Engineer

THE PROFESSIONAL BULLETIN FOR ARMY ENGINEERS

Headquarters, Department of the Army *February 1993*

Responding to Hurricane Andrew

Engineer Restructure Initiative

Functional Area Assessment

PB 5-93-1

CLEAR THE WAY

By Major General Daniel W. Christman
Commandant, U.S. Army Engineer School

Interesting times! When you read this, we will have undergone our first Presidential political party transition in 12 years. However, we must not lose sight of the fact that the fundamentals of our national military strategy will not change during this process. A summary of some military objectives that will not change include the following:

- Provide robust power projection capabilities to promote deterrence and stability
- Maintain forward presence forces abroad
- Conduct peacekeeping, humanitarian assistance, disaster relief, and other "restoration" operations
- Develop and provide strong nation assistance or security assistance capabilities
- Participate in Army domestic missions designed to contribute to the nation's moral and social fabric
- Provide forces that are capable of conducting continuous operations across the entire operational continuum

These objectives will shape the future operations of our Army as the international environment continues to evolve. Our Army, and especially the Corps of Engineers, must be poised and ready to perform its missions in virtually any theater under any conditions. More specifically, we must continue to maintain our vast combat capabilities while increasing our ability to respond to contingency missions in operations other than war. Not easy to do in a period of decreasing resources. This will be our greatest challenge in the foreseeable future!

To meet this challenge, we engineers must continue to be a dynamic and diverse arm of the greatest Army the U.S. has ever seen. We must continue to exploit and refine our unique capabilities to provide assistance in operations other than war, and to better position our Army for the 21st century. This issue of *ENGINEER* describes some of the diverse capabilities of our Corps, from expert sapper skills to Hurricane Andrew responses. The Corps' response to Hurricane Andrew in Florida and Louisiana and Hurricane Iniki in Hawaii typifies the broad scope of engineer missions. Lessons learned from the disaster-relief operations are in an article beginning on page 26.

The human challenge in Somalia is another example of our Corps' diverse missions. Colonel Bob Flowers, the joint task force engineer for this operation, has built a team consisting of six personnel from the Engineer School. In addition to providing engineer command and control, they are assessing the needs for infrastructure improvements and will provide valuable information to the Engineer Corps on future requirements for this mission area. Also, Mr. Vern Lowrey, of our Directorate of Evaluation and Standardization, was deployed to Somalia in January with the Center for Army Lessons Learned team. His assignment is an example of our commitment to the "Total Army" concept that is so vital in an era of shrinking resources. More on this important mission will appear in future issues of *ENGINEER*.

Humanitarian relief missions and nation assistance are not new to engineers. Our chief of staff has in fact described them as "traditional" Army missions. However, they are becoming increasingly complex: they broaden our perspective, challenge our creativity, and provide our nation and our Army with opportunities to foster conditions for peace and peacetime competition.

Really looking forward to further developing some of these thoughts with you during the Senior Engineer Leaders Training Conference 93 (SELTC 93), which will be held here at the Engineer Center on 20-24 April. This year's theme is "Decisive Victory." Key speakers will discuss topics such as "Engineer Roles in the Attainment of National Objectives," "Crisis Response: Forced Entry Operations," "Crisis Response: Decisive Operations," and "Preserving Peace in America's Largest Theater." Additionally, breakout working sessions will tackle current issues related to heavy and light divisions, corps mechanized and wheeled divisions, combat heavy and topographic units, and engineer roles in disaster relief, including some emerging lessons learned.

As you can see, there is a varied and demanding agenda for the fifth annual SELTC. Look forward to seeing many of you here at Fort Leonard Wood as we continue to prepare our Army and our Corps for the challenges expected in the 21st century. Essayons!

Engineer

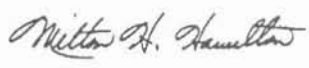
February 1993 Volume 23 PB 5-93-1

UNITED STATES ARMY ENGINEER CENTER AND FORT LEONARD WOOD

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:



MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army

03396

Cover: *SGT Brian Coderre of "C" Battery, 116th Field Artillery Army National Guard, Palmetto, Florida, provided security for outside perimeter of the Florida City Park Distribution Point. (U.S. Army Photo by SGT Zedrick G. Rockett)*

FEATURES

DEPARTMENTS

ENGINEER (ISSN 0046-19890) is prepared quarterly by the U.S. Army Engineer School, ATTN: ATSE-TDM-PB, Fort Leonard Wood, MO 65473-6650. Second Class postage is paid at Fort Leonard Wood, MO, and additional mailing offices.

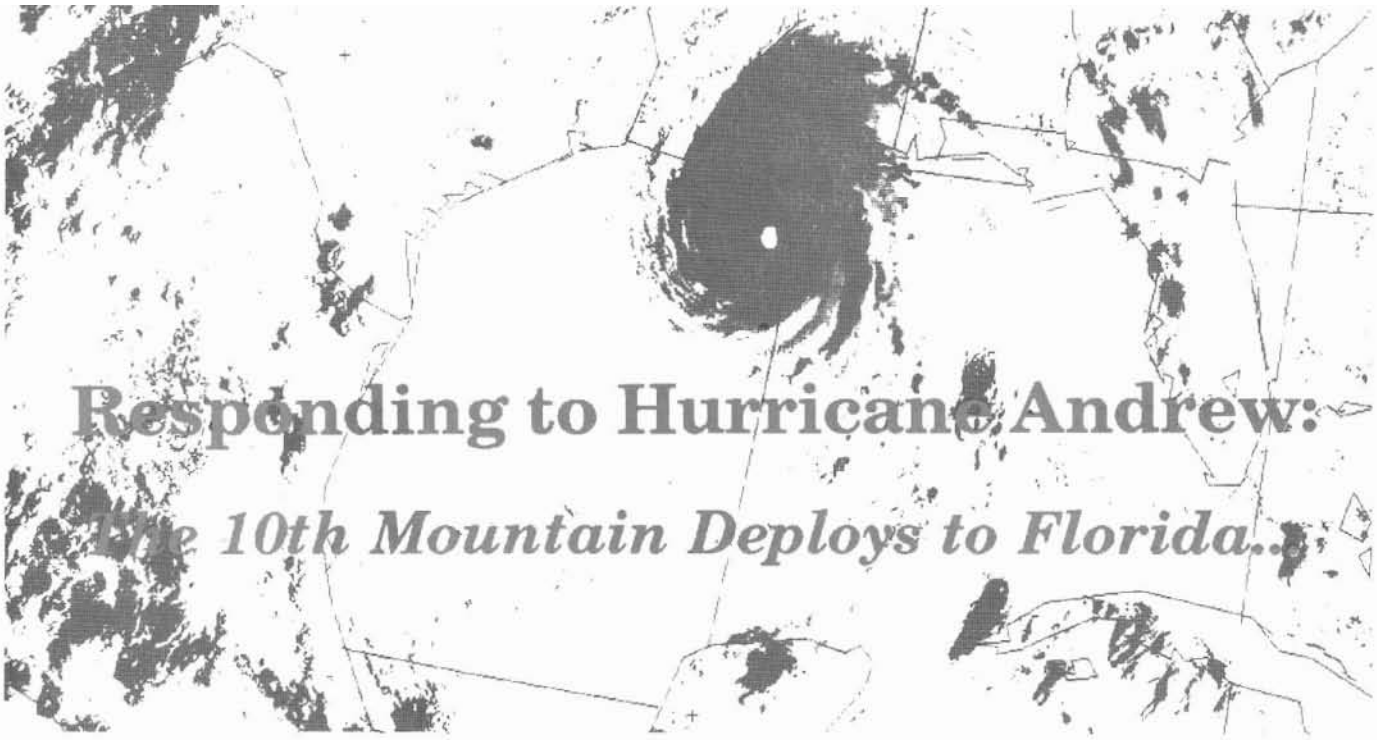
POSTMASTER: Send address changes to ENGINEER, the Professional Bulletin for Army Engineers, ATTN: ATSE-TDM-PB, Fort Leonard Wood, MO 65473-6650.

CORRESPONDENCE: letters to the editor, manuscripts, photographs, official unit requests to receive copies, and unit address changes should be sent to ENGINEER, at the preceding address. Telephone: (314) 563-7535, AV 676-7535.

DISCLAIMER: ENGINEER presents professional information designed to keep Army engineers informed of current and emerging developments within their areas of expertise. Views expressed are those of the author and do not necessarily reflect official Army or TRADOC positions, nor does the content change or supersede information in other official Army publications. ENGINEER reserves the right to edit material.

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

PERSONAL SUBSCRIPTIONS are available by contacting the Superintendent of Documents, ATTN: Chief, Mail List Branch, Stop SSOM, Washington, DC 20402. Address changes for personal subscriptions should also be sent to the Superintendent of Documents.



Responding to Hurricane Andrew:

The 10th Mountain Deploys to Florida...

Hurricane Andrew devastated south Florida on August 24, 1992. Hardest hit were Homestead, Florida City, and other communities in south Dade County. By request of Florida's governor and approval of President Bush, federal troops, active and reserve, were sent to Florida to assist in the cleanup operation. The 10th Mountain Division and the 43rd Engineer Battalion assisted in this mission.

Three days after Hurricane Andrew ravaged the Florida mainland south of Miami, the XVIII Airborne Corps sent a "be-prepared" mission to the 10th Mountain Division, Fort Drum, New York. The 10th would deploy to south Florida to assist in the hurricane relief operations. With sketchy details and some assumptions, the 10th began mission analysis and planning.

Leading problems included how large of a force to deploy, how to tailor the engineer assets, and what kinds of equipment and how much of each type to send.

On the evening of August 30, the 10th Mountain received their deployment order: leaders would go first to analyze the situation and provide guidance for the division's deployment. Along with the order were deployment specifics that addressed time lines, staging areas, and sorties—but little information about the ground mission. Therefore, the same problems (kinds of equipment and amount of each) existed, so they relied on their engineer battalion's initial planning. As a minimum, the 10th decided to take chain saws, small emplacement excavators (SEEs), bucket loaders, dump trucks, carpenter and pioneer tools, and sappers and equipment operators trained to use the equipment.

The Engineer Battlefield

When the 10th arrived in Florida, the soldiers' initial reaction to the hurricane's devastation was awe. What they had seen in newspapers or on television was nothing compared with the actual destruction in Homestead, Florida City, and other parts of south Dade County. Homestead Air Force Base was hit head-on; the only thing left undamaged was the runway.

Trees were toppled everywhere, utility lines and traffic lights were down, mobile-home parks were flattened, and debris was everywhere. Portions of roofs in many housing areas were ripped off, exposing interiors to the elements; water damage was extensive. Gale-force winds, upward of 180 miles per hour, had ripped glass from every building. As a result, there were mountains of debris, traffic gridlocks, utility outages, and general crisis and fear throughout the devastated area. For a castlebearer, it was an engineer battlefield.

The 841st Engineer Battalion, Florida Army Reserve, was the first engineer force on the ground in the Task Force Mountain sector. They were tasked to clear debris in Florida City, a rural agricultural community south of Homestead. Their initial efforts were to clear trees, fencing, house debris, and telephone poles from roadways and thoroughfares.

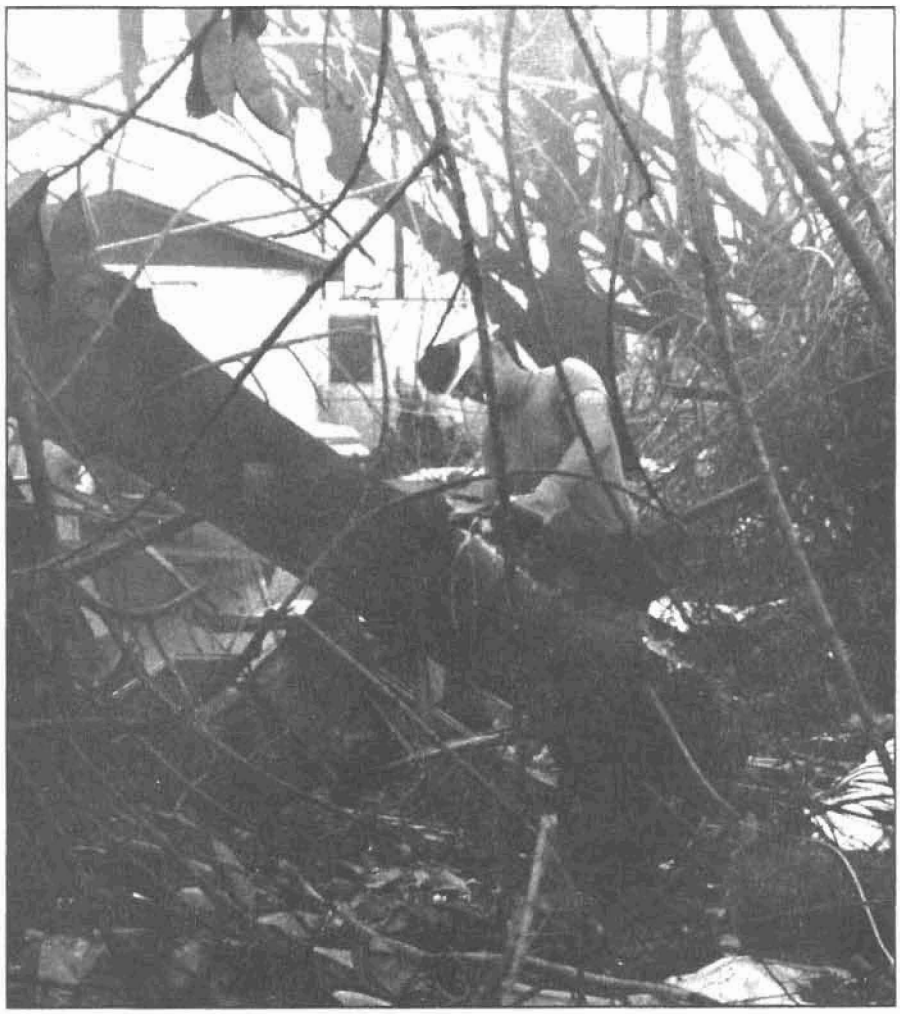
Equipment operators from the 43rd Engineer Battalion, Fort Benning, supported the 841st. A brigade-sized task force from the 82nd Airborne Division, Fort Bragg, was located north of the Task Force Mountain sector and was supported by the 27th Engineer Battalion, Fort Bragg. The 20th Engineer Brigade, Fort

By Lieutenant Colonel Peter Madsen and Major Wayne Whiteman

Bragg, provided general support to the Corps area of operations.

The equipment needed to clean up the debris and keep all the engineers ready to deploy from Fort Drum working was not available. To solve this problem, the 10th Mountain Division enlisted help from the Joint Task Force Engineer; Commander, 20th Engineer Brigade; and Jacksonville District Commander, Corps of Engineers to contract for commercial bucket loaders and dump trucks. They initially requested 50 bucket loaders and 200 dump trucks for the entire corps sector because no one knew how far the engineers would have to haul the debris.

Three days later, corps contracts brought the initial equipment package of two loaders and ten trucks into the Task Force Mountain sector. The next day an additional 15 bucket loaders and 75 dump trucks arrived. Using the commercial equipment, Task Force Mountain personnel began to organize the debris clearance mission. Together, infantry, artillery, and engineer units brought debris to the roadside, helped fill bucket loaders and dump trucks, and cleared the areas. The combined



Top: The magnitude of the devastation from Hurricane Andrew challenged relief efforts.

Bottom: Cutting through the debris was a major task for engineers.

Military and civilian contracted engineer equipment hauls debris from public rights-of-way to dump sites.

arms teams used commercial equipment to clean up debris while organic equipment was being flown in. An unexpected source of support came from many volunteer organizations and municipalities in Florida and other southeastern states. These groups sent bucket loaders, dump trucks, and cherry pickers to augment equipment in the Homestead Department of Public Works.

Organizing for Success

With the equipment on-site, the 10th Mountain Division assigned work sectors to the 1st and 2nd Brigades, the aviation brigade, and the division artillery, with an engineer company attached to each unit. This plan of action had several positive results: each brigade was responsible for all relief activities within its sector; the 10th Mountain Division leaders and Florida City, Homestead, and south Dade County officials interacted to keep on top of the cleanup operations; brigade commanders assigned work priorities; and brigade engineers advised the maneuver commanders of these priorities.

The top priority was to remove debris from areas that affected sanitation or impeded rights of way. After debris removal in these critical areas was under control, the engineer focus shifted to constructing relief camps and food distribution sites (tent cities), assisting public utility crews, and clearing debris from parks and recreation areas.

The 937th Group constructed two relief camps with 700 and 1,200 person capacities, respectively. Each camp had shower and laundry facilities, administration centers, and dining areas. Utility engineers installed the electrical, water, and sewage systems in the camps. The 586th Engineer Company, with 45 bridge trucks, transported humanitarian supplies to the camps. Restoring school grounds then became a joint effort. Army troops cleared the exterior grounds; Navy Seabees and Marines repaired roofs and interiors. As a result of this joint effort, more than 90 percent of the damaged schools opened by September 14th.

Task Force Mountain succeeded for several reasons, one of which was the integration of echelons above corps (EAC) engineer units. In early September, FORSCOM alerted and deployed several engineer forces into the theater. The XVIII Airborne Corps placed the 937th Engineer Group OPCON to the 10th Division. The 937th served as the command and control headquarters for the 43rd Engineer Battalion, the 63rd Engineer Company, the 586th Engineer Company, and the 841st Engineer Battalion. The 41st Engineer Battalion remained organic to the 10th Mountain Division, with most of its assets attached to brigades in several sectors. Their assets included sappers, chain saws, SEEs, and dump trucks.

The EAC units meshed quickly because the 41st Engineer Battalion's engineer operations section controlled the engineer forces. The commander of the 41st served as the division engineer, while the commander of the 937th Group

served as the senior engineer commander to Task Force Mountain. With this arrangement, integrating EAC forces was transparent at the division level and differences in reporting and standard operating procedures were resolved within engineer channels.

The critical nature of the relief effort did not allow for normal staff integration procedures. The EAC had to respond quickly with what they had available to provide immediate relief to the hurricane victims.

Other organizations contributed to the success of the disaster relief effort. The Corps of Engineers, Jacksonville District, augmented with volunteers throughout the Army Corps of Engineers, contracted for ice, potable water, dumpsters, portable toilets, roof covering, trailers for schools, fencing, and utility services. Six large private companies opened burn sites throughout the sector so military and civilian units could haul debris into them. The Federal Emergency Management Agency (FEMA) contracted for clearing mobile-home parks and hooking up utilities to temporary trailers, which became semipermanent homes to displaced families living in relief camps.

Members of the 202d Red Horse Engineer Squadron, as part of the joint relief effort, load a log onto an articulating front loader. (Photo by TSGT Rose Reynolds, USAF.)

