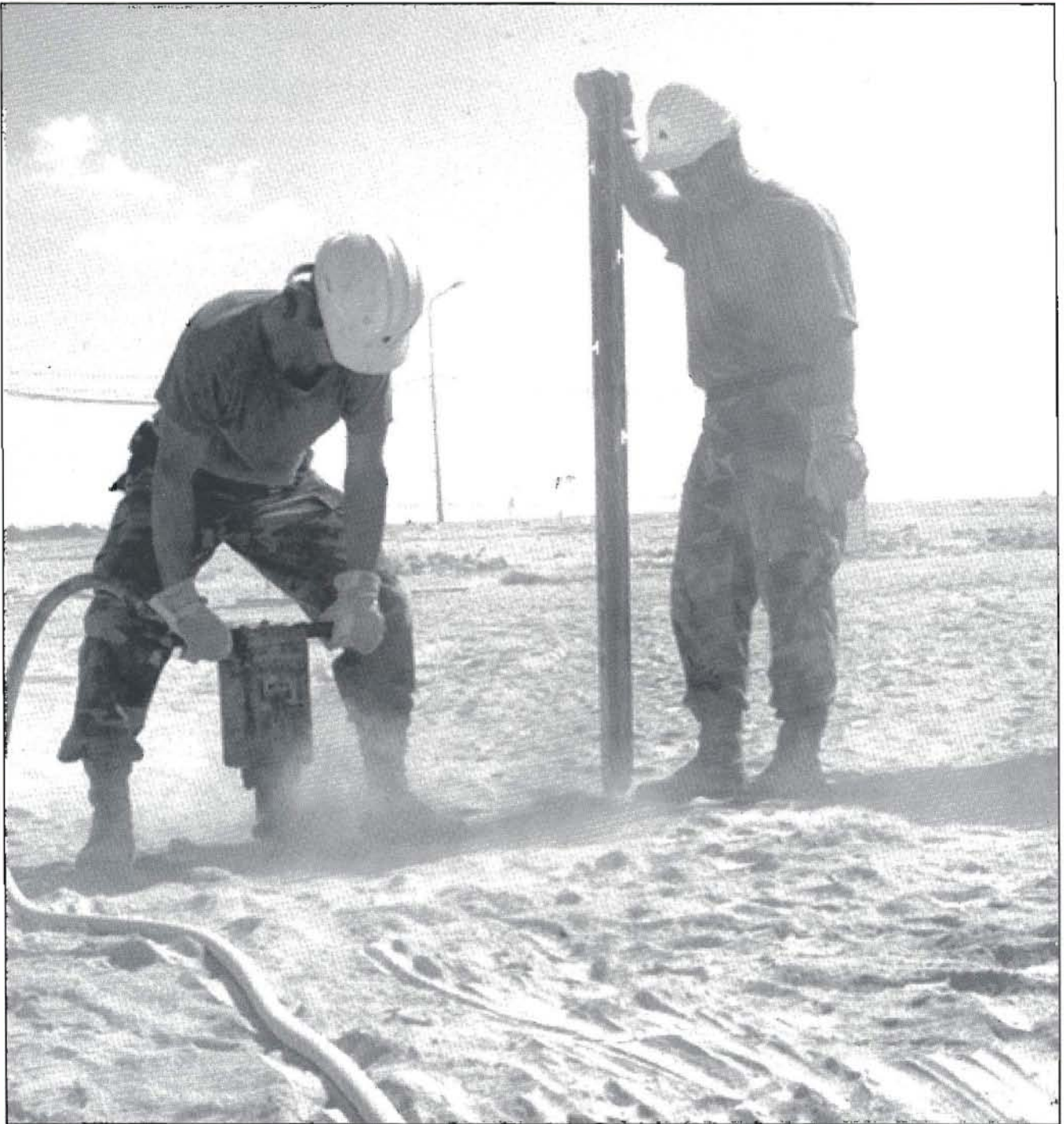


Engineer

THE PROFESSIONAL BULLETIN FOR ARMY ENGINEERS

February 2000



Exercise Bright Star

Headquarters, Department of the Army
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CLEAR THE WAY

By Major General Robert B. Flowers
Commandant, U.S. Army Engineer School

I'm sure by now that most of you have read or heard about Chief of Staff of the Army (CSA) GEN Shinseki's desire to *"transform the World's Best Army into a Full Spectrum Force ... Strategically Responsive and Dominant."* The first step of his transformation is the creation of two Brigade Combat Teams at Fort Lewis, Washington—a process that we want to achieve within the next 12-18 months.

These new highly mobile and lethal brigades are designed to be capable of deploying anywhere in the world within 96 hours. They will have about 3,500 personnel and will feature "off-the-shelf" technology that is more deployable and sustainable. All of the brigades' equipment will be air transportable by C-130 aircraft. The brigades are optimized for small-scale contingencies but will have the capability (when properly augmented) to perform stability and support operations and to participate in major theater war missions. They are designed to be combat capable upon arrival.

The brigades are infantry and information centric. Each will have three Motorized Infantry Battalions; a Reconnaissance, Surveillance, and Target Acquisition (RSTA) Squadron; an Antitank Company; a High-Mobility Artillery Rocket System (HIMARS) Battery; an Engineer Company (multifunctional and robust); and a Brigade Support Battalion. The infantry nature of the brigade provides superb strategic, operational, and tactical mobility to achieve decisive action through dismounted infantry assault. The RSTA Squadron will be equipped with a phenomenal array of data-collection equipment and will be responsible for providing the situational awareness necessary for the brigade to set the time and conditions for the fight. The brigades will be augmented with additional capability (armor, aviation, air defense, engineer, military police, chemical, etc.) based on a mission, enemy, terrain, troops, time available, and civilian consideration (METT-TC) analysis.

A unique aspect of the brigade is that it will be designed around a common medium armored vehicle (MAV) platform. The ultimate goal is to reduce the logistical and sustainment requirements. A common platform will translate to fewer spare parts, fewer maintainers, and a greatly reduced logistical footprint. The search for the optimal platform is ongoing. The Platform Performance Demonstration at Fort Knox ran more than 30 vehicles and their variants through a series of environments as we try to find the right balance between deployability, lethality, sustainability, and survivability. The Maneuver Support Center sent a team of officers and NCOs to Fort Knox to

participate in the process to ensure that our engineer-unique needs are met.

We have designed a strong engineer capability to support the brigade's mobility requirements. The brigade headquarters includes a Maneuver Support Cell with a four-person Brigade Engineer Cell and Digital Topographic Support Cell. A senior engineer—a lieutenant colonel or major—heads the Engineer Cell to deal with the full range of expected missions and potential augmentation requirements such as USACE, contractor, host nation, and multinational assets. The Digital Topographic Support Cell, working in conjunction with the RSTA Squadron, will play a critical role in managing the brigade's topographic data in support of the intelligence preparation of the battlefield process and to ensure that the maneuver commander and his subordinate elements have a common topographic operating environment throughout the brigade's battlespace. The Engineer Company is designed to support the mobility requirements of the maneuver battalions. Its design includes three mobility platoons and a mobility support platoon. It is envisioned that this is a second command opportunity. The mobility platoons will feature an engineer variant of the MAV that will include mine-detection, breaching, rubble-clearing, and obstacle-creation capabilities. The mobility support platoon will be equipped with assault bridging and earthmoving equipment such as high-mobility engineer excavators (HMEEs) and deployable universal combat earthmovers (DEUCES). The company will rely on augmentation from division and echelons-above-division engineer assets to provide additional mobility and the majority of the countermobility and survivability support required for the Brigade Combat Team.

Achieving the CSA's vision will require major paradigm shifts in the way we have traditionally done business in the Army and at the Engineer School. The successful transformation of these brigades will require unprecedented teamwork from every member of the regiment as we revolutionize our DTLOMS processes to meet the CSA's timelines. These will be intense, exciting times as we shape the future of the Army and the engineer's role in it. The Maneuver Support Battle Lab personnel are leading MANSCEN's efforts. They have reached out across the schoolhouse and the Army to bring in the right people with the right skills to help us create a capable and responsive engineer force for the Brigade Combat Team.

Our sleeves are rolled up and we are decisively engaged. Essayons!

Engineer

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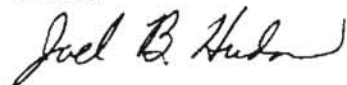
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Front Cover: Soldiers from the 92d Engineer Battalion, 2d Platoon, Bravo Company, Fort Stewart, Georgia, use a jackhammer before laying security wire around 3d Army Headquarters, Mubarak Military City. They are participating in Exercise Bright Star 99/00 in Egypt. (U.S. Army photo by SPC Jamarco Bowen, 55th Signal Company.)

Back Cover: View of the initial Panama Canal construction, 19 May 1910, Culebra Cut, Culebra, showing small slide-obstructing steam shovel.

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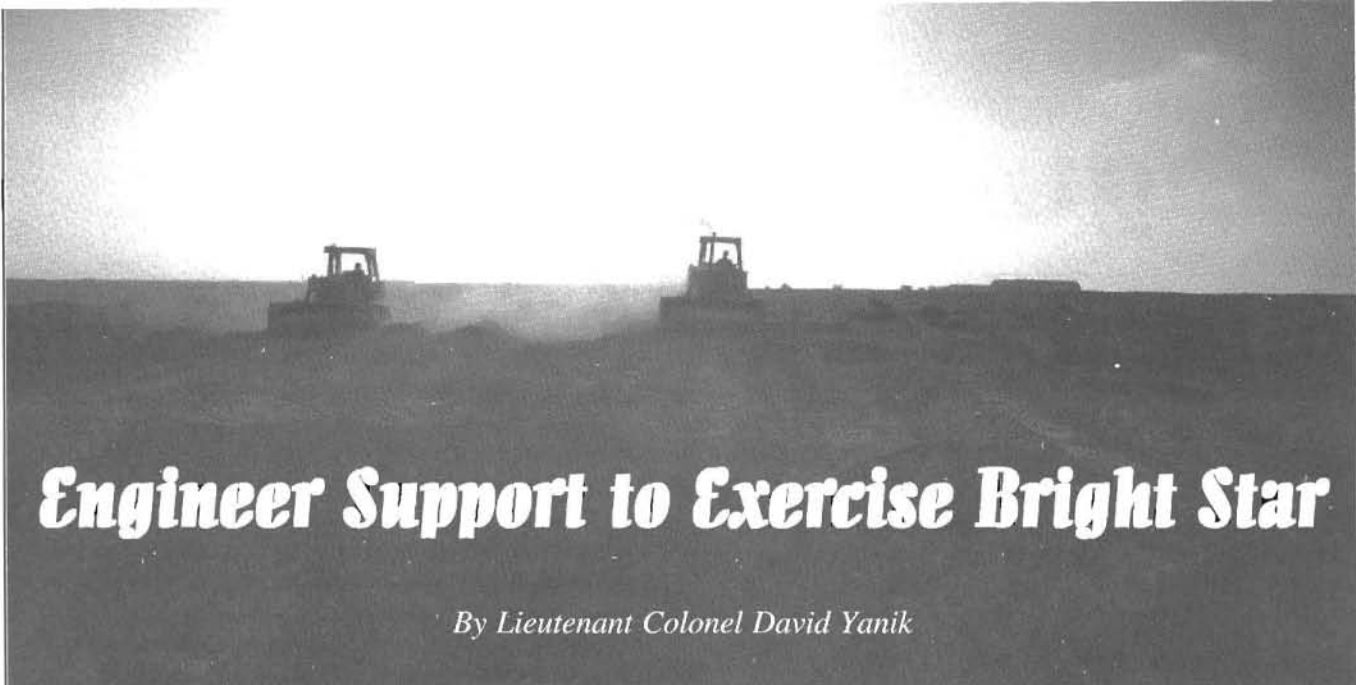
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Engineer Support to Exercise Bright Star

By Lieutenant Colonel David Yanik

Planning support for an off-site exercise is always a challenge for engineers. Anticipating Class IV supply needs, melding participant requirements with resources, learning and understanding local conditions, setting priorities, and flowing proper troop skills and equipment to meet the phased needs of the plan are all considerations facing a commander and his staff. Additionally, any commander is challenged to integrate good mission-essential task list (METL) training into an operation without compromising the services the exercise director expects. These challenges are magnified when the exercise is held in the desert halfway across the world. Such was the task given to the 416th Engineer Command (ENCOM) and the 92d Engineer Battalion (Combat)(Heavy) in Bright Star 99/00.

Exercise Bright Star

United States Central Command (CENTCOM) conducted Bright Star 99/00 in Egypt during October and November 1999. It took place in the northern desert region of the country as a joint/combined/coalition, computer-aided command-post and field-training exercise. It was the most significant coalition military training exercise ever conducted by CENTCOM and the largest-scale deployment and employment exercise in the CENTCOM area of responsibility outside of the Arabian Gulf. More than 17,000 representatives from all U.S. service components, the Egyptian military, and nine other European and Gulf States partners participated.

As the subordinate engineer command of the U.S. Army Central Command (ARCENT)/Third U.S. Army, the 416th ENCOM was the command-and-control headquarters for four engineer units:

- The 92d Engineer Battalion (Combat)(Heavy), Fort Stewart, Georgia, was the lead unit for general support.
- The 1st Platoon, Company B, 249th Engineer Battalion

(Prime Power), Fort Bragg, North Carolina, set up a 110-volt power grid to support U.S. standard equipment and minimize use of tactical generators.

- The 100th Engineer Company (Topographic), Fort Bragg, provided terrain analysis and bulk map sheet production.
- A detachment from the 306th Engineer Company (Separate)(Combat Heavy), a U.S. Army Reserve unit from Fort Totten, New York, deployed early on during the buildup to assist with interior wiring.

Planning for Bright Star 99/00 began during the previous exercise. At that time, representatives from ARCENT and the 416th ENCOM identified the need for permanent facilities for future exercises. The representatives developed a plan for a command-and-control complex to be funded under the Exercise-Related Construction (ERC) Program.

The Joint Chiefs of Staff approved the funding in 1999. The original proposal included a series of K-span buildings to be built by Reserve Component soldiers beginning in May 1999. When the evolving situation in the Balkans caused uncertainty as to funding for the project, a contracted design-construct project was coordinated with the Cairo Area Office of the Transatlantic Program Center, U.S. Army Corps of Engineers (TAC). The 416th ENCOM (Forward Cell) in conjunction with TAC-Cairo completed a complex of three pre-engineered (Butler-type) buildings. There were two 18,000-square-foot main exercise command-and-control buildings and a 4,000-square-foot Sensitive Compartmented Information Facility (SCIF).

416th Engineer Command Mission

The 416th ENCOM, with headquarters in Darien, Illinois, is a Reserve Component echelons-above-corps command-and-control headquarters that reports directly to the U.S. Army Reserve Command. A forward cell of 20 Active and Reserve Component soldiers, collocated

with ARCENT at Fort McPherson, Georgia, directly supports the ENCOM's Middle East/CENTCOM area of responsibility planning mission. The forward cell was ENCOM's primary planner for exercise Bright Star 99/00.

The 416th ENCOM's primary objectives during this exercise were to—

- Provide engineering services to exercise participants through the command and control of assigned units.
- Provide technical and planning assistance, via a liaison officer, to the 377th Theater Support Command (TSC) in testing and validating its new role as overall theater logistics manager.
- Perform these duties while testing the structure and operating procedures of its early-entry module that deploys in support of ARCENT in case of a contingency.

The unit phased three rotations of soldiers into theater to man the command-and-control cell. Each rotation included regular Army officers and enlisted soldiers and reservists on 21-day (or longer) orders. The rotations reflected the Total Army concept that embodies the ENCOM itself. Each rotation with its mix of Active and Reserve Component soldiers blended the experience of active soldiers with the technical skills of part-time unit members. Rotations were structured around anticipated missions and the skills required at important junctures of the exercise, while taking into consideration the transportation constraints of a deployment halfway across the world.

