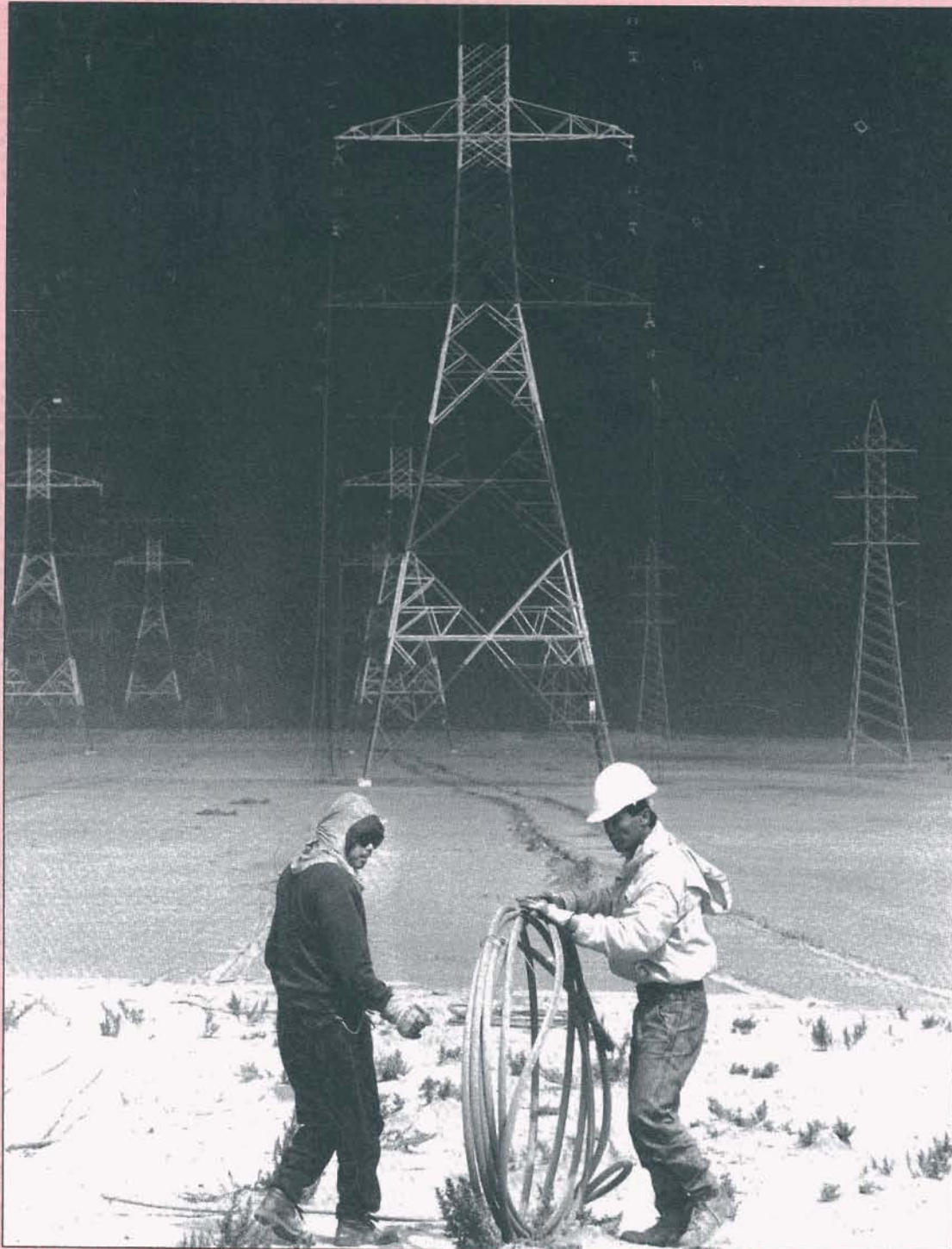


Engineer

THE PROFESSIONAL BULLETIN FOR ARMY ENGINEERS
Headquarters, Department of the Army

April 1992



NATION ASSISTANCE



CLEAR THE WAY

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

In the last three years the world has undergone the most significant changes since the end of the Second World War. As the international environment evolves, so, too, do the United States's national objectives abroad. This evolution, in turn, impacts on the operations of the U.S. Army.

The focus of this issue of *ENGINEER* is "nation assistance"—a term used to describe the concept by which the Army supports the U.S. Government's efforts to assist other nations and promote international stability. Major Hauck's article, which begins on page 11, explains nation assistance in general terms. As he states, nation assistance is not a new mission for the Army—we have conducted it throughout our nation's history. But the evolving strategic environment has caused us to take another look at this concept as a method for employing forces (as opposed to using force) to reduce the likelihood of international violence and conflict.

Other articles address specific nation assistance activities undertaken by engineers in the field. These articles reflect the diversity of nation assistance-type operations, ranging from post-war reconstruction in Kuwait to Civic Action Team missions in Southeast Asia.

The recently published 1992 *National Military Strategy* reflects the monumental changes occurring throughout the world. This document contains the Chairman of the Joint Chiefs of Staff's input to the President and Secretary of Defense for their use in preparing strategic guidance for the armed forces. It identifies several forces that are currently changing the strategic security environment. They include, among others, the continuing struggle to improve human conditions throughout the world; the march toward democracy in Eastern Europe, Latin America, and other parts of the world; and drug trafficking. These forces highlight the fact that our nation is now considering challenges very different from

traditional cold-war threats. While strategic planners have addressed those issues in the past, their relative importance has increased enormously. Recommend that you read the new *National Military Strategy* document. It's short, but it provides an invaluable perspective on evolving national strategy.

The Combined Arms Command, at Fort Leavenworth, continues to work on the revision of FM 100-5, *Operations*. The revised manual will expand, rather than change, doctrine in the 1986 version. This expansion is the result of several factors, including the evolving strategic environment addressed earlier. Other factors include changes in technology, lessons learned from recent military operations, and recognition that our doctrine must better address strategy and operational art, as well as their linkage to tactics.

As Leavenworth develops the new *Operations*, we at the Engineer School will begin revising FM 5-100, *Engineer Combat Operations*. Engineer doctrine will keep pace with that of the rest of the Army, so that we can continue to provide the best possible support as active members of the combined arms team. It's truly an exciting time to be a soldier and an engineer!

The 1992 Senior Engineer Leaders' Training Conference, or SELTC, gets underway about the same time that this issue of *ENGINEER* is published. The theme of this year's conference, "Shaping the Force for the 21st Century," is a subject of great interest at all levels of the Total Army. Those who attend the conference will hear presentations by the Chief of Staff of the Army, the Chief of Engineers, the FORSCOM and TRADOC commanders, and the Deputy Commander in Chief, U.S. Army Europe. As always, SELTC provides an opportunity for the Army engineer community to come together to share ideas, renew old friendships, and build new ones. Hope to see you there!

Engineer

April 1992

Volume 22 PB 5-92-2

UNITED STATES ARMY ENGINEER CENTER AND FORT LEONARD WOOD

COMMANDER/COMMANDANT

Major General Daniel W. Christman

MANAGING EDITOR

Catherine Eubanks

FEATURES EDITOR

Phillip R. Howell, Jr.

GRAPHIC DESIGNER

Jennifer C. Bolyard

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

Cover : *In the aftermath of the Gulf War, workers repair high power lines south of Kuwait City. (Photo by Jonas Jordon, SASPA, U.S. Army Engineer District Savannah)*

FEATURES

- 2 **Nation Assistance In Kuwait**
by Brigadier General Ralph V. Locurcio
- 11 **Nation Assistance: An Evolving (But Not New) Concept**
by Major Boyd D. Houck
- 17 **The Bridge Within A Bridge**
by Lieutenant Colonel John L. Craig, Major Theron L. Smith and Master Sergeant Richard W. Bates
- 29 **Prime Power On The Battlefield**
by Major Kenneth E. Cockerham
- 37 **The Role of Joint Task Force-Bravo In Nation Assistance**
by Major Scott Brubaker
- 47 **The Bullet Trap: Hastening The In-Stride Breach**
by Captain Stephen R. Hesler and Captain Ronald N. Light
- 50 **A Schoolhouse for Xepon**
by First Lieutenant Walter P. Cole
- 54 **MOS Consolidation: Its Time Has Come!**
by Captain James A. Price
- 55 **Engineers Aid War On Drugs**
by Sergeant Galen R. Putnam
- 62 **Observations From Just Cause**
by Captain Gordon J. Taras

DEPARTMENTS

Inside Front Cover: **Clear the Way**

- | | |
|------------------------------|---------------------------|
| 23 Book Review | 66 Engineer Update |
| 24 Engineer Problem | 70 Past in Review |
| 34 Personal Viewpoint | 73 Bridge the Gap |
| 43 Engineer Solution | |

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.

CONTENT is not copyrighted. Material may be reprinted if credit is given to ENGINEER and the author.

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.



Nation Assistance in Kuwait

By Brigadier General Ralph V. Locurcio

In the aftermath of Desert Storm, the U.S. Army Corps of Engineers played a central role in reconstructing Kuwait's infrastructure. The mission of re-establishing life support systems that provided for the safety and security of Kuwaiti citizens was a successful one, and may well be a model for the future. That is, American military assistance to third world countries, followed by nation assistance to restore internal security and enable reform, or preferably, nation assistance in lieu of military assistance to accomplish similar objectives. What follows is an analysis of engineer activities in Kuwait that can be applied to future nation assistance operations.