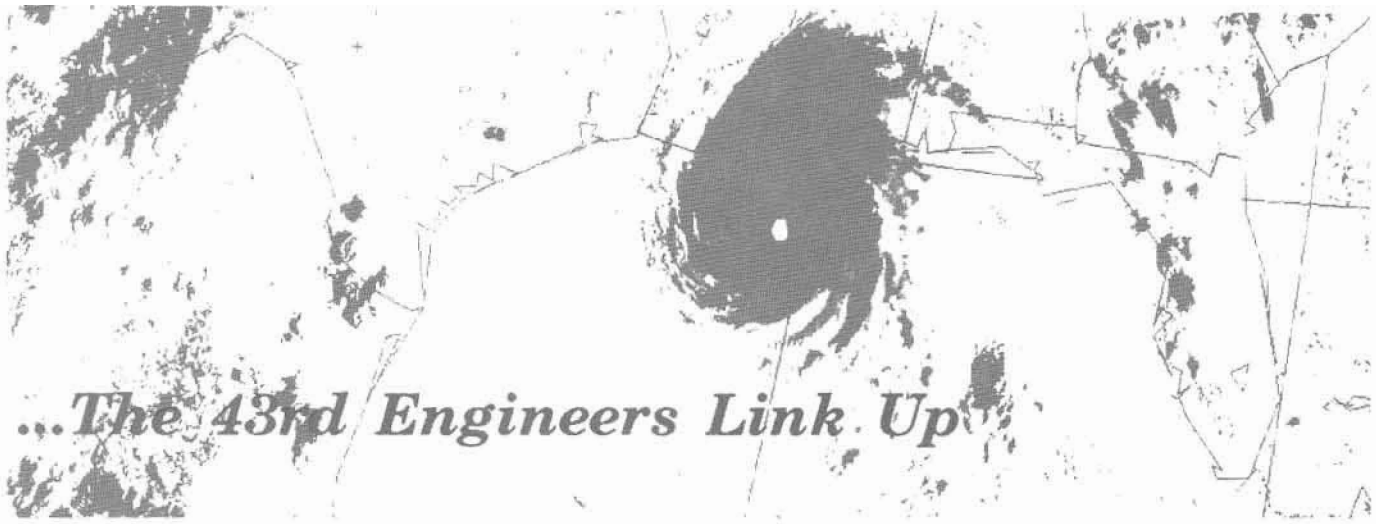
Finishing the Mission

Task Force Mountain's participation in the Hurricane Andrew relief operations was a success. Initially, however, they were not well synchronized with the Corps of Engineers. To solve that problem, USACE liaisons coordinated with the 10th Mountain Division and local municipal and county governments to focus efforts on the immediate needs of communities hit by the hurricane. Commercially contracted engineer equipment allowed troops to start cleanup operations within days after the disaster. Brigade engineers in each sector defined their missions and assigned priorities based on need. Aggressive, close coordination with civic organizations, volunteers, FEMA, and the Corps of Engineers allowed divisional engineers to voice their concerns and needed actions. The results were quick relief from the crisis and a clear path toward recovery. Military troop units redeployed, and by early October, FEMA and USACE were the main agencies involved in the continuing relief operations.

Even though disaster relief is not a commonly trained mission, it did not differ much from a wartime situation. Mission analysis at the home station, early assessment in sector, and synchronization of key assets allowed 10th Mountain Division engineers to exert their expertise on a different kind of battlefield. They responded quickly and efficiently to this time-sensitive mission and were effective throughout the entire operation. Their responsive and constructive efforts truly benefited the citizens of south Florida.

Lieutenant Colonel Peter T. Madsen is the battalion commander for the 41st Engineer Battalion, 10th Mountain Division. Other assignments included tours with the 82nd Airborne Division, Germany, and the Missouri River Division. A CGSC graduate, he holds a bachelors degree from West Point and a masters degree in civil engineering from Georgia Tech.

Major Wayne Whiteman is the S3 of the 41st Engineer Battalion. Previous assignments include assistant professor of civil and mechanical engineering at West Point, company commander for the 2nd Engineer Battalion, and S4 for the 76th Engineer Battalion. He is a graduate of West Point and CGSC and holds a masters degree in civil engineering from the Massachusetts Institute of Technology.



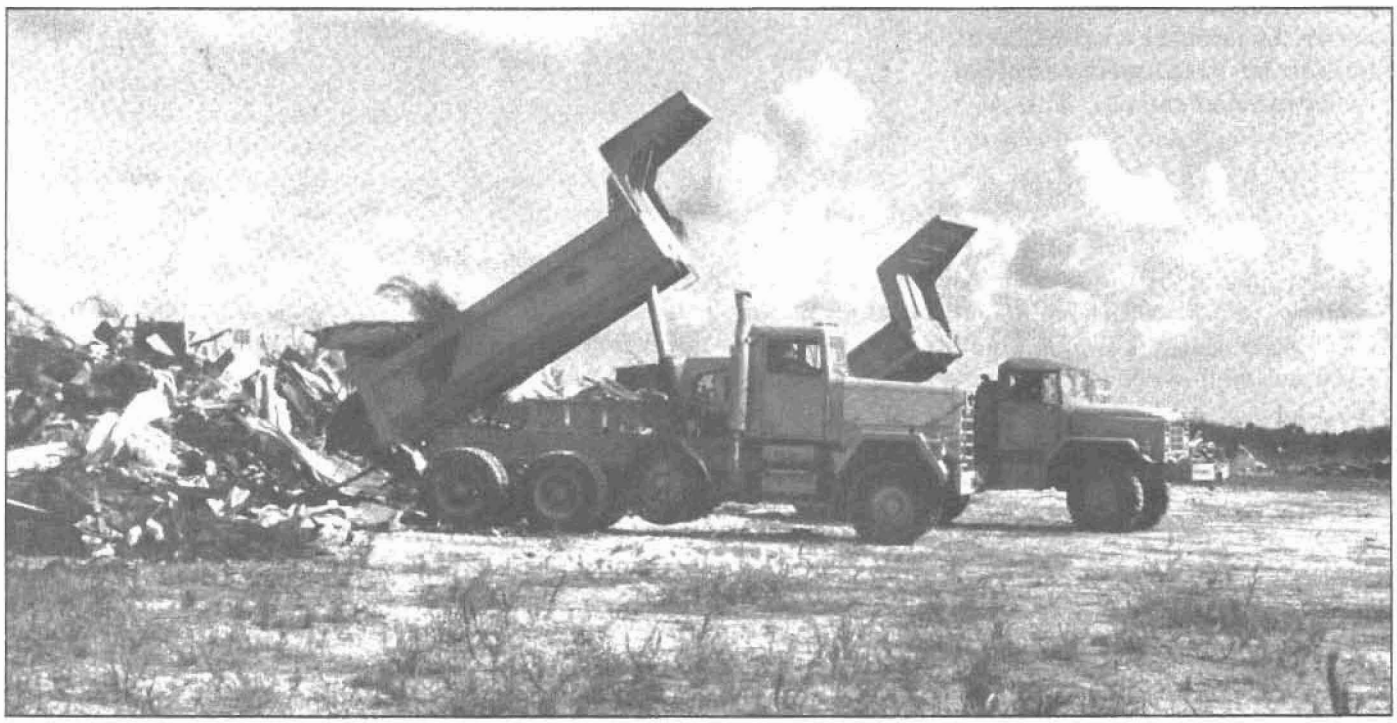
...The 43rd Engineers Link Up

The 43rd Engineers, Fort Benning, Georgia, returned from a field exercise the day before Hurricane Andrew struck. Staff members immediately stopped work on the field exercise recovery operations and prepared three contingency plans in response to the disaster, based on guidance from higher headquarters:

- Send 200 soldiers, mainly heavy equipment operators and equipment, to clear debris. Keep support to the absolute minimum.
- Deploy the entire battalion with organic equipment and the 63rd combat Support Equipment (CSE) Company attached.
- Send 200 soldiers without equipment. Soldiers would use equipment from the 841st Engineer Battalion, a U.S. Army Reserve Corps combat engineer battalion headquartered in Miami.

About one week later, the 43rd received an execution order to send 200 soldiers to replace the volunteers of the 841st Engineer Battalion, who needed to return to their civilian jobs. On August 31, 200 soldiers departed Fort Benning by commercial bus. They joined their reserve counterparts who were cleaning up debris in the hard-hit Florida City area. "The event was historic, if for nothing else, it emphasized the total Army concept," said Lieutenant Colonel Robert L. Davis, Commander, 43rd Engineer Battalion. "It was the first time that I know of where an Active unit fell in beside and operated the equipment of a Reserve Component unit."

Because of the scope of the disaster, the advance party determined that the entire 43rd Engineer Battalion, with the 63rd CSE Company attached, needed to deploy. The 43rd's rear detachment arranged for commercial bus transportation,



By Major Allen C. Estes and First Lieutenant Alex Lucas

The 43rd uses a bucket loader to scoop up the enormous amount of debris left by Hurricane Andrew.

commercial line haul for the heavy equipment, and convoy clearance for 127 vehicles on the 730-mile road march.

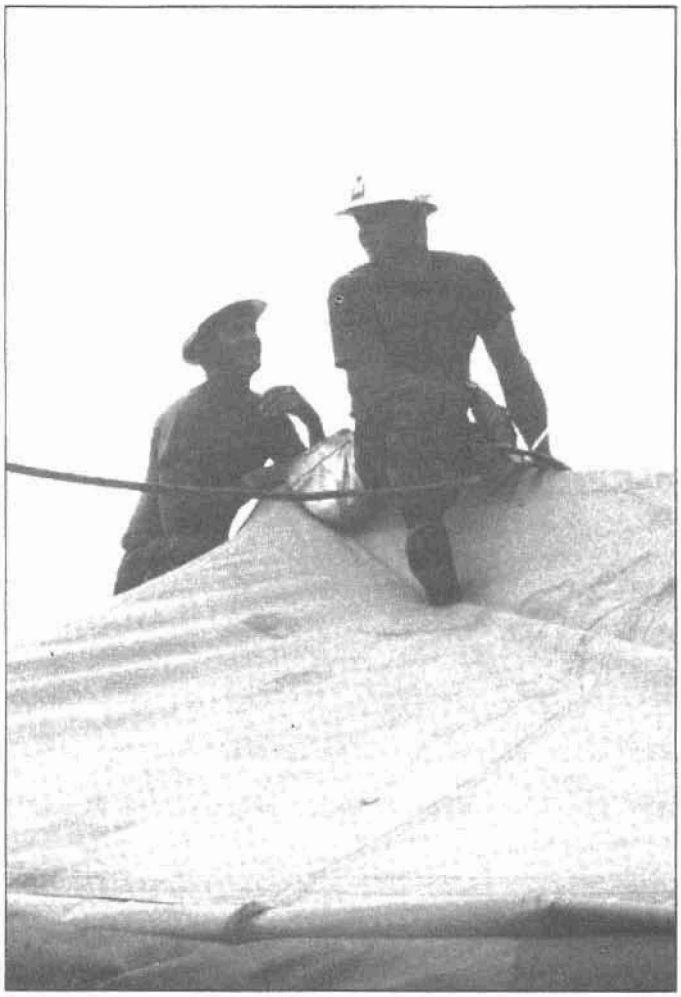
When the 43rd and 63rd arrived in Florida, they were assigned to work in the sector operated by the 10th Mountain Division. Their initial assignment was to clear the enormous piles of debris that lined the streets. Soldiers went from house to house picking up everything in sight. "The rules were not to go in any further than 10 feet from the curb," stated Captain Troy Wilson, Commander, 63rd CSE Company. "But if someone asked for help or obviously couldn't do it themselves, we didn't hesitate to lend a hand." The equipment and squads were divided into teams of loaders, dump trucks, rented wood chippers, and chain saws. With this action plan, the soldiers cleared entire streets in a matter of hours. The soldiers had to handle the debris piles with extra caution because they contained everything from trash and construction material to hypodermic needles and dead animals. Downed power lines were another hazard because some of those presumed dead carried electricity from homes operating off generator power.

The 43rd engineers hauled more than 4,000 loads of debris and put about 3,500 miles on each dump truck. While local city and county agencies identified the dump sites, changing conditions complicated the situation. One day the dump would be closed; the next day a special pass was required to use it; and sometimes the soldiers had to separate the loads into burnable and nonburnable material. Such confusion delayed progress, and eventually the 43rd was tasked to help run the dump. Trucks were lined up five or six deep waiting to dump their loads, and burning operations ran concurrent with dumping.

Within two weeks, the Corps of Engineers had contracted with so many civilian agencies that the military contribution to the total haul effort dwindled. The 43rd then reoriented its primary effort to constructing tent cities at the Campbell (120 tents) and the Homestead Middle Schools (78 tents). The relief sites were designed to provide temporary shelter for people who had lost their homes. Typically, two families shared a standard Army GP medium tent.

Initially, the 43rd was tasked only to build tent floors and provide electricity, but they also built shower units, constructed a parking lot, installed security lights, and built a large stage. The relief camps provided excellent training opportunities in plumbing, electrical, carpentry, and equipment operator skills for the soldiers of the 43rd. Material acquisition was simplified through unit Class A agents and a Homestead city contract with a local hardware store and electrical supplier.

The 43rd's base camp at Homestead Bayfront Park was one of the few sites large enough to store all the equipment in a combat heavy engineer battalion. The soldiers lived in tents, and mobile kitchen trailers were consolidated to create a battalion-sized dining facility. The park had running water so plumbers quickly built make-shift showers. The battalion ran a complete maintenance operation, including third shop support for both



Engineers set up GP medium tents as temporary shelters for hurricane victims in South Florida.

engineer and ordnance equipment.

While work hours extended from sunrise to sunset, the battalion eventually rotated platoons one day off each week. With the hectic work schedule and the uncertainty about how long they would remain in Florida, morale, welfare, and recreation became an important issue. The chaplain conducted religious services and arranged for a folk concert in the base camp. The Miami Hurricanes and Miami Dolphins both donated tickets for football games, and the Corps and division set up rest and relaxation areas. The 43rd's base camp had a volleyball court, games, television, and a lagoon for swimming. (The lagoon was not the most popular spot after one soldier pulled out a 3-foot barracuda.)

About one month after their arrival, the 43rd had completed their mission and prepared to redeploy to Fort Benning. The 43rd Engineer Battalion and the 63rd CSE Company returned to Fort Benning on September 25 with the pride and knowledge that they had responded superbly in time of need.

LESSONS LEARNED. *Additional lessons regarding disaster assistance missions are in the Lessons Learned feature beginning on page 26.*

Issue: If disaster relief will be an engineer mission, the Engineer School should predesign some tent-city base camps and create a package similar to the Army Functional Component System (AFCS).

Discussion: Because engineers construct temporary camps in crisis situations only periodically, they are not fully trained for the task. Predesigned camps would help units respond quickly in a disaster relief effort. If relief camp construction is to become a common mission for combat heavy battalions, the Engineer School should provide the 51R electricians, who specialize in interior wiring, training in exterior power distribution.

Issue: Class A agents and accounts with local vendors are essential.

Discussion: To construct relief camps quickly, a unit needs immediate access to materials. The 43rd Engineer Battalion deployed with two ordering officers and three Class A agents. Homestead city helped establish accounts with a local hardware store and an electrical supplier for obtaining materials. These vendors were able to acquire materials from anywhere in the greater Miami area.

Major Allen C. Estes is the Battalion S3 for the 43rd Engineer Battalion, Fort Benning, Georgia. A West Point graduate, he has two masters degrees in civil engineering from Stanford University. He is a registered professional engineer in Virginia. MAJ Estes previosly served with the 36th Engineer Group headquarters and the 249th Engineer Battalion and taught in the Engineer School and Department of Mechanics at West Point.

First Lieutenant Alex Lucas is the battalion civil engineer for the 43rd Engineer Battalion. He is a graduate of the Airborne and Pathfinder courses. 1LT Lucas has served as platoon leader of a vertical and earthmoving platoon and as company executive officer.

Terminate the CEV — Now!

By Colonel J. B. O'Neill

I think it's time to refuel the debate on terminating the combat engineer vehicle (CEV). There is no question that the CEV is a maintenance and readiness albatross. One need only glance at the monthly DA readiness averages to see that it is consistently below standard. However, the issues to debate revolve around the necessity for the CEV on the battlefield and the replacement for the CEV (the M1 Breacher). Here is my bottom line up-front—"Gong" the CEV now!

The Problem

This is not a new debate. In fact, the Army decision to replace the CEV with the M1 Breacher appears complete, and it should be fielded this decade. Nor is the notion of getting rid of the CEV new. Not long ago, General Saint, the former Commander in Chief, U.S. Army Europe (CINC, USAREUR), recommended removing all CEVs from Europe. General Saint's position was based on the vehicle's documented record of excessive downtime, combined with an assessment that the missions performed by the CEV could be performed by other combat vehicles and systems organic to heavy divisions. Antitank ditches don't have to be breached solely with the CEV moldboard (blade); AVLBs also can perform that task.

Additionally, the CEV's demolition gun is extremely limited in range and accuracy. General Saint concluded that demolition targets could be engaged by the M1 tank. The M1's accuracy is a quantum improvement over the CEV's accuracy, although the M1 high-explosive antitank (HEAT) round's destructive effect is less than that of the CEV's 165mm high-explosive plastic (HEP) round. Comparable destructive effect can be provided simply by firing more HEAT on the target. In sum, the CINC, USAREUR concluded that an M1 can take out fortifications too! Therefore, the CEV is not mission essential.

Many heavy divisions now enjoy a full complement of M9 ACEs. They make a big difference in our obstacle-breaching capability. When the CEV was the only hardened earthmover in the force, it was clearly appreciated as a readiness "pacing item." The CEV's age and low density have historically combined to keep that pacing item's readiness rating below standard, often at a C4 rating (not ready). All that has changed.

The M9 ACE is now the engineers' premier protected earthmover for breaching operations. Thus, a C4 readiness status for the CEV no longer renders the entire engineer battalion C4 in overall mission capability. In fact, some units now equipped with the M9 ACE subjectively upgrade readiness when CEVs are down, and some are pursuing an exemption to the pacing item reporting requirements for CEVs.

The Solution

Pending acquisition of the M1 Breacher, I recommend that the Army replace the CEVs with M1 tanks equipped with plows. By making this interim adjustment, we will replace an unreliable vehicle with a reliable one equipped with a plow blade. The greater gun accuracy achieved with the M1 will also improve our ability to engage standoff demo targets. We may even justify production of an M1 HEP round for "bunker-busting" type missions. An M1 tank equipped with a plow provides the engineer force with a common, readily supportable chassis today—not years from now.

This solution will allow us to begin resolving crucial combat system documentation issues well ahead of the M1 Breacher's fielding. For example, we probably can determine the optimum number and type of required maintenance personnel. We can resolve operator and gunnery issues, prescribed load list/authorized stockage list (PLL/ASL) issues, etc. At the same time, table of organization and equipment (TOE) personnel spaces for the M1 Breacher will remain validated.

(Continued on page 16)

Functional Area Assessment Resolves Engineer Issues

By Colonel Wyland Leadbetter

"The focus...was modified to concentrate on restructuring the Army while maintaining total force readiness during a period of unprecedented change and turmoil."

The Army constantly undergoes change. The current effort to reduce the size of the Army in response to the collapse of the Soviet Union has forced significant changes in the total engineer force structure in the Active and Reserve Components. Changes in a large bureaucratic organization can be challenging, and those projected for the Army over the next few years will significantly affect many aspects of the military engineer structure. The magnitude of these changes requires specific oversights at all Army levels to ensure that they are accomplished with minimum disruption to the units involved.

To help manage changes at the Department of the Army (DA) level, the Vice Chief of Staff of the Army (VCSA) initiated the functional area assessment (FAA) process in 1983. The process provided a means for the Army to identify and resolve issues that precluded or inhibited the execution of short-term plans and programs. The intent was that through issue resolution, the Army, organized by functional areas in a stovepipe structure, would be forced to solve problems through horizontal integration.

The FAA's focus was on specific program objective memorandum (POM) years and units that would be affected most by the programmed

Objectives

- Accomplish the restructuring effort with minimum adverse impact on:
  - The soldier
  - Readiness
  - Modernization by force package
  - Personnel, training, and leadership development
  - Materiel redistribution
  - Doctrine
  - Total force integration
- Resolve issues at the lowest level that may inhibit restructuring effort.

changes. The goal was to ensure that all factors relevant to organizational development and materiel acquisition and fielding were integrated into the force with minimal impact on readiness. Ideally, each Army functional area was to conduct an FAA every two years.

The Engineer FAA

The first engineer FAA, in 1984, was an intense review of the total engineer functional areas, specifically structure, doctrine, training, personnel, and materiel. Issues in these areas were discussed thoroughly and resolved at the lowest possible level. Issues that could not be resolved went to the VCSA for resolution. While conducting the first FAA, the process of horizontal integration between all Army members, including major Army commands (MACOMs), proponent schools, units, and agencies that provided solutions to issues that had been unresolved for years, seemed to work. The impact was felt throughout the Army; the FAA process was here to stay.

The second engineer FAA, in 1987, also resolved issues successfully. During the Persian Gulf War, the process was suspended but not forgotten. In October 1991, the VCSA reaffirmed the Army's commitment to the FAA process. The focus, however, was modified to concentrate on restructuring the Army while maintaining total force readiness during a period of unprecedented change and turmoil. The purpose of the process was refined to look at the impacts of restructuring on specific functional areas throughout the POM years. It would be used to promote a well-coordinated, comprehensive, and cost-effective transition to a smaller force, while maintaining emphasis on warfighting readiness, maximizing combat power, and accomplishing force modernization.