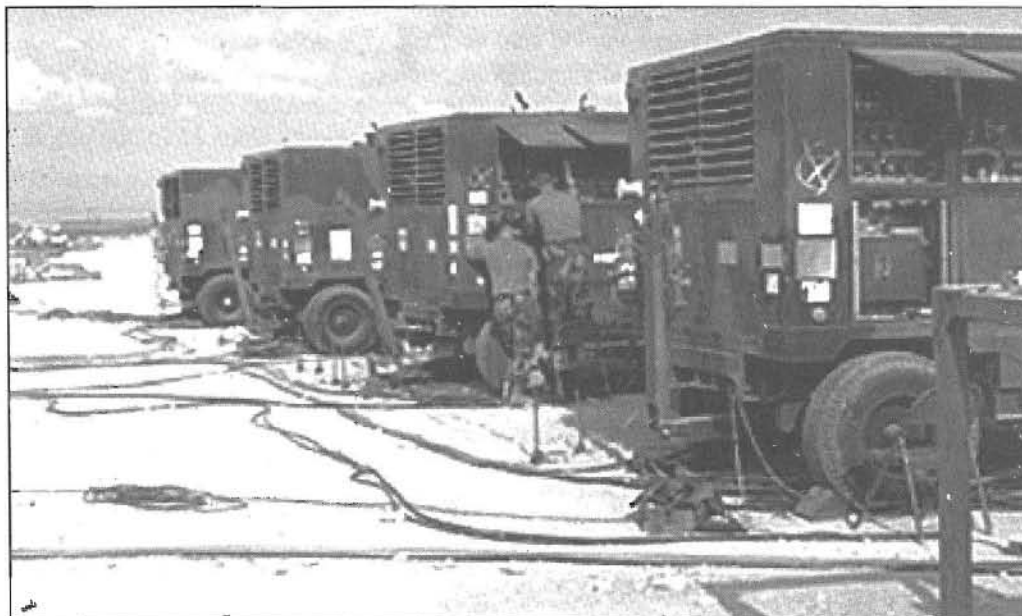
At the exercise site, the ENCOM staff focused on what an engineer headquarters does best: identifying engineer requirements, assigning work, monitoring the progress, performing quality control, and solving problems. Its main tasks were to provide assistance to the engineer units in the reception,

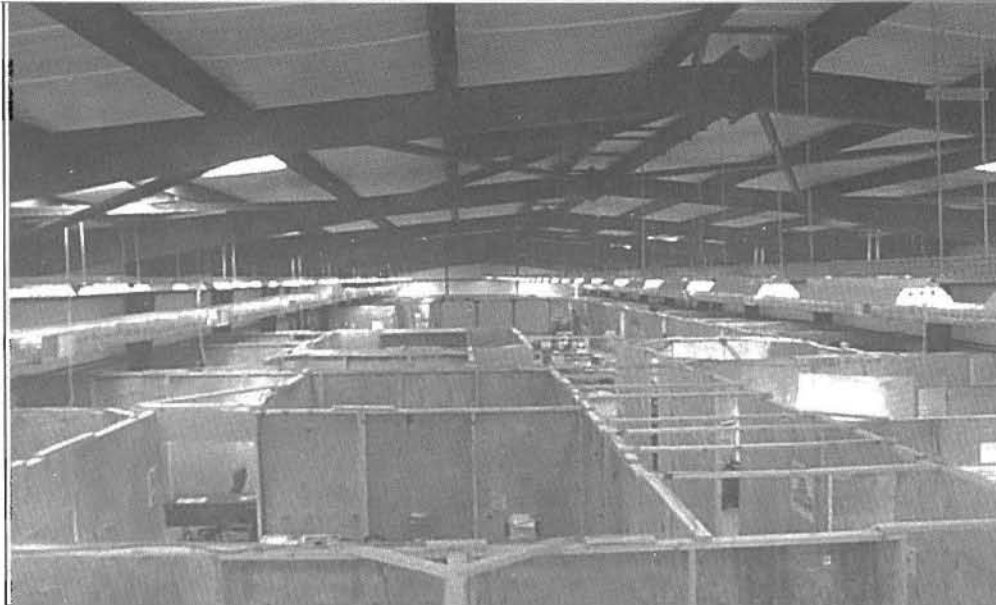
staging, onward movement, and integration of personnel and equipment; coordinate and prioritize construction effort during the buildup and sustainment stages; and coordinate the orderly closeout of engineer activities and the installation before redeployment. The cell of three officers and two or three NCOs was constantly in the field inspecting progress, coordinating support, and preparing for the next phase of infrastructure development. The austere communications capabilities, especially during the startup and base-development stages, made direct contact with units necessary to meet the changing conditions and to rapidly complete projects for arriving soldiers.

To track and control the operation, a master list of requirements and projects was developed before departing from CONUS. This list was the baseline for all activities. At the exercise site, the ENCOM became the single point of contact for all new support requests. Units and deploying headquarters, including other services and coalition partners, were instructed to submit work and support requests through the ENCOM cell. The liaison officer stationed with the 377th TSC became the point of contact for most TSC requests, which were tracked through an Access database. At daily status meetings attended by representatives from subordinate engineer units and the supported headquarters, priorities were assigned, progress tracked, and work integrated into each unit's schedule. This meeting gave staffs an opportunity to raise issues, disseminate important information, and put out fires. Additionally, each unit submitted daily situation reports, which were consolidated and forwarded appropriately. The ENCOM now had a valuable electronic record of Bright Star 99/00 activities.

An added benefit of the exercise was recording and evaluating some of the field-expedient structures fabricated and used by participating units. Valuable data was gathered on

Soldiers from the 249th Engineer Battalion, Fort Bragg, work continuously to keep the lights running during Bright Star 99/00.





Typical view of the interior partitions and finish of the exercise control building used by the major participants of Bright Star 99/00. Panels and electrical wire were completed by the 92d Engineer Battalion (C)(H).

desert theater-of-operation structures that were constructed under conditions that might apply in other situations. (The 416th ENCOM, in conjunction with the Engineer School at Fort Leonard Wood and the Huntsville Division of the Corps of Engineers, continuously upgrades its database of theater-specific structures in the Theater Construction Management System program.)

92d Engineer Battalion Mission

The battalion received notice to participate in Bright Star 99/00 in February 1999. During a series of planning meetings and site surveys, it became apparent that Bright Star would provide an excellent opportunity to train and evaluate most of the battalion's METL tasks. Unlike typical exercises that almost exclusively emphasize horizontal or vertical skills, this deployment provided a good balance of carpentry, electrical, and interior finish work along with ample dozer/blade, line haul, and other horizontal tasks.

Having time to train was important to the battalion commander. The 92d was OPCON to the 416th ENCOM, but when the ENCOM's base-development mission could not keep the entire unit occupied, the battalion staff was ready with plans to meet its own training and readiness objectives. The staff took advantage of every available training opportunity. Although significant effort was required during the initial setup stages of the exercise, once the exercise platform was in place, there were many opportunities for unit-directed training. This included honing both special staff skills and combat engineer skills through the support of the 3d Infantry Division's field-training-exercise operations.

By the time the exercise was completed, the battalion had built more than 25 miles of force-protection berm, reconstructed an old ammunition supply point (ASP), and developed a new open-storage ASP for coalition forces. It cleaned up and made functional the water system for the tracked-vehicle wash rack, assembled more than 210 wooden field latrines that had been prefabricated at home station, and wired and partitioned more than 40,000 square feet of exercise area. It constructed countless guard shacks, guard towers, tables,

tent floors, and shelves; spread more than 4,000 cubic meters of gravel in parking lots and other vehicle storage areas; and dug more than 35 tracked-vehicle positions for the 3d Infantry Division.

The 92d operated an efficient Class IV yard and, when the exercise was over, the battalion collected, inventoried, and warehoused the majority of these items for future use. The projects required 191,000 square feet of plywood, a ton of nails, and 71 miles of interior wire. The tasks were accomplished with no major accidents or injuries and an equipment availability rate well above 80 percent.

249th Engineer Battalion Mission

1st Platoon, Company B, 249th Engineer Battalion (Prime Power), is stationed at Fort Bragg, while the battalion is headquartered at Fort Belvoir, Virginia. The platoon was involved in the exercise planning from the beginning. Using site surveys and after-action reviews from past exercises, 249th personnel decided to deploy four 750-kilowatt generators to support the main camp grid and two 500-kilowatt generators as a dedicated power source for lights and air conditioning for the main exercise buildings and the Sensitive Compartmented Information Facility. This translates into a capability of producing enough electricity to support a town of 10,000 people.

A team of one warrant officer and 10 sergeants designed the grids, laid cable, located transformers and breaker boxes, and prepared the plants for operations. The team installed more than 44,000 feet of high-voltage cable and 14 transformers, which provided power from three generators serving more than 2,000 customers. The 249th provided uninterrupted power for 45 days with no equipment-induced electrical outages to the 110/208 grid while pulling all scheduled services. There were no work-related injuries.

The prime power battalion is the only one of its type. Assigned directly to the U.S. Army Corps of Engineers, it is generally deployed to support disaster relief or in an advisory role to operations in locations such as the Balkans. There, the unit's technical expertise is used to maintain host-nation

assets. Exercises of the magnitude and scope of Bright Star are rare and pose unique challenges for soldiers of the 249th. For example, the soldiers are seldom asked to incorporate different configurations of distribution systems as they were during Bright Star 99/00. And seldom do they have an opportunity to perform and train on so many individual and collective skills. By the deployment's end, the squad had trained and validated 95 percent of its METL squad.

100th Engineer Company Mission

Part of the 30th Engineer Battalion (Topo), Fort Bragg, the 100th Engineer Company (Topo) was the only engineer unit assigned to the 416th ENCOM that was not associated with the facilities support mission. A combat topographic company, the 100th deployed to Bright Star 99/00 with a seven-person terrain-analysis squad and its heavy print-plant squad.

Assigned to the ENCOM for administrative and logistics support, the 100th was directly tasked by the ARCENT G2. The terrain-analysis team set up operations near its customers within the ARCENT headquarters. Using digital data and satellite imagery supplied by the National Imagery and Mapping Agency (NIMA), the team built and reproduced numerous map products and other tactical decision-making aides. Major projects completed during the exercise were maps showing the training areas and ranges, a special two-map set of navigational aids for the aviation units, special obstacle maps for the exercise, and 14 other special maps. This effort translated into 1,400 man-hours of work that produced maps consuming more than 1,300 linear feet of map paper.

The heavy print-plant section included seven soldiers and a field bulk-production plant consisting of three vans and an associated support trailer. The crew, which received assignments through the ARCENT G2, completed bulk runs of special maps produced for a specific phase of the exercise and stock maps from the NIMA inventory. In 105 operational hours, the print plant produced 9,000 map sheets and distributed more than 5,000 of them to soldiers in the field. The project allowed evaluation of all of the team's major METL tasks.

Bright Star 99/00 was an excellent training vehicle for the terrain-analysis team. Being a very specialized organization, the skills are hard to train and often overlooked at home station. This deployment allowed team leaders to instruct, evaluate, and reinforce the skills needed by their soldiers. For the new and inexperienced unit members, this was especially valuable because it was the first opportunity to apply perishable 81-series military occupational specialty skills learned at advanced individual training.

The efforts of these two squads proved that even in this age of digital technology, organizations like the 100th are still required. During deployments, soldiers on the battlefield will always need paper map products, because nothing beats

their detail and resolution. And nothing beats the capability of field topographic units to provide the broadest dissemination of terrain intelligence.

Lessons Learned

Exercises are great opportunities to learn and train. They require much of the same detailed planning effort as tactical deployments but are executed at a pace more conducive to training, learning, experimentation, and trial and error. The engineer organizations participating in Bright Star 99/00 came away with a better understanding of their strengths and weakness, the status of their METL proficiency, and the direction needed for improvement.

In austere environments like Egypt, if you don't plan for it before deployment, you may have to do without it. In the Third World, westerners cannot count on having access to supplies and services in the quantities an exercise like Bright Star may require. Predeployment site surveys and planning conferences help ensure that critical items of support are available to meet mission demands.

Engineers must be given sufficient priority for available air- and sealift at the beginning of the exercise. Having engineer units on the ground as early as possible with the right equipment and soldier skills ensures that satisfactory infrastructure is in place before the main body of the exercise arrives.

Engineers must lead the way in anticipating, identifying, and planning support to other exercise participants. Many units were unable to adequately identify their support requirements or were very late in submitting these requests. Developing a database of common support tasks at the Army and ENCOM levels saves countless hours of coordination and planning and provides better preparation for future exercises with similar force mixes.

Conclusion

Participation in Bright Star 99/00 was a success for all engineers involved. The exercise mission, force structure, and austere desert conditions provided an excellent environment for all levels of command to train, test, and evaluate unit readiness. Across the board, engineer participants were satisfied that their time was well spent and that the experiences and lessons taken from the exercise will be drawn upon for years to come.



Lieutenant Colonel Yanik is an Active Guard Reserve officer serving as a senior team leader, 416th ENCOM Forward Cell, Fort McPherson, Georgia. Previous assignments include service with Third U.S. Army; FORSCOM; the U.S. Army Reserve Command; 412th ENCOM Forward, Heidelberg, Germany; 104th Division (IT); 70th Regional Support Command; and CJTF-Kuwait. LTC Yanik holds a bachelor of science degree in civil engineering from Lafayette College, Easton, Pennsylvania, and is a graduate of the Engineer Officer Advanced Course and Command and General Staff College.



Engineers Keep the Peace in Kosovo

By First Lieutenant Paul C. Stephenson

In July 1999, the Assault and Obstacle Platoon, Bravo Company, 9th Engineer Battalion (Combat), transitioned from traditional engineer missions to peacekeeping operations in the city of Gnjilane, the capital of Eastern Kosovo. The platoon initially occupied a schoolhouse but later moved to the main post office and medical clinic in downtown Gnjilane (see Figure 1). The mission was to provide security and stability to the city's northern sector according to the Military Technical Agreement (MTA). Signed in June 1999 by both Serbian and Kosovar Albanian leaders, the MTA outlined the withdrawal of Serbian forces from Kosovo and the demilitarization of the Kosovo Liberation Army (KLA). The platoon's duties in Gnjilane included dismounted patrols, checkpoint operations, and building searches. The platoon also ensured free access for both Kosovar Albanians and Kosovar Serbs at the clinic and post office. This article describes how the platoon conducted its operations and discusses lessons the platoon learned during its stay in Gnjilane.

Gnjilane

The largest city in Eastern Kosovo, Gnjilane serves as the cultural and economic center of the region. The prewar estimated population of the city was about 50,000. The ethnic breakdown among the population before the war was about 71 percent Kosovar Albanians and 23 percent Kosovar Serbs. In addition, Gnjilane was home to small

Gypsy, Turkish, Montenegrin, and Croatian communities that accounted for 6 percent of the population. The majority of the factories and businesses in Gnjilane catered to the region's agricultural industry.

The Threat

In June 1999, marines from the 26th Marine Expeditionary Unit occupied Gnjilane. During the first few weeks, daily shootings between Kosovar Serbs and Albanians resulted in several casualties. On a few occasions, marines were caught in the crossfire. In addition, house fires set by arsonists occurred on a daily basis.

By the time Bravo Company, 9th Engineer Battalion, relieved the 26th in northern Gnjilane, much of the shootings and fires had subsided. However, the most serious threat to the Assault and Obstacle Platoon was still the possibility of being caught in the middle of aggressive actions between Kosovar Albanians and Kosovar Serbs, who continued to attack each other in direct violation of the MTA. These groups—which included current and former KLA members, KLA sympathizers, organized crime figures, disgruntled Kosovar Serbs, and former Serbian paramilitary—were involved in shootings, arson, home invasions, bombings, and kidnappings. In addition, local Kosovar Albanians committed similar crimes, such as lootings and house burnings, against Gnjilane's Gypsy population in an attempt to force them from their homes. Local

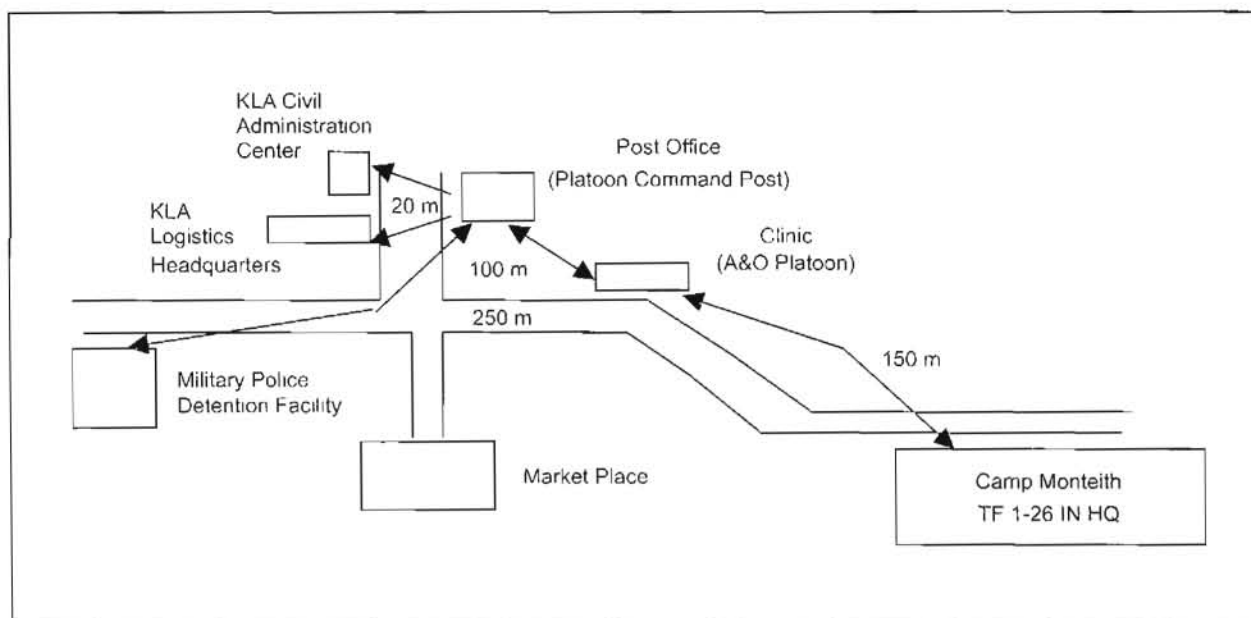


Figure 1. Downtown Gnjilane

Albanians distrusted Gypsies, who were allegedly members of Serbian paramilitary groups and police during the war.