Background

Anticipating extensive devastation from the Iraqi occupation and subsequent combat action, the Emir of Kuwait formed a government committee known as the Kuwait Emergency Recovery Program (KERP) to manage recovery operations. With functions similar to the Federal Emergency Management Agency (FEMA) in the United States, the committee was headed by Dr. Ibrahim Al Shaheen, who was later named a national minister.

After considering several private contractual options, Dr. Shaheen advised the Emir of Kuwait to ask President Bush for

recovery assistance from the Corps of Engineers, with all costs to be reimbursed by the government of Kuwait. The Corps had recent experience in natural disaster recovery after Hurricane Hugo and the San Francisco earthquake. Additionally, it had extensive experience working in the Middle East, along with knowledge of the construction environment and culture. Dr. Shaheen and his advisors assumed that Corps professionals could just as successfully apply their expertise to the devastation wrought by a military disaster. They were right.

On January 14, 1991, as the air attack began and plans for the ground attack to liberate Kuwait

were being finalized, the Corps signed a \$45 million Foreign Military Sales (FMS) agreement with Kuwait to begin the process of assistance. The Corps launched the recovery operation from its Transatlantic Division Office in Winchester, Virginia, formerly known as the Middle East/Africa Projects Office, which also provided command, control and logistical support throughout the operation.

Following the liberation of Kuwait in February, the recovery task force, dubbed the Kuwait Emergency Recovery Office (KERO), moved into Kuwait from a staging area in Saudi Arabia. Once in Kuwait, KERO operated under the local direction of the Defense Reconstruction Assistance Office (DRAO) which, in turn, reported to the Department of Defense (DOD) and the U.S. Ambassador to

**"A nation assistance
task force cannot
operate in a
vacuum—even
though...constrained
by time..."**

Kuwait for guidance and direction.

The KERO team entered Kuwait on March 4, 1991, to commence recovery operations. In the 300 days following liberation, this team, which averaged 140 American and 60 Kuwaiti professionals, placed over \$300 million in repair work through contracts with major American and foreign construction firms. Working seven days a week and an average of

12-14 hours per day, they surveyed, repaired, and restored to operation major infrastructure systems and facilities such as the national network of 300 kilovolt (kv) electrical distribution lines.

They also worked on electrical substations, water mains and pumping units, the highway network, sanitary mains, two seaports, the international airport, and more than 150 public schools. Other projects included over 750 public buildings, including police, fire, medical, other service facilities, ministerial headquarters and some defense facilities. The details of the scope and magnitude of this successful operation have been reported in several accounts by national and international media.

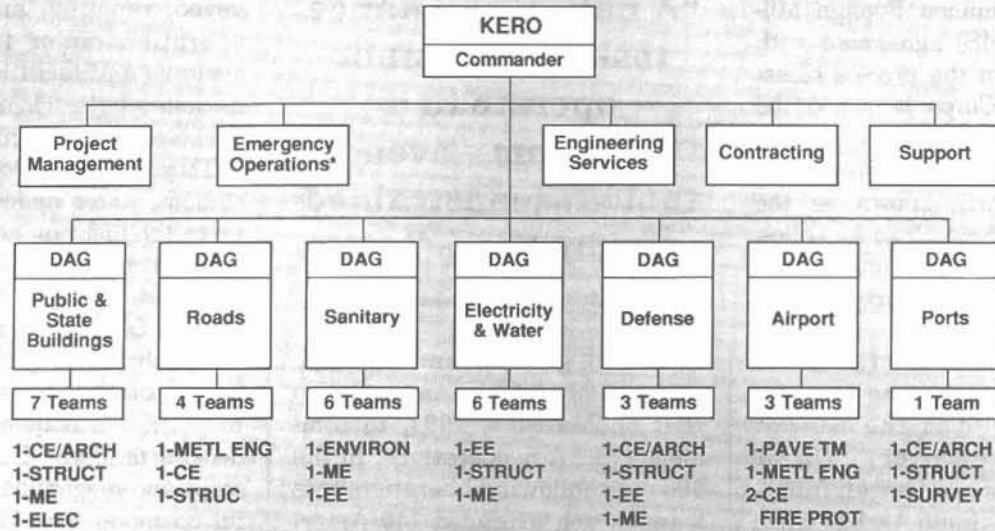
What is more important for our Army today, considering the likelihood of future nation assistance operations, is an account of the major



Above: Jim Wong, Army Corps of Engineers, and Suhalla Marafi, a Kuwaiti engineer, inspect electrical damage at Ali Al-Salem Air Base. (Photo by Jonas Jordan)

Far Left: Eman Qaturba, a Kuwaiti observer and Captain Bob Irby inspect power cables damaged by cluster bombs south of Kuwait City. (Photo by Jonas Jordan)

Damage Assessment Operations



*Provides primary direction during "recovery" phase.

Figure 1

decisions and processes which governed assistance operations in Kuwait. This article will deal with these subjects. In particular, the following will be covered:

- Organization and staffing of KERO
- Programming and budgeting for the recovery
- Contracting
- Logistics
- Political factors and partnership with the host nation

Staffing

In the case of the KERO operation, there was not much time to organize, staff and train the initial task force of approximately 140 Corps employees. These personnel were experienced volunteers from various districts and divisions, who rotated to Kuwait on a three-month cycle. To minimize potential dysfunction and confusion caused by an unfamiliar organizational structure, a decision was made to use the habitual Corps organizational

structure for a small district office.

In short, volunteers from various Corps organizations would hopefully arrive in KERO and be comfortable with the working environment with only a situational orientation and very little training. Following this basic premise, KERO used two structural variations, each suited to the particular operations at the time, but both employing a common district headquarters structure.

During the initial survey phase of the recovery, KERO field offices were set up according to Corps Emergency Management practice. Labeled Damage Assistance Groups (DAGs), each had a variable number of assigned Damage Assistance Teams (DATs), depending on the mission of each group (Figure 1). For simplicity, DAGs were aligned with specific Kuwait Ministry sectors: buildings, roads, airport, electricity, water, ports, defense, and so on, according to prewar Kuwaiti management conventions.

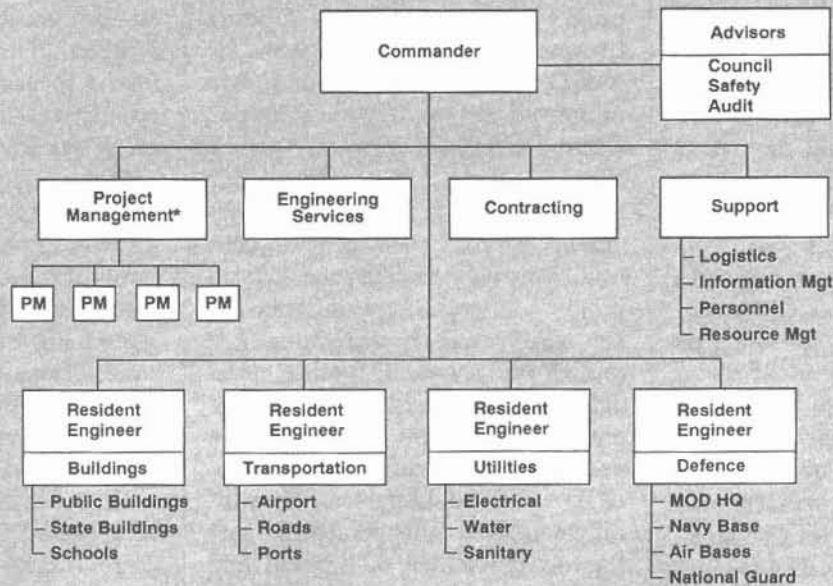
Adoption of these conventions simplified interface with the host nation because it made leaders

and volunteers from these Kuwaiti ministry sectors readily available to work with KERO. This structure was used for about 45 days while damage survey reports (DSRs) were being completed and contractors were mobilizing. Actual construction during this time was minimal.

During the subsequent recovery phase, when construction management became the dominant operational consideration, a more conventional Corps project management structure, with traditional resident offices to manage contractors in the field, was adopted (Figure 2). This helped ensure that project delivery and contract administration were accomplished according to the Corps' quality standards.

Project managers (PMs) were assigned to each ministry sector in order to coordinate with the appropriate Kuwaiti officials responsible for that sector. Managers were tasked with developing a program for each sector in order to control all projects for that sector, from concept to turnover. For example, all roads projects

KERO Organization



*Provides primary direction during "recovery" phase.

Figure 2

constituted the "roads sector program," which was the responsibility of one PM, who worked with the Kuwaiti official responsible for roads.

The PM established project priorities, developed project and program budgets, and decided project features and quality standards. Each PM also monitored progress through all technical phases (design, contracting, construction), reported on the progress of each project and the entire program, and supervised eventual project turnover.

Purely technical phases of the project life cycle were handled by the appropriate technical divisions within the KERO structure: Engineering Services (analysis, design, estimating, specifications, value engineering, field consultation); Contracting (contract preparation, solicitation, review, award, small business administration), and Resident Offices (construction management, contract administration, modifications, claims resolution). Other professional elements such as counsel, safety, and audit were also present on the KERO team to round out the profes-

sional package and ensure timely project completion.

All of these decisions proved to be correct and advisable for future operations, but there were a few problem areas. For example, the conversion from DAGs to Resident Offices proved somewhat problematic as new roles and responsibilities were sorted out. Similarly, the decision to rotate field level engineering professionals every three months was a difficult—but workable—staffing concept.

On the other hand, rotation of key leaders such as deputies, division chiefs, resident engineers, the chief of project management, the resource manager, and the property book officer, proved extremely disruptive. In future operations, key personnel should be selected for the duration of the operation, or not less than a six-month tour with a minimum overlap of at least one week.