The 1992 FAA

In June 1992, the Engineer School was informed that an engineer FAA was scheduled for presentation to the VSCA in October. The school's Systems Priority Integration Division (SPID), Directorate of Combat Developments (DCD) was tasked to lead the effort. A world-wide message to all MACOMs, Army agencies, and engineer units announced the FAA and requested issues for consideration.

An FAA team, consisting of one colonel, two NCOs, and a DA civilian, was established within SPID and committed full time to the project. Major General Christman, Engineer School Commandant, provided guidance to better focus their efforts. He identified equipment that needed immediate attention and requested that the team be sensitive to the mix of Active and Reserve Components and fully integrate both into the FAA process. MG Christman believed that a new mind set was required to focus attention on the national strategy for crisis response, including force projection, forced entry, national assistance, and disaster relief.

Issues were forwarded to SPID throughout June and July. The team catalogued each issue and assigned a point of contact (POC) at the Engineer School. The POCs reviewed each issue and resolved problems at the lowest possible level. Issues were catalogued according to TRADOC's

Purpose

- Examine the impact of restructuring the Army through the POM years on the engineer functional area
- Ensure well-coordinated, comprehensive, and cost-effective transition to a smaller force focusing on...
  - Maintaining wartime readiness
  - Maximizing combat power
  - Selective force modernization
  - Soldier welfare

Concept-Based Requirements System (CBRS) modernization functions: doctrine, training, leader development, organization, and materiel (DTLOM). An issue was considered resolved when the initiator and the school's POC concurred with the solution. A steering committee at the Engineer School reviewed the team's work and provided guidance throughout the process. Periodically, a general officer in-process review (IPR) was conducted to ensure that the FAA process was in line with MG Christman's intent.

By mid-August, 120 issues had been identified, and 105 of them had been resolved at the Engineer School. The remaining 15 were approved by the Commandant for presentation to the VCSA.

The review process, however, was not complete. During September and October, TRADOC and the Combined Arms Center commanders, a council of colonels and a general officers steering committee at DA, and the Deputy Chief of Staff for Operations and Plans (DCSOPS) reviewed the 15 issues. After their review, 10 issues remained. The FAA was now ready for presentation to the VCSA. The following issues were presented at a briefing conducted on November 12, 1992, in Washington, D.C.:

- ***Split responsibility for U.S. Army topography.*** Current Department of Defense directives and Army regulations split responsibility for topography between DCSOPS, Chief of Engineers, and Deputy Chief of Staff for Intelligence (DCSINT). Consequently, there is no single POC on the DA staff for topographic issues. Split responsibility makes it increasingly difficult to manage rapidly expanding digital data capabilities.
- ***Digital data communication requirement.*** There is an expanding requirement for digital topographic data and products at all levels. These demands potentially will swamp limited tactical communication capabilities.
- ***Direct support (DS) maintenance and repair parts availability for engineer units.*** Maintenance and repair-parts support for many engineer units recently was transferred to ordnance area support companies. Since then, engineer units have lacked timely DS support.
- ***Active diver requirement.*** The necessity for Army diving units in the active force was being questioned.
- ***Recruiting 00B and 52E personnel.*** It is difficult to recruit divers and prime power personnel because of the demanding entrance criteria and extensive training required for proficiency in these military occupational specialties.
- ***Career management field (CMF) grade structure.*** The 51 CMF grade structure lacks the promotion potential available in other CMFs.
- ***Commercial off-the-shelf equipment (COTS).*** Current Army procedures for acquiring COTS equipment do not provide equipment to support training or long-term maintenance requirements.
- ***Imbalance in the ACE/bulldozer fleet.*** Current distribution of the M9 ACE needs to be revised to change the mix of ACEs and bulldozers at the corps level. The ACE should be removed from the TOE of any unit, specifically light divisions, that will never receive the vehicle because of reduced procurement. Light divisions require the new deployable engineer universal combat

earthmover (DEUCE), which is a 30,000-pound bulldozer that can travel at 30 miles per hour and has a new rubber track that eliminates the requirement for prime mover. Additional ACEs are required to fill shortages in engineer units in Force Package 1.

- ***Digital data collection and generation.*** Current Army systems are unable to sufficiently exploit overhead civilian and military data collection assets. Army topographic engineers require an expanded capability to access these assets and provide near real-time topographic products to commanders. The topographic imagery integration prototype (TIIP) is a system of hardware and software that provides this capability. The current plan to field a single prototype system should be expanded to five systems—one for each of the four topographic battalions and one for the training base.
- ***Overaged, low density construction equipment.*** Much of this equipment is seriously overaged, but we do not expect to replace it in the current fiscal environment. While procurement is programmed in the POM, it is always deleted before the year of execution. No resources are currently identified to maintain the large quantities of overaged construction equipment that will remain in the field many years past projected life spans.

Issue Resolution

The FAA team worked closely with other Army agencies and commands during this period to define the solutions to each unresolved issue. In most cases, consensus was achieved on a preferred solution. Where agreement was not possible, multiple solutions were highlighted in the presentation. In response, the VCSA provided immediate support for the following programs:

- Procurement of the heavy assault bridge and breacher in the current POM.
- Procurement of TIIP systems for each topographic battalion and the training base in the FY 96 POM.
- Procurement of the DEUCE for light divisions in the FY 96 POM.
- Investment strategy of $25 million per year for procurement of low density engineer construction equipment in the current and FY 96 POMs.
- Establishment of an AMC task force to evaluate overaged engineer construction equipment.

The VCSA tasked his staff and other Army agencies and commands to further evaluate more contentious issues and to return at a later date for final resolutions. He—

- Directed DCSOPS to fold diver requirements into ongoing Joint Chiefs of Staff's roles and mission studies and to bring COTS management and procurement under control.
- Directed the Deputy Chief of Staff for Logistics (DCSLOG) to include Class IX resupply for engineer DS maintenance sections in the ongoing total asset visibility and strategic communication initiative. Additionally, directed DCSLOG to develop a schedule to retire overaged engineer construction equipment.
- Directed FORSCOM to review engineer equipment stationing at the National Training Center. Pre-position the corps' slice of engineer equipment that normally would be tasked to support a maneuver unit. That equipment would be available to units participating in training at Fort Irwin.
- Directed his staff to prepare a topographic single POC issue paper for decision by Army leadership.

In closing, the VCSA praised the engineers for their outstanding efforts in Desert Shield, Desert Storm, and the disaster relief operations in CONUS. He indicated that these recent combat and peacetime actions prove engineer force versatility and support their future viability. He closed by saying that engineers are leading the Army's efforts to integrate the total force into the FAA process. He stressed that engineers must be vigilant as the Army's watchdogs in the environmental arena.

In all aspects, the 1992 FAA was an unqualified success. It reaffirmed the importance of the FAA process to engineers and the entire Army community. As a result, engineers are now better prepared to address upcoming fiscal and structural changes. By using the FAA process, engineers can view the future as an opportunity to manage change.

Colonel Leadbetter is chief of the Systems Priority Integration Division in the Directorate of Combat Developments at the Engineer School. He previously served as chief of the Engineer and Mine Warfare Divisions, of the Engineer and Mine Warfare Directorate at Fort Monroe, Virginia. COL Leadbetter has a masters degree in engineering from George Washington University and is a graduate of the Command and General Staff College and the National War College.

Engineers Vie for Expert Sapper Honors

"A test! I want to develop a competition similar to the Expert Infantryman Badge (EIB) and Expert Field Medical Badge (EFMB) competitions that we can use to demonstrate our skills as sappers. I want it to be a physically and mentally demanding event that includes the total spectrum of light engineer and light infantry skills required to operate in the 25th Infantry Division (Light). I also expect it to be an excellent training assessment for the battalion. At the completion of the competition, those who excel should be recognized by an award of some kind."

Lieutenant Colonel Gregory G. Bean
Commander, 65th Engineer Battalion
February 1992

From LTC Bean's directive, the expert sapper test was created and tested on soldiers in the 65th Engineer Battalion, Schofield Barracks, Hawaii. Captain Tom Vossman studied the directive and drafted objectives and procedures for the test. He analyzed the battalion's mission essential task list and supporting individual tasks as well as input from commanders, staff officers, and senior NCOs. Then he developed a list of skills and technical knowledge that included common tasks, sapper skills, air assault skills, and a physical fitness assessment. CPT Vossman's objectives were to—

- Develop a demanding and challenging test of sapper (12B) and common skills.
- Recognize sappers for their combat engineer skills and extraordinary physical readiness.
- Gauge the status of individual skill abilities to assess training proficiency.
- Provide a training as well as an evaluation opportunity.

By Captain Geoff Gillespie, Royal Australian Engineers

Thirty tasks, broken into five categories, were identified to support the objectives. The categories were a written test, a physical fitness assessment, day/night land navigation, hands-on proficiency in 25 individual skills, and a 12-mile road march. All 12B and 21B soldiers in the 65th Battalion, regardless of rank, participated. To earn recognition as an expert sapper, soldiers had to receive a GO on each task.

Written Test. A comprehensive exam was developed to determine the soldiers' knowledge of 12B (skill levels 1 through 3), air assault, and common task testing (CTT) tasks. It was a timed test, and Field Manual 5-34 was the only authorized reference. Soldiers had to score 80 percent or more to receive a GO.

Physical Fitness Test. This was the Army Physical Fitness Test (APFT), using the EIB standard of 80 points per event to receive a GO. Standards for push-ups and sit-ups, according to FM 21-20, were strictly enforced.

Day and Night Land Navigation. Soldiers' navigation skills were tested using the division's EIB course. Soldiers had to attain four out of five points on day land navigation and two out of three points on the night dead-reckoning course.

Hands-On Component Test. This test was the heart of the competition. Soldiers demonstrated their ability to accomplish combat engineer tasks (skill levels 1 through 3), CTT tasks, and air assault tasks in a tactical environment. Events were graded on a GO/NO GO basis. Twenty-five tasks, including mine/countermine warfare, demolitions, knots, lashings and wire tires, communications skills, weapons knowledge, sling load/air assault operations, and first aid, were tested. Standards were taken from the EIB, Expert Field Medical Badge, Air Assault school, CTT, and Soldier Training Plan manuals. Participants could retest on two tasks and still remain competitive.

The 12-mile road march was the make-it-or-break-it point for many candidates.

12-Mile Road March. This was the final and most grueling event of the competition. It was based on the EIB and air assault standards for a 3-hour march with full combat load (load-bearing equipment, weapon, mask, kevlar, and 30-pound ruck). What distinguished this road march from others was the course: more than half of it was uphill, including a 3-mile stretch that rose more than 1,000 feet with several short, sharp inclines. Several veterans of the ranger, sapper, and air assault courses remarked that this road march was the most challenging of their careers. The course definitely helped to identify those soldiers who were extremely physically fit and deserved the title Expert Sapper.

The Rewards

Sappers in the 65th designed a pin and a certificate for test participants. Soldiers who passed all the test components were awarded the expert sapper pin, which can be worn on an invisible part of their uniform. All the soldiers, whether they passed or failed, received a certificate to acknowledge their participation in all phases of the grueling competition.

How the 65th Fared

Scheduling the competition was difficult because the 65th is a divisional light engineer battalion whose companies are continually on the go. The unit frequently supports the Joint Readiness Training Center and deploys to Australia and the outer islands of Hawaii. Finding a time when all companies could train up and participate in the competition without major distractions was nearly impossible. However, the battalion managed to come together, and all 12B and 21B soldiers competed and performed well. Success, for this first-time competition, came to only seven soldiers. However, all participants left the competition better trained and eager to compete again for the expert sapper title.

After-action reports from the 65th

The Expert Sapper Test emphasised testing and training. Each candidate was thoroughly debriefed on their performance for each activity. Here SSG Chapman assesses SSG Lee's knowledge of the AN-PSS 11 mine detector.

showed that all levels supported two main areas: the test's ability to determine extraordinary soldiers and its training value. Many of the 65th's young privates and specialists were excited and challenged when they had to demonstrate their abilities on skill levels two and three tasks. Testing at these levels gave the soldiers an idea of what they could expect to do as a team or squad leader in a combat situation. They could start meeting the challenges of the future.

Soldiers at all levels gained an understanding of the skills and standards that they had to meet. Specialist Christopher Kelly, Headquarters and Headquarters Company, expressed his view of the test. "The things I failed I felt were minor. I now know what I need to do. I think that with good personal preparation next year, I can pass. It was a good test."

By studying the test results, leaders could identify areas where more training or better training tactics were needed. The commander gained insight into individual soldier's abilities in terms of skills, spirit, morale, and endurance. First Sergeant Michael Balch, Alpha Company, agreed. "The [expert sapper] test is an excellent idea to use as a vehicle to train our soldiers toward a goal of achieving expert knowledge in their primary MOS."

The 65th Engineer Battalion is proud of its expert sapper competition and will share the program with anyone who asks. They intend to conduct the test annually and hope to increase the success rate to 25 percent or higher next year. Thucydides, in *History of the Peloponnesian Wars*, may have stated it best when he said, "We must remember that one man is much the same as another, and that he is best who is trained in the severest school."

Captain Geoff Gillespie, an Australian exchange officer, is assigned to the assistant division engineer section in the 65th Engineer Battalion, 25th Infantry Division (Light), Hawaii. He is a 1982 graduate of the Officer Cadet School, Portsea, Australia.

(Personal Viewpoint continued)

Why Now?

It is important that we act now for two reasons. First and foremost, we engineers need to restore our credibility with the combined arms force. We are now, and have been, unreliable because our CEVs are hard to maintain and often are not available. Far too many maneuver commanders literally scoff in disgust at CEV readiness. That skepticism is starting to join a festering (though undeserved) disdain for the capabilities and reliability of the M9 ACE. Because the engineers' reputation is in precarious jeopardy, I strongly urge us to act quickly. Our engineer force will overcome this skepticism only when we replace the CEV with a reliable breaching vehicle and when we demonstrate the reliability of the M9 ACE.

Secondly, the resource environment will never be better than it is now. In the near future, already scarce resources will become even scarcer, and competition for the few remaining resources will be brisk. Now is the time to demonstrate the merits of an M1 chassis for our interim breaching needs.

There are more issues to this debate (on both sides), but time is running out. One bright note: My division commander, Major General Blackwell, is solidly in favor of replacing the CEV with an M1 with plow, and he has formally submitted a proposal to Major General Christman for consideration. Perhaps you'll join us in supporting this proposal!

Colonel J. B. (Jack) O'Neill is commander of the 24th Infantry Division (Mechanized) Engineer Brigade. His previous heavy division experience includes service in the 16th Engineer Battalion, 1st Armored Division, and as battalion commander, 17th Engineer Battalion, 2nd Armored Division.

Book Review

This Kind of War: A Study in Unpreparedness, by T. R. Fehrenbach. Macmillan, 1963, and Bantam Books, 1991.

T. R. Fehrenbach tells the fighting soldiers' story of the Korean War, from the surprise invasion through the difficult fighting on the harsh terrain of the Korean peninsula to its inconclusive ending. The lessons learned from this conflict must not be lost on our newly elected President and his chosen domestic, international, and military advisors. We have heard military leaders tell us, "No more Task Force Smiths!" But we and our political leaders must understand this tragedy in order to prevent a similar occurrence in the future. To ensure we provide leaders with appropriate advice, all of us must also understand the individual and unit readiness requirements of our armed forces. This is especially important in light of the current force reduction.

This Kind of War is a comprehensive and impressively written history compiled from many sources—official records, operational journals, histories, memoirs, and newspapers. The most important references were the personal narratives of men who served in Korea. They added a human character to the book, making it extremely interesting to read as well as a learning experience.

The book begins with a superb short overview of the political and military situation at the time. In fact, the reader has a clearer picture of the world in 1950 than the President had. Fehrenbach continues the book as a platoon leaders' and company commanders' story. It is a history of their experiences, pain, suffering, and unpreparedness. Fehrenbach immediately draws you into the heart of the subject and does not let you exit until the book is finished. Early on you are alongside the courageous Colonel Smith and his men from the untrained 24th Infantry Division, asking what you could have done to stop the superior invasion force. Later you are with the 7th Marines, fighting well-trained Chinese at the Chongjin Reservoir, and then with the 2nd Infantry Division on Heartbreak Ridge.

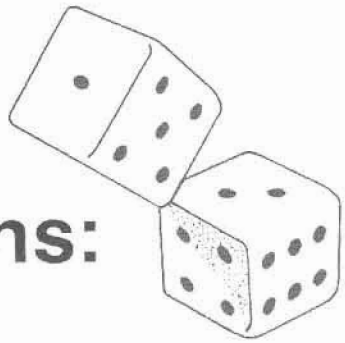
The author was a combat leader at platoon, company, and battalion levels during this war. Using his experience and many personal interviews, he describes the feelings, pressures, and fears of the soldiers, which enables the reader to understand the actions and frustrations of those who fought. Readers can apply this to their own experiences and begin to appreciate the problems forces faced in Korea.

Every lesson that we must teach junior leaders in our modern Army is covered in this book. The more you study history, the more you find that these lessons do not change—and they recur every time an army is mentally and physically unprepared to fight. Soldiers in small units can use this book in their training (at the platoon level war does not change). Soldiers live and die by their training, and the best trained soldiers and units have the edge on survival.

This book must be read and re-read by every company-level officer in the U.S. Army. We are an army that is coming home, (just like after World War II), and we must be trained for contingency, short-notice operations. The Korean War was a contingency operation that got out of hand—something we must not let happen again. We must properly prepare and equip our soldiers for the first fight, where they must win.

This book also must be read by our senior civilian and military leaders. There will always be some risks built into the defense budget, but the risks must not be at the expense of our soldiers. The author points out how critical that concept is. We must still procure the best weapons for our fighting soldiers. We must provide them the mobility required for success. We must continue to provide them the best training, like that offered at our combat training centers. *This Kind of War* provides an excellent perspective on war and soldiers, and what they require to survive and be victorious.

Lieutenant Colonel (R) Roger J. Somerville is a retired combat engineer. Commissioned through the ROTC program at Montana State University, he served in numerous troop assignments in the 82nd Airborne Division, 1st Armored Division, and 177th Armored Brigade. His last assignment was as chief, Tactics, Training and Doctrine Division at the Engineer School.



Gambling with Demolitions:

What are Safe Distances?

By Master Sergeant William Green, Jr.

Boom! A loud explosion rips through the air, and a cheer rings out from happy soldiers. Another successful demolition mission. But, wait! A strange sound is heard, followed by a weak scream for help. An accident—an unplanned event—has occurred. A soldier was struck by a piece of shrapnel.

This tragic scenario has occurred 32 times in the past four years, resulting in four deaths and 28 seriously injured soldiers. Not long ago a piece of metal was propelled from a detonation site into the face of a soldier standing behind an ammunition vehicle 200 meters away. Although the shrapnel removed most of his face, the soldier is still alive.

"A freak accident," you might say, or "the price of doing business," or "accidents come with the profession." You have probably heard leaders repeat these or similar phrases throughout your career. A more appropriate phrase, however, is "failure to enforce the standard."

Maintaining a safe distance is critical to avoiding a demolition accident. A few months ago, a soldier in one unit was sitting on the ground about 180 meters from a detonation site when a piece of shrapnel struck him in the chest. He lived only 3 hours. Again, leaders had failed to ensure the minimum safe distance from the detonation.

For those few engineers who have missed the experience of standing in a 5-second hailstorm, don't live your fantasy on a demolition site. That's called gambling with your life. Gambling that a piece of shrapnel or debris has not identified you as its landing zone.

What are the odds that a piece of shrapnel has the trajectory and force to seriously injure or kill a soldier? That tough question depends on several factors: The number of demolition missions taking place on any given day worldwide, the number of soldiers participating in the demolitions, and the amount of debris and fragments that becomes airborne. Other variables that affect the equation are the weight and shape of the demolition, soil content, air density, angle of projection, and velocity. The result is a complicated equation by which to determine your odds.

But for the 32 soldiers involved in explosives accidents in the past 48 months, the answer is simple: Enforce the standard!. The common-sense standard says that the greater the distance you are from the explosion, the smaller the chance of being struck by shrapnel.

Some leaders continue to knowingly violate the minimum safe distances rather than enforce the standard. To be safe, leaders must go to the appropriate documents for guidance. When these documents differ, use whichever distance is the greatest.