Daily Operations

To minimize the threat against the platoon and to provide stability to the area, we conducted presence operations throughout our sector of Gnjilane. These operations included dismounted patrols, checkpoint operations, and building searches.

Dismounted Patrols

Dismounted patrols consisted of four to seven soldiers. The patrol schedule varied to cover periods of time when house fires and lootings occurred most frequently, which was during the late afternoon and early evening. Manning requirements increased for night patrols to provide more security.

Many soldiers in the platoon had not conducted patrolling operations since basic training, so the patrols provided a good training opportunity. In addition, the platoon could interact with the population, which was the highlight of the deployment for some soldiers. On patrol they could see the results of the operations—people coming back to their homes, children playing in the streets, and the beginning of the slow rebuilding process.

Checkpoint Operations

Nightly checkpoint operations were conducted at the squad level to enforce curfew. Locations varied among different intersections throughout the sector to avoid developing a pattern. At checkpoints, pedestrians and vehicles were stopped and searched thoroughly. Manning for checkpoints varied from four to eight soldiers with one NCOIC. Search teams

consisted of one or two soldiers to provide security and two-man search teams. Each vehicle or individual without a curfew pass was systematically searched.

Building Searches

The most complicated operation the platoon conducted was building searches. Several factors were taken into consideration to make the searches a success:

- To justify our entry into buildings, probable cause must be established.
- To determine entry/exit routes and security needs, a thorough reconnaissance of the buildings was required.
- Based on information collected during the reconnaissance, a search plan was created and briefed. The plan included the security team and building-search team breakdown, searching methods, and where the entry would take place.

Across the street from our command post at the post office were two unauthorized KLA buildings—a logistics headquarters and a civil administration center. The platoon was to search these buildings for illegal activity. Several days before the search, the platoon conducted detailed surveillance of the buildings. Sketches were made of the buildings, and persons entering and exiting were tracked to determine when the building was least occupied. During the surveillance, several uniformed KLA members regularly entered and exited the buildings. In addition, we noticed antennas on the roofs and communications wire between the two buildings. Both the uniformed KLA members and the communications equipment were indications that KLA command-and-control activity may have been occurring inside. The platoon's surveillance of the buildings also included a thorough reconnaissance on each side of the buildings by two three-man teams.

After the reconnaissance, search teams were formed to execute the mission. The platoon was divided into security elements, search elements, and a command-and-control element. The search elements acted as assault elements while security elements acted as support. Security elements, which consisted of two-man teams, were placed along likely escape routes. Security teams were to detain anyone who left the building. A roving search team in the street would provide fire support if required. Search teams were divided into two-man personnel-search teams and two-man room-search teams. Although FM 90-10-1, *An Infantryman's Guide to Combat in Built-Up Areas*, recommends three-man room-search teams, our teams were reduced by one person to increase the number of teams. The command-and-control element consisted of the platoon leader, a radio-telephone operator, and a translator.

The KLA logistics headquarters was the first building the platoon searched (see Figure 2). With security in position, the search teams and the command-and-control element approached the building. When the command-and-control personnel reached the building, they were met by a security guard.

Through the translator, they explained to the guard the nature of their search and determined if there was anyone else in the building. Then they took the guard to a personnel holding area to be searched.

Meanwhile, the room-search teams entered the building and began to search each room methodically from the first floor to the attic. They checked for KLA documentation in desks, filing cabinets, closets, and safes. When they found documentation, they took it to be translated. Any document that mentioned illegal KLA activity was turned over to the command-and-control element. The search teams also searched sheds in the rear courtyard for military equipment, ammunition, and weapons. The security guard was brought back into the building to open doors and answer questions.

The search of the logistics headquarters confirmed our initial suspicions. Although no weapons or ammunition were found, illegal activity was occurring in the building. Besides conducting unauthorized logistical activity, information found on a computer in the building revealed possible KLA criminal activity in the Gnjlilane area. After informing higher headquarters of the results of our initial search, a debriefing team from the task-force intelligence section documented and collected our findings.

While the intelligence section continued the search, the platoon remained on-site to secure the building. The debriefing team confiscated several documents as well as the computer. The KLA logistics director, who arrived after the search began, and the security guard were detained and transported to the military police detention facility.

Lessons Learned

The platoon learned the following lessons during these operations:

Security, Security, Security

All of our operations occurred in heavily populated areas. While the threat level was low after the first few weeks, there was always the possibility of an attack. To protect against possible threats, a security man or team overwatched during all operations. Whether stopping cars at checkpoints or searching buildings, security remained the top priority.

Command and Control

FM 90-10-1 states that in military operations in urban terrain (MOUT), small-unit leaders must have the initiative, skill, and courage to accomplish missions while isolated from their units. During our patrols and checkpoint operations, squad

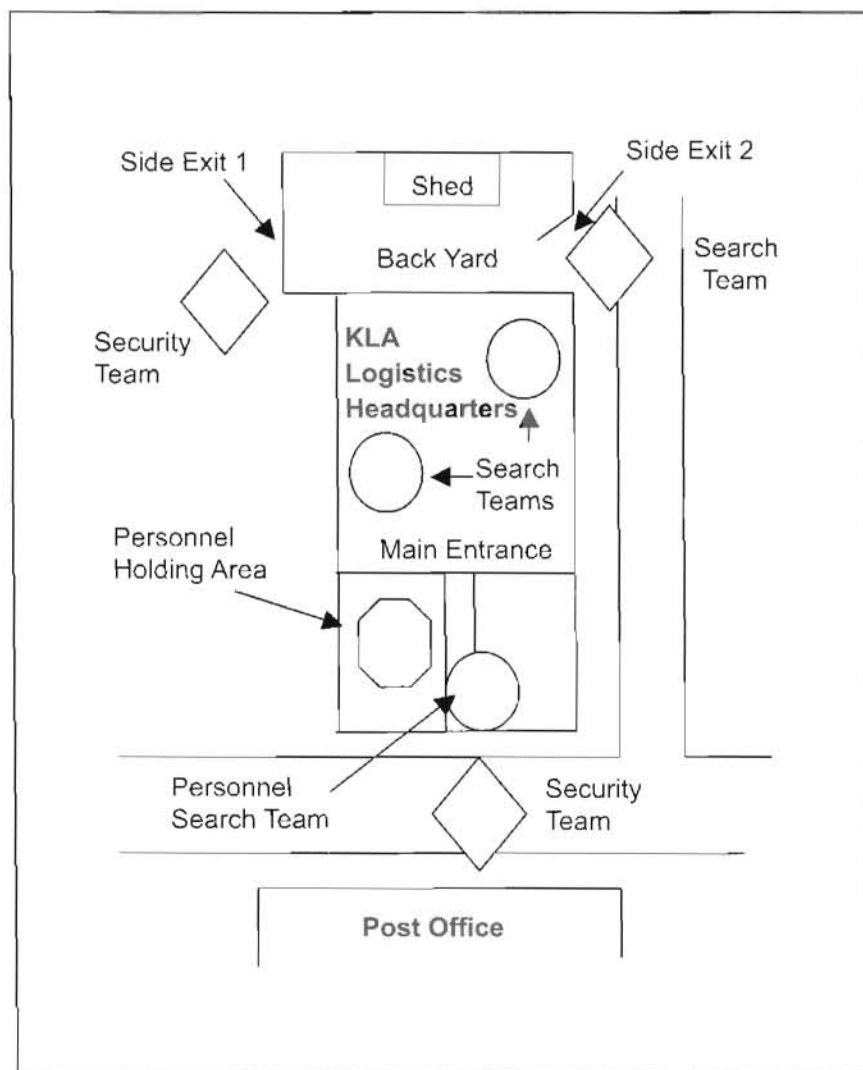


Figure 2. Building Search

leaders—and in some cases junior NCOs—were the senior leaders on the ground. To ensure that patrols and checkpoint operations were conducted to standard, a thorough mission brief and precombat inspections and checks were essential. We ensured that there was time set aside to go over every aspect of the patrol and to conduct back briefs and rehearsals. Before every patrol, leaders briefed their squads on mission objectives, contingency plans, etc.

Essential Equipment

The table below lists equipment that was useful during operations in Gnjilane. Premade plastic handcuffs called flex cuffs, which are easy to handle and reusable, were invaluable during building searches and checkpoint operations. All soldiers had to do was place a detainee's hands in the cuffs and ratchet the straps down. A release mechanism in the cuffs allowed them to be reused.

Night-vision-goggle (NVG) helmet mounts also were useful during night patrols. The mounts freed soldiers' hands, allowing them to maintain better control of their weapons. Instead of having to raise and lower NVGs hanging around their necks, soldiers flipped their NVGs down from their helmets for quick use.

One piece of equipment the platoon wished for was AN/PRC-127 radios, because they needed radios with good range and the ability to recharge for internal communications. The German-made handheld radios we used had poor range and required eight AA batteries that lasted from 24 to 48 hours. AN/PRC-127s would have been a reliable secondary means of communication in case our portable Single-Channel



Logistics Building

Ground-to-Air Radio System (SINCGARS) manpacks malfunctioned.

Systematic Approach to Searches

Before a search, discuss how it will be conducted and then rehearse to improve efficiency. For example, discuss which end of a vehicle or which floor of a building will be searched first. With personnel searches, practice search techniques so no part of the person is left unsearched. Finally, use the same soldiers to conduct searches to improve efficiency. Once teams

Mission-Essential Equipment

Item Name	National Stock Number
NVG Helmet Mount	5855-01-421-7691 5855-01-441-0401
Ranger Vest	8470-00-V22-1301 8470-00-V22-1302
Flex Cuffs	Local Purchase
AN/PRC-127	5820-01-438-7852 (Receiver) 6140-01-438-7852 (Rechargeable Battery) 6130-01-274-0839 (Battery Charger) 5905-01-274-5016 (Hand Mike)
Camel Back	8465-01-396-9917
Large Flashlight	Local Purchase
Chem Light	6260-01-195-9753 (Orange) 6260-01-074-4229 (Green) 6260-01-074-4230 (Yellow) 6260-01-178-5559 (Red) 6260-01-178-5360 (Blue)
Digital Camera	Local Purchase

The Engineer Writer's Guide

We think engineers take a special pride in their profession, and *Engineer* is always looking for articles from readers who want to share their expertise, experience, and ideas.

If you are a potential contributing writer, here are a few "writer's guide" tips to steer you in the right direction.

Articles may discuss engineer training, operations, doctrine, equipment, history, or other areas of general interest to an engineer readership.

We're especially interested in articles that have a "how-to-do-it-better" theme. For instance, we're not looking for articles telling readers how you conducted a routine field exercise. But if you think you have a "new-and-improved" way of conducting a tactical operation, training exercise, or other operational procedure that may prove helpful to other engineers, that's what we need.

Articles should generally come from contributors with firsthand experience of the subject being presented. Articles should be concise, straightforward, and in the active voice.

Length should range from 2,000 to 4,000 words, and text should be double-spaced. Generally, each such page should contain from 200 to 250 words. Manuscripts should be originals or clear copies. Provide a 3 1/2-inch disk in Microsoft Word, Rich Text Format, or ASCII (please indicate word-processing format on disk or cover letter). You also may send articles by e-mail to bridgess@wood.army.mil.

Articles containing attributable information or

quotations not referenced in the story should carry appropriate endnotes.

Contributors are encouraged to include black-and-white or color photos, artwork, and/or line diagrams that illustrate information in the article. Include captions for any photographs submitted. Hard-copy photos are preferred, but we will accept digital images originally saved at a resolution no lower than 200 dpi. Please do not include them in the text. If you use PowerPoint, save each illustration as a separate file and avoid excessive use of color and shading. Please do not send photos embedded in PowerPoint.

Include your full name, rank, current unit, and job title. Also include a list of your past assignments, experience, and education; your mailing address; and a fax number and commercial daytime phone number.

Reviews of books on engineer topics are also welcome.

Articles or book reviews may be mailed to: Editor, Engineer Professional Bulletin, 320 Engineer Loop, Suite 210, Fort Leonard Wood, Missouri 65473-8929.

All submissions are subject to editing.

If you have questions about an article you're working on—or considering writing—call Shirley Bridges or Lynne Sparks, at DSN 676-4104, or commercial (573) 563-4104. We look forward to hearing from you.

Note: Due to the limited space per issue, we will not print articles that have been accepted for publication by other Army professional bulletins.

are trained, rotate other soldiers to gain experience. During the first week in Gnjlane, we learned that the situation on the street can be very fluid. Using systematic approaches and practices allows soldiers to concentrate on a search while remaining aware of the changing situation around them.

Winning With Civilians

Develop a positive relationship with local civilians during the initial occupation phase. When we arrived at the post office and clinic, we established a strong presence in the neighborhoods. The intent was to let the people know we were there to provide stability and security to the area. To accomplish this, we held meetings with local leaders and the people. As a result, they became our eyes and ears and often came to us to report fires and suspected looting.

Maps

The normal scale of 1:25,000 and 1:50,000 on military maps will not suffice in a MOUT environment. Military maps of Gnjlane only showed the main routes, so the platoon used "tourist maps" of the city. The large-scale maps, which were obtained through the help of civil affairs, showed every street

in our sector. Since patrols were unable to give grid locations using the city maps, the squad took a pluggie along in case a grid was required on their location.

Conclusion

As the platoon became more proficient with peace-keeping operations, we began to fine-tune our techniques. Conducting presence operations gave NCOs and soldiers an opportunity to learn and practice search techniques on personnel, vehicles, and buildings. In the process, squad leaders and junior leaders learned valuable lessons that they will carry with them throughout their careers. 

First Lieutenant Stephenson is the Assault and Obstacle Platoon leader for Bravo Company, 9th Engineer Battalion (CBT), in Schweinfurt, Germany. Previous assignments include combat engineer line platoon leader and task-force engineer for Task Force 1-18 Infantry, Camp Able Sentry, Macedonia. 1LT Stephenson holds a degree in environmental policy analysis and planning from the University of California, Davis.

U.S. Army Firefighters

By Sergeant First Class Leroy A. Ward

U.S. Army firefighters make up only a small section of the Corps of Engineers. About 242 active duty military firefighters and 573 in the Reserve Components represent both table of organization and equipment (TOE) and table of distribution and allowance (TDA) assignments.

In today's Army, there are seven active duty TOE fire-fighting detachments, consisting of two to six soldiers, and 25 Army Reserve and National Guard TOE fire-fighting units, consisting of six to 30 soldiers. Many soldiers and leaders are unaware of the existence of these detachments and the services they provide. This article gives a brief overview of the organization, training, and role of Army military occupational specialty (MOS) 51M firefighters and fire-fighting units.