Programming and Budgeting

When KERO began its work, there were no

operational governmental agencies in Kuwait to accomplish the normal budgeting actions necessary to fund a large-scale national reconstruction program. It didn't take long for KERO to obligate or expend the original \$46.3 million FMS funding. Within 45 days, KERO was essentially out of funds and in need of additional authority to continue operations.

Extremely cost conscious, as any nation would be in this situation, Kuwait requested an accounting of all funds on a monthly basis. Later, they asked for a complete financial summary prior to granting any request for additional funds. To meet those requests, an efficient method of managing and displaying project information and funding status had to be developed quickly. Similarly, more than 1,000 damage survey reports had served to inventory, record and quantify the damage, but a system of managing this information was needed.

Using standard software packages and lap-top computers operating on generator power,

KERO engineers developed and implemented a computerized project data base within a few days of their arrival in Kuwait. A substantial achievement, this data base allowed field engineers to add or modify project information as field work, estimates or construction was completed. This gave PMs a continuously accurate information base and the capability to manipulate the data as required to prepare budget documents and reports rapidly.

Project data was sorted by the Kuwaiti ministry sector and presented to the appropriate ministry representatives for decisions on priority, timing, and scope. KERO PMs soon found that their counterparts, doing their best despite a lack of time, staffing, information, and facilities, were unable to respond quickly to such requests.

Working feverishly against time, KERO PMs and resident engineers collaborated to organize a prioritized line item repair program for each ministry, based on their acquired understanding of the ministry's function and the known damage. The PMs then presented these programs to the respective ministry authorities for approval. Once approved, individual programs were organized into a nationwide KERO repair program and briefed to DRAO and the KERP central committee for funding. This entire process was accomplished in little more than one week for the augmented \$212 million KERO budget for 1991-1992.

Later, the KERP committee reserved the authority to adjust funding among programs, but allowed KERO some flexibility to move funds within a program, provided the committee was notified. This process was summarized and reviewed in biweekly meetings with the KERP committee which also served to monitor progress, and add or delete projects.

To stay abreast of fast-moving project operations and funding transactions, it was necessary for KERO and DRAO to hold weekly in-process reviews (IPRs), similar to Corps monthly project review boards. Again, the data which formed the basis for these reviews emanated from the project data base. This was manipulated to form project management summaries, bar chart program schedules, key project fact sheets and other management documents. This same automated system of reports was used to inform higher headquarters, DOD, the ambassador, Kuwaiti ministers, and other interested parties on the status of projects and KERO operations.

Overall, several salient features of the budgeting operation should be noted for future operations. First, a computerized and flexible project management data base was needed from the very start of operations. This system enabled KERO managers to convincingly demonstrate their control of projects and costs. Secondly, KERO task force engineers were frequently close to the action and well versed in project details. Consequently, they were the best qualified personnel to develop and defend budget requests.

Finally, frequent communications with host nation decision makers were established to obtain program decisions, ensure acceptability of plans and operations, provide information, develop good working relations and establish credibility. A nation assistance task force cannot operate in a vacuum—even though they, and the host nation government, may be constrained by time as a result of the crisis.

Contracting

Speed and, later, control were the driving forces in all KERO contracting operations from the outset. KERO staffers planned for a 45-day competitive

emergency contract award cycle to be executed from Saudi Arabia. They were eventually forced to use a 10-day contingency plan when the war ended more quickly than expected.

Working nearly around the clock and without specific knowledge of the conditions in Kuwait, the KERO staff, with their Kuwaiti counterparts, completed necessary project scoping, solicitation, prequalification, and proposal evaluation actions. They awarded eight letter contracts worth approximately \$25 million within this extremely compressed time period. These letter contracts were further defined after mobilization, once the actual scope of the repair mission was known.

To divide the work among the contractors, Kuwaiti projects were organized into either functional or geographic work sectors according to prewar work management conventions. Consequently, the eight contracts were divided among the following areas: general building repair (in three areas of the city); road repairs; sewer/water pipe repairs; port surveys; electrical repairs, and specialized building repairs. Because this scoping followed pre-war conventions, the Kuwaiti government management structure was perfectly aligned to participate in decisions and to later take control of operations.

Because these letter contracts were essentially cost-plus instruments, a precise method of controlling and documenting the flow of work to the contractor was required once construction operations began. For control and contract administration, the original DAGs were converted to standard Corps' resident offices once mobilization was complete and construction began in earnest.

For the purpose of passing specific work requirements to the contractors, the DSRs prepared during the survey phase were



Construction crews repair Nulseeb Road near the Saudi border. (Photo by Jonas Jordan)

converted into work orders. These documents resided in the project data base. They were reviewed and modified to define the exact scope and estimated cost of work orders, and serve as the plans and specs during construction. They ultimately provided the basis for final negotiations on price and time.

As the operation progressed, larger projects were individually advertised to enhance competition and encourage participation of both American and Kuwaiti small businesses. However, this conversion to individual competitive contracting was extremely difficult with the limited KERO staff. By this time, more than \$100 million in cost-plus contracts, with well over 150 active modifications, were in progress. In addition, the time required to formulate, advertise, and award a competitive, fixed-price contract to an uncertain group of bidders was both risky and prohibitively time consuming for most applications.

The system of dividing the country into work sectors served reasonably well during the early stages of the Kuwait recovery and kept the contractors geographically separated. However, in future operations this geographical orientation should be discarded after a brief period of construction. Additionally, more general contractors should be employed during the middle to later stages of the recovery to enhance competition. That is, if the projected work flow and funding can justify the cost of additional contractor mobilization. If this is possible, proposals for individual work orders could be offered to competing contractors for greater cost efficiency.

As a rule of thumb, each general contractor must see a potential workload of \$50 to \$100 million to justify mobilization. In the case of Kuwait, the contracting operation was initially sized for a \$50-\$100 million horizon, based on the best

information available at the time and guidance from Kuwait. The eventual \$300-\$400 million workload could not have been forecasted accurately enough to justify the risk of additional mobilization. In fact, as many as ten contracts were considered at one point, but the option was discarded because the cost of mobilization would have consumed an inordinate percentage of funds available for construction.

Another contracting method worthy of consideration is job order contracting. This method awards an indefinite delivery, general construction contract based on competitively bid, fixed-unit prices. Actual quantities are specified in the field via delivery orders generated from damage survey reports or similar documents. The unit prices are fixed upon award, except for out-of-scope work, which is negotiated as a modification.

In this case, the restrictions are

two-fold. First, the considerable up-front work involved in preparing the unit price contract specification for solicitation, award, and administration is time prohibitive unless this data is already available and computerized from prior work experience in the region.

Second, as with other fixed-price contracting, the method presumes at least general knowledge of the scope, cost and availability of materials, labor and other factors which mitigate the risk of a fixed-price bid. In the case of Kuwait, even if the voluminous specifications could have been prepared and distributed in time, it is doubtful that contractors would have accepted the considerable risk of a fixed-price contract since virtually all pricing factors were unknown.

In retrospect, it appears that some form of cost-plus contracting is inevitable in an operation such as this. The instrument must be flexible enough to shape the scope of the work as it becomes known, responsive enough to meet the urgency requirements of the crisis, and yet controllable enough to ensure cost efficiency. Staffing plans must consider these factors and allow sufficient government staffing for adequate contract supervision, administration, and—most certainly—audit.

The role of auditors very early in the contract operations scenario cannot be overemphasized for cost-type contracting. While engineers are supervising contract execution, the auditors can shape the allowable range of contract overhead and specify the level of cost and pricing data required to support the contractor's costs. The sooner these parameters are established, the sooner an efficient flow of modifications, negotiations and eventual contract close outs can be established.

Logistics

Engineers are not logisticians, and even great and dedicated engineers cannot do a day's work, let alone several months of intensive work in a hostile environment, if they cannot eat and sleep properly. For example, the valuable data base previously mentioned required computers, generators, copiers, paper, cartridges, and spare parts on a daily basis. In short, the success of an operation of this magnitude and duration revolves around the efficiency and effectiveness of its logistical operation.

The KERO planning team, working with Transatlantic Division, had to assume that nothing would be available for use in Kuwait, except perhaps a building shell to serve as a shelter. Since KERO was an ad hoc TDA organization which did not exist prior to this operation, it had no organic equipment and no property book. Further, since all costs were to be borne by the Kuwaiti government, new equipment would have to be purchased on short notice with Kuwaiti funds and subsequently turned over to Kuwait when the mission was completed.

Everything needed to sustain KERO operations for 30 days, from vehicles to copiers, and personal hygiene products to food and water, had to be purchased in Saudi Arabia in the same 10-day period mentioned earlier, and loaded on semi-trailers for the journey to Kuwait. It's hard to describe the expression on a local automobile dealer's face when a KERO purchasing agent walked into his showroom on 18 January and purchased 62 4x4 vehicles for immediate delivery. Overall, virtually nothing was forgotten in over 4,000 line items needed to support operations.

As a result, the KERO team was

able to conduct self-sustained operations almost immediately on arrival. However, even the best planned operation is not perfect. A rapid resupply base must be available to replenish critical items which cannot be found locally, or to satisfy new requirements which develop as the operation matures and changes. This function was accomplished by Transatlantic Division in Virginia, using commercial air cargo resources via a sister office in Dhahran, Saudi Arabia.

Two aspects of this logistics tale deserve special consideration in future nation assistance operations. First and foremost, the equipment used by the team is host nation property and must be treated as such. Accountability, maintenance and repair, and the general condition of host government property are all key components of the image of quality performance which the task force seeks to leave behind. The reputation of the Corps and the U.S. Army is at stake.