The purpose of all demolition training is to prepare for combat, where the reality is that soldiers cannot always move to a safe distance. With that in mind, every leader must ask himself, "Do the training risks outweigh the cost?" To minimize the risk in any situation, the Safety Branch recommends that leaders use the best product on the market today: risk management. This easy-to-use product can enhance soldiers' safety without hindering the success of a mission. Risk management ensures that standards are known and risks are controlled (eliminated or reduced).

To be effective, the rules and five-step process for risk management must be fully understood by all personnel involved:

Rules of risk management:

- Integrate risk management into planning
- Accept no unnecessary risks
- Make risk decisions at the proper level
- Accept risk if benefits outweigh the cost

The five-step process:

- Identify the hazards and associated risks
- Assess the risk
- Develop controls
- Implement controls
- Supervise

It is the responsibility of leaders at all levels to ensure subordinates know and follow the rules and regulations that pertain to ranges and the type of demolition training being conducted. The risk management process is easy to use and will identify control measures that may prevent another pointless injury or death. Don't be a leader who has to say, "If only I had enforced the standard, this accident would not have happened."

Standards for demolition training are provided in Chapter 18 of AR 385-63 and Chapter 6 of FM 5-250. Know and enforce them. Minimum safe distances for some demolitions are shown below.

MSG William Green Jr. is the Engineer Branch Liaison NCO at the United States Army Safety Center, Fort Rucker.

Minimum Safe Distances

Demolition Type	AR 385-63	FM 5-250 (pages 6-6 and 6-7)*
Bare charges	Use the missle hazard distance: *Less than 27 pounds* (lbs) - 300 meters (see para 18-11 for exception *27 - 500 lbs* - distance in meters equals 100 times the cube root of the pounds of explosive *More than 500 lbs* - minimum of 800 meters	Same as AR 385-63, as shown on page 6-6, FM 5-250
Cratering charges		
40 lb	Use the missile hazard distance (above)	*Less than 30 kg* - 300 meters *More than 30 kg* - 500 meters
M180	Not mentioned in AR	1,200 meters
Shaped charges		
15 lb	275 meters in defilade	1,000 meters. Distance may be reduced to 300 meters when fired vertically into the ground.
40 lb	Same as for 15 lb	Same as for 15 lb
M1A2 Bangalore torpedos	500 meters if no shelter is available 200 meters in defilade	1,000, meters if personnel are at right angles to axis. If in the line of axis, 200 meters for standing personnel and 100 meters for prone personnel.
Steel cutting charges	Charge not to exceed 2 pounds. Must be fired in an appropriate confining structure with an excavated pit at least one meter deep. If fired in an open pit, a mat made of hemp-type material should cover the charge. Personnel should be at least 300 meters away in defilade, preferably under cover.	1,000 meters
Breaching charges (concrete)	Charges on concrete should not exceed 40 pounds and should be placed on the side nearest the observers. Personnel should be at least 300 meters in defilade. An unoccupied distance of 900 meters must be provided on the side opposite the charge.	1,000 meters. Distance may be reduced to 500 meters if personnel are prone and wearing kevlar.

* **For FM 5-250: Numbers from chart on page 6-7 must be compared to chart on page 6-6. The safe distance is the farthest of the two distances.**

Close Up:

Engineer Restructure Initiative

By Alan Schlie

"Our objective is to be available at the front line of troops (FLOT) and in the deep attack, to be capable, protected, mobile, and productive and, most important, to be responsive to the maneuver commander. But new equipment alone is not the panacea. We must forge a new engineer architecture. We need—

- *More compact units with a higher ratio of equipment to manpower.*
- *Greater integration with the Army field structure at all levels.*
- *A forward shift in command and control.*
- *Reduced overhead and greater productivity."*

As Commandant of the U.S. Army Engineer School, Major General Richard S. Kem's announcement in 1986 set in motion events that would mesh engineer missions with AirLand Battle tenets and lead to the current Engineer Restructure Initiative (ERI). With the expected publication of an evolutionary FM 100-5, *Operations*, in May 1993, the term AirLand Battle (ALB) and the concept of AirLand Operations (ALO) will no longer be used, but the tenants remain unchanged. This article describes the ERI structure, how it was fielded, and results of the fielding.

Background

Since World War II, engineers have faced serious battlefield deficiencies because of cumbersome organizational structure and antiquated equipment. Engineer support to the close combat heavy combined arms team was broken, and there were not enough engineers organic to maneuver forces. Attempts to correct the problem by assigning ad hoc task forces forward out of corps assets overloaded engineers at all echelons. Command and control (C2), communications, maintenance, and logistics became complicated to the point of not working as battles progressed. Additionally, such impromptu structuring fostered a false sense of flexibility at the corps level.

The ERI Solution

ERI, developed in 1988 and 1989, provided sufficient engineer assets organic to the division and simplified command and control, communications, maintenance, and supply. Under this concept, engineers would habitually associate with a warfighting maneuver unit, thus increasing responsiveness and building teamwork. ERI's focus was not only on the heavy division but also on providing maneuver commanders at corps and division levels with dynamic, flexible, and responsive engineer support to influence the battle. Restructuring corps combat engineer battalions, combat support equipment companies, and bridge companies retained the corps' capability and flexibility.

TRADOC reviewed the heavy division engineer brigade's ERI table of organization and equipment (TOE) in October 1990. Headquarters, Department of the Army (HQDA) approved the TOE in March 1991, and the 1st Armored Division and 3rd Infantry Division, located in Europe, converted in August 1991. The conversion process in engineer units Army-wide has continued since 1991, with all but National Guard units now converted. The new organizational structure embodied combined arms teamwork and current warfighting doctrine. During the developmental and approval time frame, TRADOC and HQDA had three ongoing force-design processes that impacted on the engineer force structure and ERI:

- TRADOC's AirLand Operation force-design process focused on lean not robust.
- The Total Army Analysis (TAA) 99 force structure review process examined major conflict areas

and how the Army would respond to national security threats.

- The Army was restructuring to reduce conventional forces in Europe.

The ERI design anticipated changes that ALO would cause in divisional headquarters and maneuver brigades. This was done by creating the dual tactical operations center (TOC) of plans-operations, a tactical command post (TAC), and a REAR. The requirement for an engineer presence at these locations came from the ALB-Future White Paper and TRADOC Pamphlet 525-5, *AirLand Operations*.

Under ALO, the engineer brigade headquarters and headquarters detachment (HHD) would disappear, and selected positions would be retained as part of the division's staff. These positions would be included in the division HHC TOE. Engineer battalions would become organic to the maneuver brigades. While retaining their identity, these battalions would lose their support platoons to the forward support battalions (FSB). To prevent excessive loss of engineer personnel through these consolidations, personnel strength caps were imposed. This meant that specific officer functions could not be documented.

The new FM 100-5 does not call for the force structuring advanced by ALO. Thus, if ERI did not evolve as previously planned, the original organizational structure would remain solid. The primary intent was to correct recognized battlefield deficiencies, not second-guess future force structure and doctrine.

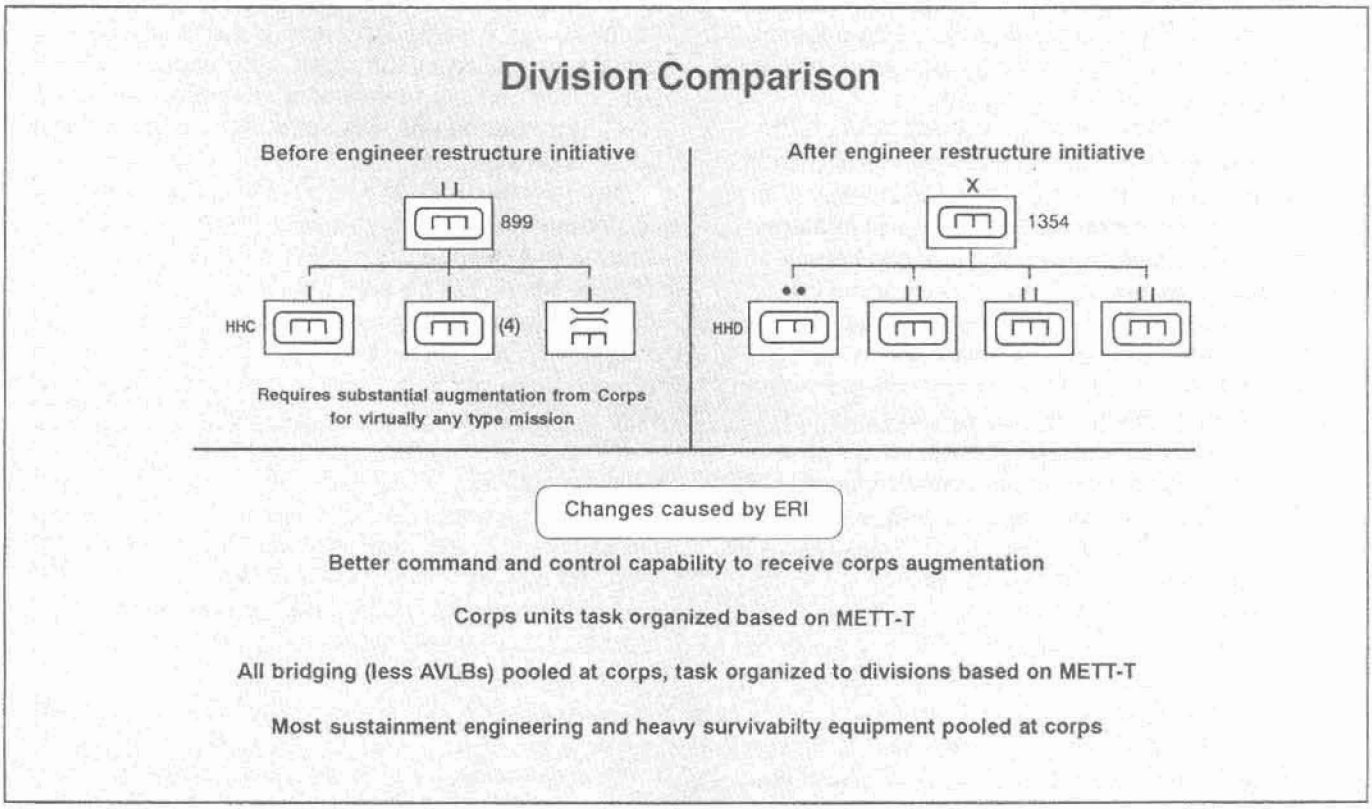
Under the ERI design, the engineer brigade headquarters provides advice and assistance to the division staff. The focus is strictly engineer, and the commander in the field must be innovative in the techniques employed to provide that support. The brigade HHD cannot provide combat service support for the subordinate engineer battalions and is extremely limited in supporting itself.

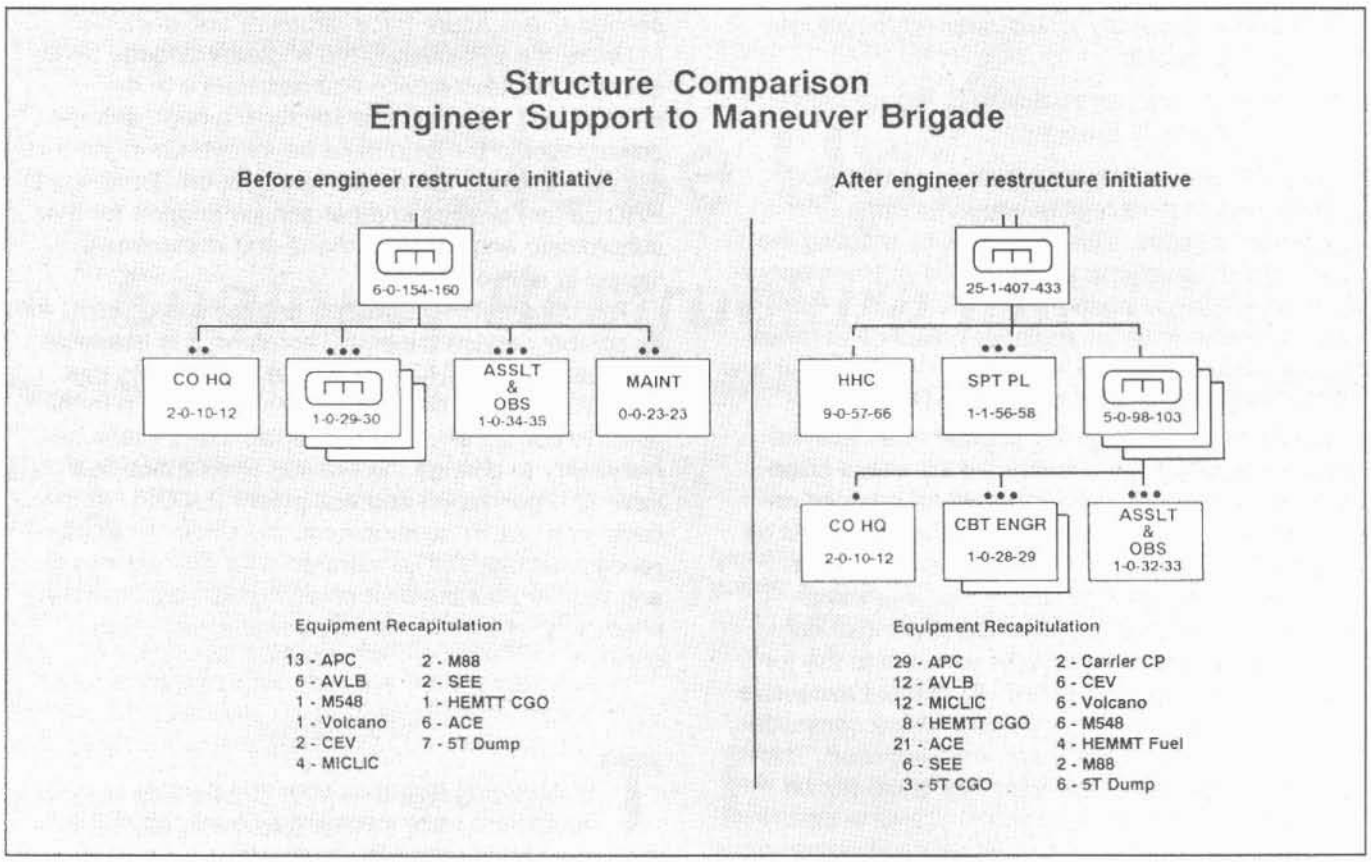
The brigade HHD depends on the division HHC for its combat service support. Therefore, it is essential that the division HHC be capable of providing that support when the brigade HHD is established in the field. To correct any support deficiencies, it may be necessary to change the division HHC's modified table of organization and equipment (MTOE). At the beginning of ERI development, the Engineer School recognized that TOCs operated on a 24-hour basis and required double-shift manning, so trade-offs were necessary when strength caps limited what was allowed.

ERI Issues

The following issues concerning personnel and equipment were identified by field commanders when they tested the ERI structure:

Personnel S2 Officer. This position focuses on gathering engineer intelligence on the opposing force. Collecting general military order of battle information is of secondary importance. Multiple shifts and





locations dictate that more than one officer must have S2 skills. Thus, the TOE includes several plans and operations positions that have overlapping knowledge and skills in the intelligence arena. An NCO monitors the reconnaissance and intelligence collection effort and performs full-time security duties. The brigade HHD has an MI-qualified tactical intelligence officer to monitor general intelligence work.

Communication-Electronics (C-E) Officer. It was not possible to duplicate this position at both the brigade and battalion levels. While the position's importance was not overlooked, supervisory strategy was the compromise. A C-E officer at the brigade level (assisted by an NCO) distributes signal instructions and plans C-E networks. NCOs at battalion and company levels complete that strategy.

Maintenance Officer. The need for this position was recognized initially but was not documented based on the priorities used to select officer positions. The brigade maintenance warrant officer (WO) and senior NCO track maintenance and readiness at the brigade level. The WO also provides expertise for engineer equipment maintenance within the brigade. At the battalion level, the support platoon has a platoon leader, platoon sergeant, WO, and motor sergeant, each with specific duties to support the commander's maintenance plan.

NBC Officer. Because the brigade staff is located close to the division staff, there is no NBC officer assigned at the brigade level. NCOs with NBC responsibilities are provided at the brigade and battalion levels.

Chaplain. When the TOE was approved, manpower regulations did not authorize a chaplain in the engineer battalion. The chaplain from the maneuver battalion was expected to provide services for engineers as well as infantry and armor personnel. A two-person ministry team was eliminated from the HHD because the unit was small and an extension of the division staff.

Equipment Records Clerks. The TOE consolidates equipment records and repair parts at one location to save overhead. While contact maintenance teams will be sent out when necessary and individual mechanics may be attached to platoons or companies, they will all belong to a single maintenance section. Consolidation makes it almost impossible to break the unit into equal groups.

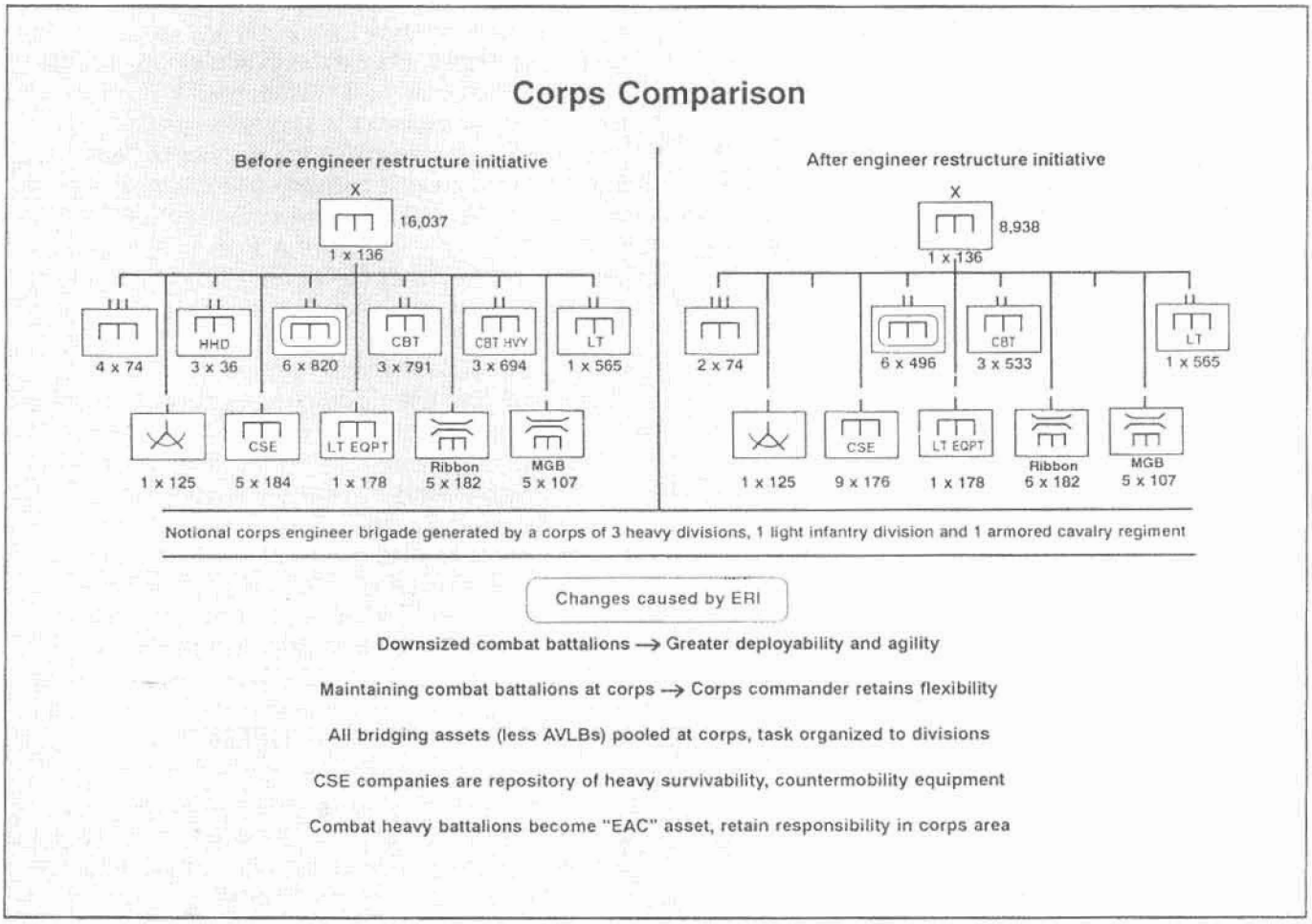
Drivers. The addition of vehicles and drivers for executive officers (XOs), command sergeant majors, and first sergeants was not supported doctrinally by the engineers. While transportation for the unit's "problem solvers" remains a very real need, the TOE cannot be changed until vehicle allocation rules are revised. The Engineer School therefore had to choose either a wheeled or tracked vehicle for the battalion commander. Because the XO's tactical position is at the TAC, the school decided that the battalion commander needed a tracked vehicle to

facilitate movement on the battlefield. The XO's wheeled vehicle would be available for either officer, when required.

