threat of violence for nonpayment. They also force a surcharge on bank withdrawals and other services that occur in their territories. Whereas with taxation, most citizens usually receive some sort of public service, ISIS provides only minimal services for these payments. What ISIS does is considered robbery. It is estimated that ISIS generated several million dollars per month in 2015 under this system.[14]

One of the steadiest forms of income for ISIS has been the sale of oil from captured oil fields. In 2014, ISIS was making $1 million a day from the sale of oil through black market sales or direct delivery to Syria and other regional countries.[15] Throughout the history of warfare, there are many instances of a conqueror plundering or exploiting the populace for resources, as demonstrated by Napoleon, and there are accounts of the crafty ways the British used credit institutions and revenues from trade.[16] But never before have we seen a country at war managing, marketing, and selling conquered resources to fund that war.

Terrorist organizations use international donations from charitable organizations, individual social networks, and fraudulent international criminal activity to pay for their war efforts. Terrorists are known to establish charitable organizations to gain support from willing and unwilling donors. They also implant operatives or create sympathizers within existing charitable organizations to siphon off funding for their cause.[17] In one case in 2000, unwitting donors in the United States gave the Holy Land Foundation for Relief and Development charity $13 million, most of which went to fund suicide attacks.[18] These financial activities were never conducted at this level prior to the 1980s and the growth of the Internet.

Although wars have often drawn fighters from across the region, modern terrorist organizations draw fighters from across the world. Many of these terrorists have no direct ties to the territories in which they are fighting. The use of foreign fighters, or mercenaries, was common practice during the Middle Ages.[19] However, it was the payment of money—not the cause—that brought most to combat during that time. As Nicoló Machiavelli wrote in *The Prince*,[20] mercenaries had limited usefulness because only a native army could do great deeds for its country since only it would have loyalty and strong bonds to its country and fellow fighters.[21] The United Nations reports that, in the last 15 years, more than 30,000 foreigners from more than 100 countries have joined terrorist organizations—mostly al-Qaida and ISIS.[22] This number represents more than one-third of all fighters, and these fighters come as individuals rather than part of a unit, as mercenaries did before the 1900s.

These thousands of terrorist fighters are self-supporting and, unlike the mercenaries of old, pay their own way to join the war effort. This is not a significant contribution to the finances of the organizations (amounting to $6,000 per fighter for 30,000 fighters for equipment and travel expenses over the last 15 years, which is equal to a total of $180 million). Logistically, however, it is a huge relief to these terrorist organizations because they have a steady flow of fighters who come nearly fully equipped and ready to fight. All the terrorist organizations need to do before sending them into combat is provide some basic training, place them in a unit, and give them weapons.[23]

Terrorist organizations have established training camps throughout the world not only to train but also to indoctrinate their fighters, as Napoleon did in the late 18th century. Napoleon recognized the importance of constantly drilling and training his Soldiers.[24] Likewise, terrorist organizations train their fighters with an emphasis on weapons, explosives, drills, engagement, escape, and urban warfare.[25] However, unlike 18th-century or modern militaries, terrorists have training camps scattered throughout the world—even within the very countries with which they are at war. Multiple terrorist training camps train, indoctrinate, and organize fighters in the United States.[26, 27] These scattered locations make it difficult to locate opposing forces. They also allow simplified logistics for the terrorist, as fighters can be sent to a local training camp before continuing their journey to the front.

Much like the U.S. Army has developed distance learning programs, terrorist organizations have established online training programs and videos to indoctrinate supporters and allow them to train on their own.[28] With easy-to-follow videos produced in multiple languages, aspiring fighters can learn about bomb manufacturing and urban warfare tactics. These videos also explain how to make contact with

terrorist organizations and join them in their struggles. While the Army limits access to online training programs to those who are already serving and have received some basic training, terrorist organizations open their content to anyone in the world. Terrorist organizations have used the Internet to bypass government controls and traditional dispersive mechanisms and can now produce material and communicate directly with the end user.[29]

European rulers of the early 18th century and beyond have been able to increase the size of their armies due to nationalism; however, those soldiers do not have the flexibility of terrorist fighters who fight for an ideology rather than a nation. When France used national politics to mobilize more than 1,000,000 men for its army in 1794, the motivation of each of those soldiers allowed for radical changes in strategic and tactical opportunities.[30] This level of nationalism, which allowed for such a large mobilization of citizens, is also a limitation, as those individuals fight only for that nationalism. Terrorists, on the other hand, fight for the propagation of their ideas and the destruction of ideas that do not conform to their beliefs. They have a dichotomous view of the world, and everyone who is not on their side is viewed as the enemy.[31] This gives them great flexibility to mass their forces at points of weakness and allows them to conduct attacks any place in the world, such as in states with fractured governments or without the support of the people.

Pooling finances and manpower from the international community, training fighters in the viewpoints and tactics of the organization using multiple pathways of instruction, and using ideology as the rallying cry for war give terrorist organizations an edge. Fighting an enemy such as this compels the United States to consider strategic operations beyond the physical domain of the battlefield and to focus on the terrorists' center of gravity, which is their ideology. Ideology is what must be defeated to achieve victory.

Endnotes:

[1]J. T. Caruso, Acting Assistant Director, Counterterrorism Division, U.S. Federal Bureau of Investigation, "Before the Subcommittee on International Operations and Terrorism, Committee on Foreign Relations, United States Senate, Washington, D.C.," 8 December 2001, <https://archives.fbi.gov/archives/news/testimony/al-qaeda-international>, accessed on 13 November 2018.

[2]U.S. Central Intelligence Agency, field listing, "Terrorist Groups—Foreign Based," <https://www.cia.gov/library/publications/resources/the-world-factbook/fields/print_2265.html>, accessed on 13 November 2018.

[3]U.S. Department of State, Bureau of Counterterrorism, "Country Reports on Terrorism 2016," July 2017, <https://www.state.gov/documents/organization/272488.pdf>, accessed on 13 November 2018.

[4]University of Maryland, "National Consortium for the Study of Terrorism and Responses to Terrorism, Global Terrorism Database," July 2018, <https://www.start.umd.edu/gtd>, accessed on 13 November 2018.

[5]Institute for Economics and Peace, "Global Terrorism Index, 2017," November 2017, <http://visionofhumanity.org/app/uploads/2017/11/Global-Terrorism-Index-2017.pdf>, accessed on 13 November 2018.

[6]MacGregor Knox and Murray Williamson, *The Dynamics of Military Revolution, 1300–2050*, Cambridge University Press, New York, 2001.

[7]U.S. Department of the Treasury, "National Terrorist Financing Risk Assessment 2015," <https://www.treasury.gov/resource-center/terrorist-illicit-finance/Documents/National%20Terrorist%20Financing%20Risk%20Assessment%20–%2006-12-2015.pdf>, accessed on 13 November 2018.

[8]Ibid.

[9]Anja Shortland and Tom Keatinge, "Closing the Gap: Assessing Responses to Terrorist-Related Kidnap-for-Ransom," Royal United Services Institute for Defense and Security Studies, Park Communications, United Kingdom, 15 September 2017, <https://rusi.org/sites/default/files/201709_rusi_closing_the_gap_shortland_and_keatinge_web.1.pdf>, accessed on 13 November 2018.

[10]"Preventing Cultural Genocide: Countering the Plunder and Sale of Priceless Cultural Antiquities by ISIS," Hearing Before the Task Force to Investigate Terrorism Financing of the Committee on Financial Services, U.S. House of Representatives, One Hundred Fourteenth Congress, Second Session, Print No. 114–83, U.S. Government Publishing Office, Washington, D.C., 2017, <https://financialservices.house.gov/uploadedfiles/114-83.pdf>, accessed on 13 November 2018.

[11]U.S. Department of the Treasury, "Remarks by Acting Under Secretary Adam Szubin at Chatham House," 12 October 2015, <https://www.treasury.gov/press-center/press-releases/Pages/jl0299.aspx>, accessed on 13 November 2018.

[12]Geoffrey Parker, *The Cambridge History of Warfare*, Cambridge University Press, 2005.

[13]Ibid, p. 169.

[14]U.S. Department of the Treasury, "Remarks by Acting Under Secretary Adam Szubin at Chatham House," p. 15.

[15]U.S. Department of the Treasury, Remarks of Under Secretary for Terrorism and Financial Intelligence David S. Cohen at The Carnegie Endowment for International Peace, "Attacking ISIL's Financial Foundation," 23 October 2014, <https://www.treasury.gov/press-center/press-releases/Pages/jl2672.aspx>, accessed on 13 November 2018.

[16]Parker, p. 215.

[17]U.S. Central Intelligence Agency analytic report, "Identifying al-Qaida's Donors and Fundraisers: A Status Report," 27 February 2002.