Similarly, the crisis situation notwithstanding, the host government does not want a rag-tag outfit operating in its country, exposed to its own population and the world media. Both of these factors are political indicators of the strength of the host government and its recovery operation, and deserve careful monitoring. Translated into day-to-day operations, this means strict care of equipment and rapid attention to repairs, housekeeping, uniforms and the like.

Another logistical consideration which deserves careful attention is "the cost of doing business." Again, notwithstanding the crisis environment, the recovery operations must be sufficient for quality operations but not extravagant.

In KERO operations, the target was to hold pure overhead costs to less than 10 percent of all expendi-

tures. KERO engineering salaries were charged to projects as direct costs wherever possible. Consequently, actual overhead costs came in around 8 percent, which was eminently satisfactory to the Kuwaiti government. This figure does not consider the salvage value of approximately \$2 million worth of vehicles and equipment. They will ultimately be returned to the Kuwaitis to produce a final overhead figure of around 7 percent.

Politics and Partnering

There is no question that operations like this have political overtones at all levels which must be carefully managed. Engineers are dealing with vast cultural differences which, in spite of the unbridled goodwill exhibited by all participants, could easily result in disagreements and lasting misperceptions. After all, aside from the humanitarian relief afforded by the nation assistance effort, the only lasting benefit for American national interests is the goodwill and lasting working relationships generated by the engineering management process. These are political rather than construction products.

The first and foremost consideration for a lasting professional image was the quality of construction provided. Early on, during the heat of the crisis phase, there was tremendous political pressure to conduct only emergency repairs to facilities so that limited funds could be spread over many project areas. Experience has shown that for all but the smallest repairs to facilities, this tolerant "crisis" attitude will subside long before the completion date of the work.

Consequently, in the calm, post-crisis environment, the user may not recognize this emergency scoping as quality construction, and he will complain bitterly that he has

been served with shoddy work. Such problems need to be resolved immediately, on the ground, with the customer—preferably in his favor—rather than through administrative appeals. This is especially true for major programs which affect large groups of citizens, as these projects justifiably receive close scrutiny and media coverage. Here, a strong, involved, and active public affairs officer can ensure balanced coverage so that such problems do not receive undue attention.

A corollary of this concerns project selectivity. All projects do not have equal value in light of U.S. political and national security objectives and values. The same is true for the host nation population. Progress will undoubtedly be reported by the American media, and consequently every project in the Corps program must appear as beneficial to Americans as to the host country. The validity of the support provided must always appear justifiable and humanitarian to the supported population, and to the American taxpayer. These media observers, who shape political decisions through public opinion, often will not give sufficient consideration to the intricacies of the project approval process.

In general, projects acceptable for U.S. government construction will suffice for the host nation population. In other words, projects which support major population segments, versus those which satisfy the goals of special groups, are usually acceptable.

On the other hand, planners should not be complacent and say "it's their money, they can do what they want with it." Some citizens of host countries may easily accept the use of government labor to work on private projects as one of the perks of high office. It may even be sanctioned legally, but such practice would never be con-

doned or understood in the U.S., and should be avoided. For example, work on private residences, ornate buildings, and VIP facilities should be avoided unless there is an overriding and unmistakable social value. In Kuwait, reconstruction of the national parliament involved very special and expensive construction and furnishings. But the overriding value of providing a necessary and suitable facility for the return of democratic government in Kuwait was universally acceptable in both the U.S. and Kuwait.

As a general rule, U.S. forces should always be used for the "highest and best" purposes which afford the maximum positive image and the least risk, political or otherwise, to our government and our personnel. Projects which do not fill this criteria should be recommended for construction by private contractors working directly for the host government. Close cooperation with the U.S. ambassador and his staff will serve to provide the political sensitivity necessary to properly screen projects.

A second consideration for construction managers is the political problem of "who's in charge" of the nation assistance effort. Clearly, the host nation must be in charge, and U.S. elements must keep this steadfastly in mind. This is not as trivial as it appears because engineering judgments, which we make routinely and frequently without asking, are often driven by our own cultural imperatives—which may not be valid in the host nation.

For example, Americans, as a general rule, value time more than money—especially in crisis situations. Eastern cultures are much more patient. Cost and perceived value are more important than time, and this difference can cause major disagreements and the misperception that Americans are not good managers.

A corollary to this example is the role of true partnership with host nation managers. In the case of Kuwait, the host nation managers were adamant about having a partnership with the Americans. This desire stemmed from their need to direct their own destiny in a professional way, and from their sincere desire to learn the American way of managing a project.

True partnership was relatively easy to achieve in field engineering activities through the use of Kuwaiti volunteer engineers who were assigned to KERO. These engineers worked side by side with their American counterparts throughout the entire recovery operation and shared every experience. Consequently, the Kuwaitis and Americans developed a mutual understanding of each other, and from that came the respect and trust which formed a true partnership.

That is not to say that problems didn't exist. There were many differences in work practices, compensation, privileges, and housing arrangements—all of which were potential areas for discord. These were discussed as each case arose and a conscious effort was made to ensure that both Kuwaitis and Americans followed the same rules and practices.

At the managerial level, the partnership was equally important but harder to achieve because of the complexity of managers' responsibilities, and the time constraints on their respective schedules. The individuals involved had to make a concerted effort to include their counterpart in any and all decisions pertaining to the recovery program.

This usually caused a time delay and additional discussions. But the time was well spent because it prevented later misunderstandings and delays during construction. In fact, in almost every case where consensus on

policy was not achieved prior to a construction decision, there were misunderstandings and delays during the critical—and more costly—construction cycle.

Finally, the task force commander can also expect considerable attention from DA, DOD and the U.S. Congress. These agencies all require current and accurate information on all operations to fulfill their responsibilities and answer constituent questions. Consequently, a comprehensive, rapid, and preferably automated reporting system must be developed early on.

In Kuwait, both Transatlantic Division and the Defense Reconstruction Assistance Office (DRAO), utilizing reports from KERO, interacted directly with these agencies to provide accurate information, answer inquiries and relay sensitivities to KERO. This allowed KERO to concentrate on engineering and construction activities rather than external coordination.

Conclusion

To sum up the Kuwait experience in a few words is difficult. There were so many lessons learned that this article can only scratch the surface. Some general thoughts are important, however.

First of all, as an intergovernmental operation, the Kuwait experience was a tremendous success. The humanitarian spirit of the participants easily bridged cultural and professional differences and paved the way for close cooperation and good working relations. What resulted from this cooperation was the prospect of a long-term relationship—based on trust and goodwill—that is probably more important than the operation itself. Of paramount importance to these excellent working relations was the responsive and accountable support of the engineering management structure

in KERO. Budget documents and funds accountability were precise and convincingly accurate. This is of cardinal importance to the establishment of trust with the host nation.

Second, a true and honest partnership in all engineering decisions eliminated potential misunderstandings which could easily have delayed construction and undermined the completion of key projects.

Finally, free and open communications with all parties ensured that both U.S. and Kuwaiti government officials—and their constituents—understood exactly what was happening as the recovery progressed.

The Kuwait recovery was a satisfying and professionally exciting experience for all who had the opportunity to participate. As an intergovernmental experience, it holds promise for future application, not only in the aftermath of a conflict, but potentially as a conflict management or conflict reduction mechanism which warrants serious consideration. 

Brigadier General Locurcio is commander and division engineer of the Pacific Ocean Division, Army Corps of Engineers. He previously served in the Persian Gulf as commander of the Corps' Transatlantic Division's Kuwait Emergency Recovery Office (KERO). Other assignments included commander and district engineer of the Corps' Savannah District and Philadelphia District, and assistant director of construction at Army Corps of Engineers Headquarters. He has also served in several troop assignments in Germany and Vietnam. He is a graduate of West Point, and holds a master's degree in urban engineering from Purdue University. He is also a graduate of Command and General Staff College and the Army War College. He is a registered professional engineer in Virginia, Pennsylvania, and New Jersey.



Nation Assistance: An Evolving (But Not New) Concept

By Major Boyd D. Houck

“The mission of the 146th Engineer Detachment can be broken down into four discernible areas. [The unit must] maintain the capability to deploy Mobile Training Teams to provide military instruction in engineer-related fields... be prepared to deploy Technical Assistance Teams capable of providing assistance to the military and para-military forces of Latin America... be equipped to provide Civic Action Teams to assist the civilian population in nation building activities... [and] provide physical support setting up Special Forces Operational bases and furnish guidance to the 8th Special Forces Group command and staff.”¹

Does this sound like the current mission for a unit heading for Latin America in a few weeks? It is, in fact, extracted from an article on the 146th Engineer Detachment in the Summer 1971 issue of *ENGINEER* magazine. While the

Army’s involvement in nation assistance (a term which evolved from nation building) is currently receiving a lot of attention, the concept is certainly not a new one. This article addresses the evolving concept of nation assistance.

Nation assistance is not an engineer-specific term or even a purely military one. The concept applies to certain types of activities conducted by any United States government agency. Within the military, engineers are often mentioned in conjunction with nation assistance because of their unique capability to support it. Every arm and branch of the military, however, continues to make significant contributions to nation assistance.

In general terms, nation assistance is cooperative action between the United States and another nation to promote internal development and the growth of institutions within that nation. The U.S. government conducts nation assistance



Engineers lower a submersible pump into a well casing on Tiger Island, Honduras.

activities to promote stability within a specific country or region of the world. There are several key points related to this description of nation assistance.