Missions

Army firefighters provide fire-fighting services, including fire protection and fire prevention, to theaters of operation. During deployments, firefighters are task organized—usually as general support (GS)—to the joint task force, who in turn makes them GS to the supported unit. Although they are GS due to their uniqueness, these fire-fighting teams require mess, maintenance, logistical, and administrative assistance from the supported unit. Firefighters have three primary missions:

Aircraft Crash/Rescue Fire Fighting

This is firefighters' most demanding mission and involves aircraft or ground vehicles that are burning or have crashed. Firefighters must be familiar with basic safety procedures of all U.S. aircraft. Although the emphasis is geared toward rotary-wing aviation assets, firefighters must also be familiar with fixed-wing aircraft.

Structural Fire Fighting

This mission encompasses burning of static objects, such as tents, houses, barns, and other buildings. Fire-fighting teams require skilled technical training so they can quickly execute fire-fighting "battle drills." These include connecting fire trucks to hydrants, venting buildings, and searching for victims in smoke-filled buildings.

Fire Prevention

This task includes taking active and passive measures to prevent fires from occurring. Active measures, which include

building inspections, generally are left to sergeants and above. Passive measures are encouraged by all firefighters through public relations and safety programs.

Responsibilities

Firefighters support two general types of units or customers. The first is U.S. Army or Air Force aviation assets. Most aircraft use a more flammable fuel than ground vehicles and require additional attention during fueling and defueling operations. Attack aircraft are twice as dangerous, since onboard fuel has the capability of detonating ordnance on the aircraft.

The second type of customer is units that live in a large collection of tents or base camps. The tendency to erect tents close together and the propensity of canvas and wood to burn creates a risk to occupying soldiers. Army firefighters work with unit or installation safety offices to provide and enforce fire-prevention guidelines for these temporary shelters.

Army firefighters are not limited to these customers during combat operations. Other tasks may include providing aid to host-nation fire departments and protecting



U.S. Army firefighters enter a smoke-filled building.

ammunition storage points; petroleum, oil and lubricant (packaged and bulk) storage points; motor pools; and internment/dislocated-civilian camps.

Types of Units

Army firefighters are organized into two types of detachments: headquarters (LA) and fire-fighting (LB). These detachments may be task organized based on the size of the area to be covered, the number of vehicles or aircraft that require protection, and the availability of other military firefighters (Air Force or Navy).

LA Detachment

This detachment serves as the command-and-control function for three to five other detachments. The four-soldier team consists of an MOS 21B fire marshal (a first lieutenant), an MOS 51M40 fire chief (a sergeant first class), an MOS 51M30 fire inspector (a staff sergeant), and an MOS 63B10 mechanic. Equipment for the LA detachment includes two HMMWVs and assorted radios for establishing a base station. Missions are to—

- Plan fire-fighting programs and area fire protection.
- Exercise command and control during rescue and fire-fighting operations.
- Conduct fire-prevention operations, to include determining building classification and conducting installation-level inspections.
- Develop plans for handling hazardous-material emergencies.
- Conduct initial fire-ground investigations.
- Conduct fire department unit maintenance operations for technical fire-fighting equipment not provided during deployment from local support maintenance activities.



Firefighters extinguish a burning fuel spill.



Firefighters inspect their self-contained breathing apparatus gear.

LB Detachment

The core of the fire-fighting team, these detachments consist of an MOS 51M30 team chief (a staff sergeant), an MOS 51M20 crash rescue sergeant, two MOS 51M10 crash rescue specialists, and three MOS 51M10 driver/operators. LB detachments operate the fire-fighting equipment, which includes a fire truck, a water truck, self-contained breathing apparatus, a hydraulic jaws set, and crash kits. They provide 24-hour fire protection and personnel rescue support, administer timely and adequate first aid, and implement a fire prevention program(s) for—

- Life-support areas.
- Intermediate staging bases.
- Forward-operating bases.
- Petroleum, oil, and lubricant tank farms and distribution sites; open and closed warehouse facilities; or general depots.
- Enemy prisoner of war and civilian internment camps.

MOS Training

Army firefighters begin their military careers with basic training at Fort Leonard Wood, Missouri. When they graduate, they are transferred to Louis F. Garland Fire Academy, Goodfellow Air Force Base, Texas, which is the home of fire-protection training for the entire Department of Defense. Here, firefighters attend advanced individual training (AIT) for the 51M MOS. Operated by the Air Force, this joint service school has 125 multiservice and civilian instructors. Training provided by the academy complies with the National Fire Protection Association (NFPA) standards. Soldiers, airmen, marines, and sailors train together for 13 weeks on individual and crew drills. Trainees must maintain the TRADOC academic standard of 70 percent but also must

pass several physically demanding tasks, as well as standardized written and performance evaluations, to graduate. After completing AIT, soldiers are NFPA certified at the *Firefighter II*, *Airport Firefighter*, and *Hazardous Materials* operational levels.

Career progression for firefighters is unique. They are trained and nationally certified as firefighters in MOS 51M through the grade of E7. When they are promoted to master sergeant/E8, they leave this MOS and change to MOS 51Z general engineering supervisor, where they are involved with other engineer specialties not normally associated with fire fighting.

Certifications

Department of Defense manual 6055.6-M, *Fire and Emergency Services Certification Program*, is a component of a national certification system for firefighters and others in the fire-protection career field (fire fighting and rescue, fire-department management, training, inspections, etc.). The Firefighter Certification System is accredited by the International Fire Service Accreditation Congress (IFSAC). The certification program is mandatory for all Department of Defense firefighters—military, civilian, and contractors. Certification requirements are governed by the applicable NFPA standards. These standards prescribe precisely what must be done for certification at each level.

Certification may be obtained by completing correspondence courses (called career-development courses) combined with performance tests, resident training schools (such as state and local fire academies and the Louis F. Garland Fire Academy) accredited by IFSAC or the National Professional Qualifications Board, and other training that is *proven* to be equivalent to that required by the NFPA. The Air Force Civil Engineer Support Agency, Contingency Support Directorate, Tyndall Air Force Base, Florida, manages and administers this program.

Military firefighters depend on federal and state training facilities to provide instruction on various skills. The two major training resources to test fire-fighting skills are a *smokehouse* and a *burn pit*. A smokehouse is a building vented with ducts to produce a blanket of smoke within the building. Soldiers are required to enter the building and rescue any personnel found inside. A burn pit is a concrete bowl with a special drain system in which objects can be set afire. Firefighters use a combination of water and foam to extinguish burning vehicles and aircraft. The special drain system in the bottom of the pit separates the water and foam so each can be recycled. Performing these two training events is equivalent to a combat arms unit live-fire exercise.

Army fire-fighting units maximize the use of these training facilities for their soldiers, who rarely attend specialty training such as Airborne or Air Assault School. Some



Wearing protective gear, firefighters inspect a burned-out helicopter.

colleges offer an associate degree in fire science, which is an excellent resource for building a competent fire-fighting unit. Although this training is expensive, soldiers benefit from being trained by subject-matter experts and receiving hands-on training with live-fire burnings.

Summary

Soldiers and leaders face several challenges concerning firefighters in TO&E units. Leaders must balance military requirements and fire-fighting certification requirements. It is difficult to schedule qualification ranges or mandatory classes while soldiers are working day-on/day-off rotations. Career soldiers must maintain all required engineering skills. Staff sergeants must work hard to retain their engineer-specific skills, such as construction and bridging, to complete the Basic and Advanced Noncommissioned Officer Courses.

The presence of military fire-fighting detachments in theaters of operation is not commonly known or understood, but firefighters play a critical role there. In addition to their primary missions, firefighters provide benefits to all soldiers, since they also receive lifesaving training. Commanders must take active steps to include these detachments in their companies and battalions and help make the theater safer for all personnel.

Sergeant First Class Ward is a senior firefighter observer-controller/trainer with the Engineer Training Support Battalion, Fort Lewis, Washington. Previous assignments include the 89th Engineer Detachment (FF) Fort Bragg, North Carolina; Fort Wainwright Fire and Emergency Services, Fort Wainwright, Alaska; and Directorate of Combat Developments and Directorate of Training, U.S. Army Engineer School, Fort Leonard Wood, Missouri.



Keeping the Mechanized Engineer Rolling

By First Lieutenant Don A. Nestor

The short-notice deployment of Bravo Company, 9th Engineer Battalion (Combat), to the Balkans in June 1999 presented numerous maintenance challenges for mechanized combat engineers. This article describes how a company executive officer addresses, manages, and attacks the mission of keeping mechanized engineers rolling. It also identifies some of the problems encountered when deploying a company and its equipment to a new area of operation before a forward support battalion (FSB) arrives.

Missions

With only five day's notice, Bravo Company transitioned from a 10-day, high-intensity rotation at the Combat Maneuver Training Center in Hohenfels, Germany, to a six-month peacekeeping deployment to Kosovo. As one of the first engineer units

from the 1st Infantry Division to arrive in Kosovo, its work began immediately as the company helped lay the groundwork for the U.S. area of responsibility. Missions included road marches, mounted and dismounted patrols, berm construction, force-protection construction, and civilian convoy escorts.

During the first six weeks of deployment, the company compiled more than a year's worth of miles (600) on its vehicles and equipment. The high operating tempo (OPTEMPO) and constant vehicle use cost more than \$300,000 for Class IX repair parts in less than two months.

Key to Success

Department of the Army Pamphlet 710-2-1, *Using Unit Supply Systems*, defines the prescribed load list (PLL) and describes procedures for managing it. The pamphlet states that a PLL is kept to support a unit's daily

organizational maintenance operations. Normally this is for a prescribed number of days of supply, which depends on the average customer wait time.

The importance of a PLL is not truly realized until a unit must rely solely on its PLL parts to maintain vehicles and equipment. This became clear to Bravo Company during its first 30 to 45 days of deployment. With no full forward support battalion in Kosovo, parts flow was slowed to a trickle. Parts availability was limited to the company's PLL—which provided parts for about 25 days—and the prestocked major assemblies at Camp Able Sentry in Macedonia. PLL management is an important function because, during short-notice deployments, the PLL often must maintain the company for an extended period of time.

A unit's ground PLL is a combination of demand-supported (DS) and command-supported (CS) parts, not to exceed 150

lines. To be stocked as a DS line, a part must be requested at least nine times in a 180-day period. If a part meets this demand requirement, it is automatically added to the PLL. Then, to be retained, it must be requested six times in a 180-day period.

To combat the lack of parts acquired as DS lines, units are allowed to stock up to 15 CS lines. Battalion commanders must approve these lines in writing before they can be added to the PLL. This provides a means of stocking a part that is mission essential even though it does not meet the demand-supported criteria. Units should select CS lines carefully to ensure that necessary wartime stock is on hand for deployments.

Having a maximized PLL before deployment would have benefited Bravo Company tremendously. Due to the nature of its operations, the company's M113A3 armored personnel carriers, M998 high-mobility multipurpose wheeled vehicles (HMMWVs), and 5-ton trucks accrued the most mileage and required the most maintenance. Maintenance personnel observed that the vehicles' tracks and/or suspension sustained a great deal of wear and tear from constant use. However, the OPTEMPO during garrison operations was less than 600 miles over the course of a 180-day period, which did not build the demand history required to maintain a PLL capable of supporting the deployment.

Before deployment, the PLL was limited to 39 lines (24 DS and 15 CS). As a result, many of the track and suspension parts required to repair vehicles were not on hand. This operational constraint made it difficult to maintain vehicles according to -10/20 standards. An increased PLL that included but was not limited to the items in Table 1 would have been a combat multiplier during the initial stages of deployment.

Parts Flow

Although Bravo Company deployed with its Unit-Level Logistics System-Ground computer, the company did not have its original Department of Defense Activity Address

Table 1. Minimum Recommended Deployment PLL

NOUN	NIIN	Vehicle Type
Shock	01-028-8573	M113A3
Generator	01-238-9710	
Track Shoe	00-078-2908	
Road Wheels	01-139-3748	
Idler Wheel (Inner)	01-040-8855	
Idler Wheel (Outer)	00-856-2299	
Sprockets	00-141-1154	
Track Pads	01-130-3366	
Track Adjusters	00-403-6776	
Regulator	00-900-7993	
Fan Tower	01-319-2899	
Cooling Pump	01-320-0530	
Starter	01-188-7438	
U-Joints	01-356-9189	M998
Tire, Pneumatic	01-171-4746	
Parts Kit	01-382-8874	
Wheel Spindle	01-203-5764	
Generator	00-909-2483	
Track Shoe	01-234-1917	M9 ACE
Road Wheels	01-361-1764	
Generator Belt	01-291-5838	
Track Pads	01-156-8105	
Generator	01-264-6542	
Pump, Axial	01-158-4069	
Pulley	01-362-3577	
Starter	00-304-3493	
Generator	01-131-4931	HEMTT
Starter	01-139-3722	
Generator	00-830-6660	AVLB

NIIN = National item identification number

Table 2. Weekly Maintenance Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0800-1600 1st Platoon's Maintenance (B809, B34)	0800-1900 HQ's Maintenance	0800-1600 A&O Platoon Maintenance	0800-1600 1st Platoon's Maintenance (B809-B34)	0800-1900 A&O Platoon's Maintenance		0900-UTC Bridge Maintenance Every Other Week
B1 Maintenance	B6 Maintenance	B801/B809 B255 Maintenance		B66 Maintenance	B7 Maintenance	B3 Maintenance
	1100-Company Maintenance Meeting	1600-Task Force Maintenance Meeting for XO				
	1300-1600- C&E /S&R Turn-In				1300-1600- C&E /S&R Turn-In	

UTC = until complete CE = communications and electronics SR = small-arms repair

Code (DODAAC) from Schweinfurt. Therefore all orders that were not received before deployment were no longer valid and consequently had to be reordered under a new DODAAC in Kosovo. This further prolonged the time it took for the company to receive replacement parts. The 299th FSB deployed to Kosovo about 30 days after the initial units, and the parts flow followed—but not instantaneously.

The great distances between the company, the forward support battalion, the initial staging base (ISB), and the direct-support unit in Germany drastically increased the travel time in the parts flow. When the company ordered a part, the request went to the 299th FSB at the main American base camp. These requests were forwarded to the ISB, which then sent them to the direct-support unit in Germany. Instead of having a direct link between the direct-support unit and the FSB, as in garrison operations in Germany, a third party was established at the ISB. This increased the amount of time between ordering and receiving parts.

Services

Without a deployable battalion service section, the responsibility for conducting vehicle services belonged to the company's maintenance section. The short-notice deployment to Kosovo created a backlog

of five vehicle services originally scheduled for the second and third weeks of June. Overdue services from the home station in Schweinfurt and the OPTEMPO in Kosovo caused vehicles to break the Army's low-usage program. This created additional hours of work for the mechanics. The company developed a service schedule to continue troubleshooting and repairing its vehicles and servicing its equipment. Unfortunately, time could not be allowed for scheduling an entire two-week-block service for platoon vehicles, weapon systems, communications systems, and equipment. Instead, the service schedule permitted one vehicle and its respective equipment to be serviced according to -10/20 standards in a span of one week. The balance between services and troubleshooting vehicles became a major focus and an essential aspect of maintaining the company's fleet.

Split-Base Maintenance

Bravo Company's high OPTEMPO, geographic distance from the 299th FSB, and expanding area of responsibility resulted in split-base operations. With three platoons (two organic and one attached) operating in Bravo Company's sector and the company's fourth platoon attached to another unit, maintenance at the

company level took on a new and difficult form. Initially, 1st Platoon was attached to a light infantry company team. According to the command and support relationship, this company team was supposed to provide 1st Platoon with mechanic support. However, the light infantry mechanics had little or no experience working on tracked vehicles, so the responsibility for troubleshooting and repairing the platoon's vehicles rested on the company's contact team. During the first few weeks of split-base operations, a three-man contact team encountered numerous problems while trying to maintain vehicles in three locations. The complications included the wear and tear sustained by the company's weapon and communications systems.

To overcome problems caused by split-base operations and satisfy operational requirements of individual platoons, a regulated maintenance schedule was developed that provided a balance between maintenance and missions. Table 2 shows a weekly schedule that allowed days for the contact team to travel in sector to the remote company sites and troubleshoot vehicles, weapons, and communications systems. The company also incorporated the 299th FSB's small arms and communications and equipment shops into its weekly maintenance schedule. The schedule



Soldiers from Bravo Company replace the track on an M577 command post vehicle.

provided mechanics with a clear focus of their work and allowed the platoons to address dispatching, small arms, and communications equipment problems.