[18]U.S. General Accounting Office, "Terrorist Financing, U.S. Agencies Should Systematically Assess Terrorists' Use of Alternative Financing Mechanisms," November 2003, <https://www.gao.gov/new.items/d04163.pdf>, accessed on 13 November 2018.

[19]Parker, p. 150.

[20]Niccolò Machiavelli, *The Prince*, Grant Richards, London, 1903, pp. 47–54.

(continued on page 46)

Maximizing

Training Opportunities Across a Company in a Resource-Constrained Environment

By Mr. Damon M. Yourchisin

The Army is changing. We are transitioning to a smaller and more capable force, reducing budgets and returning to large-scale, ground combat operations (LSGCO); we must be able to "do more with less." This cycle has been repeated many times, and it will continue in the future. We must learn from the past in order to ensure that this latest transition doesn't take us by surprise. The biggest change is that unlimited wartime resources of money and manpower are being greatly reduced as we rebuild an Army capable of executing LSGCO in a multi-domain environment in 2028. This will impact all facets of Soldier training and create a new catchphrase: "maximizing training benefit from limited resources."

The best way to accomplish this transition is to incorporate the necessary tactical skills into everyday activities that must occur on a consistent basis, such as physical training (PT) and preventive maintenance checks and services (PMCS). This article describes some options for commanders to incorporate selected basic Army warrior tasks (AWTs) and battle drills (BDs) into everyday training and mission accomplishment routines. These options will free up more traditional duty time for larger-scale, more complex, more resource-intensive training events, allowing the unit to focus on high-end technical skills.

The ability to take normal routines to the next level by incorporating tactical tasks is complex and time-consuming and must be done in a crawl-walk-run format. Success is a direct measure of the effort invested on the front end of execution (planning and preparation). If the proper planning, preparation, and pre-execution checks are conducted, Soldiers can become tactically competent at their core and directed training time can be filled with the technical aspects of their particular military craft. A truly efficient training method is characterized by—

- The upfront investment of a long-term vision (nested within well-thought-out quarterly and annual training guidance).
- Short-term goals. (The eight-step training model and troop leading procedures are followed to the letter.)
- Distribution of the load. (Everyone involved takes key roles in planning and execution on a nearly daily basis.)

In order for the efficiency of this method to be recognized, leadership must take an active role. This starts with the training of leaders.

As you, as commanders, delegate specific tasks derived from your vision and guidance to lower-level leaders, there are opportunities for junior leaders to practice mission analysis, the eight-step training model, and troop leading procedures on a daily basis. With your tutelage, they can work on aspects of the military decision-making process, warning orders, mission and operation orders, proper leader reconnaissance, and mission briefings in support of smaller-scale, maximized training opportunities. The opportunity to gain training and experience during these tasks is often overlooked. Do you recall the last time a junior leader wrote an operation order? Was it written for the annual certification, for validation of the unit, or for the quarterly range? Why aren't we frequently publishing orders so that everyone has an opportunity to plan and execute?

Here's *one* way to implement this in your company. A company commander has a vision of successfully completing four AWTs and one BD during a quarter. The executive officer—

- Divides the tasks amongst platoon leaders (PLs) and platoon sergeants (PSGs) to ensure that expertise can be gained before the task is trained.
- Conducts a calendar review and overlays specific PT and PMCS sessions in which teaching, training, initial evaluation, and retraining events will occur.

The PLs/PSGs then begin their mission analysis and eight-step training model process and back brief the executive officer on their plan for execution. Over the next 3 months, roughly 24 PT sessions (company, battalion, and other mandatory PT events), four command PMCS sessions, and one emergency deployment readiness exercise are available. In the end, the company will have easily taught, trained, and evaluated four AWTs and one BD—all without having taken a traditional training day from the schedule. Over a 1-year period, the entire list of AWTs and BDs can be executed—with redundancy built in for those more difficult and perishable skills. Reinforcement is performed during

normal training events, which can be tactically done at a near-run pace so that the focus can be on technical skills.

A unit assessment is required to determine weak and strong points, the starting baseline (crawl, walk, or run), and the best time to perform the tasks based on mission requirements. This article contains a few suggestions about how to make a program like this work.

Example Training Vision

Select one AWT from each of the major categories of shoot, move, communicate, survive, and adapt and two BDs that focus on mounted operations or that complement the AWTs selected. It may not be appropriate to incorporate all of the listed subtasks for each AWT or BD; but throughout the quarter, 90 percent of the subtasks can easily be accomplished. These should all be completed during PT hours and on command maintenance days, with no degradation to overall Army physical fitness test performance or equipment readiness.

Over the next quarter, all individuals are trained to a "T" on—

- Five AWTs. The five example AWTs are—
  - Employ Hand Grenades.
  - Perform Individual Movement Techniques.
  - Perform Voice Communications.
  - Perform Combatives.
  - Grow Professionally and Personally.
- Two BDs. The two example BDs are—
  - Perform Actions as a Member of a Mounted Patrol.
  - Evacuate a Casualty.

Example Incorporation of AWTs

Employ Hand Grenades

Perform this AWT during PT. Based on the subtasks and minimal equipment needs, this can be incorporated into multiple PT sessions. Arm and shoulder strength and hand and eye coordination are necessary for success. Therefore, as the PT program for the quarter is developed, incorporate arm and shoulder strength building and hand and eye coordination drills. Later, bring the two together by adding dummy hand grenades, then add in hand grenade trainers, and then integrate with other tasks (such as individual movement techniques). If this seemingly easy task is taken seriously and sufficient planning rigor is applied, instructors can net great additional benefits (research, coordination for integration of the task, long-term PT planning, rehearsals).

Perform Individual Movement Techniques

Perform this AWT during PT. Although there are only two subtasks to this AWT, the subtasks are quite complex and require teaching and training. This is a good AWT for which to use the crawl-walk-run method, performing at half or full speed. Perform these subtasks first while wearing the Army physical fitness uniform, then the Army combat uniform and, finally, full tactical gear. As a finale, add the hand grenade. Perform these subtasks on a consistent basis and with small teams. These subtasks present a great workout, and all that is required is the preparation and provision of the venue and resources. Four-Soldier stacks can be performed while multiple floors are cleared—all in less time than it takes to run 4 or 5 miles.

Perform Voice Communications

Perform this AWT during PT and PMCS. This AWT has a great set of subtasks that can be conducted in coordination with any activity, such as a weekly ruck march for PT, with communication via radio or hand and arm signals only. The march is not administrative in nature; it is a tactical forced foot march. Teach some of the skills during stretching, and then go straight into execution. As time goes on, and if leaders are disciplined, the unit will easily communicate during all missons. Also, when performing the required weekly road test at the end of PMCS activities, ensure that the convoy briefing includes a signal portion. Emphasize training over tactical communication while on a convoy (navigating to a refuel point or other location, conducting a recovery operation of a sister vehicle).

"Success is a direct measure of the effort invested on the front end of execution (planning and preparation)."

Perform Combatives

Perform this AWT during PT. Combatives refers to a technique of neutralizing the enemy after primary and secondary weapons have failed. This task may seem easy; and with a unit that is 100 percent Level 1-trained, it may be. But that just means you can really dig into this task. Combatives, a perishable skill, needs to be regularly incorporated into a long-term PT program. Ensure that you have appropriate instructors, and tailor the training to events that are likely to be encountered. For example, focus on individual movement techniques and work on urban operations that will require close-quarters combat. This will also build confidence in Soldiers who may not have completely understood combatives in the 2 weeks that it took to become certified while at basic training.

Grow Professionally and Personally

Perform this AWT during an extended PT session or during officer/noncommissioned officer PT. At first, this may seem a difficult and inappropriate choice for a task. However, if we leave the task to each individual, many may never accomplish it. A great way to tackle some of the subtasks associated with this AWT (even though the subtasks are not well codified) is to perform what was once known as a leader reaction course. This brings a unit closer together and builds teams, trust, and confidence. It allows subordinates the opportunity to step up to a leadership role and shine; it is also mentally and physically challenging. This is a great way to grow as an individual and as a small unit.

This type of training will pay big dividends over time, especially as you counsel and develop your leaders.