Field Feeding. This initiative, developed by the Quartermaster School and approved by the Chief of Staff of the Army, was implemented Army-wide in 1989. Under the Army field-feeding plan, a soldier is fed by the nearest facility. The Quartermaster School developed ration issue and accounting procedures to accommodate this method of field feeding. Units must adjust their method to accommodate local circumstances. The Quartermaster School is evaluating comments from the training centers and will solve problems caused by the increased coordination, planning, and expended manhours.

Equipment. Some equipment changes have already been approved and incorporated in the Commander's TOE Handbook (DA TOE Handbook 05330L-CTH), which is scheduled for publication in mid-1993. Inclusion of the following items in the base TOE, as published in the consolidated TOE update, is scheduled to occur by April 1993:

- A water trailer and camouflage netting have replaced the collapsible drum and its tiedown and the towing and lifting assembly in the engineer company (TOE 05337L).
- Two small emplacement excavators (SEEs) will be retained in each engineer company. Operator spaces for these vehicles are created by converting two 12Bs to 62Js in the obstacle section. Additional support equipment for the SEE is also included.
- The Engineer School has requested that engineer companies retain two 5-ton dump trucks in the obstacle section. The maneuver brigade has very limited capabilities to transport the required amounts of barrier and demolition materials. Thus, if engineers need materials to execute mobility and countermobility tasks, the 5-ton dump trucks, as existing, on-hand equipment, can rectify the shortfall. This request is still under consideration.
- The support platoon (TOE 05536L) will receive four engine analyzer sets. This will allow one simplified test equipment/internal combustion engine (STE/ICE) to be deployed with each contact maintenance truck while one is maintained at the maintenance section's field site. The support platoon will have two steam cleaners instead of one to increase their maintenance and decontamination capabilities.



What ERI Did

- Engineer brigade created with three engineer battalions in armored divisions
  - One battalion for each ground maneuver brigade
  - No "dedicated" engineers for divisional cavalry squadron, aviation brigade, or other divisional units
- All divisional bridging reorganized and moved to corps
- Divisional engineers focused on offense and mobility
  - Design was parallel to AirLand Battle-Future workshops
  - Design assumed 80 percent offense, 20 percent defense
  - Design provided only for a hasty defense
  - Scatterable mines provided dynamic countermobiliy capability
  - Survivability capability severely curtailed
  - Sustainment engineering capability was not a priority
- Significant combat engineer capability remained at corps
  - Mechanized engineer battalions
  - Wheeled combat engineer battalions
  - Combat support equipment companies
  - Assault float bridge and medium girder bridge companies

Nonengineer Issues

The following ongoing initiatives are outside the engineer functional area but will impact on revisions to the ERI TOE:

- The chaplain manpower rule was changed so that a chaplain with an assistant and a vehicle will be placed in each battalion and in the brigade.
- The mail clerk manpower rule was changed so that each battalion will have a mail clerk.
- The chemical officer manpower rule was revised so that each brigade staff will have two chemical officers.
- The PAC clerk rule was revised so that each battalion will have one additional clerk.
- The supply clerk rule was revised so that each company will have a supply specialist.
- A three-medic crew is assigned to each APC that is used as an ambulance. Those APCs will be added to the battalion in sets of two.
- The legal clerk rule was revised so that each battalion will have one clerk.

The latest manpower initiative readjusts the planning factors used to determine the annual available MOS productive manhours (AAMPH). By increasing the AAMPH, the number of persons needed to perform a function, such as supply clerk, is reduced. While the AAMPH directly affects the number of mechanics, it "bleeds" over into all manpower requirement calculations. The Engineer School has not yet validated the final impact of this initiative.

While these changes may not seem significant, they improve capabilities without disrupting the approval process for ERI and without impeding the plans to field ERI organizations. Both were key considerations at the time, since the Engineer School's intent was not to change ERI until many of the conversion pains were worked through and the dust settled.

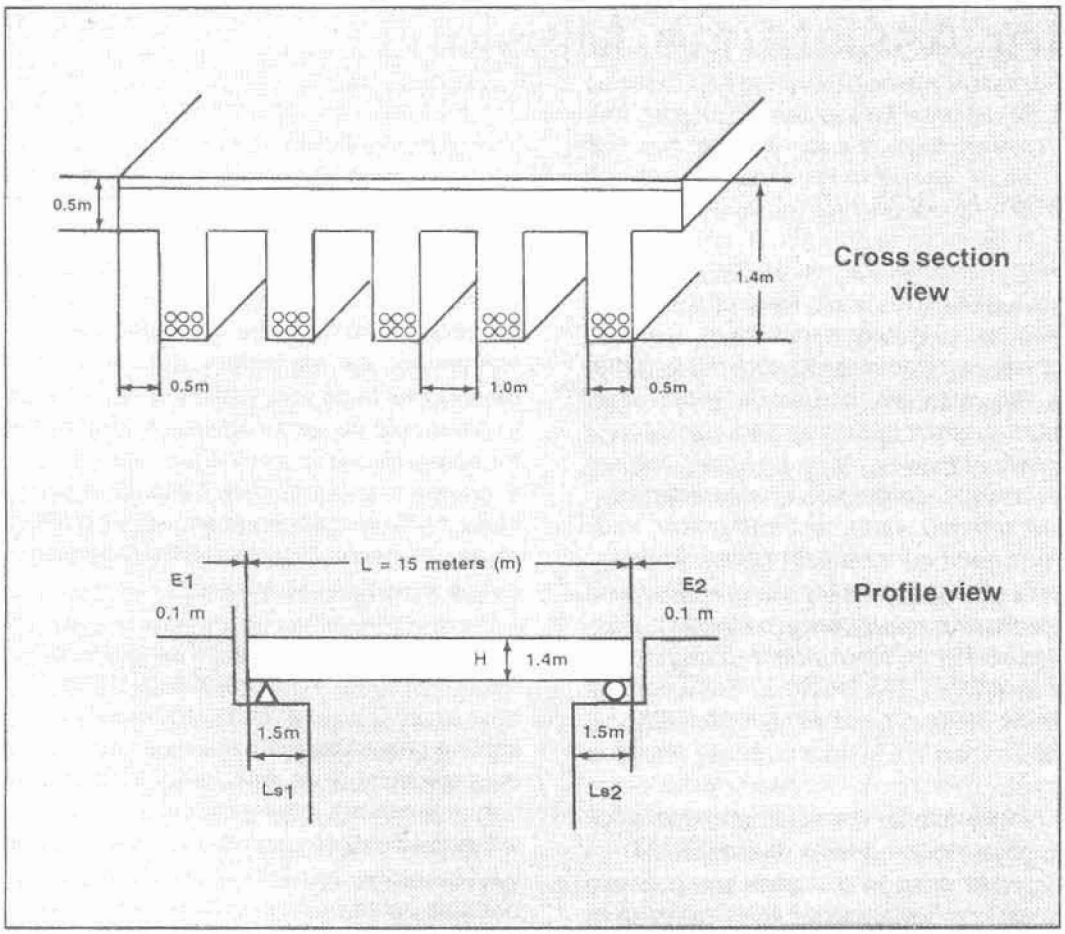
To better support the ERI battalions within the heavy division, ordnance and quartermaster proponents have increased the number of personnel in the forward support battalion and the main support battalion (MSB). The maintenance company, FSB (TOE 43009L000) has added a 17-soldier engineer support team. In response to the division's increase in engineers, the main support company (TOE 42004L100) has been increased by three soldiers and the service and support company, MSB (TOE 42007L100) has been increased by seven soldiers. Engineer brigades in heavy divisions should coordinate with their installation MTOE manager to ensure the proper support units are documented.

The Engineer School's Directorate of Combat Developments is reexamining ERI requirements based on the revised FM 100-5 and its evolution of current operational precepts, as opposed to full acceptance of ALO concepts. Sufficient field experiences during war and peace time have been validated and will allow meaningful changes to be made to the engineer brigade, heavy division TOE.

Alan Schlie is a military organization and equipment analyst with the Directorate of Combat Developments. A retired command sergeant major, most of his active duty career was spent in divisional engineer battalions.

Engineer Problem

PROBLEM: Determine the most efficient method of destroying the simply supported, reinforced - concrete, beam and slab bridge shown below using C4 explosives.



Reference: FM 5-250.

Engineer Solution on page 35.

Lessons Learned:

Disaster Assistance Missions

By Major James R. Brannon

The following Lessons Learned address disaster relief. In the past three years (September 1989 - September 1992), U.S. military forces have responded to three hurricanes and two typhoons that struck densely populated areas. After the most recent storms, Hurricane Andrew in Florida and Louisiana and Hurricane Iniki in Hawaii, Army engineer soldiers provided relief services, cleared and hauled debris, produced and distributed water, restored power, and constructed life support centers (tent cities). These missions revealed important lessons in preparedness, leadership, organization, equipment, and safety. For more information write to Commandant, U.S. Army Engineer School, ATTN: ATSE-ESA-L, Fort Leonard Wood, MO. 65473-6630. Or, call (314) 563-5303, DSN 676-5303.

ISSUE: To rapidly deploy the right combination of forces and equipment tailored for a disaster is difficult. Lack of specific mission guidance and poor engineer intelligence from the disaster zone combine to make such deployments especially challenging.

DISCUSSION: A few units that deployed to Florida found they were short of needed tools, sets, kits, and outfits (SKOs). Some also lacked critical haul capability for heavy equipment. While those challenges were overcome through an unprecedented joint operation, some units could have been better prepared.

Engineers responding to natural disasters must be prepared to accomplish a variety of horizontal and vertical missions. For hurricane clean up, a primary task is debris removal. This requires large numbers of chain saws, dump trucks, and bucket loaders. An unanticipated mission in Florida was the massive effort required to clean up and open several dozen elementary and secondary schools, which entailed extensive electrical and interior work. The requirement to set up life support centers created heavy demands for carpenters and electricians (and their SKOs). Not everyone brought all their tools. One commander observed: "The initial engineer mission NEVER includes all eventual tasks! Nobody is smart enough to define everything in advance."

RECOMMENDATION: If possible, units should take their entire TOE to a disaster site. They should take all SKOs, generators, chain saws, pumps, and lighting sets. Anticipate the need for light- and heavy-duty electrical work, temporary tenting, power generation and lighting, carpentry, temporary plumbing, water purification, and road clearance. To increase haul capacity, take side racks for cargo trucks. Take portable lights and generators, which can do double duty for round-the-clock construction and operations.

ISSUE: Disaster areas face critical shortages of needed supplies and construction materials. Lumberyards, hardware stores, and other vendors may be closed or destroyed. Items these suppliers normally provide may not be available.

DISCUSSION: The scope of the damage from Hurricane Andrew was unprecedented. Almost every item for basic human needs had to be hauled in and distributed. While this was captured in local and national news, the need for plywood, nails, tools, plastic, canvas, electrical wire, and other hardware items

largely went unnoticed. Be aware that in any disaster area some local vendors may engage in price gouging.

RECOMMENDATION: Within reason, purchase equipment and materials you are likely to need before deploying. Specifically: Purchase additional chain saws with extra blades and chains (allow for two 24-inch models per squad, and one 30-inch or 36-inch model per platoon). Units will also need plywood, forklift pallets (they make excellent foundations for tent flooring), nails, exterior Romex type electrical cable, duct tape, electrical tape, PVC glue and sealant, 12-foot and 16-foot ladders (for hanging cable and interior electrical work), and some fluorescent lighting fixtures (for tents). Take the National Electrical Code (NEC) book to ensure your work is up to a standard that can be hooked into city power.

ISSUE: Hurricanes and other disasters often destroy all major means of communications. Telephone lines, power poles, radio towers and transmitters, and cellular telephone towers may be out of service for days or weeks. Communications will be a premium issue for engineer units.

DISCUSSION: Hurricanes Andrew and Iniki knocked out all communications. In Dade County, Florida, only two of five cellular telephone towers survived the storm. Because communications systems for Active, Reserve and state National Guard forces vary widely, cellular phones may be the best way for federal, state, and local agencies to keep in touch. In Florida, for example, Army reserve frequency modulated (FM) communications were not compatible with mobile subscriber equipment (MSE) from the XVIII Airborne Corps. Additionally, local police, fire, county sheriff, ambulance services, hospitals, and municipal governments could not communicate with military forces. Military FM and civilian FM used entirely different frequency bands and were incompatible. While the best overall military communications system for static use was MSE, cellular phones were valuable, especially when communicating with other mobile military forces or civilian agencies. Local police all carried cellular phones. By using cellular phones, Army units increased their operational credibility with many civilian agencies.

RECOMMENDATION: Contract for and take at least enough cellular phones to mimic the unit's command net. Use FM radios, citizen band (CB) radios, and cellular phones to communicate with civilian agencies, people who are stranded and need help, and each other. Be prepared for confusion and disjointed communications in the area of operations. Other "communications" devices you may need include portable facsimile (fax) machines, personal computers (and lap-tops), MCS computers, copy machines, and MSE fax machines. Be aware that you may need to modify a computer with a fax board to interface with an MSE fax machine.

ISSUE: Large natural disasters probably will require more federal military aid than one DOD agency can provide. Joint operations with Army, Navy, Marines, Air Force, Coast Guard, or allied forces may play a role in disaster relief. This type of operation requires unique skills, knowledge, and special duties.

DISCUSSION: Throughout the area of operations, military commanders must integrate with several overlapping civil governmental agencies (city, county, and state). Public utilities (water, electrical, phone, gas, sewage, and garbage) operate across broad political and geographic areas, and each has its own organization and relationships with local governmental agencies. Because military units in Florida did not understand these interrelationships and levels of authority and responsibility, it was difficult for them to coordinate work and communications. Maneuver commanders who carved up an area with divisional boundaries found themselves slicing up cities, counties, and municipal and county utility districts. As a result, city and county agency personnel were confused as to which military commander was "in charge." This created a need for multiple liaison officers, burdened communication systems, and caused some duplication of work effort.

RECOMMENDATION: By using the intelligence preparation of the battlefield (IPB) process as a guide, engineer commanders should know the level of coordination that exists in the disaster area. They must determine if municipal governments have coordinated utility support and repairs, where the top authority lies, and who is in charge. They must become familiar with police and fire jurisdictions, public utility districts, and hospital districts.

If coordination between agencies is broken, engineer commanders must help "fix" it. The objective is to re-establish the local government's ability to function properly. Thus, normal channels of operations should be employed to the maximum extent possible. Be prepared to commit liaison officers to as many levels of government as necessary to keep communications open and missions orderly. Officers and senior noncommissioned officers should be familiar with the way local governments and public utility districts operate. They should also be familiar with the capabilities and structures of Navy Seabees, Marine engineers, and Air Force base civil engineering squadrons and Prime Beef Units.

(Continued on page 31)

The Sheffield Method of Bridge Demolition

By Major Ira Joe Davis

The U.S. Army has used explosives to destroy bridges for decades but has never had a process to identify the most efficient way to do so. This problem was resolved by integrating the Sheffield method of bridge demolition into Chapter 4 of FM 5-250, *Explosives and Demolitions* (June 1992). The method is described in Chapter 4 but is not labeled as "Sheffield."

The Sheffield method is a result of a study conducted by the Department of Civil and Structural Engineering at the University of Sheffield, England, from September 1971 to August 1974. The study, directed by the British Royal Armament Research and Development Establishment, analyzed existing bridges under dynamic loading conditions. It also developed procedures to ensure the most efficient use of explosives in performing bridge demolition missions. Their data base included analysis of more than 15,000 European bridges. Researchers compared their findings with existing British and U.S. Army doctrine for bridge demolition missions. By adopting the Sheffield method, the U.S. Army standardized bridge demolition procedures among the American, British, Canadian, and Australian (ABCA) armies.

Bridge Demolition

The purpose of all bridge demolition missions is to create gaps in the bridge by attacking key bridge components. The intent is to create gaps large enough to defeat an enemy's assault bridging capabilities and render the bridge militarily unrepairable. This forces the enemy to concentrate efforts on other crossing sites or to attempt deliberate bridging operations. Either way, it slows the enemy's momentum.

The minimum desired gap is 5 meters greater than the enemy's assault bridging capabilities. For planning purposes, the minimum gap is 25 meters, but the preferred gap is 35 meters. To obtain the minimum gap on spans less than 25 meters, one or both ends of the bridge are cratered. Demolished bridge sites should be mined, and the debris should be booby trapped to further slow the enemy's bridging efforts.

Two minimum conditions must exist to ensure successful bridge demolition:

- A collapse mechanism must be formed.
- Once formed, the collapse mechanism must be allowed to move far enough under the bridge's weight to create the desired obstacle.

Bridges are stable structures. They must support their own weight (dead load) plus the weight of the crossing traffic (dynamic live load). The intention of the Sheffield method is first to identify the critical members of the bridge for destruction so that the bridge collapses under its own weight (the collapse mechanism). Second, the bridge must have sufficient space to move as it fails to prevent jamming or pinning. All bridge demolition missions are designed to be completed with a minimum amount of time, manpower, and explosives. Previous U.S. Army bridge demolition doctrine did not address these concerns.

Bridge Types and Bridging Principles

To use the Sheffield method properly, engineers must first categorize the bridge as a simply supported, continuous, or miscellaneous structure. Bridges may have either single or multiple spans. A multiple-span bridge may contain both

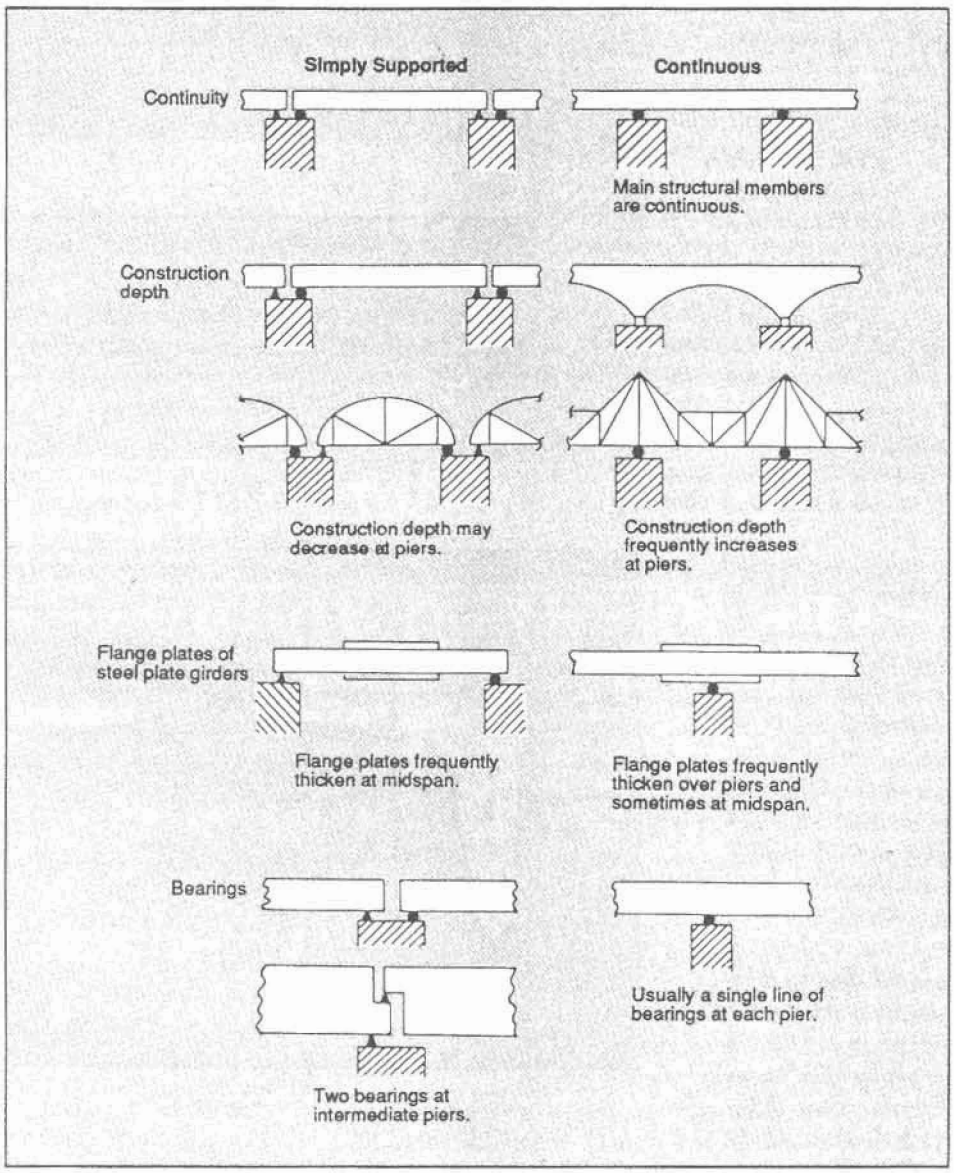


Figure 1

simply supported and continuous spans. To categorize a bridge just by its appearance is difficult; whenever possible, construction drawings should be used. Because this is seldom practical, engineers must have a method to categorize bridge structures rapidly. Some principles and construction practices can help with this process.