Lessons Learned

A valuable lesson learned during Bravo Company's deployment to Kosovo was the importance of staying on top of its PLL and ensuring that all lines were either on hand or on order at all times. A robust PLL at the company level would have improved the unit's ability to maintain its fleet to -10/20 standards. Reducing the demand criteria needed to stock a DS line on the PLL would have enhanced

the company's operational readiness rate. An enlarged PLL would have provided parts to repair many of the company's vehicles. Furthermore, having more parts stocked on PLL would have greatly reduced or even eliminated the time required to receive parts during the first 45 days of deployment.

Summary

No one knows when he may receive a mission to deploy a company and its vehicles and equipment with less than a week's notice. Always plan for contingencies. Keeping the mechanized soldier rolling requires that an executive officer be constantly

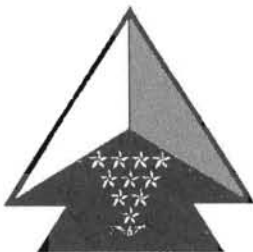
involved in establishing priorities, balancing and managing maintenance assets, and preventing overwork and consequent burnout of mechanics. *Duty, first, maintenance always.*



First Lieutenant Nestor is the executive officer for Bravo Company, 9th Engineer Battalion (Combat). Previous assignments include combat engineer line platoon leader, battalion shop officer, and battalion motor officer. A graduate of the Engineer Officer Basic Course, 1LT Nestor holds a bachelor of science degree in mechanical engineering from the University of Notre Dame.



CTC Notes



Battle Command Training Program (BCTP)

Synchronizing Engineers: Weighting the Main Effort in the Defense

By Lieutenant Colonel Ron Light

"The nature of water is that it avoids heights and hastens to the lowlands. When a dam is broken, the water cascades with irresistible force. Now the shape of an army resembles water. Take advantage of the enemy's unpreparedness; attack him when he does not expect it; avoid his strength and strike his emptiness, and like water, none can oppose you."

Sun Tzu, *The Art of War*

In the offense, doctrine tells us that "commanders attack to avoid the enemy's main strength." It should come as no surprise that the enemy seeks to do the same thing. As Sun Tzu noted, "the enemy flows like water, seeking the path of least resistance." However, sometimes engineers miss this point as they shape the battlefield during the defense. This article briefly reviews what it means to weight engineers in support of the defense.

Before exploring this concept, we must understand an important condition of the battlefield: the enemy is observing our defensive preparations. Wherever we have fought in the past

and wherever we will fight in the future, the enemy is watching. During Warfighter exercises conducted by the Battle Command Training Program, the World Class Opposing Force (WCOPFOR) is adept at inserting special-purpose forces (SPF) throughout friendly forces' areas of operation. The WCOPFOR bases much of its plan on the information these SPF teams report.

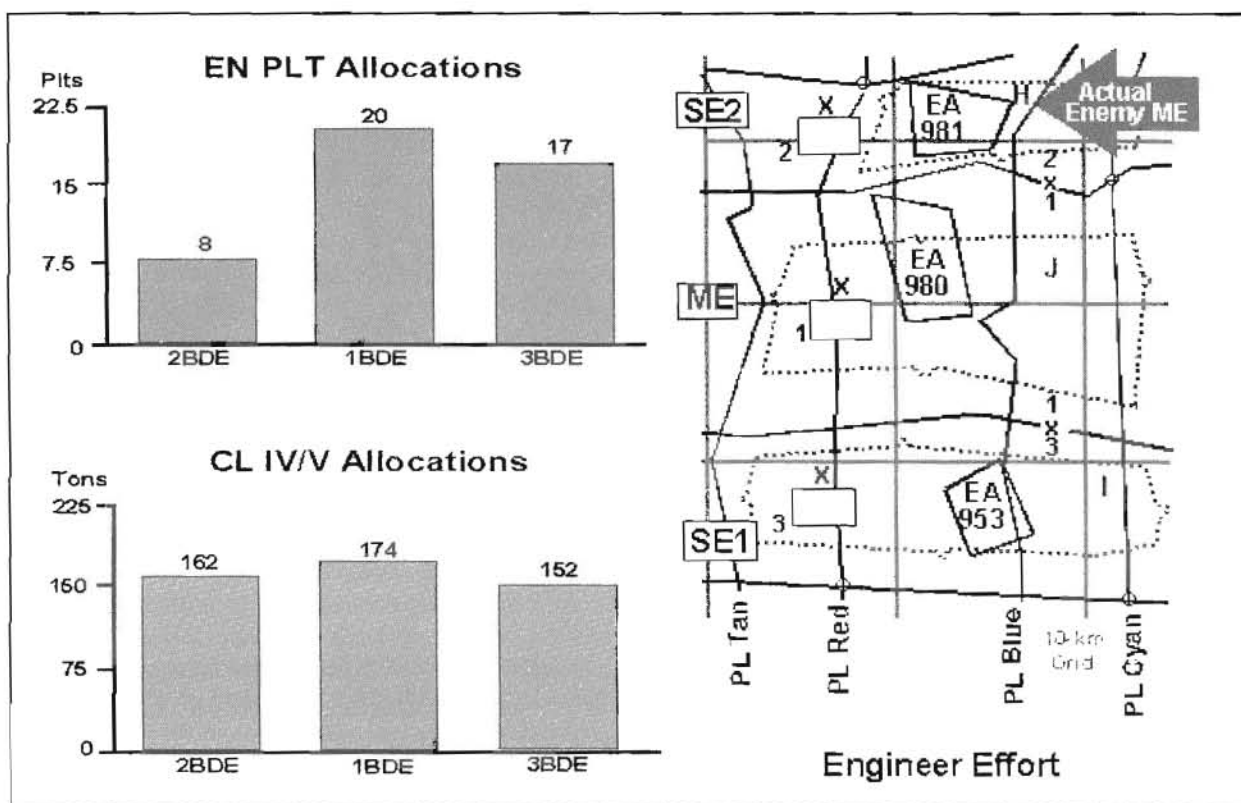
What do the SPF teams report during our preparations for the defense? Just as at the "dirt" combat training centers, the teams look for and report on the activities of friendly engineers. As an engineer once observed during a training rotation at the National Training Center, "Find his bulldozers, and you've found his defense." SPF teams are trained to look for engineers, armored combat earthmovers, and Volcano countermobility systems. With this information, the battlefield calculus to predict where our main defense effort is becomes relatively simple for the WCOPFOR. Simply stated, engineer activity is usually an accurate gauge to predict our main effort.

More often than not, friendly engineers make it far too easy for the WCOPFOR to identify the main effort. In the defense, engineer staffs weight the division's or corps's main effort (the force which will do most of the killing on the battlefield) with engineers. The main effort ends up in a strongpoint defense, and supporting efforts are relatively much weaker. As noted above, two things happen when this occurs. First, WCOPFOR SPF teams see this asset allocation, and they report accordingly. Second, the commander of the WCOPFOR uses this information to plan his attack against our weakness. More often than not, the WCOPFOR correctly reads where the friendly main effort is by identifying where the preponderance of friendly engineers are arrayed on the battlefield—and he attacks elsewhere. The enemy flows like water.

The figure on page 19 illustrates this point. The enemy was known to be attacking from the east. The division designated that 1st Brigade (in the center) was the main effort. This is where the division commander wanted the enemy to go and where he wanted to kill the enemy. In the north, 2d Brigade was a supporting effort, as was the 3d Brigade in the south. Notice, however, where engineers were arrayed on the battlefield. The bar chart in the figure shows that 1st Brigade received most of the engineer assets available: 20 engineer platoons. Moreover, 1st Brigade also received the largest allocation of Class IV/V (obstacle) barrier material: 174 short tons.

Recalling that the enemy is adept at reporting on our defense preparations, where do you suppose he attacked? Seeking to avoid friendly strength (easily read as 1st Brigade), and noting a relative weakness between the two supporting efforts, the enemy attacked into 2d Brigade in the north. The ensuing fight was quick and brutal.

By now it is probably obvious that *weighting engineers in the defense does not usually mean weighting the main effort with engineers*. The enemy will avoid our strength. One of the



primary ways he gauges our strength is by observing where we array engineer forces. We can deceive or mislead the enemy as to where our main effort is by weighting engineers to our supporting efforts.

Of course, we must allocate some countermobility assets to the main effort. Remember, however, that *doctrine urges commanders to mass effects, not necessarily assets*. We can allocate close air support and air Volcano missions to the main effort. These assets allow us to mass countermobility effects in a very short time. Moreover, with planning we can use these assets relatively late during our defensive preparations, when the enemy has less time to react. This technique was used effectively by a unit during a recent Warfighter exercise.

So what does it mean to "weight engineers in support of the defense?" Usually it does not mean making the main effort an impregnable force with all of the division's allocation of mines, wire, and pickets. What it does mean is creating a condition on the battlefield that confuses the enemy and causes him to commit his forces not against what he perceives to be our weakness but against our strength.

Lieutenant Colonel Light is the senior engineer observer/controller for the Battle Command Training Program at Fort Leavenworth, Kansas. He is scheduled to command the Honolulu District, U.S. Army Corps of Engineers, in July 2000.



Joint Readiness Training Center (JRTC)

The Engineer Survivability Execution Matrix

By Sergeant First Class Isaac N. Horton and Sergeant First Class Thomas V. Murray

We have observed a trend at the Joint Readiness Training Center concerning the engineer survivability execution matrix and how it impacts force-protection operations here and ultimately on the modern battlefield. The trend is that units employ the age-old blocked-time survivability execution matrix. This means that rather than conducting a detailed mission analysis, each unit with an established priority is allocated the same amount of time and engineer assets. The result is that the final product we observe routinely fails to adequately address

force-protection requirements, link time and the resources available, and command and control engineer resources that execute force protection in support of the brigade.

The unit encounters many unnecessary challenges in executing these types of matrices and in protecting the force according to the commander's intent. Force-protection levels are not linked to enemy attack probabilities through the engineer battlefield assessment (EBA), and the unit's critical systems do not get the required level of protection. Ultimately, units suffer irreplaceable losses of mission-critical equipment and resources from enemy direct action that could have been prevented.

To be successful on the current lethal battlefield, units must protect critical systems, equipment, and supplies from enemy observation and attack. Units rotating through the JRTC struggle with planning and executing force-protection and survivability operations. This is due to incomplete EBAs and a lack of clearly defined doctrinal procedures for planning these types of operations at brigade level. Engineer company commanders and brigade engineers are doctrinally required to prepare detailed plans for survivability operations and include these plans in the brigade operations order (OPORD).

Technique

A brigade-level technique that engineer units can use to help improve their current system for calculating survivability

requirements and preparing a survivability execution matrix consists of the following three steps:

Step 1: Identify key assets within the brigade.

Although time consuming, this is a simple process that must take place at home station. List battalion-level organizations and major company assets in matrix form. Figure 1 depicts a random selection of command- and-control nodes, weapon systems, and equipment in a typical light infantry brigade against the current task organization or the unit. The requirement matrix is a sample product that units must develop and implement at battalion level and use as the primary tool in calculating survivability requirements.

The construction times shown are not standard across the Army. The time required to construct protective positions varies from unit to unit. This is primarily due to the mission and the type of assets organic to that unit (such as D7 dozers, D5 dozers, deployable universal combat earthmovers [DEUCEs], loaders, small emplacement excavators [SEEs], or armored combat earthmovers [ACEs]) as well as the soil composition. The times should be established by timing—from start to finish, day and night—actual construction of the positions by two or more operators to get an average-time-required planning factor. We suggest that the times be established by using a single blade or single bucket rather than a blade team. Our example uses 15-blade work hours per day as a planning factor.

	Bde C2	Bn C2	Co C2	M9 8	5T/ TPU	5T/ SER	HEM MTT	Inf Pit	105 mm How	Q36/ Q37	Sig C2	MTRS	FARP	VOLCANO	ATLS	ATP	M1A1	M3A3	M88	AVLM	FISTV	155mm How	AVENGER	30KW Gen	5K Tanker	Avvn HELLO	M113A3	Aid Sta	FIST/ FO	Stinger	Dragon	DM/ TOW	ATD	P/ Berm	Misc	Misc	
Time in Minutes	150	120	60	45	60	60	90	120	90	90	120	45	150	90	60	120	150	90	90	90	45	150	30	15	120	90	30	30	15	15	15	45	60 MH	70 MH			
Bde																																					
2-35 Inf																																					
4-4 Inf																																					
1-82 Inf																																					
1-21 Cav																																					
A 1-4 FA																																					
B 1-4 FA																																					
120 FSB																																					
HHC Bde																																					
B 2-45 AR																																					
C 2-45 AR																																					
C 19 Sig																																					
A 22 En																																					
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Figure 1

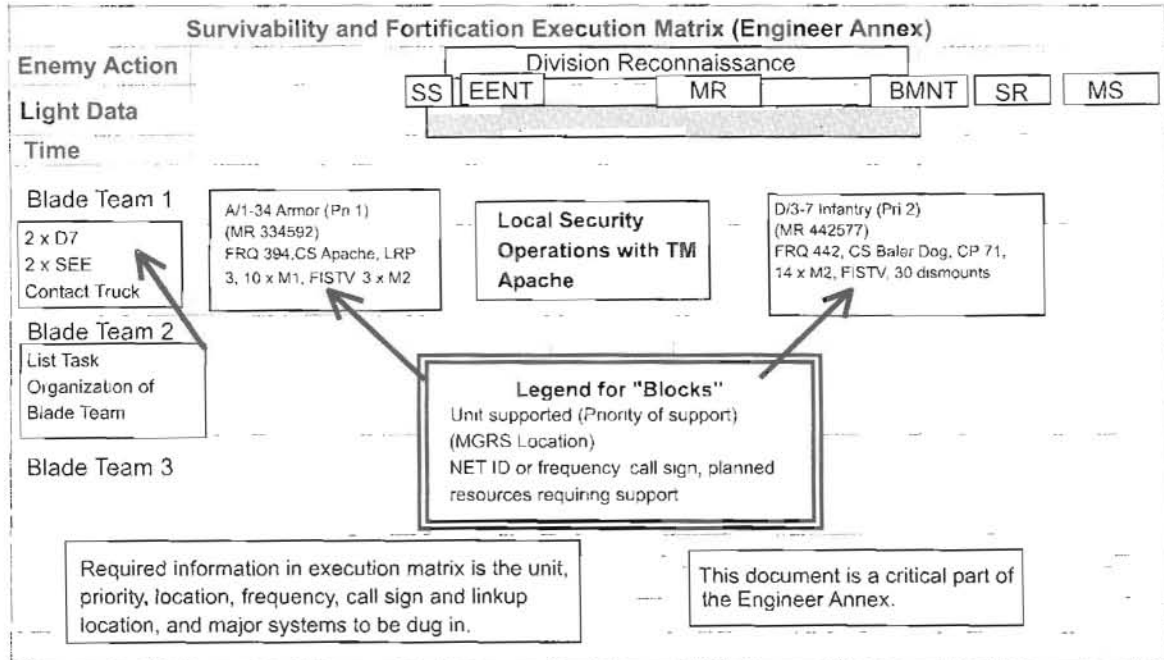


Figure 2

Step 2: Prepare an engineer work estimate.

Record the time available, the number of dozers or SEEs available, and the brigade commander's priority for survivability effort. FM 5-103, *Survivability*, states that maneuver commanders should set survivability priorities based on the engineer's input and recommendation (which is based on an updated and accurate EBA) and mission analysis with the brigade staff. It is at this point that the blocked-time matrix is normally developed. This can be avoided if units have a system for accomplishing the detailed planning necessary for preparing a brigade-level survivability timeline.

Step 3: Prepare the survivability execution timeline.

This timeline (better known as the "missing link") must be a collective effort of the engineer commander, the assistant brigade engineer, and the equipment platoon leader. The document, which is paramount to the engineer annex in the brigade OPORD, is often omitted. This may cause the brigade's force-protection levels to be substandard. Figure 2 depicts the 80 percent solution for a detailed survivability execution timeline. At a minimum, the information in the matrix should include the supported unit, priority, location, frequency and call sign, and work estimate. As stated earlier, the timeline *must* be included in the maneuver brigade and battalion base orders. When properly planned and included in the base order, conflicts can be avoided during execution of the engineer's survivability timeline.