Example Incorporation of BDs

Perform Actions as a Member of a Mounted Patrol

Perform this BD during each complete PMCS period of rolling-stock items. This level of training is only for units that already have a robust maintenance plan. The following three phases are suggested components of a maintenance program plan to take advantage of tactical training:

- **Phase 1.** Implement a grassroots PMCS program that involves the entire unit, including all leaders (officers and noncommissioned officers). The place of duty during the determined time and date is a motor pool, where a "by the book" PMCS of rolling stock is being conducted. Go through the equipment manual, and read it literally and correctly performing each action step by step. PMCS is supervised and resourced; small operator actions (rust removal, minor paint repairs, fluid top-offs, bolt tightening) are handled on the spot. Always ensure oversight from maintenance personnel so that everyone learns something during the process. Conduct PMCS of the command vehicle with the driver, and quiz Soldiers on the system parts and functions. Establish a solid baseline, and then progress to Phase 2.
- **Phase 2.** Exercise each of the systems with a road test—a mandatory part of PMCS. Start with small-scale road tests (before, during, and after operations PMCS). The road test phase is subdivided into parts. First, just roll everything out (get tires moving; work lubricant into vehicle joints; heat up petroleum, oil, and lubricant products throughout the vehicle). Stay on paved roads initially; travel to the refuel point, top off fuel, and return. As you improve and get more efficient, start exercising all of the vehicle systems. Take vehicles onto the highway; operate them at highway speeds and full operating temperature; then take them off-road, over rough terrain, to exercise the suspension, steering, transfer case, and differentials (mandate the use of four-wheel drive, high and low). Once you really get into the swing of performing this phase, you can incorporate value-added training while still in the vehicle.
- **Phase 3.** Phase 3 of the plan will not be realized or appreciated in the beginning. Make a plan and rehearse it during close-out procedures. Leaders refine convoy planning and briefings, select small tasks on which to focus during training, and give everyone opportunities to execute tasks. For example, when performing self-recovery with a tow-strap and then a tow-bar, Soldiers operate their communications and navigation equipment with discipline. A typical administrative day in which Soldiers leave early for lunch can be turned into a great training opportunity that reinforces tactical work performed on a daily basis. The phase is painful, takes longer than normal, and seems difficult to plan. But once everyone gets used to bringing full "battle-rattle" and dummy weapons, it becomes second nature. After 3 months of performing this phase, equipment runs better, faults in equipment can be identified quicker, repairs are handled faster (maintenance personnel notice the extended effort and involvement and want to help), and tactical actions fall into place. Every week presents an opportunity for a miniature field training exercise, with all the associated planning, preparation, and rehearsals required. Precombat checks and inspections, rehearsals, and other preparations that normally trip up a unit while executing a major event become a habit—not something unit members forgot.

Evacuate a Casualty

Perform this BD during PT or PMCS tactical training or as a drill. There are many subtasks; you can tailor a venue to focus on particular subtasks. A great PT session incorporates survival, communication, movement, and shooting skills. While Soldiers are stretching, pass out instructions and equipment (dummy weapons, combat lifesaver bags, stretchers, rescue equipment/sleds, Joint Tactical Radio Systems, maps, and compasses) and provide a mission order.

As an example, consider a mission order that involves finding a downed helicopter, searching for and rescuing survivors, establishing a landing zone (LZ), transporting personnel and sensitive equipment to the LZ, and calling for medical evacuation (MEDEVAC) if necessary. As a unit, move to the first location and find the dummies (casualties). At this point, some personnel pull security, others evaluate and treat casualties, and others call for support. Transport the group of casualties to a good LZ location, set up the LZ, and wait for MEDEVAC. Train on your skills along the way, and then critique your operation at the LZ.

Issue another mission order, and change personnel positions. Given the running, carrying of gear, and dragging or carrying of 200-pound dummies, this training is physically strenuous. It is also a great opportunity to learn first aid techniques. It combines some of the other tasks performed at other PT sessions (radio communication, security operations, individual movement techniques). Complete this using a crawl-walk-run approach so that by the end of the quarter, you are using rucksacks and in full battle-rattle gear.

Example Culminating Event

With extra time added to the PT or PMCS window, a culminating event, with evaluations of multiple tasks, can be fun and challenging for the unit. It takes months of training to build up to this culminating event and to certify that everyone is capable of accomplishing each of the tasks (such as drown proofing or rappelling). A week before the culminating event, the unit might receive a warning order that includes a packing list and report times. Some of the possible actions associated with tactical tasks discussed in this article include—

- Start on the second floor of a facility, and issue a task to safely get personnel and equipment to the ground (with no stairs available). This forces personnel to rappel to the ground floor.

- Use a tactical road march formation to land navigate to the first point in a multiroom/multistory building.
- Use four-Soldier stacks to set up a rally point, drop rucksacks, and secure and clear the building.
- Have each stack encounter a noncombative who must be physically subdued due to the rules of engagement and a casualty who must to be treated and transported to an LZ, where MEDEVAC personnel are called.
- Issue a mission order for a follow-on mission to link up with another unit and conduct an ambush.
- Conduct a tactical road march and land navigate to the link-up point (and unfortunately, the information provided was determined to be incorrect and you are on the wrong side of a water obstacle—but the link-up must be made immediately).
- Cross the river, creek, pond, or lake using poncho rafts.
- During the road march, call for fire on an observed enemy position, conduct numerous movement drills while attempting to break contact with the enemy, and set up a hasty ambush according to the mission order.

The culminating event could be performed over a 4- to 5-hour period and could easily be tailored to the time available. Although culminating events are incredibly challenging, they are very rewarding and a lot of fun. They are not as resource-intensive as they seem, and people will talk about them for a long time—and others will want to join in. When trained for over a long period of time, and with minimal external resources required, culminating events are easily completed at the team, squad, platoon, or company level. These are also great events for officers or senior noncommissioned officers to ensure that the first part of the eight-step training model is completed to satisfaction (and leaders are certified).

Conclusion

Less money and fewer personnel do not equate to reduced capability. However, greater ingenuity is required to maintain the same capability or to improve the existing capability that has been eroded away by more than a decade of a very specific type of sustained combat. The time to adjust is now. We are transitioning to a smaller and more capable force, reducing budgets, and returning to LSGCO. Whether we win or lose on the battlefield will be determined by how well we weather this budget and force reduction and transition back to LSGCO. We must maintain our tactical and technical skills; and for the foreseeable future, the only way to do that is to see everything as a training opportunity and then maximize that opportunity.

Mr. Yourchisin is a retired Soldier and is currently serving as Chief, Concepts and Analysis Division, Maneuver Support Capabilities Development and Integration Directorate, Army Futures Command, Maneuver Support Center of Excellence, Fort Leonard Wood, Missouri.

("Terrorist Organizations," continued from page 42)

[21]Peter Paret, *Makers of Modern Strategy: From Machiavelli Fto the Nuclear Age,* Princeton University Press, Princeton, New Jersey, 1986, p. 26.

[22]United Nations Security Council Counter-Terrorism Committee, "Foreign Terrorist Fighters," 24 September 2014, <https://www.un.org/sc/ctc/focus-areas/foreign-terrorist-fighters/>, accessed on 13 November 2018.

[23]Financial Action Task Force Report, "Financing of the Terrorist Organization Islamic State in Iraq and the Levant," February 2015, <http://www.fatf-gafi.org/media/fatf/documents/reports/Financing-of-the-terrorist-organisation-ISIL.pdf>, accessed on 13 November 2018.

[24]J. C. Herold, *The Mind of Napoleon*, Columbia University Press, New York, 1955, pp. 219–220.

[25]James J. F. Forest, *The Making of a Terrorist*, Vol. 2, Praeger Security International, Westport, Connecticut, 30 November 2005, pp. 296–297.

[26]U.S. Federal Bureau of Investigation, Anchorage Counterterrorism Field Office Report, "Muslims of the Americas," 1 December 2009, <http://ww.fuqrafiles.com/2009-2011-fbi-investigation-of-moa-in-alaska/>, accessed on 13 November 2018.

[27]U.S. Federal Bureau of Investigation, New York Field Office Report, U.S. Attorney's Office, Southern District of New York, "Al Qaeda Supporter and Organizer of Jihad Training Camp in Oregon Sentenced in Manhattan Federal Court to Life in Prison," 15 September 2009. <https://archives.fbi.gov/archives/newyork/press-releases/2009/nyfo091509.htm>, accessed on 13 November 2018.

[28]United Nations Office on Drugs and Crime, "The Use of the Internet for Terrorist Purposes," September 2012, <https://www.unodc.org/documents/frontpage/Use_of_Internet_for_Terrorist_Purposes.pdf>, accessed on 13 November 2018.

[29]Bruce Hoffman, *Inside Terrorism*, Columbia University Press, June 2006.

[30]Knox and Williamson, pp. 62–68.

[31]Angel Rabasa et al., *Beyond Al-Qaeda: Part 1, The Global Jihadist Movement*, RAND Corporation, 2006, pp. 7–11.

Major Fell serves as the operations officer for the 253d Engineer Battalion, Arizona National Guard. He holds a bachelor of science degree in biochemistry and molecular and cellular biology from the University of Arizona, Yuma.