Bending moment is the governing factor in most bridge designs. The construction depth generally increases at the location of maximum bending moment; the flange thickness may also increase on steel stringers at the point of maximum bending moment. According to the principles of material science, the maximum bending moment on a simply supported span occurs at the midpoint. The maximum bending moment for a continuous span occurs at the intermediate supports. By using this information, engineers in the field can categorize most spans into one of the three major categories. Figure 1 can be used as a guide in the categorization process.

About 94 percent of all bridges are either simply supported or continuous types. Miscellaneous bridges make up the remaining 6 percent of bridge types. Bridges in the miscellaneous category include suspension spans, swing-span and lift bridges, bascule bridges, vertical-lift bridges, and float bridges. The Sheffield method provides detailed demolition techniques for simply supported and continuous spans. Procedures to demolish miscellaneous bridges are discussed separately in FM 5-250.

As a rule, continuous spans are more difficult to destroy than simply supported spans and require a greater amount of explosives. When in doubt about the bridge type, assume it is continuous. This

conservative approach will guarantee bridge demolition though not the most efficient use of explosives. After the bridge is categorized into one of the main categories, it is further classified by using the decision trees shown in FM 5-250, pages 4-10 and 4-15. Composite steel and concrete construction is classified according to the major longitudinal load-carrying members in the span. Once the span is fully categorized, engineers use the tables in Appendix H, FM 5-250, to decide the best method for destroying the bridge.

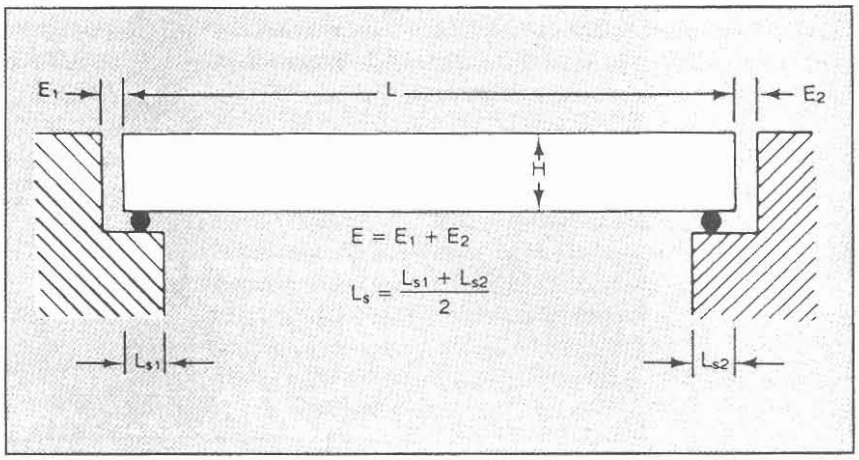


Figure 2

Simply Supported Spans

Simply supported spans are the easiest type of bridge to destroy. The recommended point of attack is always at the midspan to take advantage of the maximum bending moment generated by the bridge dead load. The line of attack should be made parallel to the face of the bridge abutments to reduce the possibility of twisting and jamming. To use the procedures in FM 5-250 for a simply supported span, four critical dimensions must be obtained: total bridge depth (H), span length (L), total end clearance (E), and average length of the bearing supports (L_S). (Figure 2.) The three attack methods for the simply supported bridge are the bottom, top, and angled attacks.

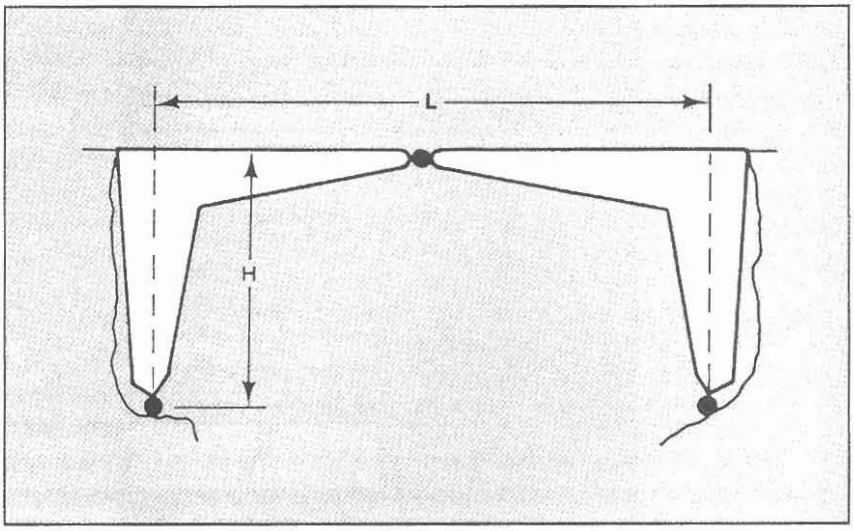


Figure 3

The bottom attack is the preferred method for destroying simply supported spans. It provides some cover and concealment for the demolition party and allows use of the bridge up to the point of demolition. It is particularly useful for bridges with steel stringers, where charges can be placed inside the channels of the steel members. Bottom attacks are generally not used on concrete beam or slab bridges because of the difficulty in attaching charges. Use of the Sheffield method allows engineer planners to calculate the minimum required end clearance (E_R) to prevent jamming when using a bottom attack. This value is compared with E to ensure jamming will not occur. If E is less than E_R, the unit must use a different attack method or blow one or both abutments to provide additional end clearance.

Top attacks are used primarily on concrete beam and slab bridges where a bottom attack is impractical. In the top attack, the Sheffield method enables the engineer planner to calculate the length of cut required (L_c) to prevent jamming.

The concrete-stripping charge is a new technique used to create the L_c for reinforced-concrete bridges. The charge cuts a ditch across the span and all the way through the depth of the bridge. The concrete-stripping charge destroys all of the minor reinforcing steel and damages most of the major reinforcing steel. The major reinforcing steel should fail in tension when the compressive concrete is removed. When using the concrete-stripping charge, the ditch width (W_d) is compared to the L_c to ensure that jamming will not occur. If necessary, the charge is increased to ensure that the necessary cut is obtained.

An angled attack may be used when end clearance is not a problem. When using the angled attack, all bridge members must be cut (span, hand rails, service pipes, and so forth). The point of attack is located between the midpoint and a point

one-third the length from one end of the span. The cut is made at 70 degrees to the horizontal to prevent jamming.

Continuous Spans

Continuous spans generally are more difficult to destroy than simply supported spans because they have no common point of attack. The Sheffield method provides recommended attacks for each type of continuous span. The line of attack should still be made parallel to the face of the abutments to prevent twisting and jamming. The critical dimensions for planning the attack of a continuous span are L, which is measured from the centerline of the bearings, and the bridge rise (H), which is measured from the springing to the top of the deck. (Figure 3, page 30.)

Continuous steel and concrete bridges usually are attacked by cutting the span on both sides of the intermediate supports. The concrete-stripping charge used for simply supported concrete spans can also be used for continuous spans. The Sheffield method recommends locations for cuts that will create an unbalanced bending moment in the span. This bending moment will cause the span to collapse. Because of their design, continuous concrete spans often require two-staged attacks to ensure their complete destruction. The first attack destroys the concrete; the second attack removes the reinforcing steel. Therefore, continuous concrete bridges should not be used for planned reserved demolition targets.

Arch and portal bridges are attacked by calculating the minimum L_c required to ensure their destruction. Although the formulas for each type are different, the procedure is the same as for simply supported top attacks.

The Sheffield method of bridge demolition is the most significant change to U.S. Army demolition doctrine in the last 20 years. Now, for the first time, engineers can accurately calculate the minimum amount of explosives necessary to guarantee the complete destruction of most bridges. This will improve engineer support to the maneuver elements and better use the limited resources available on the battlefield.

Major Davis is the S3 of the 1st Engineer Brigade at Fort Leonard Wood, Missouri. He has served in the 54th Engineer Battalion and the 307th Engineer Battalion. Major Davis has a BS degree in civil engineering and is a graduate of Command and General Staff College.

(Lessons Learned, continued)

ISSUE: Many engineer units do not have contingency plans for natural disasters.

DISCUSSION: U.S. Army engineers will respond to many disasters. Whether fighting fires in the Rocky Mountains or quelling civil disturbances in inner cities, federal military forces will continue to serve the immediate needs of U.S. citizens and our allies when natural or man-made disasters occur. Some units, such as the 25th Infantry Division (Light), Fort Shafter, Hawaii, have disaster response as one of their contingency missions. Disaster relief is on their division mission essential task list (METL).

Contingency plans are valuable because they can speed up the deployment process, even though they may require some modification for any given disaster. Unit locality has no bearing on the type of disaster you may be assigned to deal with. Units from as far away as Fort Drum, New York, and Fort Riley, Kansas deployed to Florida in response to Hurricane Andrew. Air National Guard units from Alaska supported Operation Garden Isle in Hawaii.

RECOMMENDATION: CONUS-based contingency planning and rapid force projection have replaced our Army's forward deployment posture. Contingency planning for natural disasters is good practice and good training. In the absence of guidance from higher headquarters, engineer units should prepare contingency plans to support major disasters (fires, floods, tornados, hurricanes, earthquakes, and civil disturbances). Determine the equipment and material needs for each scenario, organization and manpower requirements, deployment sequencing, and your unit's sustainment needs. Prepare equipment load plans and checklists showing where to obtain critical equipment and materials. And, remember to evaluate your own intelligence needs that may drive the makeup of key personnel in the advance party.

Major Brannon is an analyst in the U.S. Army Engineer School. Previous assignments include platoon leader, DEH operations and executive officer, assistant S3, and company commander. He is a registered professional engineer in Texas.

Deploying from Two Places at Once:

A Challenging Experience

By Captain Paul J. Karnaze

The 937th Engineer Group is an active Army engineer group at Fort Riley, Kansas. The group consists of a headquarters company, the 34th Engineer Battalion, 541st Maintenance Battalion, and the 16th Mobile Army Surgical Hospital. The 937th Group was called to assist in the disaster relief effort from Hurricane Andrew. However, Colonel Greenwalt and the tactical command post were at Fort Leonard Wood, Missouri, participating in a field exercise with the 5th Engineer Battalion. Responding to the relief effort meant deploying the 937th from two locations within 66 hours. This article describes how this took place.

Just when you think you've covered all the bases, they slide in a curve ball that messes up the whole game plan. Actually, I felt like I did not even know what game I was playing when I returned from leave late on the night of September 1. It was about 2230 when my wife and I walked through the door, tired from our flight, to find a message on the answering machine. My assistant S4, the group staff duty officer, had left a message that something was up. He did not say much except that we had an 0300 staff planning session at headquarters with the group executive officer. At first I thought that it was a welcome home joke by my lieutenant, but then I detected a serious tone in his voice that told me this was no pun. I decided to call him at the duty phone number and...

At Fort Riley

0200300S September 1992: The warning order was out. We did not know exactly when the execution order would come or when we would leave, but we now had a mission—participate in Task Force Wright to provide command and control for debris cleanup operations in south Florida. Quite a mouthful, but what did it mean? Questions began to surface:

- Who will go—group headquarters, the 34th Engineer Battalion, or both?
- What are our critical personnel shortages?
- Who will conduct the prepare for overseas movement (POM) order and when?
- What are our critical equipment shortages?
- What mission or region-specific items might be required (additional haul assets, Class IV, maps of south Florida, additional communications equipment, assorted batteries, SSSC supplies, mosquito nets, bug spray, 2-quart canteens, and work gloves)?
- What about Colonel Greenwalt, Group Commander, and the tactical command post (TAC)? The TAC provides command and control for engineer-specific missions that group elements conduct in forward locations. It also can be the advance party for the group. TAC equipment includes a built-up HMMWV

Soldiers and equipment board a C-5 at Forbes Air Field en route to Homestead AFB. Limited time required the equipment to be moved by air rather than by rail. (Photo by SFC W. Fleming.)

connected to a 577 tent extension with communications and work areas, three HMMWVs for command and control, and a diesel generator. The crew consists of the S2, S3, S3 operations officer, S3 construction officer, S3 staff NCO, communications NCO, mechanic, and four driver/RTO/ clerks.

We scheduled a video teleconferance for 0400 to discuss the mission with Colonel Greenwalt.

At Fort Leonard Wood

The commander and the TAC had a little more information about the mission—they had received a hard copy deployment order from FORSCOM around midnight. Because of the immediate needs in Florida, the group would deploy within days, not weeks or months, after notification. Therefore, the TAC would deploy from Fort Leonard Wood to Homestead Air Force Base, Florida. Once there, the TAC would coordinate with on-site higher and subordinate units and secure an area for the main body from Fort Riley.

The video teleconference answered many of our questions:

- The mission was expected to last from 30 to 60 days.
- The TAC would deploy by C-130s from Fort Leonard Wood to Homestead AFB.
- The group's main body would deploy by buses and transport trucks to Forbes Air Field, Topeka, Kansas, and then by C-5s to Homestead AFB.
- Ordering officers and Class A agents, who would buy mission-essential supplies locally, had to be certified.
- Additional communications assets would be acquired to replace those the 1st Infantry Division units had borrowed for REFORGER.
- Division G1 would assist in filling equipment and personnel shortages within the group.
- All group headquarters' commitments through October would be cancelled.
- Personnel would take weapons and ammunition basic loads.
- Each person would take a five-day supply of meals ready to eat (MREs).

The remaining question was, how would the TAC deploy and who would support them?

The 5th Engineer Battalion went overboard helping the TAC deploy. They provided work space, airload specialists, transportation support, and issued MSE equipment. By 0600 on September 2, the TAC crew was preparing the vehicles and equipment for the airlift. By 0700, the 5th Engineer's communications specialists had installed mobile subscriber radio and telephone equipment in two vehicles. The vehicles then went to the wash rack, where DOL personnel helped prepare them for airlift. Meanwhile, TAC personnel coordinated with 5th Engineers for equipment and supplies. By 1230, the HMMWVs were cleaned, loaded, and prepared for boarding. The only item left was to complete the Hazardous Cargo Clearance and Air-Load

Movement Plan by 1400. At 1430, the vehicles were weighed and loaded; the first C-130 departed Fort Leonard Wood at 1500, and the second one left about two hours later.

Back at Fort Riley

The group's main body began to prepare for movement. After the video teleconference, the executive officer briefed company personnel while the staff published a modified packing list, identified nondeployable personnel, coordinated to fill personnel and equipment shortages, acquired Class IV for blocking and bracing, and prepared personal gear. We had no air-load movement plans on file, so the new unit movement officer created the data.

On September 3, the installation POM team conducted a POM in the morning followed by vehicle load-out in the afternoon. However, neither aircraft schedules nor departure times had been established by late afternoon. At 1430, the emergency operations center (EOC) informed the group that they would not depart until September 7 or 8. Thus soldiers were preparing to go home when a message arrived from FORSCOM (about 2000) stating that they would fly from Forbes Field the next morning. The unit prepared for air movement throughout the night, securing the vehicle loads, performing preliminary airlift inspections, and staging and loading vehicles onto transporters for movement.

September 4 began with formation at 0430 to draw weapons and protective masks, verify airlift manifest information, and release soldiers for breakfast. At 0600, the unit departed Fort Riley for Forbes Field. The UMO and the unit completed all paperwork and loaded the first C-5, which departed Forbes Field at 1400, about 66 hours after notification. The second aircraft was delayed 24 hours because of mechanical problems. Most of the personnel deployed on the first aircraft, leaving the UMO and a skeleton crew to deploy on the second aircraft. The total count was 82 soldiers, 12 HMMWVs, 9 HMMWV trailers, four 5-ton cargos, one 5-ton cargo trailer, 4 small CONNEXs, and a headquarters-worth of equipment and tents, which were deployed by two C-130s and two C-5s.

Lessons Learned

A deployment that requires movement from two locations by the same unit produces many lessons learned. Some of them are positive affirmations that plans on paper work, while others prove that what is on paper does not always pan out.

- Be flexible. The Son of FRED (Fort Riley Emergency Deployment Support Plan, revised) is a good guideline, but it is unrealistic when given less than the recommended 15 days to deploy.
- Develop air-load as well as rail-load movement plans ahead of time, and keep them in movement books. Existing plans can be modified quicker than new ones can be created.
- Establish and train movement teams to alleviate delays and coordination problems.
- Use an external unit's motor pool personnel to prepare the departing unit's vehicles for movement. These personnel can perform maintenance and on-the-spot repairs, weigh and steam-clean vehicles, and assist in departure airfield control group (DAG) operations. This gives the deploying maintenance personnel time to pack tools, manuals, equipment, and repair parts.
- Create a list of movement preparation items. These items are not necessarily MTOE authorized but are essential to efficiently prepare the unit for movement. Include petroleum down-loading pumps, lifting shackles, outside lighting, and blocking and bracing materials.
- Assign external personnel as ordering officers and Class A agents. These become full-time jobs when associated with engineer units because of the great variety and quantity of items, especially Class IV, that must be purchased locally to perform construction missions. Staff members are busy with their primary functions and may not have time to purchase items locally. Using external personnel also eliminates any conflict of interest problems that could be perceived.

It is inspiring to see a unit respond to the unexpected and succeed. Everything does not always happen according to plan. Our group never anticipated an order to deploy in 66 hours from two separate locations. However, when a unit practices what it plans, change is not necessarily disastrous. This would not be the last change to occur on the deployment. The warm-up was over, and now it was time to play ball.

Captain Paul Karnaze is the S4 for the 937th Engineer Group, Fort Riley, Kansas. He received an ROTC commission and a bachelor of science degree from the University of Kansas. He is also a graduate of the Infantry Officer Basic Course and the Quartermaster Officer Advance Course. Previous assignments include positions in the HHC, Berlin Brigade and the 5/502d Infantry Parachute Regiment.

Engineer Solution

SOLUTION:

The Sheffield method is the preferred method of bridge demolition. An introduction to this method is provided in the article, "The Sheffield Method of Bridge Demolition", beginning on page 28.

Step 1. Recon and categorize the bridge as a simply supported, concrete beam slab with bottom support.

Step 2. Obtain the following critical dimensions:

$L = 15m$

$H = 1.4m$

$E = E_1 + E_2 = 0.1 + 0.1 = 0.2m$

$$L_s = \frac{L_{s1} + L_{s2}}{2} = \frac{1.5 + 1.5}{2} = 1.5m$$

Step 3. Determine a method of attack from Table H-3 (Attacks on Simply Supported Bridges), FM 5-250.

Use Serial 20, Deck Bridge, Bottom Support Method III. A top attack is appropriate. Cut at midspan with a concrete-stripping charge.

Note: Serials 18 and 19 are for use only on slabs.