First, nation assistance is a *cooperative* effort between the U.S. and another nation. Next, "institutions" in the context of nation assistance is a very broad term. It ranges from national agencies such as the host nation's military, its ministry of public works, and so forth, to local organizations such as public education and health services. Finally, the host nation (in conjunction with the United States) must establish objectives for internal development that meet the needs of their people. These objectives may include the reduction of poverty, the equitable distribution of the benefits of national development, or taking steps to ensure continued prosperity within the nation. The achievement of

these objectives contributes to stability both within the country and within the region.

Though a lot is said and written about nation assistance, exactly what it consists of is still a subject of debate. The definition continues to evolve. The coordinating draft of Army Field Manual (FM) 5-114, *Engineer Operations Short of War*, contains the following proposed definition:

*"Nation assistance is political, economic, informational, and military cooperation between the United States and the government of another nation, with the objective of promoting internal development and the growth of sustainable institutions within that nation. This corrects conditions which cause human suffering, and improves the quality of life of the nation's people. Nation assistance is conducted to promote stability within the world, which is in the U.S. national interest, as well as for humanitarian reasons."*²

Training and Doctrine Command (TRADOC) published TRADOC Pamphlet 525-5, which is the umbrella concept for AirLand Operations, on August 1, 1991. It contains the following definition of nation assistance:

*"The primary supporting concept of peacetime engagement that seeks to coordinate the use of all U.S. political, economic, informational, and military assistance for a host nation's program to promote stability, sustainable development, and institutional growth responsive to the people's needs. DOD, working in concert with other U.S. agencies and at the host nation's request, provides health, technical, management, and other assistance consistent with authorizing legislation to achieve the desired goals. Nation assistance emphasis is on developing host nation capabilities in key areas by transferring skills to civilian and military sectors. These actions are integrated through the U.S. government's country plan."*³

Both definitions include the concept that nation assistance is a cooperative effort. This cooperation must exist not only between the U.S. and a host nation, but also between U.S. agencies operating



National Guard engineers work on a block wall during construction of a school in Comayagua, Honduras .

within a country. Both emphasize the importance of nation assistance in responding to the needs of the host nation's people. They also address sustainable institutional and internal development, which result in increased stability.

The primary objective of nation assistance is to promote stability in a country or region. Stability in this context is orderly change, not stagnation. In many developing nations, the government faces a major challenge in ensuring balanced development. If modernization and development do not improve the standard of living of all the nation's people, discontent may develop.

Perceived inequity in the distribution of the benefits of national development may create an environment in which an insurgency may take root. While one should not view nation assistance purely as a counterinsurgency strategy, failure to develop the type of national environment a nation assistance program seeks to promote may create favorable conditions for insurgent activities.

The concept of nation building, from which the concept of nation assistance evolved, refers to efforts to integrate the people of a developing nation. As one political science reference described it, "Nation building is an architectural metaphor for the process induced within a state to integrate the

country and tie the inhabitants together in a national fellowship."⁴

In the 1960s and 1970s, the term "nation building" was in common use, although the general concept had been in existence for many years.⁵ The U.S. military participated in various roles in support of nation building, including building our own nation. In the late 1980s, a perception developed that the term "nation building" had negative connotations when addressing America's role in the development of emerging nations. It implied that the U.S. was building other nations in our own image, rather than allowing these countries self-determination in their development.

Around the turn of the decade, "nation assistance" began gaining favor as a less pejorative term.⁶ However, it is not uncommon to still hear "nation building" and "nation assistance" used interchangeably, even though there is a philosophical difference between the two terms.

The lack of a clear-cut description of what activities fall into the category of "nation assistance" is an indication that the concept is still evolving. Some of the activities which nation assistance may encompass include some types of security assistance, disaster relief, humanitarian and civic assistance, combined exercises, and deployments



As part of another school project in Honduras, a soldier puts finishing touches on a door before installing it.

for training. The actual process for selecting, developing, and funding specific projects or programs is beyond the scope of this article. However, I will address some basic principles that apply to nation assistance.

Image and Perception

Nation assistance activities should strengthen the image of the national and local governments in the eyes of the populace. This increases national unity and promotes stability. Nation assistance programs must be designed so that the perception of the host nation's people (as well as the actuality) is that their government is the guiding force. A perception that the U.S. is imposing its will in a region, rather than cooperating with the nation's government, may create problems. Such a

perception may weaken the local government and create (or aggravate) conditions which cause instability.

Coordination

Nation assistance activities must be coordinated efforts between the host nation and all U.S. agencies involved (Department of State, Drug Enforcement Administration, and so on). This coordination is essential to achieve the maximum overall effect rather than isolated accomplishments. Lack of a master plan may result in situations such as bridges with no roads between them, roads without bridges, or health facilities with no clean water supplies.

To facilitate coordination, the U.S. ambassador's country team (working with the host nation) will develop a "country plan." A key member of this team is the United States Agency for International Development (USAID), an agency of the Department of State. Cooperation between military planners and USAID within a country will assist in developing a coordinated master plan for developmental assistance. The country plan contains a "vision" of what the U.S. and the host nation should do together. The host nation must fully concur with this vision, as well as the method of achieving it, for nation assistance to be successful. In other words, the host nation must "buy in" to the program or it will become a unilateral effort rather than cooperative one.

Expectations

Expectation management is a key aspect of nation assistance. National development results in rising expectations on the part of the populace. As the people of a nation see the benefits of development accrue to others, they will want more for themselves. While this is understandable, it may not be possible for a government to meet the people's desires on a schedule that satisfies them. Expectation management is essential in all host nations with which the U.S. deals. The government and the people of the host nation must not be given any promises that the U.S. may not be able to fulfill. To do so may cause unwarranted resentment toward the U.S.

Self-Help

The objectives of a nation assistance program must meet the needs of the people it is designed to help. A key point here is that a program should attempt to develop a host nation's capabilities, rather than simply provide a temporary solution to a problem (which may then require repeated involvement by the U.S.).

For example, planners should plan and execute a bridge construction project in such a way that a host nation learns to build their own bridges, and not simply be the recipient of a bridge built by Americans. Also, the project design must take into account the skill and technology level of the recipients.

The results of the program must be maintainable (structures or facilities) or sustainable (technologies or capabilities) by the host nation. Projects that make extensive use of local contractor support benefit the host nation in two ways. First, the material or service provided by the contractor contributes to the finished construction project, which is an asset to the local populace. Second, the ability of the host nation to conduct its own development is increased as contractors gain experience.

Need

Planners must carefully research projects which the U.S. will support as part of a nation assistance program. Projects should meet a genuine need. They should benefit the majority of the population in an area, not just a few individuals. The projects should not offend cultural or religious norms. They should make maximum use of local resources (subject to U.S. statutory limitations).

Whenever possible, projects should be achievable in a short time frame. They should provide maximum visibility and credit for the local government and have a measurable impact. A completed project has greater impact if the local populace feels that it contributed to identifying the need for the project, and participated in completing it.⁷

A Joint Venture

Joint action by U.S. and host nation military and civilian personnel is a key part of reinforcing the concepts of U.S./host nation cooperation and transfer of capabilities from America to the host nation. Civic action projects in particular should be a joint venture. When U.S. forces and host nation personnel work together on a project, several benefits are gained. First, the local

populace gains ownership of the finished product. The host nation military and civilians gain valuable skills (management, construction, and so forth). The people of the host nation see their government helping their society. Perceptions regarding the U.S. are improved. And American soldiers gain a better understanding of the host nation.

Training Opportunities

Nation assistance activities in which U.S. military forces are involved will generally provide a training opportunity. This serves the dual purpose of improving U.S. relations abroad while maintaining a trained and ready force. The concept is not new, as this 1951 example indicates:

*"Assistance by Army Engineer units in a project such as this [the construction of a sports field] serves as a means of training for engineer equipment operation and materially enhances understanding between the United States Army and [local] communities. Some of the conditions under which this assistance is provided to communities are: that the equipment is readily available; that it not be required for military projects; that the project be practicable; and that the community be willing to assist with hand labor and make the finished sports or play area available to all youth who desire to use it."*⁸

When a U.S. military unit is involved in a nation assistance project during an exercise, the exercise objectives must be clearly defined. This will prevent confusion on the part of the U.S. participants and disappointment on the part of the host nation. While all nation assistance projects should offer some training value to the U.S. forces involved, some projects will be more focused on training, and some on assisting the host nation.

Local Governments

It is essential that U.S. personnel executing nation assistance activities coordinate closely with the local government in their area of operations. This coordination will improve civil-military relations and reduce the chance of misunderstanding between U.S. forces and the local populace. The local government is best suited to address the needs and desires of the people. Americans must remember that they are guests in the host nation. They are there at the invitation of that country's government to provide cooperative assistance.

Doctrine

Although the U.S. Army has conducted nation assistance type activities for many years, there is currently no doctrine which specifically addresses it. FM 100-5, *Operations*, makes no mention of nation assistance. The Combined Arms Command (CAC, a doctrinal integrating center within TRADOC) is currently revising this manual. The new version will include nation assistance as part of Army doctrine. To facilitate this revision, CAC has published several versions of a nation assistance "enabling concept" to collect input from within the Army.

FM 100-20, *Military Operations in Low Intensity Conflict*, contains the Army's doctrine for operations in low intensity conflict environments. While not specifically addressing nation assistance, it does contain many of the concepts that apply to nation assistance activities. Looking at engineer doctrine in particular, FM 5-100, *Engineer Combat Operations*, does not mention nation assistance by name. It addresses it in concept, citing "spreading government influence and encouraging national unity in developing countries."⁹ FM 5-114, *Engineer Operations Short of War*, provides engineer doctrine for operations short of war. It addresses nation assistance in some detail, and contains many of the basic principles included in this article. This manual is currently in coordinating draft.