Engineer Qualification Tables

By Mr. Don W. Durst

As of 1 August 2018, the engineer qualification tables (EQTs) have been redesigned to focus on mission-essential task (MET) proficiency. Most of the revision was focused on the removal of weapon qualification requirements since these are documented in their own respective training circulars (TCs)—for example, TC 3-22.9, *Rifle and Carbine*.[1] The number of tables was reduced from 12 to six by grouping the tasks into functional areas such as mobility and countermobility. By redesigning the EQTs to support MET proficiency, unit capabilities are taken into account, allowing for a greater focus on equipment-specific tasks such as tasks involving the armored combat earthmover/bulldozer, armored-vehicle launch bridge/joint assault bridge, and high-mobility engineer excavator.

The primary method of assessing whether an EQT task has been executed to standard is by referencing the training evaluation outlines, which focus on individual or collective tasks. An individual task is a clearly defined, observable, and measurable activity accomplished by an individual. It is the lowest behavioral level of a job or duty that is performed for its own sake. An individual task supports one or more collective tasks or drills and often supports another individual task. A collective task is a clearly defined, discrete, and measurable activity or action that requires organized team or unit performance and is conducted to a defined standard. Furthermore, a collective task describes the performance of a group of Soldiers under actual operational conditions in the field and directly contributes to mission accomplishment. All tasks that Soldiers are expected to execute have associated training evaluation outlines (tasks, conditions, and standards) specifically designed to ensure that they know what is expected of them. All training evaluation outlines can be found on the centralized Army repository at <https://atiam.train.army.mil/> or on the Army training network at <https://atn.army.mil/>.

EQTs are embedded in the Combined Arms Training Strategy (CATS). Like the EQTs, CATS products have also been redesigned to focus on MET proficiency and are reliant on the use of training evaluation outlines to provide the actual tasks, conditions, and standards to conduct assessments of task proficiencies. CATSs are descriptive, not prescriptive, by design.

CATSs provide guidance to commanders and leaders for the planning and execution of training. CATSs do not prevent commanders from modifying tasks to achieve the required unit training proficiency. CATSs outline training strategies based on mission, functions, and capabilities that a unit was designed to accomplish in accordance with its table of organization and equipment. CATSs utilize all of the collective tasks in the proponent-approved unit task list in order to create a holistic, task-based, event-driven strategy. In CATS, collective tasks that are logically trained together to achieve proficiency in unit functions and capabilities identified in the table of organization and equipment are grouped into task sets. Additionally, CATS focuses on a mission-essential task list (METL) strategy based on the METL of the higher unit. Utilizing the digital training management system, CATS enables commanders and leaders to create a specific unit training plan for reaching and sustaining proficiency. Commanders, leaders, and staffs are encouraged to use this strategy to develop training plans based on unit mission, function, and capabilities; commanders' dialogue; and the current assessment of unit training proficiency.

CATS enables a commander to create a multitude of various unit training plans. A doctrinal training calendar provides a starting point to assist the unit commander and staff in developing their own training calendars. Units progress through CATS based on resources, time available, and the commander's assessment of task proficiency using the doctrinal process of assessing training, missions, and METs while preparing or updating unit training plans.

The purpose of EQTs is to focus on critical collective tasks that directly support the unit's METL. Due to differing capabilities, different types of units focus on different tasks. However, the tables are based on squad and platoon training events for validation by unit commanders. The EQTs are currently listed in the applicable unit CATSs; but in the near future, they will be published in a separate TC. There will also be a chapter dedicated to EQTs in a future TC covering training and qualification, infantry, cavalry, and combat engineer squads. That TC will lay out the holistic training strategy and inform maneuver commanders of the engineer-specific training requirements that they must ensure are resourced.

Examples of Current CATS EQT Design

Conduct of Table I: Leader Demolition, Munitions, and Explosive-Hazards Certification

Conduct of Table II: Individual Demolition, Munitions, Explosive Hazards, and Obstacle Certification

Conduct of Table III: Mobility, Reconnaissance, Reaction to Contact

Conduct of Table IV: Countermobility, Survivability Tasks

Conduct of Table V: Squad Certification

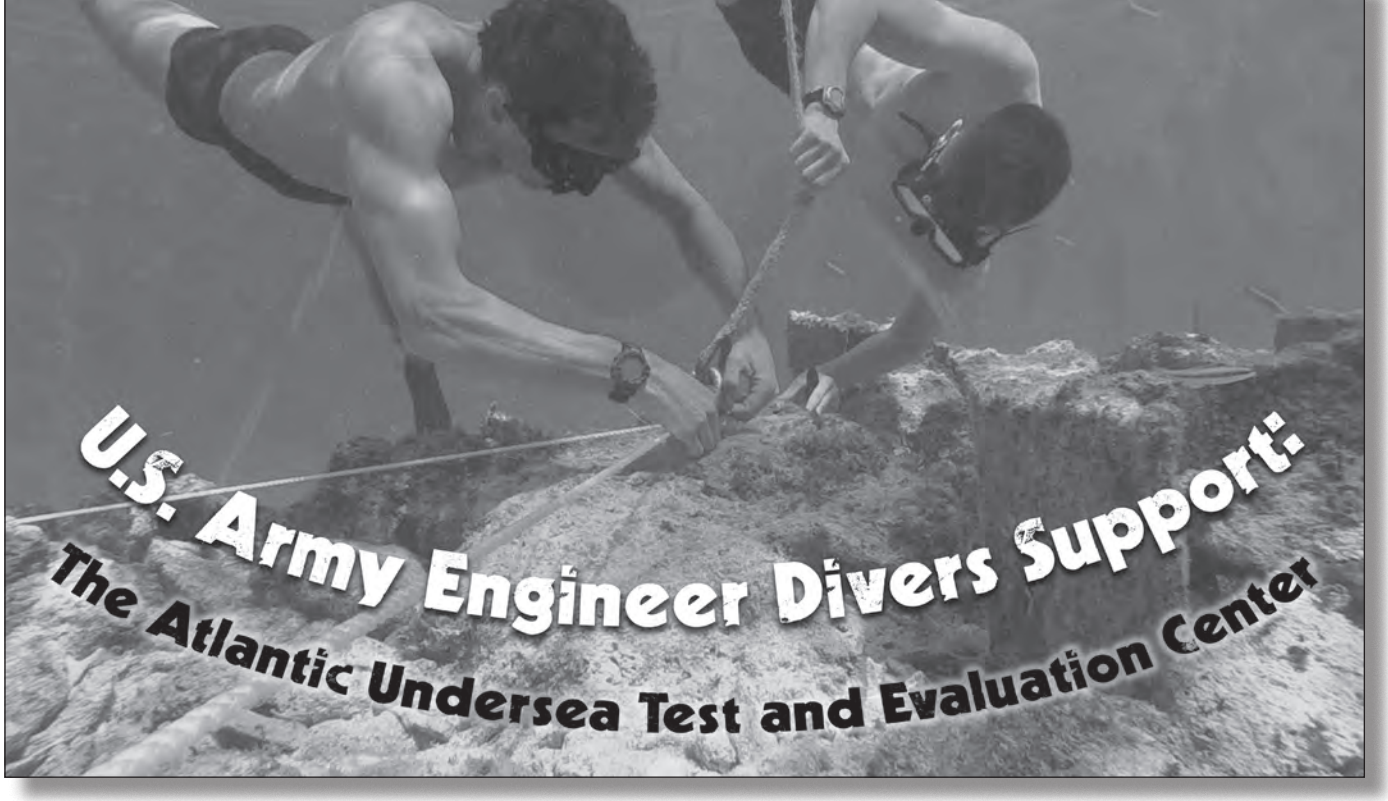
Conduct of Table VI: Platoon Qualification

Due to operations security requirements, it is not possible to provide an example of a training evaluation outline.

Endnote:

[1]TC 3-22.9, *Rifle and Carbine,* 13 May 2016.

Mr. Durst is the chief of the Collective Training Division, U.S. Army Engineer School, Fort Leonard Wood, Missouri. During his active-duty Army career, he served in various leadership positions, ranging from team leader to first sergeant, while assigned to Company A, 307th Engineer Battalion; Company B, 27th Engineer Battalion; and Company A, 44th Engineer Battalion.



U.S. Army Engineer Divers Support: The Atlantic Undersea Test and Evaluation Center

By Captain Joshua N. Voorhees and Sergeant First Class Samuel S. Winter

Training to be a U.S. Army engineer diver is very difficult. In fiscal year 2018, the attrition rate for advanced individual training for Military Occupational Specialty 12D was greater than 90 percent. Approximately 130 enlisted Soldiers started Phase 1 of the advanced individual training, and only nine moved on to Phase 2.

Army engineer dive teams stand ready to deploy worldwide to support the U.S. Army Forces Command (FORSCOM) and other organizations and programs within the Department of Defense, such as the U.S. Army Corps of Engineers (USACE), the Defense Prisoner of War/Missing in Action Accounting Agency (DPAA) and, most recently, the Naval Undersea Warfare Center.