Conclusion

By conducting a comprehensive EBA and implementing this three-step technique, engineer survivability planners communicate the critical path for executing the commander's priorities of force protection. The execution timeline provides the means to command and control survivability operations through time and space based on identification of key assets and the engineer work estimate process. The end result is that blade utilization is maximized in a prioritized and efficient manner. By protecting critical weapon and sustainment systems, the ability to deliver combat power and achieve mission success is dramatically increased. *No idle blades.*

SFC Horton and SFC Murray are observer/controllers at the Joint Readiness Training Center, Fort Polk, Louisiana, where their focus is to teach, coach, and mentor engineer leaders at all levels concerning force-protection and survivability operations on the Army's battlefields.



Sets, Kits, and Outfits:

Bridging, Diving, Lighting, and Fire-Fighting

By Alan Schlie

In the third of four articles on sets, kits, and outfits (SKO), the focus is on bridging, diving, lighting, and fire-fighting tools. The first article discussed tool sets for construction trades. The second article concentrated on pioneering, mine warfare, and demolition tools. The fourth article will feature tools for the technical trades and topography.

Bridging

If you've been around long enough to remember light tactical rafts and the dry span with universal trestles, then you'll be glad to know they've been placed in depot stocks and are used only in the most extreme emergencies. In addition to providing a means for crossing wet and dry gaps, these older bridging sets provided a perfect opportunity for building unit cohesion, teamwork, and esprit de corps.

Engineers have always been expected to bridge gaps without restricting the speed of the maneuvering element, and the bridges are expected to handle increasingly heavier loads, yet involve fewer soldiers in the construction effort. To realize these expectations, the interdependent spheres of mission,

enemy, terrain, troops, and time available (METT-T) must be handled with a delicate touch. The U.S. Army Tank-automotive and Armaments Command (TACOM) Bridge Engineering Division has been juggling those glass balls for a long time, pushing the development of lightweight metals and laminates by commercial suppliers and overcoming the dwindling manufacturing base to ensure that Army needs are met and that every promising candidate is fully explored. The research and development work begun by the Fort Belvoir Research and Development Center continues at TACOM's Research and Development Engineer Center in Warren, Michigan.

The assault float bridge, or ribbon bridge (not an SKO), was fielded in the 1970s and eventually replaced all float bridging assets in table of organization and equipment (TOE) units. It is now being upgraded to increase buoyancy and military load class (MLC) in faster stream velocities. The assault float bridge can be assembled at the rate of 210 feet per hour by the same soldiers who deliver it to the bridge site. It carries MLC 70 in current velocities of 7 feet per minute. Multirole bridge companies retain the **Supplemental Bridge Set** for constructing overhead anchorage systems.

The **Float Bridge Sets** that have been replaced include various lengths of M4T6 and MLC 60 floating bridges, their corresponding bridge-erection sets, ferry conversion and dry-span sets, light tactical raft sets, and aluminum floating foot bridge sets. All the older bridges will be stored in set configuration and available for humanitarian as well as military needs.

The **Medium Girder Bridge (MGB)** (bridge, erection, and reinforcing sets) was developed to replace the M2 Bailey bridge (bridge, erection, cable reinforcing, and pier conversion sets) in 1972. The MGB is available in sufficient quantities for all 20 multirole bridge companies—only at a reduced authorization. About 150 Bailey sets

Soldiers launch a 70-foot double-double Bailey bridge by hand.





A diver cuts concrete with the hydraulic chain saw, a component of the Underwater Construction Set.

will remain in depot stock with another 100 bridges erected or stockpiled in numerous countries around the world. Current stocks of MGB sets are being overhauled at the rate of 10 sets per year. The depot work includes inspection, structural repair, and repainting. Twenty-eight soldiers can construct 46 meters of MLC 60 MGB in 3 hours.

The **Heavy Dry Support Bridge (HDSB)** is being developed to replace the MGB and in a limited role as a line of communications (LOC) bridge until a final design is determined for the LOC. The HDSB is a marked improvement over other prefabricated fixed bridging systems because it can be constructed at the rate of 40 meters in 90 minutes by 14 soldiers and can carry MLC 96W/70T. The HDSB is programmed for fielding in 2002.

Diving

Proponency for U.S. Army divers resides with the Engineer School. All divers are trained at the Naval Diving and Salvage Training Center, a joint service training command located in Panama City, Florida. And while diving equipment for engineers and Special Forces is similar, the two groups have different mission requirements for tool sets. Army divers' underwater missions involve reconnaissance, demolition, hydrographic surveying, obstacle emplacement, inspection, repair, light and heavy salvage, and recovery. They also conduct dam, levee, and lock inspections for the Corps of Engineers.

To accomplish those tasks, there is a myriad of diving sets, supporting sets, tool sets, and ancillary equipment. Diver equipment sets allow surface-supplied diving to depths of 250 feet or self-contained (scuba) diving to depths of 190 feet, thermal and physical protection, depth monitoring, regulating gauges, communications equipment, lights, and video recorders. **Surface-Supplied Lightweight Diving Sets** are

scheduled for procurement in 2000 and 2001. **Scuba Diving Sets** are tentatively scheduled for procurement in 2008.

Supporting equipment sets consist of specialized high and low air compressors for tank and flask filling or supplying surface air, gas-analysis kits, and hyperbaric recompression chambers. The **Special Divers Air Support System (SDASS)** is the first of engineer diving equipment in the Force XXI modernization plan that supports a modularization concept. The SDASS supports extended diving operations by accepting air from any of three sources and properly distributing it to one, two, or three divers at depths of 250 feet. It provides constant depth monitoring of the divers by topside support personnel. The SDASS also supports the recompression chamber and is scheduled for procurement in 2004.

The **Underwater Construction Set** contains four subpackages. Each can be used independently, allowing diving teams to tailor equipment loads based on mission requirements. The first is a hydraulic tool package used for constructing; removing debris; and cutting concrete, wood, and metal. The second is a cutting and welding package for both surface and underwater operations. The third is a salvage package for lifting heavy debris and recovering objects weighing up to 80,000 tons. The fourth contains hand tools, hardware, and equipment used to locate and mark underwater obstacles. All components can be used in freshwater or saltwater to a depth of 250 feet. Procurement of the Underwater Construction Set began in 1999.

Ancillary equipment includes 3-man reconnaissance boats and 7- and 15-man inflatable assault boats. All are fabricated from neoprene-coated nylon fabric; have a rigid stern for mounting an outboard motor; and are issued with paddles, air pumps, and a repair kit. Procurement for the 15-man boat is underway with additional purchases for all three beginning in 2002. A replacement 35-horsepower outboard

motor is also scheduled for fielding in 2002. The motor is hand-startable, uses a gas/oil-mix fuel, is capable of being sound suppressed, and can be restarted within 10 minutes after being submerged. An **Underwater Photography Support Set**, based on digital technology, will enhance the divers' reconnaissance, inspection, and damage-assessment capabilities in the future.

A senior enlisted diver in the Materiel Branch of the Maneuver Support Center's Directorate of Combat Developments works closely with the civilian diving community, the Naval Diving and Salvage Training Center, and the item managers at TACOM Armament and Chemical Acquisition and Logistics Activity, Rock Island Arsenal, Illinois, to modernize diving equipment. The overall number of diving sets needed is small compared to other systems, but providing breathable air to—and completing vital underwater missions by—Army divers requires the best equipment that technology has to offer and an aggressive modernization plan.

Lighting

The Engineer School is the proponent for temporary and portable illumination for airfields and heliports; tents, camps, and other facilities; and construction projects. Item managers at the Communications-Electronics Command, Fort Monmouth, New Jersey, oversee the development, procurement, and fielding of more than 23,500 portable/temporary lighting sets that are found in all types of units.

Lighting sets provide temporary illumination for tents, camps, buildings, command posts, tactical operation centers, hospitals, and other structures and facilities. Electrical power is provided directly by generators and/or local power grids or by rechargeable batteries. Safety (electrical-shock protection and circuit-overload prevention) is a primary concern along with the capability to reduce the light signature. Electrical power distribution in bivouac areas is normally provided by the Distributed Illumination System-Electrical components authorized to the unit.

Special-purpose lighting sets with uniquely designed lighting units are available for emergency lighting of small tactical air strips and landing sites and temporary lighting of 2,000 linear feet of runway or a 200-square-foot helipad for operations under combat conditions. These lights are lightweight, portable, and battery-powered; flash with high-intensity horizontal and vertical beams; have multicolored, interchangeable domes; and are anchorable.

Floodlight Sets provide lighting for perimeters; guard towers; security; prisoner of war camps; logistic sites; and nighttime construction work on airfields, roads, pipelines, ports, or logistics-over-the-shore sites, quarries, and batch plants. The Floodlight Set is planned for procurement beginning in 2000.

As the light sets are reviewed, changes will be implemented to make the systems safer and eliminate lead-acid batteries, increase the operating life of the batteries by changing the recharging characteristics, and develop more options for recharging/operating sources. As development funds become available, the sets will be updated based on the military adaptation of some commercial products.

Fire-Fighting

The multipurpose fire-fighting vehicle was procured for use by the armed forces to provide fire-fighting capability for protection of military installations and aircraft, whether at home base or the forward tactical operations area. The military-adapted commercial item (MACI) fire-fighting vehicle functions equally well when fighting structural fires, combating fuel fires, or suppressing brushfires. The MACI replaced all configurations of the 530-series fire trucks—crash-rescue, brushfire, and structural-fire—currently in the field. The MACI was fielded in 1988-89 and has an on-board, 750-gallon water-storage capability; seating for a four-soldier crew; and a foam proportioner. The MACI set is currently managed by TACOM.

A replacement for the MACI is programmed for 2003, assuming testing and final selection are completed by then. The requirement is to have an increased water-tank size (1,000-gallon), seating for a crew of six soldiers, a foam proportioner, blackout lights, M16 rifle holders, and four-wheel drive; and be able to ford to depths of 0.75 meters. It will carry a 3-cubic-feet-per-minute air compressor for refilling air tanks and for use with inflatable jacks. In addition, it will contain a full set of hoses, ladders, tools, and crash-rescue/survival equipment.

Summary

As stated in the first article of this series (*Engineer*, August 1999), each soldier uses one or more sets, kits, or outfits containing either the tools of the trade or to support numerous other tasks from field feeding to maintenance to communication. The next time you discover that you don't have the right tool or enough tools—or if the tool doesn't work—tell your supervisor and then call the Maneuver Support Center Directorate of Combat Developments. Make your tool sets work for you. Send comments to the Organization Branch (Tom Knotts or Alan Schlie), 320 Engineer Loop, Suite 141, Fort Leonard Wood, Missouri 65473-8929. Telephone numbers are commercial (573) 563-6191, DSN 676-6191, and fax (573) 563-5056. The e-mail address is schliea@wood.army.mil.



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Army Safety Augmentation Detachment:

Making the Difference in Today's Mission

By Lieutenant Colonel (Retired) Bill Ramer and Fred Fanning

Army Safety Augmentation Detachment (ASAD) personnel are an essential piece of the Total Army safety and can be a priceless addition to any deployment mission—whether for war, peacekeeping, or training. The key is to know whom they are and how to get them on your team. The information in this article will help engineer unit commanders and staff officers prepare and execute missions by identifying a source for safety support.

In the fall of 1995, the Dayton Peace Agreement on Bosnia-Herzegovina was moving toward approval. A NATO-commanded multinational military Implementation Force (IFOR) would monitor and help ensure compliance with the agreement on military aspects and fulfill certain supporting roles.

In Bosnia-Herzegovina, an American Army general commanded both the Multinational Division North and Task Force Eagle. Included in the division were a Nordic-Polish Brigade, a Russian Brigade, a Turkish Brigade, and an American Brigade and Aviation Regiment. This multinational mission had unique requirements, and civilian safety personnel played an important role in helping commanders and leaders implement a safety program that supported the requirements. However, there were not enough of these personnel to cover all areas and to stay on the job for the hours, days, and months that they were needed. Most engineer units do not have their own organic civilian safety personnel, and it may be difficult to obtain support from the civilian safety personnel assigned at division and corps levels. The solution for Task Force Eagle was Army reservists from the Army Safety Augmentation Detachment.

ASAD personnel are individual mobilization augmentees with the U.S. Army Reserve. They are officers and warrant officers assigned to the U.S. Army Forces Command (FORSCOM) Safety Office. These personnel receive basic training and education in tactical and operational safety.

ASADs bring to an operation the experience of their military background from active duty, reserves, and National Guard. Since they are still active soldiers, their perspective is focused on the needs of their fellow soldiers as well as the need to support the mission. Their training helps to focus this effort and join with the civilian safety personnel (when available) and the ongoing safety program of the deployed unit. This tie-in is critical and will allow the ASAD to join an already-formed team and contribute to the effort to improve hazard identification and control-measure implementation.

ASADs have served during Operations Joint Endeavor, Joint Guard, and Desert Storm, as well as operations in Haiti and Somalia. ASAD personnel in Bosnia-Herzegovina, Croatia, and Hungary provided continuous operational safety support to U.S. forces traveling to and from and operating in Bosnia-

Herzegovina. Using these personnel was a critical element from the time they began training until they reported for duty. Since each unit makes a choice about where its safety program is established in the command structure, ASAD training stresses the need for adapting operational safety to the command structure and the constantly changing operational environment. They work for the unit or task-force commander, and their bottom line is protecting the soldier and thereby protecting the force.

The utility of ASADs is seen best in their ability to provide a command with operational military safety personnel with field experience. They do not implement the unit safety program—they enhance and sustain it. They provide safety staff officers at the brigade, division, and corps levels. Statistics indicate that soldiers in Operation Joint Guard were actually safer in theater than in their respective garrisons in Germany and CONUS. Seventy-five percent of the Army's casualties are "self-inflicted" through accidents. ASAD personnel are the only staff officers whose sole focus is reducing these incidents and sustaining the ground combat power available to the ground commander. They are proud to have been there. The Task Force Eagle motto says it all: *Protect the soldier, protect the force!*

If commanders are interested in ASAD support for their next mission, operation, or training event, it is essential that they understand the program and the support that can be provided. An official request must be sent through the chain of command to the FORSCOM Safety Office. It is also essential that the unit Reserve Liaison Officer be involved. There are specific requirements for which ASAD support can be used, and in some instances a presidential call-up must occur before support can be provided. In addition, in some cases there may be costs incurred by the unit for this support. The best approach is to outline the specific requirements of the unit and make a formal request to the FORSCOM Safety Office to provide the costs and availability of ASAD personnel. For Operations Joint Endeavor and Joint Guard, the time and effort spent getting ASADs approved and on the ground were well worth it.

E-mail comments or questions to fanningf@wood.army.mil, or call him at (573) 596-0116.

Lieutenant Colonel Ramer was a member of the Army Safety Augmentation Detachment in Bosnia-Herzegovina. He served as a safety officer with the 1st Armored Division and the 1st Infantry Division.

Fred Fanning, a certified safety professional, is safety director of the Maneuver Support Center at Fort Leonard Wood, Missouri. He served as safety director for the U.S. Army V Corps during the first two and one-half years of the Stabilization Force operations in Bosnia-Herzegovina.



Ohio Engineers Get "Stick Time" at Selfridge:

A Mutually Beneficial Relationship Continues

By Rae Higgins

Sports fans have long known about the famous Michigan-Ohio State football rivalry. But there's no rivalry between units at Michigan's Selfridge Air National Guard Base and the Ohio Army National Guard's 216th Engineer Combat Battalion (Heavy). In fact, there's reason to cheer because military units headquartered in both states joined forces in 1998 to begin a comprehensive, ongoing quality-of-life project that continues to be mutually beneficial. For the second year, soldiers from the 216th reported for two weeks of annual training at Selfridge beginning in late July.

The U.S. Army Garrison-Selfridge, which is a business element of the Tank-automotive and Armaments Command (TACOM)-Warren, is one of the active duty units at Selfridge. Despite the fact that Selfridge is an Air National Guard base, it is home to soldiers, sailors, airmen, marines, coastguardsmen, and their families. The Army garrison is charged

with infrastructure maintenance, which includes housing, morale, welfare, and recreational activities.

Mission

The 216th's mission is to provide general engineering with limited mobility, countermobility, and survivability tasks. Its soldiers must construct, repair, and maintain supply routes, landing strips, buildings, structures, and utilities. As an organization of citizen-soldiers, the unit provides these services both to the people of Ohio and to the nation.

According to TACOM's National Guard adviser, hosting the unit's annual training is a major mutual endeavor. Not only does Selfridge gain new facilities at a minimal cost, but the Ohio Army National Guard receives valuable training as well.