Step 4. *Calculate the minimum length of cut (L_c)* to prevent jamming in the top attack:

$$H/L = \frac{1.4}{15} = 0.093 \text{ (round up to 0.10 for Table H-2, FM 5-250)}$$

$$L_s/L = \frac{1.5}{15} = 0.10$$

$L_c/L = 0.150$ (from Table H-2, FM 5-250)

$L_c = (L_c/L)(L) = (0.150)(15) = 2.25m$

Engineer Solution

Step 5. *Compare the ditch width (W_d)* from the concrete-stripping charge with the required L_c:

$W_d = 2h + 0.3$
h = overall roadway and beam/slab depth
$W_d = 2(1.4) + 0.3 = 3.1m > L_c = 2.25m$

Therefore, one row of charges is sufficient.

Step 6. Calculate the amount of explosives required for the concrete-stripping charge.

Beams

$P = 3.3\ (3.3h + 0.5)^3$ (pounds of TNT per meter)

$P = 3.3\ [(3.3)\ (1.4) + 0.5]^3 = 442.9$ pounds of TNT per meter

Amount per beam = (pounds of TNT per meter) (beam width)

= (442.9) (0.5) = 221.5 pounds of TNT per beam

Determine the equivalent amount of C4 required per beam (divide by the RE factor).

$\frac{221.5}{1.34} = 165.3$ pounds of C4 per beam

Determine the number of packages of C4 required per beam.

$N = \frac{\text{Charge weight}}{\text{Package weight}} = \frac{165.3}{1.25} = 132.2$

Round up to 133 packages per beam.

Slabs

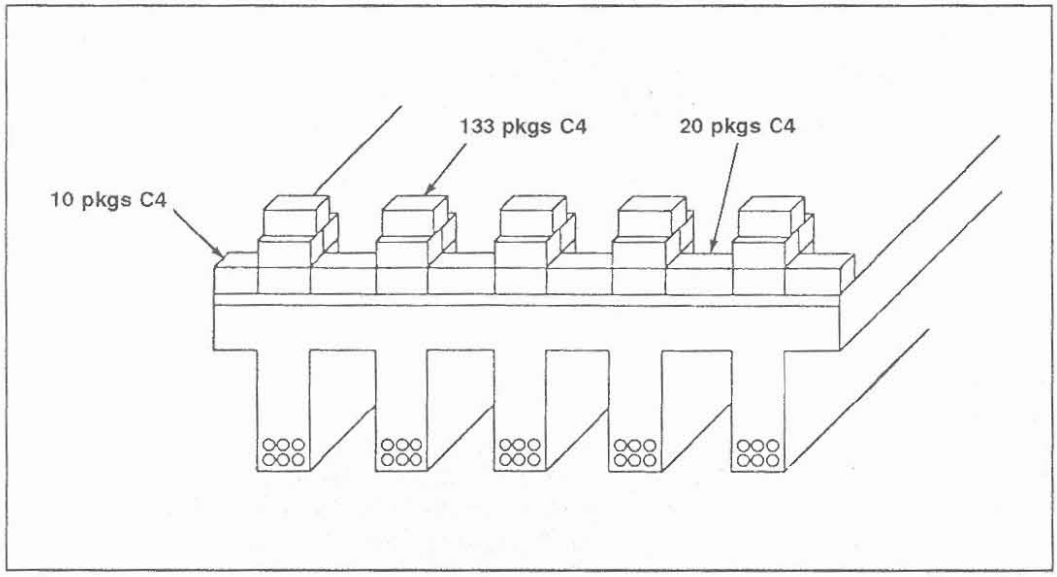
$P = 3.3\ (3.3h + 0.5)^3$ (pounds of TNT per meter)

$P = 3.3\ [(3.3)\ (0.5) + 0.5]^3 = 32.8$ pounds of TNT per meter

Amount per slab = (pounds of TNT per meter) (slab width)

= (32.8) (1.0) = 32.8 pounds of TNT per slab

Engineer Solution



Determine the equivalent amount of C4 required per slab (divide by the RE factor).

$$\frac{32.8}{1.34} = 24.5 \text{ pounds of C4 per slab}$$

Determine the number of packages of C4 required per slab.

$$N = \frac{\text{Charge weight}}{\text{Package weight}} = \frac{24.5}{1.25} = 19.6$$

Round up to 20 packages per slab.

Total charge equals the (number of beams) (packages per beam) + (number of slabs) (packages per slab)

$P = 5(133) + 5(20) = 765$ packages of C4 per slab.

Note: To reduce the amount of explosives required by one-third, tamp each pound of explosives with two filled sandbags.

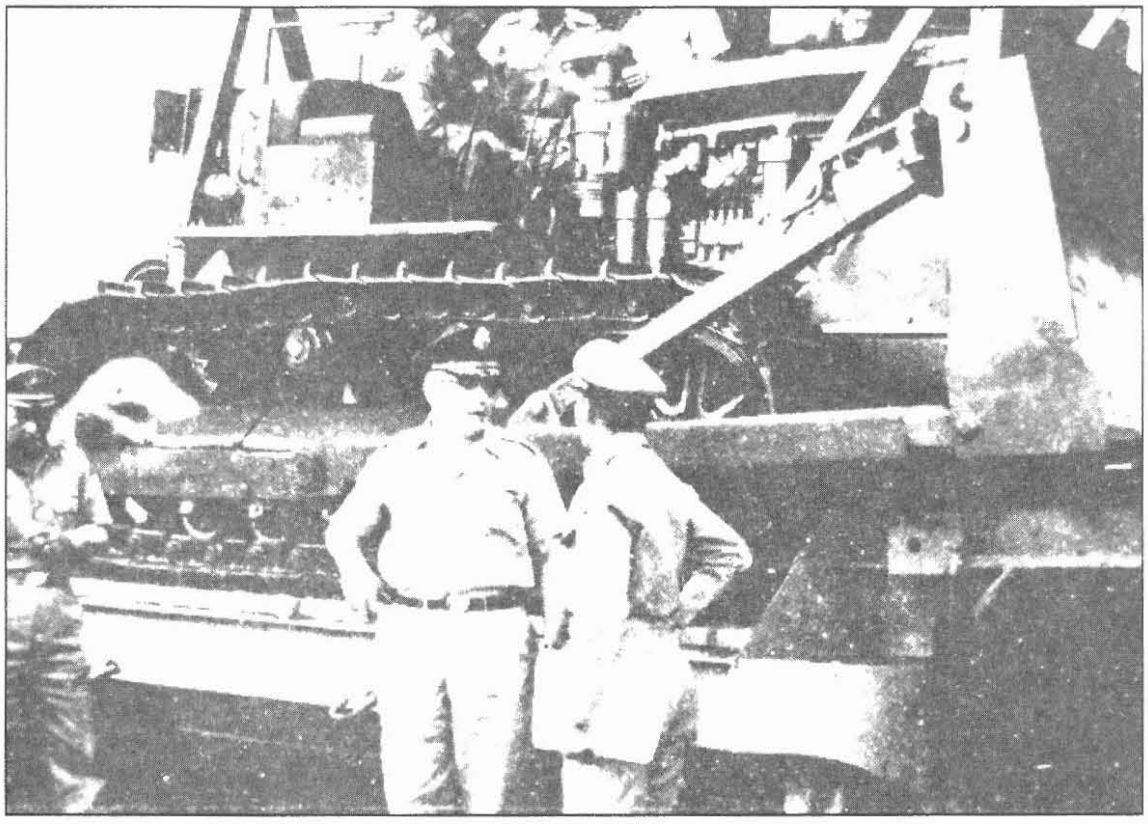
This ENGINEER Problem/Solution was submitted by Major Ira Joe Davis. Currently the S3 for the 1st Engineer Brigade, Fort Leonard Wood, Major Davis formerly served as chief, Combat Engineering Division, Department of Instruction, U.S. Army Engineer School.

Philippine Engineers in Nation Assistance: The Huk Campaign

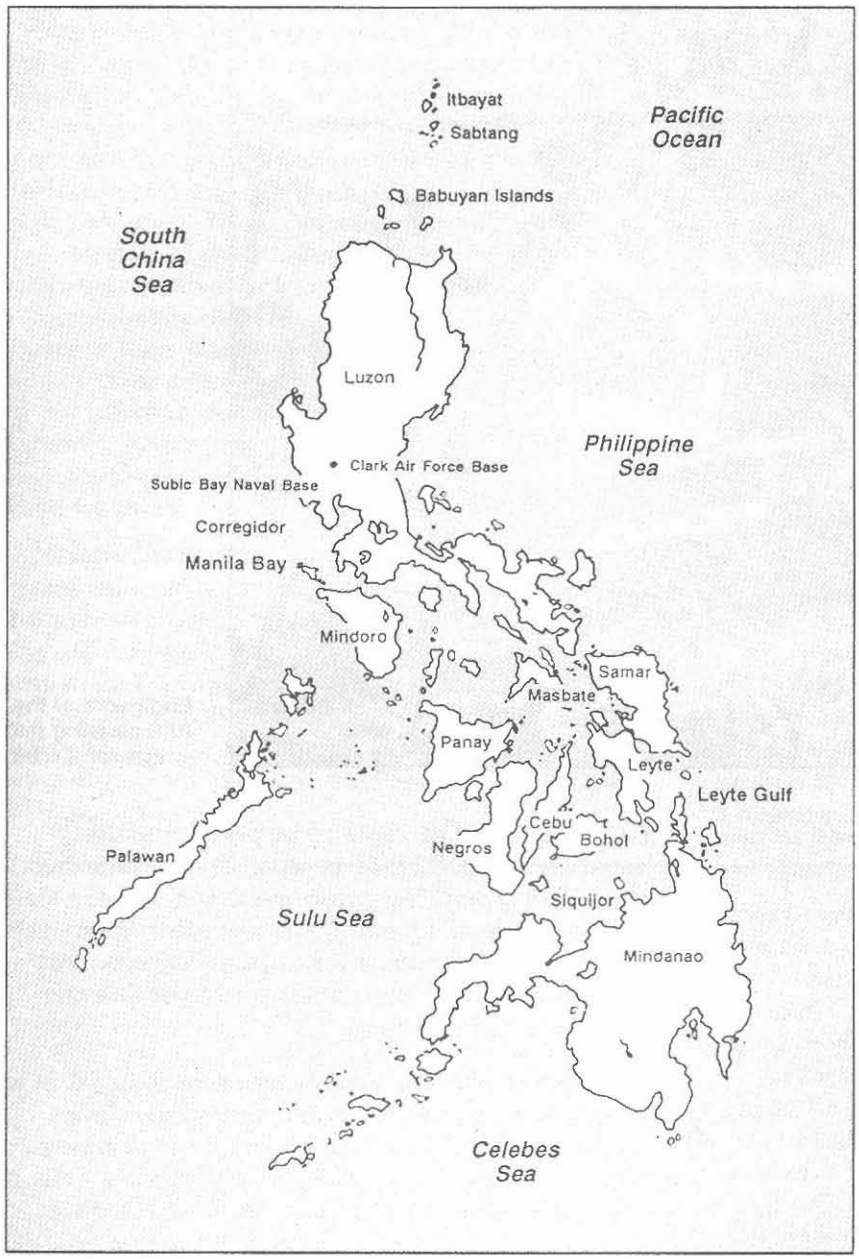
By Captain James R. Weber

To effectively combat a counterinsurgency, a country must coordinate political, psychological, social, economic, and military factors. The engineers of the Armed Forces of the Philippines (AFP) played a significant role in the successful campaign against the communist guerrillas, known as the Hukbong Mapagpalaya ng Bayan (Huks) or People's Liberation Army, in the late 1940s and 1950s. Because of policy changes in the political arena, the government and the army lost significant support from the people. When the administration turned its efforts to rebuilding the country by using the army engineers, the people's perception of the government and the army improved. Some of the AFP's missions, which included upgrading roads, building bridges, constructing schoolhouses, and drilling wells, helped improve their image.

To counteract the communist influence, the U.S. limited its role in nation assistance to technical expertise and monetary aid. The U.S. gave the Philippines $250 million in economic aid over a five-year period, and the U.S. Army sent a Joint United States Military Advisory Group (JUSMAG) to provide technical assistance. Although American engineer units did not participate in the civic action missions after 1946, engineer officers continued to serve on the JUSMAG staff.



U.S. Army MG Daniel, Chief of JUSMAG, and LTG Cruz, Chief of Staff of the AFP, confer about engineer equipment. (Photos courtesy Alvin H. Scaff, *The Philippine Answer to Communism*, Stanford University Press.)



The Philippines

Background

After the Japanese invaded the Philippines in March 1942, the Communist Party of the Philippines (CPP) formed the Hukbalahap (People's Army Against the Japanese) or the Huks. By fighting the Japanese, the Huks won support for the communist cause from the Filipino people and remained an influential organization after the war ended. It was then that the CPP changed the name of their military branch to the People's Liberation Army.

In July 1946, when the Philippines gained their independence from the United States, the Huks began a terrorist campaign to seize control of the newly formed republic. The Philippine President, Manuel Roxas, developed a policy of all-out force to eliminate the Huks. When the army and the Philippine constabulary indiscriminantly shelled villages that they suspected to be Huk strongholds, support turned away from the government and toward the Huks.

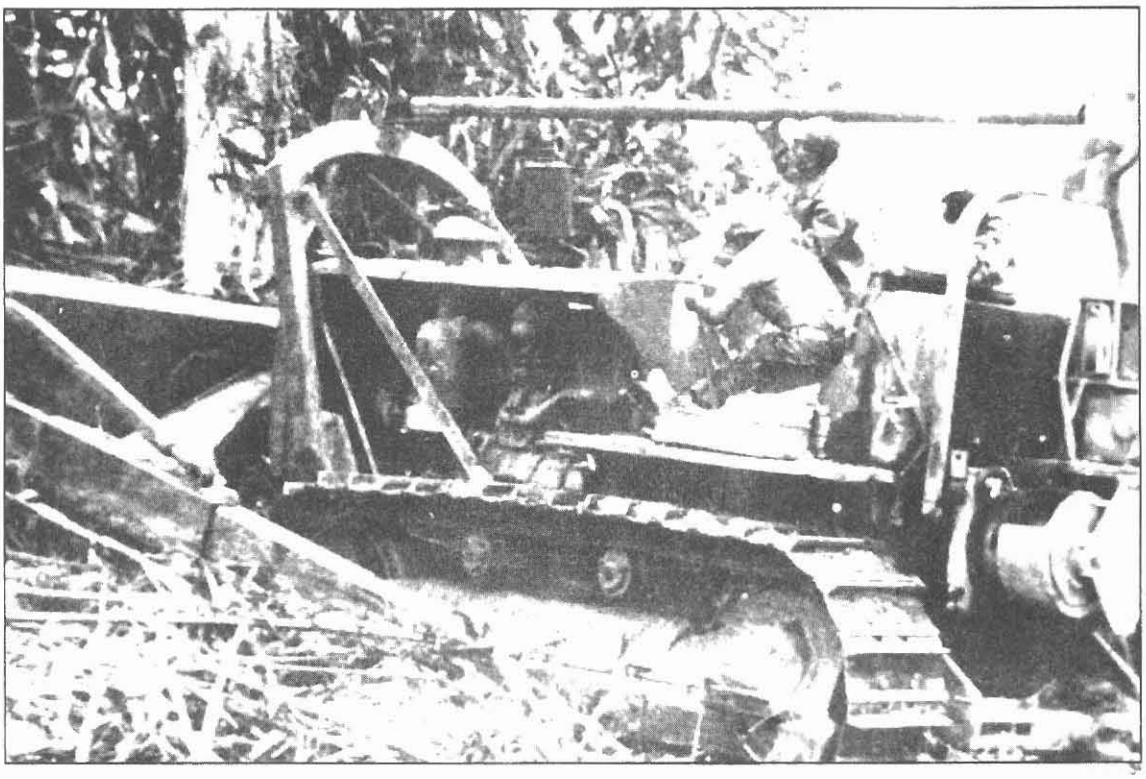
Elpidio Quirino became president in 1948. He changed the brute-force policy to one of conciliation by trying to collect weapons from the Huks and granting them amnesty. After a few months, Quirino's conciliatory policies failed, and the Huks continued to consolidate their power.

In 1950, the Huks staged large-scale raids to show how weak the government was. In response, the administration returned to the brute-force policy, which again proved to be unsuccessful. For example, when the constabulary killed innocent civilians at Maliwalu, Pampanga, the people condemned this action. An officer wrote that people supported the Huks simply because soldiers abused innocent people. Because of such actions and mistakes made by the government, the Huks gained control over large parts of the country.

Policy Shift

In September 1950, Ramon Magsaysay assumed the duties of Secretary of the Department of National Defense. Magsaysay implemented many needed reforms within the armed forces and was instrumental in altering the government's approach toward the Huks. The government had learned two important lessons regarding the Huks: it needed the respect and cooperation of the people, and the people might support the government if it dealt with the Huks in a just and humane way.

Magsaysay was the driving force behind the shift in the administration's policy. He developed a two-fold approach to the counterinsurgency: army battalion combat teams would conduct small unit raids against the Huks, and the army would perform civic action missions. To accomplish the civic action missions, army engineers staffed the Economic Development Corps (EDCOR) to build farm settlements, freshwater wells, road networks,



Engineers of the AFP clearing thick jungle for a road.

bridges, and schools. Creating EDCOR was an important development in the counterinsurgency.

Farm Settlements. Many Filipinos were tenant farmers who did not own their land. The communists demanded land for the landless. Through EDCOR, Magsaysay offered the Huks and other peasants 25 acres of land and a government-built house. Not surprisingly, the people looked favorably on this program. The country had plenty of jungle land; the problem was how to make the jungle usable for agriculture. Magsaysay turned to the army for an answer to this dilemma. The Engineer Service Battalion (Composite) was tasked to transfer the land into crop-producing areas. In February 1951, EDCOR opened 75,000 acres of land for settlement.

The most important benefit from the EDCOR settlement program was the public's perception of the government. Even though fewer than 300 former Huk families and 1,000 total families received farmland from the government, Magsaysay scored a moral victory. He publicized this initiative and showed that he could provide land for the landless faster than the Huks could. Through EDCOR, Magsaysay converted some of the die-hard communists and gained support from the general population toward the government. The EDCOR farms were an immediate display of government reform, and peasants began to believe that the administration actually cared for their welfare.

The Huks retaliated. In April 1953, three officers and two enlisted men from the Philippine Corps of Engineers were en route to inspect a site designated for an EDCOR farm when Huks ambushed and killed them. The government honored the slain engineer officers by naming farms after them: the new project was named for Captain Paredo, and the existing ones were named for Major Arevalo and Lieutenant Gallego.

Liberty Wells. Army engineers assisted in a well-drilling program because many rural communities did not have a good supply of drinking water. They drilled as many as 60 artesian wells in one 45-day time period. This liberty well project was so important to the Filipinos that they established a Liberty Wells Association. Their slogan was a Chinese proverb that said, "God bless those who dig wells, build bridges, and construct roads." This work continued to enhance the people's confidence in the army and the Philippine government.

Road Networks. Before World War Two, the Philippines had a fairly good road network. Numerous roads and bridges were damaged during the war because of the fighting between the allies and the Japanese. While American engineers repaired the transportation system enough to support their own offensive to retake the islands, they did not restore all of the roads. The poor road conditions benefited the Huks because foot travel was more feasible than vehicular travel. They moved around on foot, making it difficult for the government to track them.

The people blamed the government for the poor roads. Again, the government turned to the engineers for help. From 1946 to 1952, they repaired 263 bridges and 385 miles of roadway, making all the roads that existed before the war operational. Besides repairing existing roads, the engineers built new ones. When Magsaysay was President of the Republic of the Philippines, he emphasized the construction of secondary roads. These feeder roads helped villages that once were considered remote. Farmers then were able to trade their goods and deliver their crops easier than when they traveled on footpaths through dense vegetation. By restoring and constructing the road network, the Philippine people were able to see their government at work for them.