Engineer dive detachments continually seek real-world opportunities to train and validate the unit's mission-essential task list (METL) to increase readiness and better prepare the unit for operational deployment. Army divers are proficient in scuba and surface-supplied diving modes as well as recompression chamber operations. However, this is only the beginning. Army divers are capable of completing many common Army engineering tasks with one added factor—they accomplish these tasks while underwater. Underwater diver capabilities include beach reconnaissance operations, port construction, use of hydraulic tools, cutting, welding, obstacle reduction, salvage, and hydrographic surveys. Divers also use sonar to perform underwater searches during search-and-recovery missions, and they maintain and repair the Army's many watercraft. Due to this versatility, an Army diver is often referred to as a jack-of-all-trades.

A member of the 86th Engineer Dive Detachment steps in the water, Andros Island, Bahamas.

The Atlantic Undersea Test and Evaluation Center (AUTEC), Naval Undersea Warfare Center, Andros Island, Bahamas, provided a unique opportunity for the 86th Engineer Dive Detachment in the spring of 2018. AUTEC required support to conduct the salvage and replacement of 23 derelict marine aid-to-navigation stations (ATONs) marking the vessel

channels to and from their respective training sites on Andros Island. The mission presented the 86th with the chance to support a sister Service and conduct dynamic, live-fire training of its individual and collective tasks in preparation for its upcoming deployment to the U.S. Central Command (CENTCOM) area of responsibility.

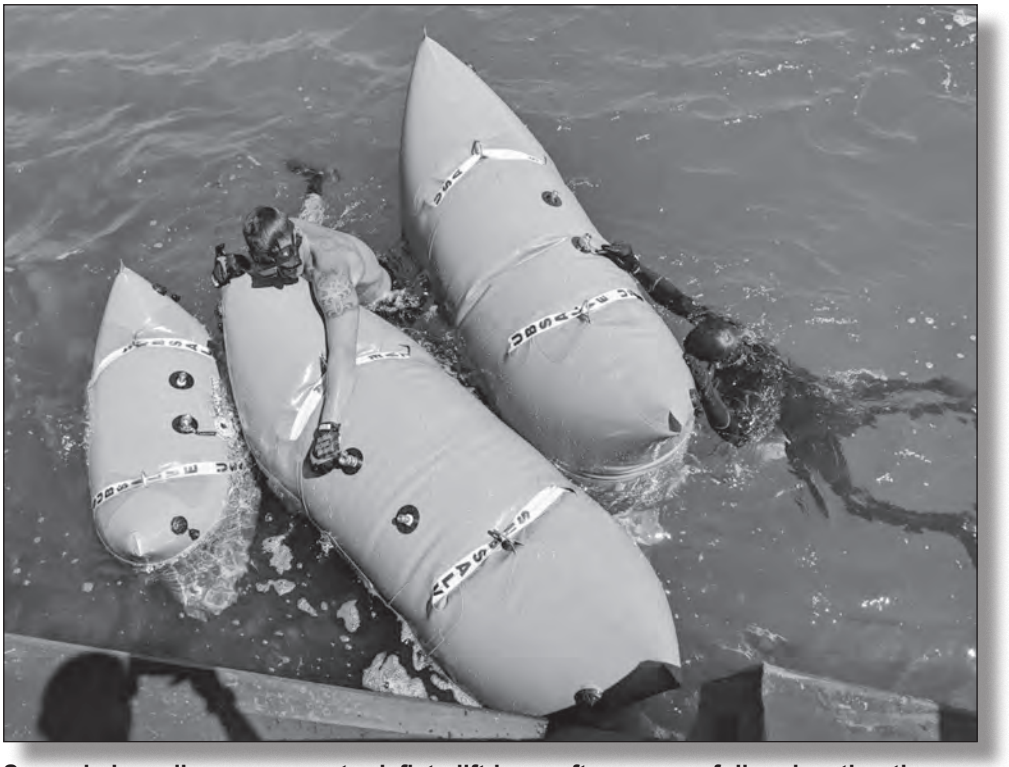
The detachment was tasked with removal of two types of ATONs. The first consisted of a single 12-inch steel I beam driven into the seafloor, with day-boards and a beacon mounted on top to mark its side of the channel. Each day-board displayed signs that were used for daytime navigation, whereas the beacon flashed red or green light that was used for nighttime navigation. The second type of ATON consisted of five 12-inch steel I beams driven into the seafloor, each angled so that they met at the top, where they were held together by a galvanized steel platform, upon which day-boards and a beacon were mounted. Each structure was located in 25 feet or less of seawater and stood 10–15 feet above the waterline.

An Army master diver uses a BROCO exothermic cutting rod to detach I beams on the surface, Andros Island, Bahamas.

In March of 2018, 21 Soldiers from the 86th Engineer Dive Detachment deployed to AUTEC to begin removing the I beams of the ATONs from the seafloor. Although the unit was well-trained in the task, the mission posed a new challenge. It was necessary to determine a safe way to remove each ATON while minimizing the risk of the structure collapsing on the divers or their air source. The constantly changing variables of the weather, sea state, and marine life also affected completion of the mission.

The noncommissioned officer in charge (NCOIC) of the mission performed extensive research to determine a safe and repeatable way to remove each ATON from the water. Upon discovering useful information among various fire engineering manuals, the NCOIC personally spoke with firefighters to learn more. It turns out that the techniques used by firefighters to navigate structure collapses directly pertained to the situation and effectively solved the problem.

For each multiple I beam ATON, four of the five I beams were detached from the seafloor by a surface-supplied underwater cutting team using BROCO® exothermic cutting rods. Next, a surface cutting team, located on a separate vessel, used BROCO exothermic cutting rods and oxyacetylene torches to cut all five I beams at the waterline, letting them fall free and clear into the sea since there were no divers in the water at the time. After all five I beams were detached at the surface, the underwater cutting team returned to the site to make the final cut on the fifth I beam that still stood underwater. Due to the possibility that the last free-standing I beam could fall back on the divers or their umbilical line, cutting off their air source, the final cut was made in the same manner that firefighters cut

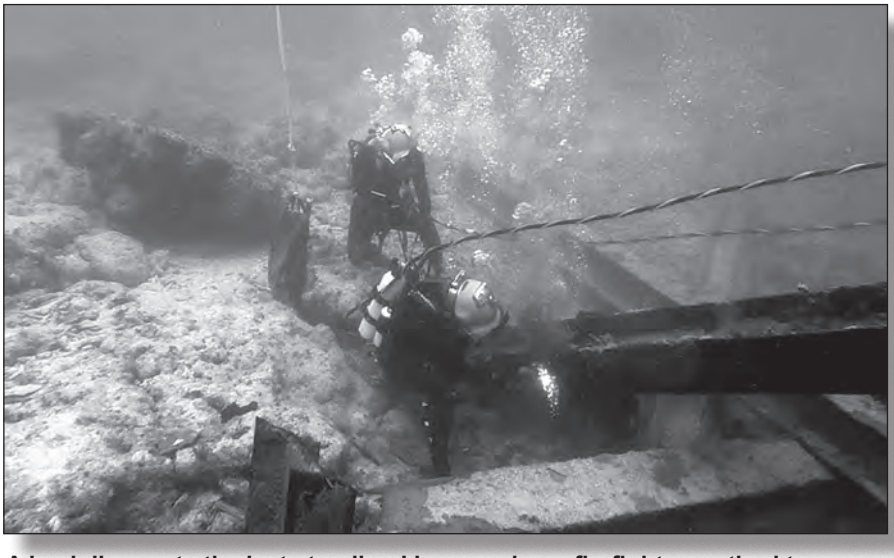


Second-class divers prepare to deflate lift bags after successfully relocating the attached I beams to the pier, Andros Island, Bahamas.

The lead salvage diver uses a BROCO exothermic cutting torch to detach a center I beam from an ATON while a second-class diver tends to the lead diver, Andros Island, Bahamas.

steel I beams to control the direction of fall. The NCOIC and lead master diver executed the first working dive to validate the plan. Employing these firefighting techniques proved to be extremely successful and repeatable throughout the operation.

Once the structure was detached and lying on the seafloor, a scuba team rigged the cut I beams with lift bags, raised them to the surface, and towed them to shore, where they were removed from the water with a crane. Once the obstacles were deconstructed and the debris was cleared from the site, a fourth team arrived and attached the new navigational buoy system, replacing the former aid station with a more easily maintained ATON system. This sequence of events was repeated for all 23 ATONs, with minor deviations to account for changing variables such as the weather, sea conditions, and the position of each ATON on the seafloor. In total, the detachment successfully cut and removed 71 I beams.