Units from the 216th that reported to the U.S. Army Garrison-Selfridge for Annual Training '99 included Alpha Company, headquartered in Chillicothe;

Charlie Company, based in Youngstown, and its Detachment 1 out of Camp Perry; and Battalion Headquarters Support Company, from Hamilton, and its Detachment 1 from Felicity.

This past year's stint at Selfridge was especially challenging for the 216th to plan because the majority of the battalion's personnel were called up to assist with hurricane relief operations in Nicaragua. In addition, 50 soldiers from Alpha Company were deployed to Korea. Hence, the annual training team could not be identified (from the aforementioned units) until the first day of training. The battalion held daily training meetings to ascertain how to overcome the obstacles that cropped up and forged ahead with the work at hand.

Annual Training '99

Annual Training '99 built upon the engineers' 1998 project, which centered chiefly on

"vertical work"—building five picnic pavilions in a park along one of Selfridge's shoreline areas.

The project in 1999 was more comprehensive, however, as the units got to really roll up their sleeves and focus on "horizontal" work. Their goal was to build a recreational vehicle campsite in the park.

In all, the 216th's soldiers racked up some good stick time, indeed. Their major accomplishments included installing nearly 1,500 feet of 6-inch water main to deliver water to 30 recreational vehicle campsites; emplacing two fire hydrants to satisfy fire codes; placing base-course materials in the main road to the sites and a vehicle turnaround; and grading the campsite area.

According to the Garrison - Selfridge commander, the garrison provided the battalion with \$37,000 worth of materials and received \$110,000 worth of construction work this year.

When completed, the recreational vehicle park will be open to active duty service members, retirees, National Guard and Reserve members, Department of Defense civilians, and eligible family members. The park will be managed by the Directorate of Morale, Welfare, and Recreation, and officials hope it will become a money-making operation. If the park is successful, Selfridge officials will consider building more recreational vehicle campsites. A rustic campground project might even be in the works.

The measurement of an exercise such as this is the kind of training soldiers get. The exercise increased the overall readiness of the battalion by giving soldiers an opportunity to hone their military occupational specialty skills. Despite the less-than-ideal circumstances at the outset, in the end it all paid off. Heavy equipment operators received a lot of stick time, and the troops were not only able to pull vehicle maintenance but also to cross train and increase the skill proficiency of junior enlisted soldiers. Cross training is an essential element of the battalion's work. It became especially important because the annual training team was "piecemealed" together due to the Nicaragua mission. For this



When complete, this shoreline area will be home to a recreational vehicle campsite complete with electrical and water hookups.

project, the plumbing teams consisted of about 20 carpenters who cross trained as plumbers.

The 64 soldiers who participated in the Selfridge Annual Training '99 came from all walks of civilian life—among them students, plumbers, corrections officers, and business owners. Whatever their civilian profession, they were all motivated for annual training and eager to work and learn.

One sergeant who had previously spent seven years on active duty logged her first annual training with the National Guard at Selfridge. The veterinary technician said she learned a lot while in Michigan, such as surveying, driving trucks, and laying pipe. As one of the few women participating in the annual training, she said that today's Army offers more opportunities for women than when she was on active duty. The Boston native said she and the other women in the battalion were doing the same kind of work and received the same kind of treatment as their male counterparts.

A loader operator from the Headquarters Support Company, a private residential construction worker in civilian life, was able to spend all-important time using his loader to fill 5-ton trucks with dirt that the dozer operators had dug, moved, or cleared. He emphasized that it is always good training for the unit whenever you can get on your equipment. The site noncommissioned officer in charge agreed. The 16-year Guard veteran, who

had just returned from Nicaragua, said that annual training rotations provide opportunities for soldiers to gain crucial experience. These types of projects provide realistic training for tasks the unit might encounter on the battlefield.

The Benefits

The Selfridge-Ohio National Guard partnership proved to be a win-win situation any way you look at it. The battalion worked projects that have real-world application on the battlefield, so it maintains readiness by sharpening soldiers' skills. The garrison and the Selfridge community as a whole not only get new or improved facilities and a significant quality-of-life upgrade, but they also get them for a bargain. It was great training for the Ohio Guard engineers and great savings for the government and it gave folks great facilities to enjoy.

Bo Schembechler, the University of Michigan's fabled former gridiron skipper, and legendary ex-Ohio State football coach Woody Hayes wouldn't even argue with that.

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The Corps and the Canal

By Dr. James W. Dunn

The U.S. Army Corps of Engineers did not build the Panama Canal. It was built by the Isthmian Canal Commission (ICC), which was authorized by the Spooner Act and appointed by the President of the United States. However, Army engineers became involved in the U.S. interest in building a canal in 1870 when President Ulysses S. Grant, stimulated by the opening of the Suez Canal in 1867, ordered the U.S. Navy to conduct surveys of possible canal routes in Central America. The Navy reported to an Inter-oceanic Canal Commission whose membership included Chief of Engineers Brigadier General Andrew A. Humphreys.

The United States was following the path of earlier Spanish interest in the possibility of a canal trade route somewhere in Central America. Spanish explorer Vasco de Balboa walked across the Isthmus of Panama to the Pacific Ocean in 1513, and in the middle of the 16th century a Spanish Catholic priest, Father Francisco de Gomara, wrote a book about a canal in either Nicaragua or Panama. However, it was not until the 18th century that the Spanish conducted surveys of potential routes. In 1787 Thomas Jefferson, the U.S. minister to France, made an unsuccessful attempt to obtain those survey reports.

From the middle of the 19th century, the United States made increasing use of the Panama isthmus as settlers moved to the new lands gained in the Mexican War, and gold seekers rushed to the California mining sites. In 1850 a U.S. company obtained the right to build a railroad across Panama and completed a one-track line in 1855. Among those who crossed from the Atlantic to the Pacific in those mid-19th century years was Captain Sam Grant, when he moved



The spillway, looking north from the west wall. Foundations for valve and cofferdam piers are in the foreground.

his family in 1852 to his assignment with the 4th Infantry Regiment in Oregon.

After studying the Navy survey reports in the early 1870s, President Grant's Inter-oceanic Canal Commission concluded that the Nicaragua route was better than Panama because of the high cost of a lock canal through the Isthmus of Panama and the threat of yellow fever and malaria there. However, before the United States could get started, Ferdinand de Lesseps, builder of the Suez Canal, formed a French company to build a sea-level canal in Panama. The Universal Inter-oceanic Canal Company began work in February 1881, and by midsummer the first yellow fever and malaria cases were reported. There were 125 deaths in 1882 and 420 in 1883. By 1889 de Lesseps' company was bankrupt, and work on the canal came to a halt; the cost of a sea-level canal was too high, and the yellow fever and malaria threat was too great.

While the French struggled in Panama, the United States Maritime Canal Company—which included retired General George B. McClellan, who had entered the Corps of Engineers upon his graduation from West Point in 1846—obtained a concession to build a canal in Nicaragua. Several attempts in the 1880s and 1890s resulted in failure due to high costs and the inability to hire a reliable work force. The U.S. and French failures indicated that private industry could not succeed alone; an inter-oceanic canal in Central America needed government support.

In 1895 President Grover Cleveland appointed a three-member Nicaragua Canal Board to study and compare the two routes—Panama and Nicaragua. The Ludlow Commission, named for Army engineer member Lieutenant Colonel William Ludlow, recommended continued study of the Nicaragua route. To do so, in 1897 President William

McKinley appointed a Nicaragua Canal Commission. It included Professor Lewis M. Haupt of the University of Pennsylvania, who graduated from West Point in 1867 and entered the Corps of Engineers, and Army engineer Colonel Peter C. Hains. That commission also recommended Nicaragua.

The U.S. interest in Nicaragua concerned the French company, which still held the de Lesseps' concession to build a canal in Panama and was interested in selling it to the United States. In 1896 the French hired a New York lawyer, William Nelson Cromwell, as a lobbyist for their renamed New Panama Canal Company. He, in turn, hired retired Army engineer Brigadier General Henry L. Abbot as a technical expert. Abbot wrote a report citing the advantages of a lock canal in Panama over a sea-level canal in Nicaragua.

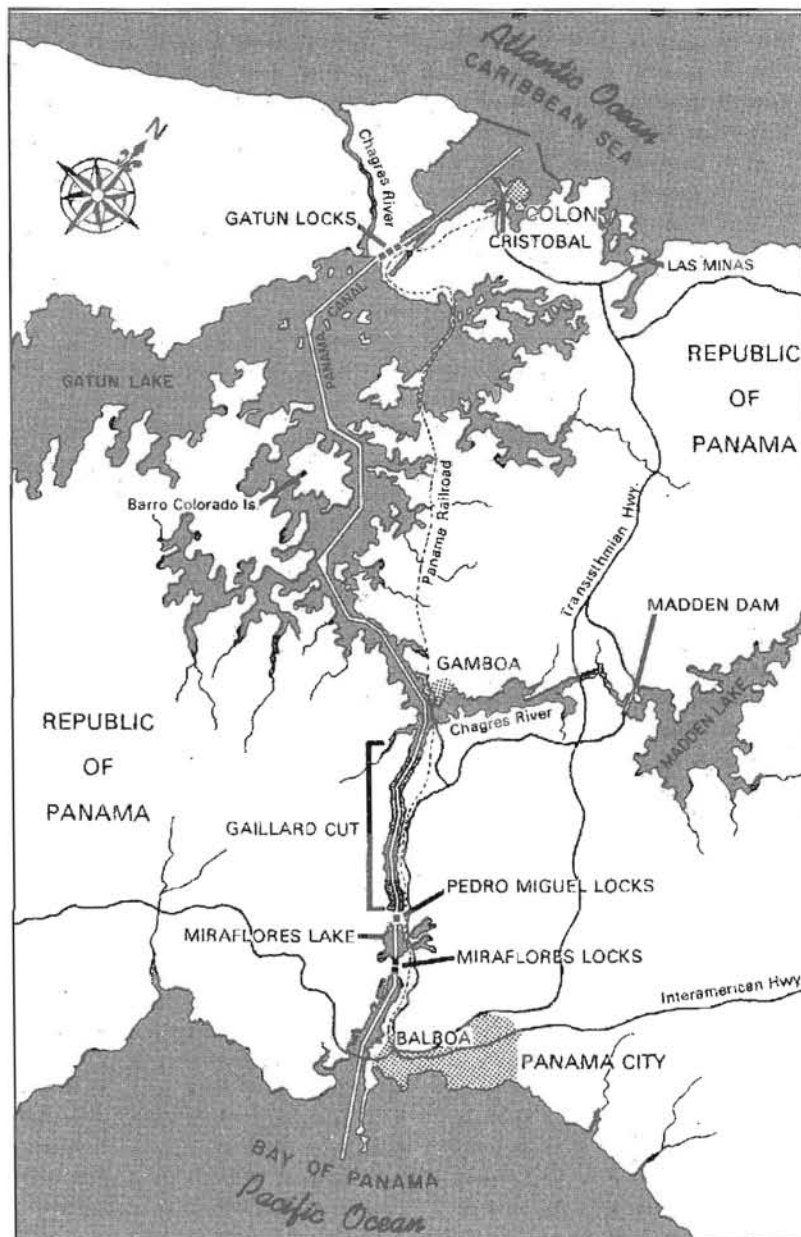
The Spanish-American War illustrated to the American public the need for some type of canal in Central America when it took the battleship *Oregon* more than 60 days to go from San Francisco to the Caribbean by way of Cape Horn. In December 1898, the French made an official approach to the United States about buying the concession rights of the New Panama Canal Company.

To sort this all out, Congress appropriated \$1 million to fund an Isthmian Canal Commission to recommend either Panama or Nicaragua as the route for an interoceanic canal. The ICC included Haupt and Hains from the previous commission and Army engineer Lieutenant Colonel Oswald H. Ernst. When the November 1901 report recommended Nicaragua because it was cheaper than Panama (the New Panama Canal Company valued its assets at \$100 million), the French hired Philippe Bunau-Varilla to support Cromwell's lobbying efforts in the United States. Bunau-Varilla was a French engineer who had worked for de Lesseps in Panama and was a shareholder in the New Panama Canal Company. While Bunau-Varilla talked about the advantages of Panama over Nicaragua—such as better

harbors, a shorter route, and an operating railroad—he also got the New Panama Canal Company to revalue its assets at \$40 million. That made Panama cheaper than Nicaragua, and an amended ICC report in January 1902 recommended the Panama route.

With that report Senator John C. Spooner successfully sponsored an amendment to turn a Nicaragua bill into a Panama bill. The Spooner Act, signed into law by President Theodore Roosevelt on 28 June 1902, authorized

purchase of the New Panama Canal Company for \$40 million, purchase of a zone in Panama for construction of a canal, and set up a seven-member presidential-appointed Isthmian Canal Commission to build the canal. In the March 1903 Hay-Herran Treaty, the United States and Colombia (which owned Panama) agreed on the purchase price for the French company and payment of \$10 million by the United States to Colombia for the right to build a canal in Panama. By August that treaty was a



Map of the Panama Canal Zone

dead issue, as Colombia wanted more than \$10 million from the United States and some of the \$40 million going to the French company.

Fearful that the United States would go to Nicaragua, Panamanians interested in having the canal built across the isthmus approached Bunau-Varilla. Acting as their representative, Bunau-Varilla talked with officials in Washington and then promised the Panamanians U.S. support in the event of a revolt and break with Colombia. After an almost bloodless revolt on 3 November, Panama declared itself a republic on 4 November. In the early morning of 6 November, Army engineer Major William M. Black, at the request of the Panamanians, raised the flag of the new republic over the city of Colon.

Major Black and Army engineer Lieutenant Mark Brooke were in Panama as representatives of the ICC to study and report on the New Panama Canal Company in anticipation that Colombia would agree to the Hay-Herran Treaty. Both engineer officers remained in Panama into 1904, with Black as acting chief engineer and Brooke signing for transfer of the New Panama Canal Company property to the United States on 4 May 1904.

Bunau-Varilla, as Panamanian envoy to the United States, signed the Hay-Bunau-Varilla Treaty on 18 November 1903. The United States purchased from Panama a 10-mile zone across the isthmus for \$10 million and \$250,000 annually, guaranteed Panama's independence from Colombia, and paid the French \$40 million for the New Panama Canal Company. After Panama ratified the treaty in December 1903 and the U.S. Senate did so in February 1904, President Roosevelt—as required by the Spooner Act—named a seven-member ICC to build the canal. The ICC included Colonel Hains and Lieutenant Colonel Ernst.

The first ICC chief engineer was John F. Wallace, who was a railroad engineer and general manager of the Illinois Railroad when he took the job to build the canal. He arrived in Panama to take over

from acting chief engineer Major Black in July 1904, but he resigned a year later. He was fearful of the yellow fever threat and attracted by a better-paying job in the United States. Railroad engineer John Stevens—an executive with the Chicago, Rock Island, and Pacific Railroad—replaced Wallace and arrived in Panama in July 1905. He remained longer than Wallace and was successful in building a solid infrastructure that included worker and family quarters. His railroad excavation system functioned like a conveyor belt with the trains carrying the dirt from the steam shovels directly to the dump sites.

Stevens was ready to dig in 1906, but the type of canal—sea-level or lock—remained a question. Wallace had recommended a sea-level canal, but Stevens favored a lock canal. A 13-member board of consulting engineers recommended, by an 8-5 margin, a sea-level canal, but the ICC accepted the minority report for a lock canal written by retired Army engineer Brigadier General Henry L. Abbot. The plan President Roosevelt signed into law in June 1906 called for a canal with three locks on the Atlantic side, three on the Pacific side, and a lake in the middle created by damming the Chagres River at Gatun.

Stevens never got very far with this plan because he resigned in February 1907. His strength was as a railroad construction engineer, and by 1907 the conveyor-belt-type railroad system was in place. What awaited Stevens was hydraulic engineering: the design of dams and locks and the large-scale use of concrete. That was not his strength, but it certainly was the strength of Army engineers in the U.S. Army Corps of Engineers. Thus, it was to the Corps that President Roosevelt looked to get someone who could not quit.

On 18 February, Roosevelt summoned Army engineer Major George W. Goethals to the White House for an interview and, on 26 February, he announced that Goethals was going to Panama as chairman of the ICC and chief engineer to complete construction

of the Panama Canal. As a member of the Army General Staff, Major Goethals had accompanied Secretary of War William Howard Taft to the Canal Zone in 1905 to recommend sites for coast defense fortifications.