Nation assistance will continue to be an important mission for the Army as we move toward the end of this century. While the Army must prepare for its primary mission of fighting and winning a land war, it is in our interest to support activities which lessen the chance for armed conflict. Working cooperatively with other U.S. government agencies and host nations worldwide, Army engineers can continue to build a more stable world. 

Major Houck is a doctrine developer for the Engineer School's Directorate of Training and Doctrine. He previously served as a senior team leader and small group instructor for the Engineer Officers Advanced Course. Other assignments include regimental engineer for the 2nd Armored Cavalry Regiment, maintenance officer for the 18th Engineer Brigade, S-4 for the 79th Engineer Battalion, and company commander in the 94th Engineer Battalion. He is a graduate of the Combined Arms and Services Staff School.

Endnotes

¹Captain Dennis F. Pierman, "From South of the Border," *The Engineer*, vol. 1, no. 2 (Summer 1971): pp. 6-9.

²U.S. Army Engineer Center, Field Manual 5-114 (Coordinating Draft), *Engineer Operations Short of War* (Fort Leonard Wood, MO: U.S. Army Engineer Center, May 1991), p. 1-28.

³U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-5, *AirLand Operations: A Concept for the Evolution of AirLand Battle for the Strategic Army of the 1990s and Beyond* (Fort Monroe, VA: TRADOC, 1 August 1991), p. 48.

⁴Vernon Bagdanor ed., *The Blackwell Encyclopedia of Political Institutions* (New York, NY: Basil Blackwell, Inc., 1987), p. 379.

⁵Books written in the 1960s and 1970s on nation building. These include:

R. Bendix, *Nation-Building and Citizenship* (Berkeley, CA: University of California Press, 1977).

K.W. Deutsch and W.J. Foltz eds., *Nation Building* (New York, NY: Atherton, 1963).

S.N. Eisenstadt and S. Rokkan eds., *Building States and Nations*, 2 volumes (Beverly Hills, CA: Sage, 1974).

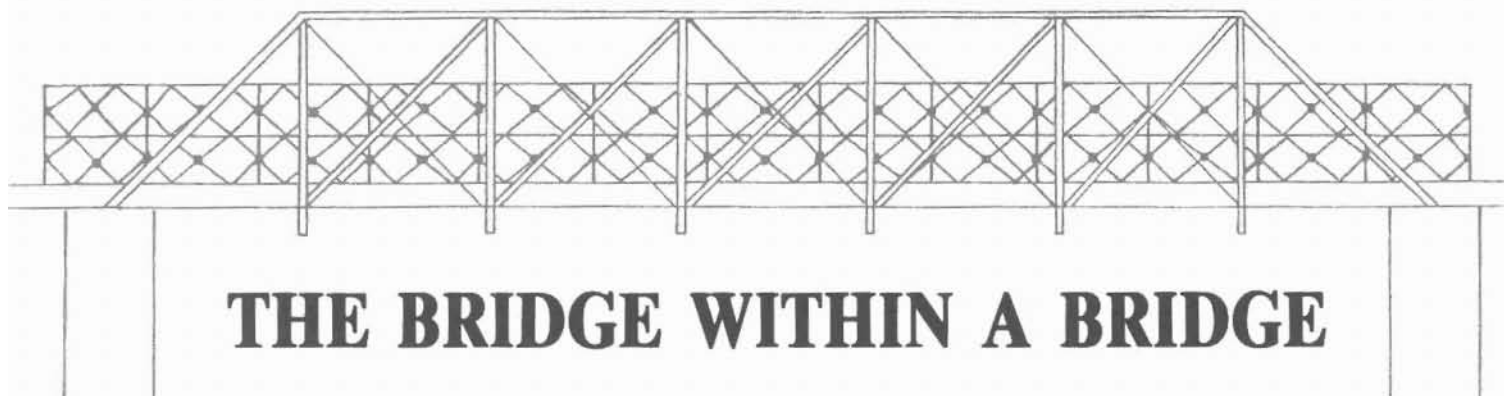
The basic concept of nation building has been in existence much longer. It "became prominent after the dissolution of European colonialism." (*The Blackwell Encyclopaedia of Political Institutions*, p. 379)

⁶One example comes from the following source: Lieutenant General Henry J. Hatch, Chief of Engineers, "Security, Stability, Sustainability: Conditions for Peace," p. 6. This paper was presented at the National Defense University conference "Evolving US Strategy for Latin America and the Caribbean: Mutual Hemispheric Concerns and Opportunities for the 1990s," 15-16 November 1990.

⁷Several of these principles were drawn from the following source: Department of the Army, Field Manual 5-100, *Engineer Combat Operations* (Washington, DC: U.S. Government Printing Office, 22 November 1988), p. 91.

⁸E.P. Hanifan, "The Army Lends a Helping Hand," *The Military Engineer*, vol. XLIII, no. 294 (July-August 1951): p. 279.

⁹Field Manual 5-100, p. 91.



THE BRIDGE WITHIN A BRIDGE

*By Lieutenant Colonel John L. Craig, Major Theron L. Smith
and Master Sergeant Richard W. Bates*

On the night of November 12, 1990, a sand-laden snowplow attempted to cross a 93-year-old single lane bridge in Port Byron, New York. The snowplow's blade struck a vertical member of the bridge structure, and a 40-foot section of the bridge's roadway collapsed into the Seneca River. The plow and its two crewmen were sent careening 16 feet into the icy water. They were badly shaken, but not seriously hurt.

The bridge, however, was another story. The 133-foot bridge, which served as the only access to Haiti Island (see map inset), was now useless. Several dozen families were left stranded on the island, and were cut off from heating oil, groceries, mail, and emergency services.

As a temporary measure, a small flotilla of boats, rafts and canoes served as a stop-gap delivery and crossing service. Three days after the accident, Cayuga County engineers built a temporary foot path across the damaged bridge. But the path was only capable of supporting one

person at a time. With the winter weather getting harsher every day, the residents of Haiti Island needed vehicular access to their homes—and soon.

Echo Company

The day after the accident, an evening television news-cast about the bridge caught the attention of Reserve infantry Major Tad Smith, the commander of E Company, 2nd Battalion, 391st Regiment, 98th Division (Training). Thinking that his unit might be able to help the residents of Haiti Island, Smith contacted John Ozolins, the county's highway superintendent. Ozolins, who happened to be an Army National Guard engineer officer, listened to Smith's rundown of Echo Company's bridging capabilities—which included Bailey bridge construction.

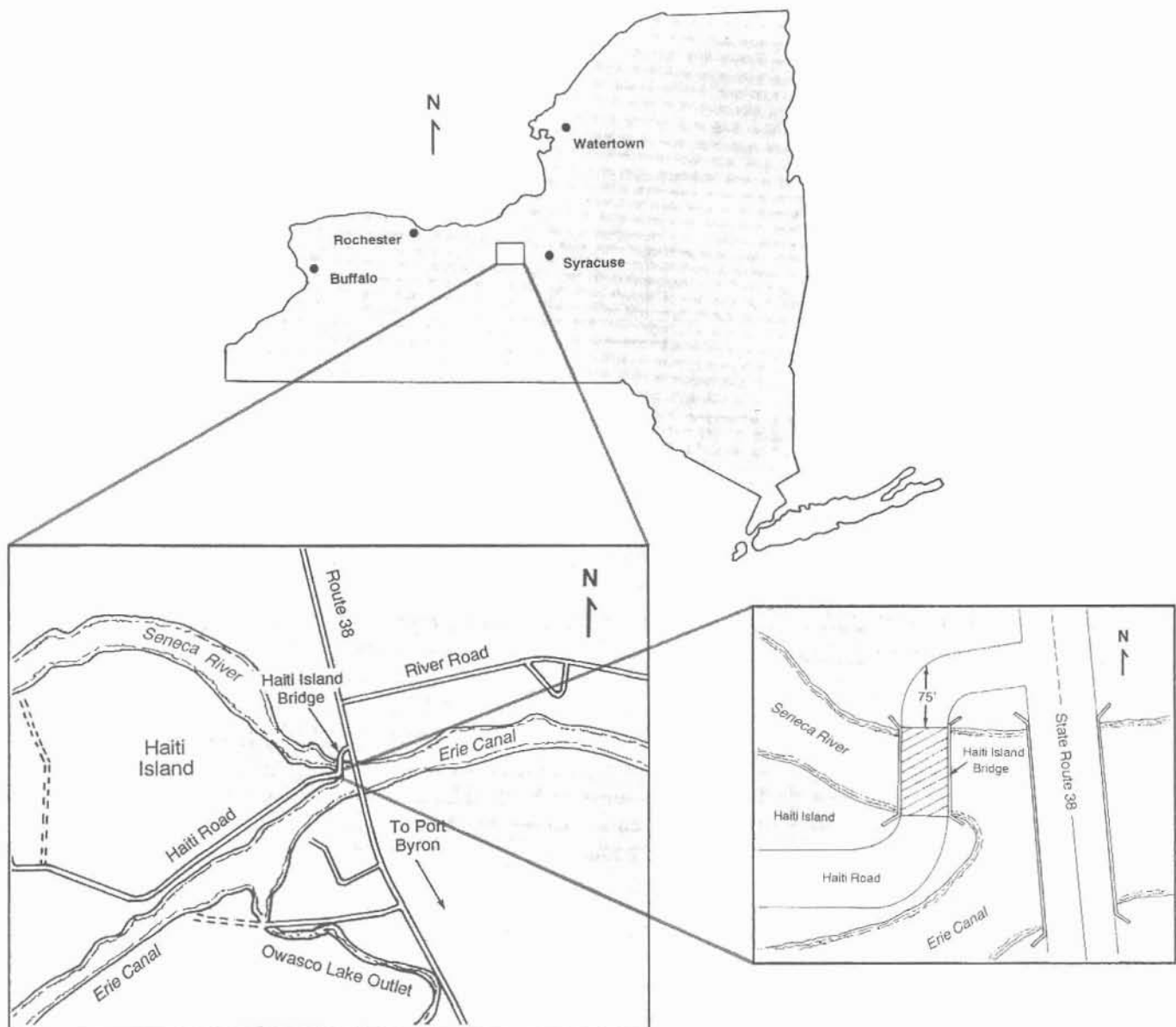
Enthusiastic about Echo company's potential assistance in getting the bridge fixed, Ozolins told Smith that the New York

State Department of Emergency Management, along with the state's Department of Transportation (DOT), owned several sets of M1 Bailey bridge parts. These parts, all World War Two surplus, were scattered throughout the state in several storage locations. If officials were to declare a state of emergency, those parts could be made available for the construction of a temporary bridge to Haiti Island.