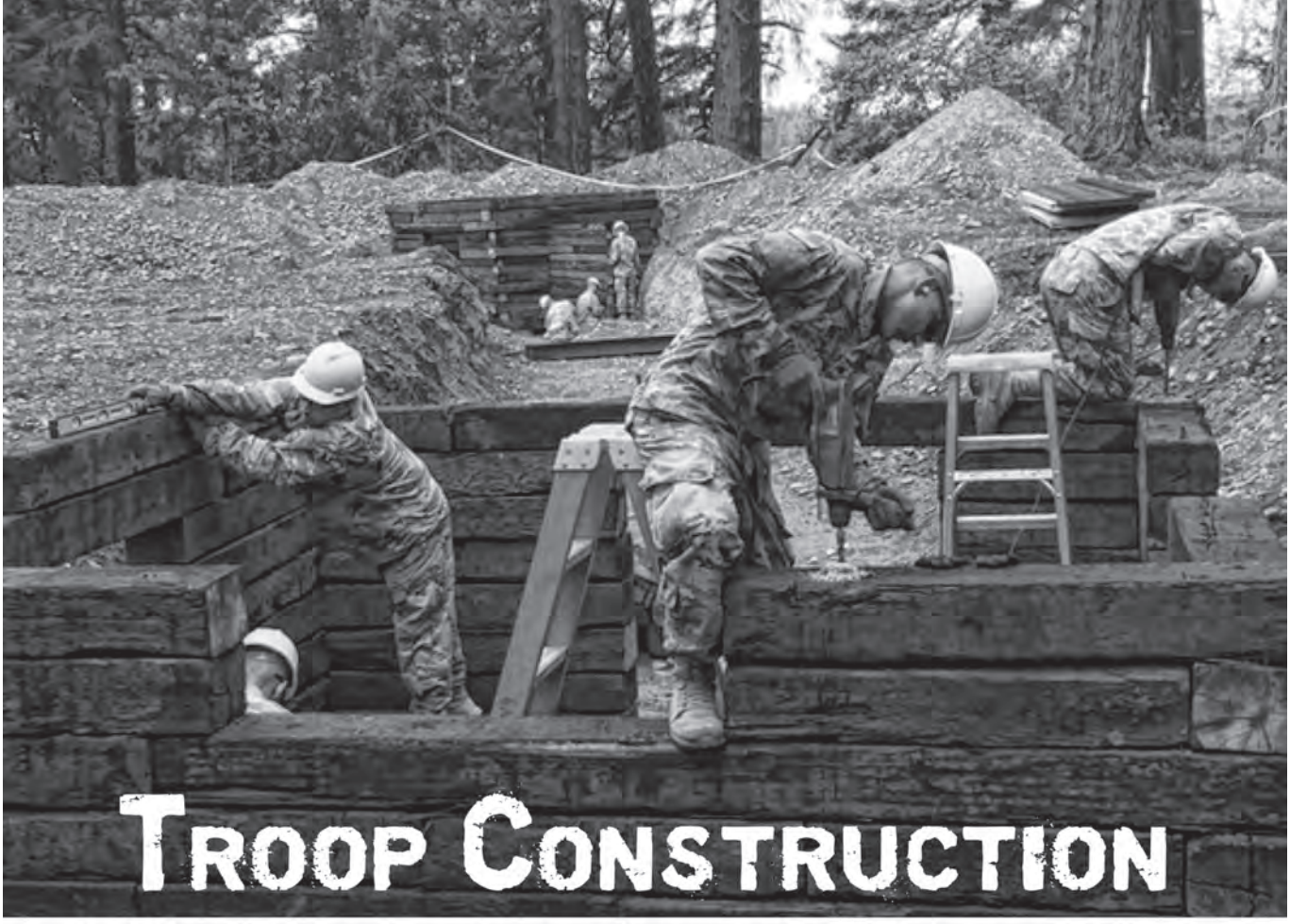


A lead diver cuts the last standing I beam using a firefighter method to control the direction of the fall, Andros Island, Bahamas.

The 86th Engineer Dive Detachment was presented with a challenge, developed a plan, conducted a site reconnaissance, performed research, revised the plan, and successfully deployed the team and its equipment to execute the plan. The team conducted training that would be nearly impossible to replicate in a controlled training environment, while simultaneously providing its unique abilities to upgrade AUTEC navigation systems. The technical diving knowledge that the team gained was not the only value added from this exercise. Logistical challenges while deploying a full dive team and its equipment overseas tested and honed the detachment unit movement procedures for deployment. This successfully equipped the team with the knowledge necessary to efficiently deploy anywhere in the world with minimal notice to conduct diving operations and achieve the desired results. When everything was said and done, the team gained the invaluable training experience required to assess its abilities in a live-fire exercise. The team is now better prepared to manage the ebb and flow of the ever-changing operational environment.

Captain Voorhees is a diving officer who served as the executive officer of the 86th Engineer Dive Detachment, Joint Base Langley–Eustis, Virginia. He holds a bachelor's degree in business administration from Gordon College, Wenham, Massachusetts.

Sergeant First Class Winter is a U.S. Army master diver in an engineer dive detachment. He is participating in the Training with Industry Program at Dive Lab Incorporated, Panama City Beach, Florida. He assists with instructing, performs repair and overhaul of diving equipment, and assists with manned and unmanned testing of prototype diving equipment.



Troop Construction

in Support of Unit Training Readiness

By Captain Jordan E. Benson

Conducting troop construction operations provides an exceptional opportunity for a unit to train on construction and improve an installation. Many installations lack troop construction programs or assign only limited minor projects. The engineers on Joint Base Lewis–McChord (JBLM) have created a troop construction program that challenges the constructing unit while providing a valuable service to the installation. This article contains a description of the methods and procedures used to provide high-quality training and improved capability at JBLM from February 2015 to November 2017.

Establishment of a Troop Construction Program

To have a successful troop construction program, battalion and brigade leaders must support the execution of construction tasks. At JBLM, the 555th Engineer Brigade uses the General Engineering Section (GES), consisting of the brigade construction warrant officer, civil engineer, construction management engineer, and survey and design team, for troop construction planning. The primary foci of the GES are coordination with companies to determine desired training opportunities, coordination with the Department of Public Works (DPW) for potential projects, design of

A bunker under construction on JBLM

identified projects, and acquisition of approvals for execution.

Understanding the training objectives of construction companies within the brigade is of utmost importance. Due to the long lead time required for the approval of construction projects, companies focus on establishing their training objectives a year out from the anticipated execution of a project. The GES holds quarterly meetings to discuss company training and determine the types of projects that can support the training tasks. With the priorities established, the GES effectively prioritizes projects in the design process and finds other potential projects that support training objectives.

Construction of a new bridge over Murray Creek

Every week, DPW holds a synchronization meeting to review all work orders that have been submitted. Due to budgetary and manpower limitations, DPW is unable to complete all submitted work orders; therefore, it is essential that GES have a representative in attendance. Based on the training priorities established by company commanders, in conjunction with a knowledge of troop construction capabilities, the GES representative takes responsibility for the design and eventual construction of projects.

Once a project is identified, a senior member of GES contacts the requesting unit to gain a better understanding of the project requirements. Following this initial meeting, the GES representative creates a general concept (with graphics), ensuring that the desired end product meets the expectations of the requesting unit. Once approved, the product is forwarded to the survey and design team to conduct the site survey and create the initial designs. With the concept in hand, the GES representative contacts DPW to ensure that an overview of the project is included in the monthly facilities utilization board meeting that leads to the facilities board meeting for approval of the location of the project. The Historical Preservation Section of DPW is a common barrier to site approval.

Vertical construction of the Noble Hill bunker and trench system

To ensure that projects are quickly routed through DPW, a representative is assigned to oversee the transfer of documents from section to section. When the DPW representative receives the design, he or she creates a project packet that includes the design, work order, and any other pertinent documents. A routing slip is attached to the front of the packet, and the packet is hand-carried to each section for input. It takes approximately 10 duty days for a packet to go through all sections. Each section reviews the design and makes

Tree removal from the Murray Creek Bridge project site

comments based on requirements for approval. The design is modified, and the modification is added to the project packet. The previous design, along with changes and comments, is kept in the project packet. Projects are rarely approved immediately after the first review. The process typically occurs three times before the start of construction is approved; however, that number increases as required.

With all the approved projects on hand, GES sends a read-ahead packet to the company commander approximately 1 week before the quarterly readiness conference. This allows the companies to review the projects and identify the ones they want to undertake. During the quarterly readiness conference, a GES representative answers questions about the projects and annotates which projects the companies elect to undertake and when they anticipate execution. Based on these plans, GES creates professional development sessions tailored to various tasks associated with the projects. These sessions focus on Gantt chart development, man-hour estimates, equipment, and construction safety.