In 1907 Goethals was 47 years old and had almost 30 years experience as an officer in the Corps of Engineers. Upon graduation from West Point in 1880, he entered the Corps and began a career of river-and-harbor and lock-and-dam construction work on the Ohio and Tennessee Rivers, canal work at Muscle Shoals, and coast defense construction work in New England.

Promoted to Lieutenant Colonel in March 1907, Goethals took with him to Panama as members of the ICC two other Army engineers, Majors David Gaillard and William Sibert. Both were members of the West Point class of 1884. Gaillard was serving on the General Staff with Goethals and had experience in river-and-harbor work, while Sibert had a river-and-canal work background.

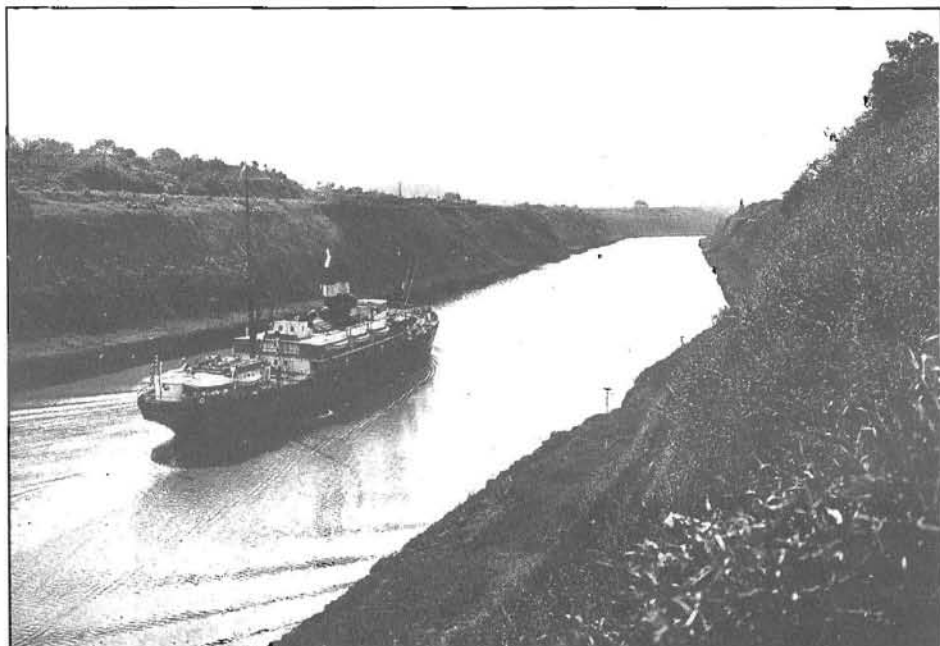
Goethals placed Army engineer Major Harry F. Hodges in charge of the ICC office in Washington, D.C., where he could use Corps personnel throughout the United States to help select and inspect equipment to be sent to the Canal Zone. Goethals initially organized the canal work by type, putting Gaillard in charge of excavation and dredging and assigning Sibert to lock-and-dam construction.

After several months of observation, Goethals was ready to make some changes. In late 1907, he moved the two Sosa Hill locks on the Pacific side inland to Miraflores because of the threat of naval bombardment. He brought Hodges to Panama as assistant engineer in charge of lock design and replaced him in Washington with Army engineer Major Frank C. Boggs. He widened the bottom width of the Culebra Cut, a channel through the Culebra Mountain in the Continental Divide, from 200 to 300 feet; and, on the recommendation of the Navy, increased the lock widths from 100 to 110 feet.

Goethals reorganized construction responsibility on a geographic basis. Major Sibert got the Atlantic Division from the ocean through the Gatun Locks to the Gatun Dam, and Major Gaillard got the Central Division of Gatun Lake and the Culebra Cut. Sydney Williamson, a Corps civilian engineer who had worked with Goethals in Tennessee and New England, got the Pacific Division from the Pedro Miguel Lock through the Miraflores Locks to the ocean. Goethals divided each division into districts, with a superintendent of construction in charge, and he organized his headquarters into sections responsible for design, buildings and equipment, and survey and personnel. Similar to the Corps system, design and general planning came from the headquarters while the details were left to the divisions.

Construction of the Gatun Dam began in 1907. The 1.5-mile earthen dam, with a concrete spillway in the middle, crossed the Chagres River to create a 164-square-mile lake as part of the canal. Lock construction began in 1909, with Army engineer Major James P. Jervey supervising masonry work of the triple locks. In 1912 Army engineer Lieutenant Frederick Mears completed relocation of the Panama railroad required by the creation of Gatun Lake. The canal was near completion in 1913, when steam shovels working from both ends of the Culebra Cut met in May and Gatun Lake began to fill in June. In September a trial lockage at the Gatun Locks resulted in the tug *Gatun* rising from the lowest chamber to the lake in 1 hour and 51 minutes. The canal would have opened in 1913 but for slides in the Culebra Cut.

Fortification of the Canal Zone was only partially completed by 1913. The Hay-Buana-Varilla Treaty gave the United States the right to fortify the zone, but it was not until 1911 that Congress appropriated the funds to begin fortification construction. With



The SS Panama in Culebra Cut, near Empire, on a trip southward through the canal.

Sydney Williamson as construction supervisor and Army engineer Major Eben E. Wilson the design engineer, construction began that year on three forts on the Atlantic side and two on the Pacific. In 1912 the Chief of Engineers organized a section in his office under Goethal's son, Army engineer Lieutenant George R. Goethals, to oversee fortification construction in the Canal Zone. The first Atlantic fort was operational in 1914 and the first on the Pacific side in 1916. By the time the United States entered World War I, there were nine operational forts at each end of the canal.

With the canal ready to open, an April 1914 executive order abolished the ICC and established the Panama Canal with George W. Goethals as the first governor of the Canal Zone. Although the start of the war in Europe overshadowed it, the canal officially opened on 15 August when the liner *Ancon* passed from the Atlantic to the Pacific side. While most of the Army engineers who had worked on the canal were there in 1914, one was missing. Lieutenant Colonel David DuBose Gaillard left Panama in 1913 to seek medical attention in the United States. He died in Baltimore on 5

December 1913 of a brain tumor, and in April 1915 President Woodrow Wilson renamed Culebra Cut as Gaillard Cut in his honor.

There were rewards and honors for all for completing the canal, highlighted by the March 1915 promotions of George W. Goethals and Harry F. Hodges to major general and William Sibert to brigadier general. However, for the Army engineers, the greatest reward over the years proved to be not only that they had completed construction of the canal but that they had built a canal for the centuries. At the end of the 20th century, the Panama Canal was still operating as a vital link in world commerce.

Dr. Dunn is a historian in the Office of History, U.S. Army Corps of Engineers, Alexandria, Virginia.

Suggested Reading

Gerstle Mack, *The Land Divided*; David McCullough, *The Path Between the Seas*.

PERSCOM Notes

By Sergeant Major Theresa Fillmore

When Can I Retire?

There are several misconceptions in the field about the ability to retire, at will, when first eligible (20 years). Many senior noncommissioned officers believe, and understandably so, that once they reach 19 years of active service, they should have no problem getting a retirement request approved.

According to Army Regulation 635-200, *Enlisted Personnel*, paragraph 12-4, "a soldier of the Regular Army who has completed 20 but less than 30 years of Active Federal Service (AFS) may, at the discretion of the Secretary of the Army, be retired at his or her request. The soldier must have completed all required service obligations at the time of the retirement."

Of course, the Secretary of the Army doesn't personally approve the request. The approval authority for voluntary retirement requests is delegated to other individuals referred to as a "retirement approval authority."

Sergeants first class and above have mandatory retirement dates (MRD) that extend past 20 years. For sergeants first class, the MRD is 22 years; for master sergeants/first sergeants, the MRD is 26 years; and for sergeants major/command sergeants major, the MRD is 30 years. Any request for retirement earlier than shown is a voluntary request and may be disapproved.

The key phrase is "must have completed all required obligations at the time of retirement." The following obligations usually require an exception to policy for approval. These requests also are more likely to be disapproved.

Tour Completion. Soldiers stationed overseas are obligated to complete their tours as follows:

- Soldiers accompanied by dependents who traveled at government expense must complete the prescribed "with dependent" tour or at least 12 months from the date of arrival of dependents, whichever is longer.
- Unaccompanied soldiers must complete the prescribed "all others" tour.
- Soldiers who have no dependents must complete the tour prescribed for the country in which they are serving.

Soldiers who have requested and been granted an in-place consecutive overseas tour (IPCOT) or a consecutive overseas tour (COT) would find a retirement approval especially difficult if they have taken advantage of the benefits (family travel/leave) of the IPCOT or COT. These requests are also particularly difficult to approve because the soldier requesting the retirement causes an unprogrammed loss that usually requires a replacement in a short amount of time.

Schools. Many schools require a time-in-service obligation upon graduation. The Army expends funds training soldiers in a

particular military occupational specialty (MOS) or skill and expects them to fulfill their commitment by serving in that MOS or skill for a specific amount of time. Unexpected requests for retirement would result in the Army trying to get another soldier trained earlier than expected in order to carry on the mission.

Time in Grade. Soldiers promoted to sergeant first class, master sergeant, and sergeant major incur a two-year service obligation. This obligation is from the effective date of the promotion before voluntary nondisability retirement, unless soldiers are eligible for retirement by completing 30 or more years AFS; already eligible through prior service for a higher grade at time of retirement; age 55 or older; or exercises expiration of term of service. A promoted soldier may not, at his or her request, be reduced to terminate the required service obligation.

Permanent Change of Station (PCS). Soldiers who are moved from CONUS-to-CONUS or OCONUS-to-CONUS locations are required to serve 12 months from the time of arrival. Again, the Army expends funds to move them, and in many cases their families, and expects them to serve the allotted time.

Retirement in Lieu of PCS. This is our biggest challenge regarding voluntary retirement requests. Soldiers who receive notification for PCS may request retirement in lieu of PCS subject to the following conditions:

- Soldiers who have 19 years 6 months or more of AFS when notified of PCS. The retirement application must be submitted within 30 days of receiving PCS notification. The retirement date will not be later than 6 months from the date of notification or the first day of the month following the month in which 20 years of AFS is completed, whichever is later. All service obligations must be fulfilled no later than the approved retirement date.
- Soldiers who would have less than 20 years of AFS upon arrival at a new assignment may sign a Declination of Continued Service Statement (DCSS). They are required to retire immediately upon attaining retirement eligibility, and the DCSS must be submitted and approved within 30 days of receiving official PCS notification.

As you can see, there are several roadblocks in the path of voluntary retirement. The needs of the Army usually prevail. Soldiers should not make concrete plans, such as civilian employment or school enrollment, until their retirement has been approved. Transition leave and permissive temporary duty impacts, because those dates are considered in all exception-to-policy requests. We are willing to work with soldiers and their families; however, the Army expects soldiers to fulfill their commitments to the best of their abilities.

Sergeant Major Fillmore is sergeant major of the Engineer Branch.



Lead the Way



Command Sergeant Major Arthur Laughlin
U.S. Army Engineer School

Our regiment is moving at a very fast pace, particularly in the past few months. Let me bring you up to date on the actions, tell you about some of the strong leaders I have visited in parts of our engineer training base and, most importantly, encourage you, our NCO leadership, to keep our engineers safe during this incredible time.

First, the Army is intensely planning and organizing to transform into a strategically deployable force. **Step one** is to stand up an Initial Brigade Combat Team (IBCT) at Fort Lewis this spring. This unit includes an organic engineer company. The Engineer School is literally running into the future, designing the company that supports this brigade. The school's current efforts are to design the company's organization; assist the Army in picking a squad vehicle for the brigade and its engineers; write the doctrine manuals that give the company tactics, techniques, and procedures (TTPs) that are consistent with the TTPs for the maneuver elements; and write the training plans that initially train the unit and later sustain that training. **Step two** is to stand up more brigades, each more mature in capability and deployability than the IBCT. **Step three** is to plan the transformation of the rest of the Army. Every change has a price, and the Army is making trade-offs with some new equipment to finance this transformation. The Grizzly and Wolverine programs have been identified by the Army for termination as part of the price. We at the Engineer School are working to help the Army mitigate the mission risks caused by not putting these highly capable machines into the engineer force. I want each of you to understand that the Army has made its vision clear and that each of us will assist in this transformation. I charge each leader to understand this vision (found at <http://www.army.mil>) and to explain it down to the most junior enlisted member. This is an exciting prospect and is the way of our regiment and the future of our Army.

Second, there are some parts of our regiment and the regiment's training base that are not well known. I visited several of these places and saw how our engineer leaders make a difference every day. Sheppard Air Force Base in Texas is one of those places. CPT Manus and 1SG Lea are our command team for the 51K plumbing course. Did you know that our plumbers and the Navy's Seabee plumbers are being trained by the Air Force? If not, then let me introduce you to the Interservice Training Review Organization (ITRO). For several years, we have successfully consolidated training at the Navy's Gulfport, Mississippi, base; Panama City, Florida, base; Sheppard and Goodfellow Air Force Bases; and here at Fort Leonard Wood. At each site, we have engineer leaders like Lea and Manus who have learned new ways of doing business and met the training and certification standards of the host unit. So when you are deployed and get assistance from engineers of a sister service, you know they all came from a common training heritage.

I'd like to highlight one of the gems of this ITRO training at Panama City. Under the leadership of a super command team, CPT Perusek and SFC Kane, highly motivated and highly qualified soldiers learn to be Army MOS OOB divers. These divers are trained on scuba techniques and surface-supplied (or hard-hat) diving and upon graduation are awarded the rank of second class diver. Great soldiers like SSGs Thompson and Haney challenge our divers to be the very best. Anyone interested in becoming an Army diver should check website <http://www.wood.army.mil/TDD/mos00B.htm> for information.

I have found some key fundamentals at these sites that make the difference between mediocre and excellent soldiers. I see NCOs who are willing to learn new ways of doing business while maintaining the standards of our Army. The old adage of "the only right way is the Army's way" no longer holds true. I see NCOs communicating effectively with superiors, regardless of service, and being effective in dynamic environments. Finally, I see NCOs demonstrating the professionalism of Army NCOs to our sister services. The NCOs' dedication to duty and straightforward honesty and love of country quickly convince the Air Force, Navy, and Marine Corps that we are all on the same team—America's team.

Third, and most dear to me, is safety. In my last article, I told you that safety and enforcing safety standards are leaders' business. That hasn't changed—and it won't. The last calendar year is one I do not wish to see us repeat. In spite of all our efforts, we lost too many soldiers. We must do better. I again challenge every leader to relook their risk-assessment procedures. I challenge them to demand that safety standards be enforced at every level. You must be vigilant in enforcing those same standards. Risk assessment is a continuous and deliberate process. If your training conditions are less than adequate or have changed at any time since your risk assessment, RE-EVALUATE ASAP. I must tell you that it is not the war-fighting skills or those high-risk tasks that we give our full attention to that cause us anguish. More often it is day-to-day duties, such as driving back and forth to the unit or driving down the road in an M113, that give us grief. Simple things—wearing a seat belt, ensuring that jack stands are properly positioned, and chocking your vehicle when it is parked—will prevent tragedies. As NCOs we teach our subordinates to meet the standards, and we always set the example ourselves. In doing this, we survive the hazards of day-to-day life as well as the battlefield. Our profession is dangerous by its inherent characteristics. Weapons, fatigue, exposure, heavy equipment, inexperienced personnel, and combat are what we accept with our choice to serve. We think carefully about what we will do, identify each hazard, and figure out how to get around those hazards. For weapons we use range procedures and ammo discipline; for fatigue and exposure we use leader checks and proper equipment. When we stop using this smart approach, we get into trouble. Motor pool safety procedures that become routine become deadly. Off-duty travel when we are tired becomes a tragedy. Leadership can keep our troops safe.

These three things are my messages to you. The Army is moving out, and we engineers are going to move out too. The regiment is training hard with our sister services, and NCO attributes are making that successful. Finally, safety is a prime area for NCO leadership to make a big difference.

Two special opportunities are coming for us to further discuss the critical NCO leadership tasks. First is ENFORCE 2000, when we gather all the command leadership teams in our regiment here at your engineer home. Second is the Regimental Sergeants Major Conference this fall in Savannah, Georgia. Please contact me at Laughlin@wood.army.mil with any issues you think need to be discussed.

Remember to be safe, train smart, and train to standard. Never forget that each one of you is an important combat multiplier.