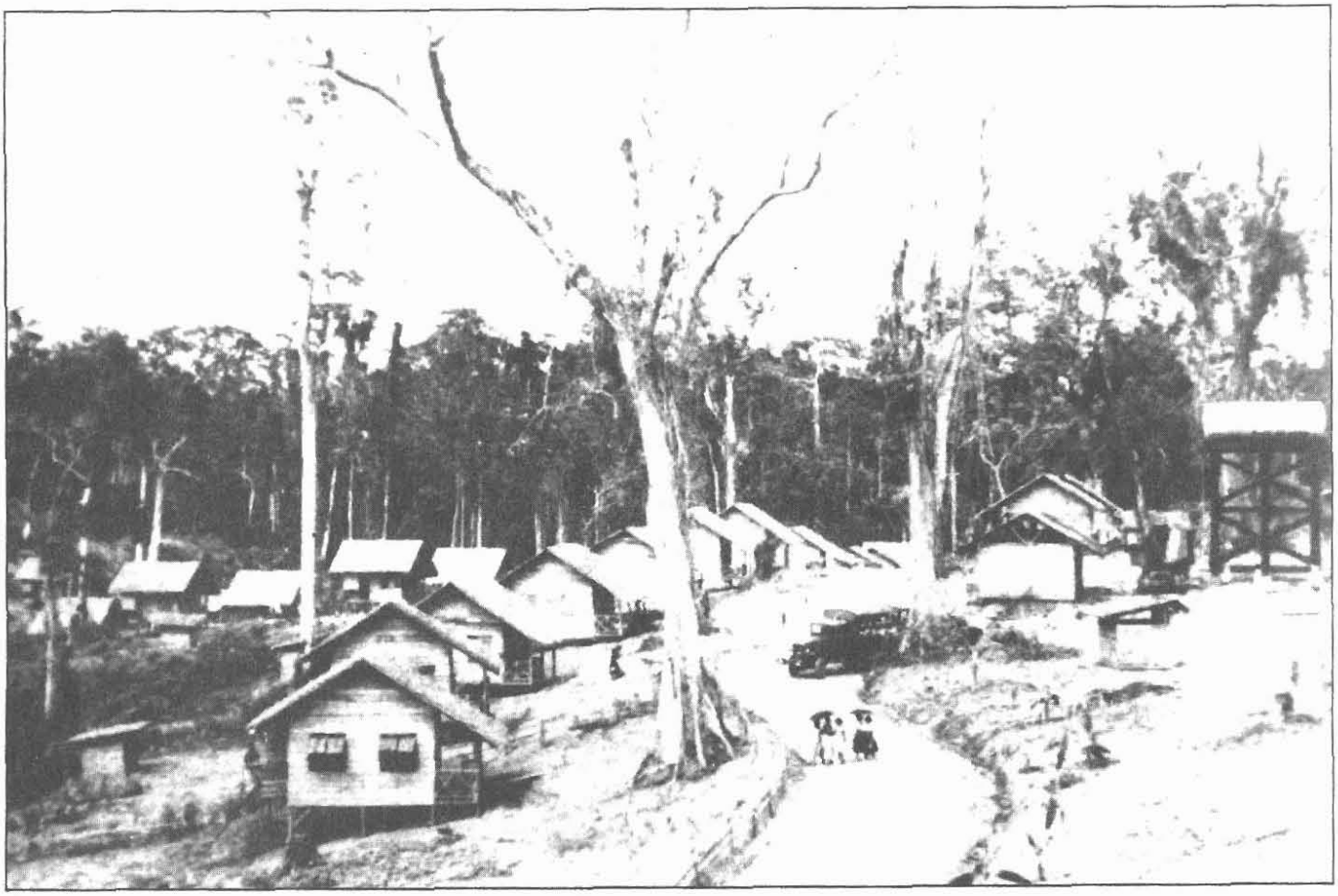
Schoolhouses. In 1954, President Magsaysay enacted a program to build schoolhouses throughout underdeveloped areas of the country. The 1st Engineer Construction Group, which was formed in February 1954, manufactured and erected about 500 prefabricated schoolhouses in one year. To help the schoolhouse program, the army organized an Engineer Forestry Company to produce lumber.

Operation Redemption. The government continued its positive influence through another initiative, Operation Redemption, which started on January 7, 1954, as a symbol of commitment to support the peasants. This time the army targeted the deserted hamlet of Luis Taruc, the Huk leader. To improve living conditions, 3,000 army engineers and trainees cleaned up the area, built roads, and dug wells. The project was successful, and within one year, more than 2,000 Filipinos inhabited the town.

The End of Hostilities

By 1954, when large-scale fighting between the government and the Huks ended, the army had captured and killed many Huk leaders. The People's Liberation Army Committees disbanded, and Luis Taruc surrendered in May 1954.

The government was victorious for several reasons: the highly mobile battalion combat teams attacked the Huks incessantly, the government received intelligence information from its growing public supporters on the location of the Huks, and Magsaysay used the army in a socioeconomic role as well as in its military role.



An EDCOR settlement built by engineers.

Expanded Civic Action

The engineers continued to be involved in civic action programs after the fighting ended. With a decreased military threat, the army started transferring soldiers from the infantry battalion combat teams to the engineers. Consequently, the 1st Engineer Construction Group increased its personnel strength. Government leaders continued to emphasize socioeconomic programs because they realized that many of the conditions that contributed to the spread of the communist movement still existed. Continuing the programs meant involving the engineers.

As a result of this involvement, the army organized additional engineer units to work on rural development programs. In January 1956, the 1st Engineer Combat Group was formed, which consisted of 1st, 2nd, and 3rd Engineer Combat Battalions. This unit was designated as a combat engineer group, but its main function was to help the 1st Engineer Construction Group complete civic action projects. For example, the 2nd Engineer Combat Battalion constructed the 9-kilometer Agoncillo-Bosoboso-Gulod road in Batangas, which mainly consisted of feeder roads. The 3rd Engineer Combat Battalion built many roads, bridges, and prefabricated school buildings in central and northern Luzon.

These types of civic action projects continued into the late 1950s. The government's plan for land reform produced positive results. The EDCOR program expanded and more peasants obtained their own land to farm. The original civic-action programs of the feeder roads, liberty wells, and prefabricated schoolhouses continued to have a high priority because they provided essential services to an increasing number of people.

Conclusion

Under Magsaysay's leadership as Secretary of National Defense, the Philippine army proved that they could effectively accomplish tasks outside the normal military realm. As president, Magsaysay orchestrated all government agencies to address each element of counterinsurgency. Specifically, the Philippine engineers helped to rebuild the country and combat the Huks. They helped in rural development programs, improved the peasants' quality of life, and contributed to the successful execution of the counterinsurgency. The Philippine government began land reform and funded many projects with grants and loans with the economic aid the U.S. provided. However, the Corps of Engineers of the Philippines Armed Forces deserves much of the credit for the success of the civic action programs.

Bibliography

Armed Forces of the Philippines, *Souvenir Program - 24th Anniversary of the Corps of Engineers*, 1961.

Armed Forces of the Philippines, *Souvenir Program - Silver Jubilee of the Corps of Engineers*, 1962.

Bashore, Captain Boyd T., "Dual Strategy for Limited War", *Readings in Counter-Guerrilla Operations*, Fort Bragg, North Carolina: U. S. Army Special Warfare School, 1961.

Beckett, Ian F. W. and John Pimlott, *Armed Forces and Modern Counter-Insurgency*, New York: St. Martin's, 1985.

Felder, Louis F., *Socioeconomic Aspects of Counterinsurgency, A Case History: The Philippines*, Washington, D. C.: Industrial War College of the Armed Forces, 1963.

Galula, David, *Counter-Insurgency Warfare*, New York: Frederick A. Praeger, 1964.

Hammer, Major Kenneth M., "Huks in the Philippines," *Modern Guerrilla Warfare*, ed. Franklin M. Osanka, New York: Free Press of Glencoe, 1962.

McCuen, John J., *The Art of Counter-Revolutionary War*, Harrisburg, Pennsylvania: Stackpole Books, 1966.

Romulo, Carlos P., *Crusade in Asia*, New York: John Day, 1955.

Scaff, Alvin H., *The Philippine Answer to Communism*, Stanford: Stanford University Press, 1955.

Seekins, Donald M. "Historical Setting," *Philippines A Country Study*, ed. Frederica M. Bunge, 3rd ed., Washington, D. C.: U. S. Government Printing Office, 1984.

Tirona, Lieutenant Colonel Tomas C., "The Philippine Anti-Communist Campaign," *Modern Guerilla Warfare*, ed. Franklin M. Osanka, New York: Free Press of Glencoe, 1962.

Captain James R. Weber, a graduate of the U.S. Military Academy, is currently assigned as the Engineer Officer Advanced Course Operations Officer. He is a graduate of the Cavalry Officer Basic Course, Armor Officer Advanced Course, and Combined Arms and Services Staff School. Other assignments include positions with the 2d Armored Cavalry Regiment and the 1st Infantry Division.

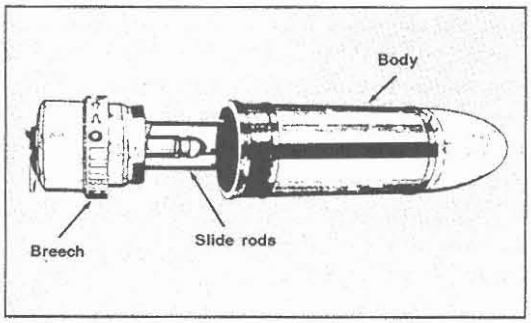
ENGINEER UPDATE

Commercial numbers are (314) 563-XXXX and Defense System Network (DSN) numbers are 676-XXXX unless otherwise noted.

Directorate of Training and Doctrine (DOTD)

1993 Senior Engineer Leaders Training Conference (SELTC). The 1993 SELTC for Active and Reserve Component senior leaders will be held on April 20-24 at the Engineer Center. A District Commanders Conference and SELTC activities will be held concurrently on April 21-23, with registration beginning on April 20. The Regimental Dinner is scheduled for April 23. Invitations will be mailed early in February. POC is CPT Steve Chi, -5335.

ENGINEER Readership Survey. Thanks are extended to those readers who responded to *ENGINEER's* survey. Responses will be used to improve the content and quality of future issues. Many units indicated that we have an incorrect address on file or that they do not receive the number of copies required. To fix those deficiencies, send your old and new addresses and the number of copies required to: Engineer Professional Bulletin, Attn: ATSE-TDM-PB, Fort Leonard Wood, MO 65473-6650. POC is Jennifer Bolyard, -7644.



CEV M970

Cartridge, Subcaliber Ammunition Training Device (M970). Fielding of the M970 training device for the Combat Engineer Vehicle (CEV) will resume in February 1993. Units in Germany will receive the M970 training device in February. Korea and CONUS units will begin receiving the device in March. Devices to the remaining engineer units in CONUS will be fielded through September 1993. The fielding plan for February and March is shown below.

Engineer Units	Location
February 93	
58th CO	Baumholder, GE
16th BN	Fuerth, GE
40th BN	Baumholder GE
12th BN	Bad Kreuznach, GE
10th BN	Wuerzburg, GE
82nd BN	Bamberg, GE
23rd BN	Hanau, GE
March 93	
2nd BN	CP Castle, Korea
44th BN	Kimpo, Korea
97th BN	Fort Irwin, CA
129th BN	St. Anthony, ID
286th BN	Bellingham, WA
132nd BN	Sacramento, CA
NTC Blue Force	Fort Irwin, CA

The M970 device is a simple-to-use trainer that does not require any new equipment team training or spare parts. Units are authorized to use the device upon receipt. POC is Bill Good, -7637.

Bailey Bridge Video Tapes. Two new video tapes, Bailey Bridge Construction, Parts I and II, are available in TASC film libraries Army-wide. Bailey Bridge Construction, Part I, TVT 5-30, describes bridge site preparation from reconnaissance to completion of the site layout. Construction of a Bailey bridge is described in Part II, TVT 5-31. It describes the complete construction of a 100-foot double-single Bailey bridge with an upgrade to double-double capacity. POC is Dave Shafer, -7749.

Directorate of Combat Developments (DCD)

AN/PSS-12 Mine Detector. Production tests have identified a defect in all AN/PSS-12 mine detectors. Investigation revealed that the bracket on the search head where the telescopic pole attaches is cracked or broken. This defect does not render the unit inoperable. The detector can be used until repair procedures become available. All defective sets should be retained until disposition instructions are received from ATCOM. POC is SFC Michael Craig, -7993.

Concept Evaluation Program (CEP). The CEP is a Training and Doctrine Command (TRADOC) program that provides quick, innovative testing to resolve training and combat development issues. Proponents such as the Engineer School use the program to refine materiel requirements or determine the operational and training potential of new materiel. It is used to assess the potential for adapting commercially available items or modifying existing items and prototypes to satisfy user requirements. The program is also used to evaluate nonmaterial applications, such as testing of doctrine, training and organizations. Ideas for potential candidates for CEP can be submitted to: Commandant, USAES, Attn: ATSE-CDM, Fort Leonard Wood, MO 65473. POC is Dr. Merrill Stevens, -7500

Directorate of Evaluation and Standardization (DOES)

Special Studies. Input from engineer units is requested to support two special studies conducted recently at the Engineer Center. Both studies concerned the quality of training soldiers receive—one involved the physical fitness of graduates; the other reviewed the adequacy of maintenance training. Send comments or suggestions to improve the training (in these or other areas) of soldiers you receive from the Engineer Center to: USAES, Attn: ATSE-ESE, Fort Leonard Wood, MO 65473. POC is Jerry Wauthier, -5297.

Reserve Component (RC)

Reserve Training Office. We welcomed Major Joe Aldridge, Chief of Reserve Training, in November 1992. He is the point of contact for Reserve Component configured courseware (RC^3) products. Questions may be addressed to: Commander, USAES, Attn: ATSE-TD-TDR, Fort Leonard Wood, MO 65473. MAJ Aldridge may be reached at -7522.

BRIDGE THE GAP

By Command Sergeant Major Roy L. Burns, Jr.
U.S. Army Engineer School

I write this as I finish my first week serving you as the Engineer Center Command Sergeant Major (ECCSM). I'm filled with excitement, enthusiasm, anxiety, and anticipation. And, I'm more than a little humbled by the honor bestowed on me, as well as the responsibilities that lay ahead of me.

As I was leaving Germany, a soldier asked, "Sergeant Major, aren't you scared by all this?" I couldn't help but think about what General George S. Patton, Jr., said: "All men are a little frightened..." A little frightened? Yes, but I'm optimistic that we have a great team that is able to take on challenging missions and win! Decisive victories are our legacy. Ensuring future successes is our challenge. So, let me introduce myself, share some of my goals with you, and discuss the kind of leadership we need to nurture.

I am 39 years old and have 20 years of active duty. I served three tours in Germany. My leadership style is making soldiers feel confident that they can approach me anytime, anywhere, about anything. The contributing factor for attaining my position as the ECCSM is SOLDIERS! The soldiers I've been responsible for, directly or indirectly, did what I asked. At the same time, my commanders believed in my ability to accomplish the mission. I am a stickler for leading by example. My favorite quote, which I use and teach others is, "In order to be successful in anything you want to do, you must have a goal."

I have three goals to accomplish at the Engineer Center:

- Establish two-way communications from the Engineer Center to units in the field.
- Ensure that the quality training taught here is tough, realistic and, above all, safe.
- Continue to promote quality-of-life issues for single soldiers and families on Fort Leonard Wood.

The kind of leadership we noncommissioned officers need to nurture is genuine concern for new soldiers. For some of them coming into the Army, the future seems uncertain. As leaders we face many challenges: changes in Europe, changes in force size and structure, budget reductions, MOS consolidations, and the retention of quality soldiers. New soldiers are concerned about whether their leaders really "care about me and my situation." If we do uncaring things to soldiers during their first days in a unit, i.e. brush them off because we leaders are "busy," leave them out of major training events, or let them wait for days to in-process, they will only remember the "bad" things. Those memories can harm their integration into a unit.

When we say, "Leaders care for their soldiers," we mean they are genuinely concerned about the problems soldiers face from day one! Leaders care "bone deep" not just "skin deep." When a soldier has a personal problem, the caring leader strives to assist in dealing with the problem head-on, whether the problem occurs during the soldier's reception or during reassignment to a unit. The leadership counseling manual, FM 22-101, helps leaders develop the necessary skills to assist soldiers with their personal and professional growth.

Leaders must understand their soldiers in order to identify their problems and to assist as they strive for excellence. Leaders nurture their soldiers so they understand the rules, both formal and informal. For example, how to meet appearance standards, how to feel proud about what they do and the unit they belong to, and when to shout their motto when saluting—such as, "Hoo-ah, sir, Essayons!"

Belonging to a team is important to both soldiers and their leaders. As we spend time with our soldiers in different activities, let's make them feel they're important. Make them feel they are an integral part of the unit, and help them become functioning and important members of our unit—our team!

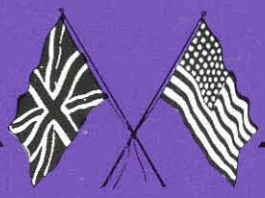
Firm and caring leadership creates a climate in which soldiers become motivated, enthusiastic, and willing to perform any mission. Soldiers always respond well to a leader who listens to their concerns, provides advice and assistance, and deals with them honestly and fairly. A positive climate develops through a sincere and continuous effort over time, not just during scheduled counseling to meet a requirement.

I challenge you to set goals and look forward with pleasure to working with you to accomplish them.

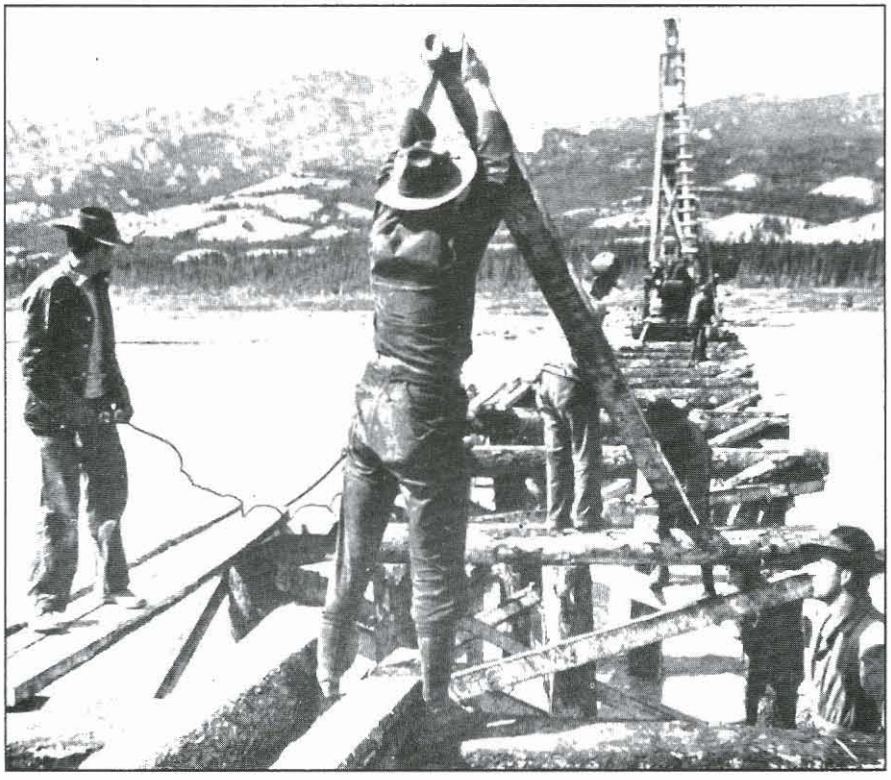
DEPARTMENT OF THE ARMY

ENGINEER PROFESSIONAL BULLETIN
US ARMY ENGINEER SCHOOL
ATTN: ATSE-TDM-PB
FORT LEONARD WOOD, MO 65473-6650

USPS 522-390
OFFICIAL BUSINESS



ALCAN HIGHWAY 1942



On October 24, 1942, after only 8 months and 12 days of round-the-clock construction efforts, engineers working from both the north and south met at Beaver Creek, a few miles east of the Alaska-Canada border. During this remarkable construction project, 11,000 soldiers and 6,000 civilians from both the U.S. and Canada built the 1,523 mile-long highway known as the Alaska-Canada Highway, nicknamed the ALCAN.

Photo and art courtesy of Don Menzies, *The Alaska Highway*, The Douglas Printing Co., LTD, Edmonton, Alberta, Canada.

PIN: 070-895-000