Exposed substructure during construction of the elevated walkway at Murray Creek

Company Level Troop Construction

At the company level, the key to a successful troop construction program is the focusing of all construction tasks on the company mission-essential task list (METL). Any organization planning to use troop construction as a method to build readiness must focus on training tasks associated with the unit METL—especially the subtasks listed in the training and evaluation outlines. By reviewing the training and evaluation outlines, the company can identify smaller tasks and projects, which in turn, can help improve the readiness of the

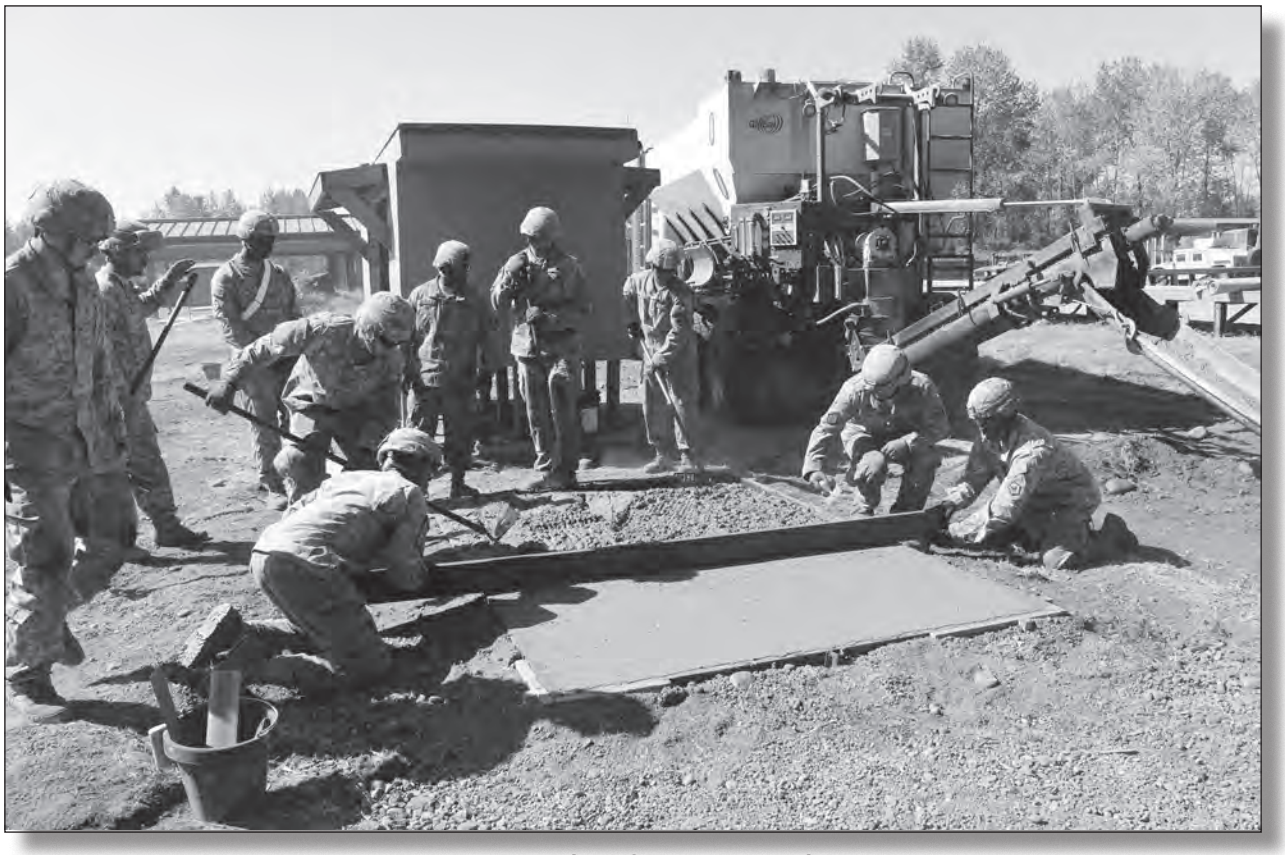
organization. For example, the task to construct a concrete structure is made up of several subtasks that are implied with any concrete work—specifically, the use of batter boards and the compaction of the subgrade. There are also some supporting tasks that are not implied, such as the construction of a masonry wall. Understanding that masonry construction is a component of constructing a concrete structure helps the company identify projects that will help them become more proficient in their METL.

To ensure project success, it is important to identify the required capabilities and quickly assign a project manager. Company commanders typically assign a platoon leader with most of the capabilities necessary to serve as the project manager and give him or her operational control of other required capabilities. This serves two purposes. First, it establishes a clear task organization for the project. It also provides the platoon leader with experience in a capability or military occupational specialty that is unfamiliar to him or her. The company commander and the company construction chief brief the project manager on the assigned project and identify areas of concern that require special attention.

With the project assigned, the project manager begins creating the project packet, which consists of key components of the construction plan. First, the project manager defines the scope of the project and the responsibilities of the constructing unit. Next, the project leader, with the support of the construction chief, creates the construction activities list. Based on these tasks, the project manager delegates the creation of construction activity summary sheets for each task to squad leaders. The squad leaders analyze their assigned activities and create estimates of anticipated duration, construction crew size, Soldier availability, and material requirements. With the completed construction activity summary sheets, the project manager creates the project Gantt chart and an estimate for the bill of materials. Several other components are added to the project packet, and the project manager back-briefs the company commander. If the company commander is comfortable with the plan and the timeline, the project manager is directed to schedule two briefings. These briefings are similar to range briefings, and they serve to manage expectations for the completion of the project. The first briefing is presented to the battalion operations officer (S-3) and the battalion construction cell. The second briefing is presented to the battalion commander for project approval. With project approval, construction activities are free to begin.

Quality Control

The quality of the projects completed strongly influences the future work opportunities available to an organization. If an organization produces mediocre projects, fewer projects are assigned to the organization. Conversely, if the organization builds a reputation for producing substantial projects that have a long life expectancy, that organization is recommended for further troop construction support. One of the first major JBLM projects assigned



Construction of a concrete pad

to a company was the Noble Hill project. The project consisted of the construction of a 5,000-square-foot bunker-and-trench system, two UH-60 Black Hawk helicopter mock-up pads, a breaching pad, a small village, and a 1-mile-long running trail. Several of the tasks were similar to tasks that had been previously completed and were well within the capability of the company. The construction of the bunker-and-trench system presented a challenging new opportunity for the company; significant effort from horizontal- and vertical-construction engineers was required. Several JBLM units and senior leaders were aware of the complexity of the project and recognized how well troop construction personnel executed it. From that point on, troop construction became a preferred option for the completion of projects on JBLM.

The quality of a project is strongly influenced by the quality control plan emplaced by the company, battalion, and brigade. The consolidated plan is developed by construction warrant officers at each level and enforced by the company construction chief. The company construction chief typically visits the project site every other day, checking a list of items in support of the quality control plan. The chief also inspects the current status of the project and ensures that the project is on pace with the published Gantt chart. As Soldiers conduct site cleanup at the completion of the day's activities, the project manager drafts a status report and submits the report to the company commander and the company construction chief. The status report documents the work completed during that day, the current progress in relation to the Gantt chart, the work anticipated to be completed during the next duty day, and any issues or concerns. This information drives additional support requirements in order to maintain the project timeline. The reports contribute to the weekly company situation report and ensure that the battalion maintains oversight of the project.

Due to the consistent high quality of construction projects and a reputation for projecting accurate timelines, several JBLM units have specifically been asked to be included in project troop construction support. The 7th Infantry Division requested numerous projects, to include the construction of 56 flagpoles to represent all of the U.S. states and territories, a masonry base for a statue, a concrete pad for a Stryker display, and a physical fitness station. I Corps requested a banner system on the parade field, a Stryker pad, and the construction of an interior wall. The most significant project requested was the Murray Creek project, which consisted of a 25-meter-long wooden bridge over a creek, an elevated walkway, and a 500-meter-long trail through a wooded area.

Recommendation

Troop construction projects can serve as a means of improving the skills and techniques of Soldiers and providing a tangible, measurable end state. They also improve the installation. Troop construction makes use of Soldiers, thereby avoiding labor costs, saving the funds of the requesting organization, and helping to preserve resources in a fiscally constrained environment. Construction Soldiers want to train on their tasks, and they have an unwavering desire to build upon and improve their surroundings. Provided the opportunity, these Soldiers undertake daunting challenges and create results that far exceed expectations. The following actions are important in the development of a successful troop construction program:

- Understand the training objectives of construction units.
- Focus construction projects toward improving the unit METL.
- Identify project capability requirements.
- Assign a project manager to lead the project from start to finish.
- Conduct quality control inspections to enforce quality expectations in projects.