Ozolins and Smith agreed to pursue the joint project, and started contacting appropriate officials and key personnel in both government and Army channels.

On the Army side, an initial coordination meeting was held. Sergeant First Class Don Hoffman, Echo Company's most experienced Bailey bridge NCO, and Master Sergeant Richard Bates, a bridge specialist assigned to Readiness Group Seneca, served as the resident Bailey bridge "gurus" for the project.

One week after the collapse, Hoffman and Bates, along with Echo Company engineers, visited the site. Hundreds of



Maps courtesy Cayuga County Planning Board

measurements were taken, along with an hour's worth of video tape of the bridge.

Echo Company personnel then proceeded with a design proposal for the bridge. It was decided that a Class 30 bridge would be needed. The company decided to build an initial 140-foot double-single bridge (Class 8), with a later upgrade to a Class 30 double-double. (On completion of the upgrade, the New York DOT, perhaps because of the unusual nature of the project, conservatively rated the bridge as a Class 15).

Ozolins made initial contact with other highway personnel, along with local and state officials,

and scheduled an initial joint planning meeting. He also reviewed several considerations that would impact heavily on any bridge reconstruction efforts:

- The only accessible site for a replacement would be within the superstructure of the existing through-truss bridge. Its massive steel trusses and overhead bracing system remained in place, even with a 40-foot section of substructure missing.
- No one from the New York State DOT had ever built a Bailey bridge and launched it in a counterbalanced configuration. The standard DOT

method was to assemble the bridge on the ground, and use large cranes to lift it into place. This was not possible at Haiti Island without first removing the existing bridge.

- While some of the Bailey parts were stored inside and were well maintained, most of them sat in open storage yards. These parts did not appear on any central inventory, and their condition was questionable. To compound these difficulties, the only DOT personnel who knew what Bailey bridge parts looked like had retired long ago.



Haiti Island Bridge the morning of November 13, 1990, the day after its failure. Forty feet of roadway collapsed into the Seneca River when a snowplow struck one of the bridge's vertical beams. Note the partially submerged plow. (Photo by Craig Jackson, by permission of Syracuse Newspapers)

■ The temporary foot bridge would be of little use in reconstruction efforts. It was only rated for crossing one person at a time, and no construction loads would be allowed. A close examination (including X-rays) of key support points on the old bridge indicated that some of the critical support bolts were at 25 percent of their original strength. Civil engineers had already placed cabling along the trusses to reinforce these bolts.

The first planning meeting had more than 30 participants. Representatives included New York DOT, Waterways, State Emergency Management, law enforcement and fire safety officials, and aides to State Assemblyman Michael Nozzolio.

Echo Company personnel presented their proposed plan to

the group, using a Bailey bridge Training Extension Course (TEC) tape to illustrate their proposal. Promises of support at the start of the meeting were followed by looks of disbelief as the briefing progressed. Because of the coming holidays and long-range weather forecasts, Echo Company personnel indicated they wanted to complete the bridge within the next two weeks.

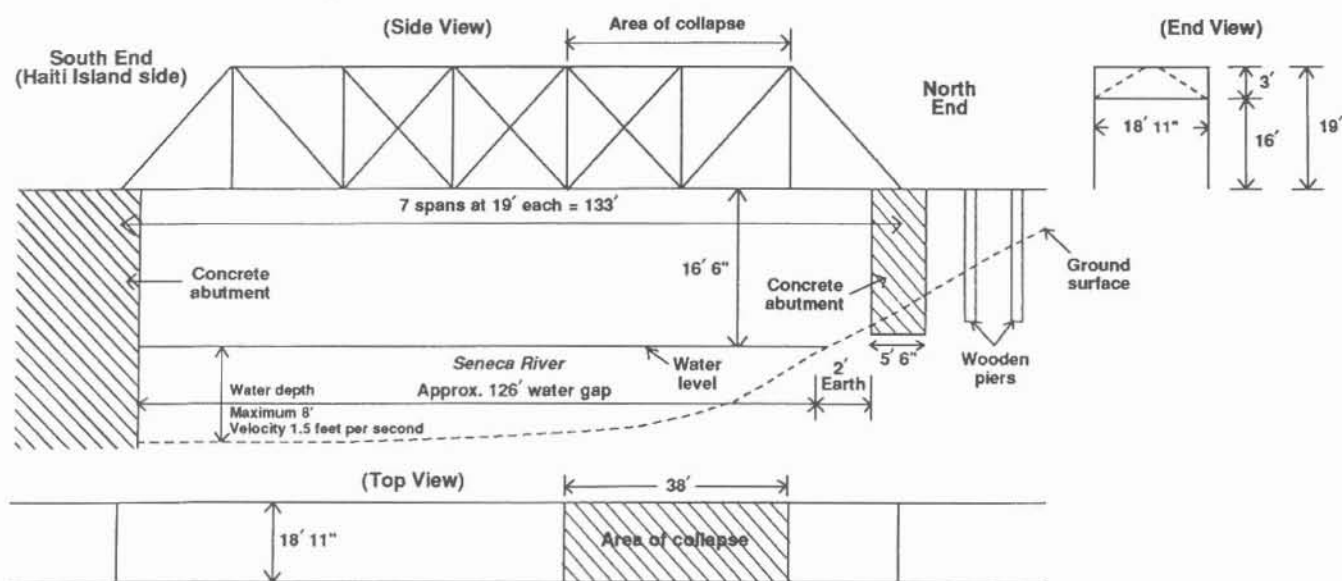
The civil engineers and state officials had serious doubts about the Echo Company plan—they simply didn't believe that building a bridge within a bridge was possible under the current circumstances. They were particularly skeptical when the Army engineers told them they not only could do it—they could do it in one weekend.

However, state officials were willing to let the Army try. And,

despite their concerns, they still offered their full support. Based on the company's briefing, the group gave their go-ahead to the project. Civilian authorities then formerly requested Echo Company's assistance through the office of the 98th Division commander, Major General Barclay Wellman.

Significant preparation was required to support the operation. Some of the initial steps included:

- Alert and mobilization of Echo Company for an unscheduled drill weekend three weeks before Christmas—and one week before its regularly scheduled drill.
- Completion of a detailed engineer work plan that included site layout, team assignments, equipment requirements, and man-hours.



Site profile of Haiti Island Bridge and gap

- Location and inventory of Bailey bridge parts in three state storage sites (Syracuse, Buffalo, and Watertown).
- Transportation of more than 170 tons of bridge parts to a staging area near the bridge site.
- Construction of an additional 25 feet of backspace area at the north end of the near shore. Originally, the backspace dropped off sharply at 75 feet from the near shore rocking rollers. The additional 25 feet of construction area was needed to allow counterbalancing of the launching nose and other construction requirements.
- Final rehearsal.

The Alert

A telephonic warning order was issued to all Echo Company personnel on November 23, just ten days before construction was to begin. A written order was prepared the next day. At the same time, critical person-

nel were called to duty in advance of the main body. The final alert order came five days later, when the work plan and inventories confirmed the feasibility of the mission. Unit response was 100 percent.

The Work Plan

Initially, the advance party was divided into teams, each with specific evaluation and coordination responsibilities. Team meetings were held daily in a command post established by Ozolins at the Cayuga County Highway Department.

The first team worked with civil engineers hired by the state to determine suitability of the site, along with the bearing points of the proposed Bailey bridge. This team was also responsible for site safety.

A second team was sent to the various New York DOT storage sites to examine and inventory Bailey parts. Assistance from DOT personnel was invaluable and made an almost impossible task relatively easy.

While the company executive officer and first sergeant coordinated local support, equipment, services, and food, a third team began site preparation. Working with the county highway department, the team located and cleared a staging area for the incoming bridge components. A building site less than 100 feet from a major highway was cleared and secured.

After being briefed about the 100-foot backspace requirement at the bridge, a highway department crew used fallen bridge parts and hundreds of yards of gravel to create a 100-by-26-foot secured backspace area.