Conclusion

Troop construction is an underutilized function on numerous installations. Typical troop construction programs focus only on training area operations, such as route repair and improvement. Little to no vertical-construction projects are offered to troop construction units, forcing the units to train on tasks with no tangible outcomes. However, engineer units, which can provide unique capabilities, are assets that can improve the standard of living on an installation in a fiscally constrained environment. Troop construction units can significantly improve readiness and benefit the installation as a whole. Support from higher echelons is essential to building the program, and the development of an effective quality assurance program is key to attracting future project opportunities.

Senior leaders need to begin planning earlier to establish priorities and facilitate coordination for the design and approval of supporting projects. The appropriate use of engineer assets is essential to the readiness of not only the engineer unit but also all units on an installation, through the continual improvement of facilities and the surrounding area.

Captain Benson currently serves as a brigade engineer battalion observer, coach, trainer for the Joint Multinational Readiness Center at Hohenfels, Germany. He holds a bachelor's degree in systems 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.

The Engineer Button(s)

By Mr. Troy D. Morgan

Engineer Soldiers often refer to their buttons with a sense of pride. Many Soldiers wore unique buttons until 1902, when the Army prescribed the General Service button to be worn by all Soldiers except for U.S. Corps of Engineers officers. Few people realize that Army engineers have worn many unique buttons over the years.

On 9 May 1794, Congress created the Regiment of Artillerists and Engineers. These Soldiers wore a button unique to their regiment. The button featured a cannon and a stack of cannonballs, with "USA&E" enscribed along the bottom edge. On 27 April 1798, the 2d Regiment was authorized. The buttons for artillerists and engineers were then changed so that "1st REGT" or "2nd REGT" was added at the top to depict the regiment to which the Soldier was assigned.

The origin of the button that engineer Soldiers wear today dates to sometime between 1802 and 1814. At that time, the Corps of Engineers was heavily involved in costal fortifications and that mission is manifested in the design of the button. A fort in the lower left of the button and the sea beneath it symbolize the coastal fortification mission. An eagle, the national symbol of the United States, holds a scroll with the motto of the Corps of Engineers—*"ESSAYONS"* (Let Us Try).

When the company of Sappers, Miners, and Pontoniers was authorized in May of 1846,[1] new uniforms were created for the enlisted engineers. A simple, three-turreted castle was chosen to adorn the button.[2]

The 1846 button was short-lived, as the 1857 uniform regulation called for all enlisted men to wear the same buttons as officers of their respective corps (branches).[3] So enlisted engineers donned the *Essayons* button, the same button worn by their officers.

The regulation of 1861 called for enlisted men to wear buttons "the same as is used by the artillery, omitting the letter in the shield."[4] This button was known as the General Service button. In 1902, the General Service button underwent a change in design. In addition, dark or black metal buttons were introduced for field uniforms. At the same time, the Army directed that all Soldiers wear the General Service button except engineer officers, who would continue to wear the *Essayons* button.[5]

Pre-1902 General Service button

Post-1902 General Service button

Enlisted engineers continued to wear the General Service button until the Army Deputy Chief of Staff (G-1) approved the wear of the *Essayons* button on 25 April 2016.[6] But that is not the end of the story. In addition to these buttons that were worn by the Corps of Engineers, there was one more button.

On 5 July 1838, the Corps of Topographical Engineers was organized and it was authorized a unique button. This was a very small unit, having only 36 authorizations. It lasted for 25 years before being abolished on 3 March 1863.[7]

Endnotes:

[1]Raphael P. Thian, *Legislative History of the General Staff of the Army of the United States from 1775–1901*, Government Printing Office, Washington, D.C., 1901, pp. 503–4.

[2]Ephriam D. Dickson III, "Sappers, Miners, and Pontoniers: Outfitting Company A, Engineer in 1846," *Military Collector & Historian,* Vol. 70, No. 2, Summer 2018, pp. 105–114.

[3]U.S. Army, *Regulation for the Uniform and Dress of the Army of the United States*, William H. Horstman & Sons, Philadelphia, 1851, p. 6.

[4]U.S. Army General Order No. 6, 13 March 1861.

[5]William K. Emerson, *Encyclopedia of United States Army Insignia and Uniforms,* University of Oklahoma Press, Norman, Oklahoma, 1996, pp.15–16.

[6]Memorandum from G-1 to Commander, TRADOC, subject: "Recommended Change to DA Pam 670-1, *Authorization of Enlisted Engineers Soldiers to Wear Essayons Buttons*," 25 April 2016.

[7]Thian, pp. 502, 509.

Mr. Morgan is the Engineer Museum Director at Fort Leonard Wood, Missouri.

ENGINEERS' CREED

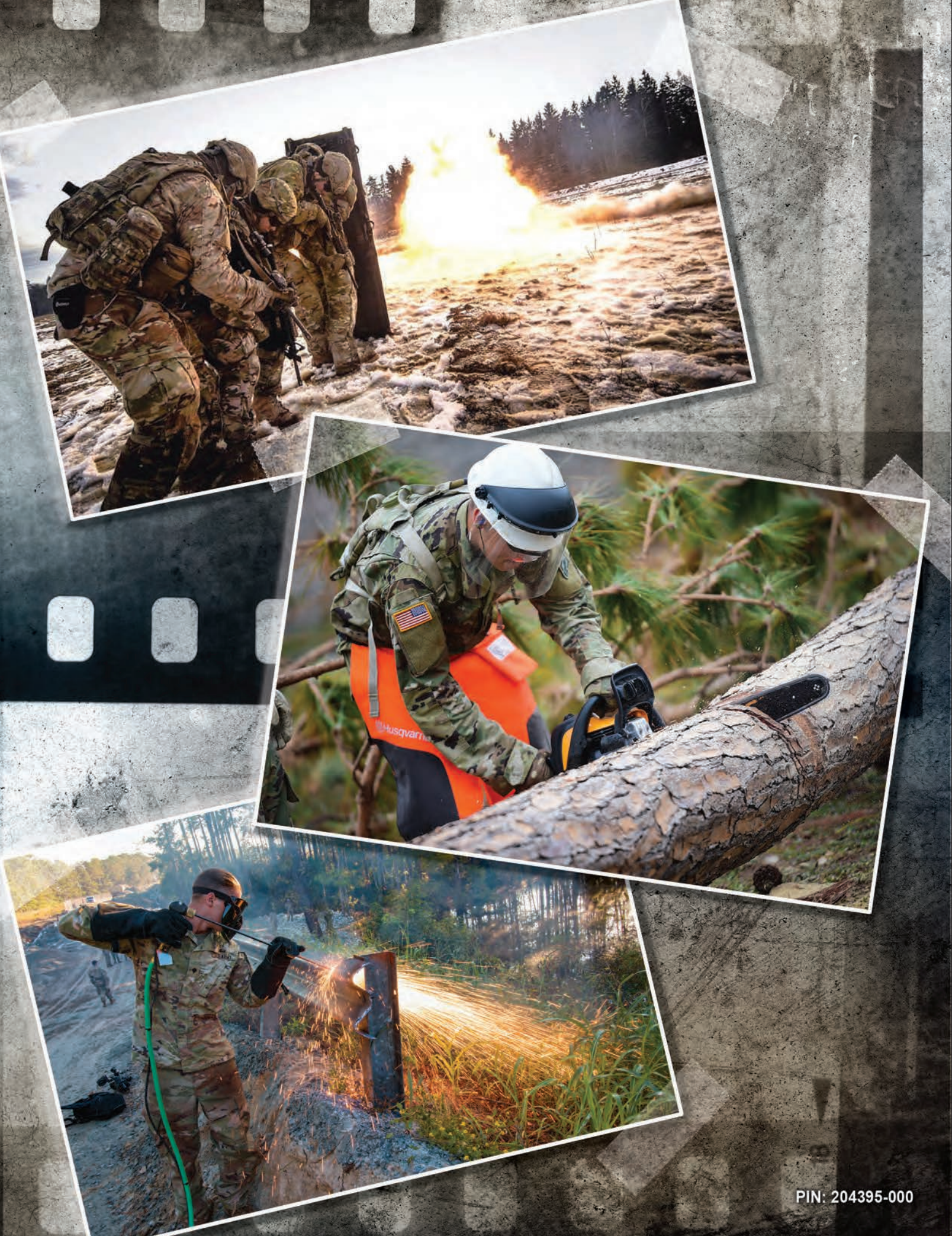
As a Professional Engineer, I dedicate my professional knowledge and skills to the advancement and betterment of human welfare.

I pledge—

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

In humility and with the need for divine guidance, I make this pledge.

Adopted by National Society of Professional Engineers, June 1954



PIN: 204395-000