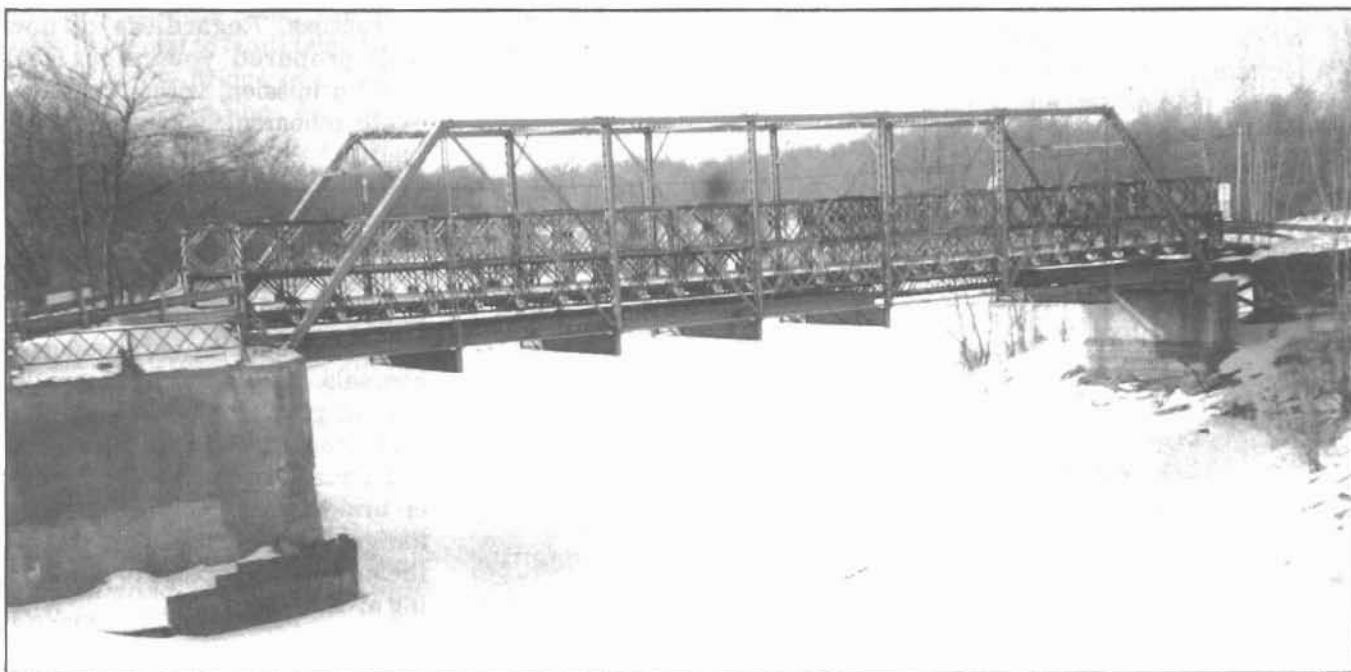
The third team also identified a 14-inch difference in height between the near and far sides of the bridge. When combined with the projected sag in the launch nose (63 inches in a 140-foot, double-single bridge with two launch-nose links), the near-shore rocking roller assemblies needed to be 54 inches above ground.

This would ensure that the planned 140-foot double-single bridge would reach the rocking rollers at the 100-foot point on the



Left: Echo Company engineers begin constructing the Bailey. Note the 54-inch cribs for the nearshore rocking rollers.

Below: The "bridge within a bridge" after completion of the project.



original bridge, and not impact (touch down) on the original decking. This, in turn, would require another team to work with the highway department to prepare cribbing for the two rocking rollers and six construction rollers.

Because of the lack of M1 Bailey bridge manuals, the decision was made to use the M2 manual (TM 5-277), with the assumption that there were no major differences between the two models other than width. The M1 roadway width is 11 feet, and the M2's roadway is 12 1/2 feet.

Inventory

After the decision was made to go with an initial double-single bridge (with future upgrade to a double-double), parts lists were compiled and given to the inventory team. The team split up and traveled with DOT personnel to the three storage sites. The resulting inventory detailed not only the number and type of parts on hand—but their condition as well. The inventory process also resulted in the team's recommen-

dation that several Echo Company personnel be assigned to loosen and dismantle rusty parts needed for the project.

Transportation

Transportation was a three-part problem. Buses loaned to the project by the Port Byron School District did double duty. They moved troops from home station (over 80 miles away), and ferried them from work sites to the American Legion Post, where

The following six observations all had a significant impact on the mission, and should be worth noting by other engineers involved in bridging projects:

- Preparations for bridge launching did not include a complete mock-up of the existing bridge during the Bailey bridge scale model construction. As a result, when a 50-ton crane was moved by barge to the far side of the site, with the intent of letting it carry the weight of the 47.5-ton launching nose, it was unusable. Failure to fully plan for clearing the overhead bracing system of the old bridge eliminated the ability to use the crane.
- As a result of the sag in the double-single bridge, the bottom panel pins, holes, and chord bolt holes could not be brought into alignment. This caused difficulties when panels were laid on top of the double-single panels during conversion to a double-double bridge.
- To solve this problem, a special alignment tool was fabricated. This consisted of a threaded rod 18 inches long and one inch in diameter (with national fine threads), and two 6-by-6-inch, half-inch-thick steel plates with a nut on each end. The rod was put through the bracing frame bolt hole. A steel plate and nut were then attached to the ends of the rod, and the bolts tightened. This served to pull together the bottom

of the sagging top panels, and bring the panel pin holes and chord bolt holes into alignment. Conversely, and as normally used, the chord jacks were used at the top of the panels to push the panels apart, and bring the panel pin holes into alignment.

- A normal roller layout worked flawlessly. The only unusual part was that at 100 feet from the near-shore, another set of rocking rollers had to be put on the old bridge decking to "catch" the launching nose. Care had to be taken so that the launching nose did not heavily impact the rocking rollers and do additional structural damage to the old bridge.
- The limited on-site backspace available for layout of equipment was adequate, but required detailed truck load plans to bring equipment from the staging area to the equipment layout site.
- A relearned lesson was that using chord jacks can be backbreaking work for such things as jacking the tops of panels apart in order to align bridge pin holes. A change in the gear ratio to improve the mechanical advantage would make the work much easier.

Finally, don't give up when someone tells you it can't be done. Frequently, as shown at Haiti Island, it can be done. Live by the motto: "Essayons!"

they ate their meals and slept.

Tools and equipment were transported on 2 1/2-ton trucks borrowed from F Company, 2nd Battalion, 391st Regiment.

Movement of the heavier bridge parts was handled by county highway department trucks and drivers. The county also provided material handling equipment for loading and unloading.

Rehearsal

The end result of all good planning is the identification and elimination of obstacles to success. Regardless of how well prepared you might feel about a mission, without an adequate rehearsal, you're only half ready.

Using dozens of photographs, hours of video tapes, and a scale bridge kit borrowed from the Training Audio-Visual Support Center at Fort Drum, team leaders conducted repeated mission rehearsals. During these rehearsals, several problems were identified and resolved. These potential problems included on-site storage of bridge parts and tools, team assignments, and load plans for the movement of parts to the staging area.

Construction

Like most successful operations, there is little to say about the actual construction of the bridge—except to say that all went as planned. It was difficult to construct a Bailey bridge on rollers that were almost five feet above the ground. It turned out that the minimum backspace area was just that—barely adequate. An additional 20 feet would have made the job much easier. While not quite like threading a needle, it's not easy to launch

a 140-foot bridge through such a small opening.

The original bridge's opening was only 13 inches wider at the transoms, and only 29 inches wider at the panels, than the Bailey being launched.

Echo company began bridging operations at 8 a.m. on December 1. At 2:30 p.m. the following day, the first vehicle drove across the bridge-within-a-bridge. It had been three weeks to the day since the bridge's collapse. After the preparatory work, it took Echo Company just 15 hours to "bridge the gap."

Three months later, the company returned to Haiti Island, and upgraded the bridge to a double-double configuration. And today, the bridge-within-a-bridge is called "Echo Bridge" by the residents of Haiti Island. 

Lieutenant Colonel Craig is chief of the Combat Arms Division for Readiness Group Seneca. He has previously served as a battalion executive officer and S-3, and has commanded four engineer companies. He holds master's degrees from Central Missouri State University and the University of Alaska. He is a graduate of Command and General Staff College.

Major Smith is commander of Echo Company. He previously served in the New York Army National Guard as an infantry and Special Forces officer. He received his commission from Alfred University, and is a graduate of the Infantry Officer Advanced Course.

Master Sergeant Bates served as the chief enlisted advisor for the Engineer Branch, Readiness Group Seneca, during the bridge project. He is now retired. He previously served as operations sergeant and a platoon sergeant for the 10th Engineer Battalion. He also served two combat tours in Vietnam.

Book Review

First Across the Rhine, by Colonel David E. Pergrin with Eric Hammel, 347 pages, Ballantine Books, New York, 1990.

Colonel Pergrin graduated from Pennsylvania State University in 1940 with a degree in civil engineering. After graduation, he was commissioned a reserve second lieutenant in the Corps of Engineers. When called to active duty in April 1941, he reported to Fort Belvoir, Virginia, for assignment to the Engineer Training School. After several training assignments, Pergrin transferred to Camp Swift, Texas, where he joined the 291st Engineer Combat Battalion, the unit *First Across the Rhine* is about. He wrote this book with Eric Hammel, a professional historian.

COL Pergrin had two purposes for writing the book. First, he tells the history of the 291st Engineer Combat Battalion, from its activation early in World War II until the end of that war in Europe in 1945. Second, he shows how a well trained, well led, and physically fit unit functions effectively in combat.

COL Pergrin describes the formation of the 291st Engineer Combat Battalion and its early days at Camp Swift. The unit initially consisted almost entirely of new soldiers and second lieutenants. While this presented many challenges, it also gave the battalion commander and COL Pergrin (then a major and the battalion executive officer) much flexibility. Junior enlisted men with potential were promoted rapidly. Officers were rotated from position to position to determine which were best suited for each billet.

During their time at Camp Swift, the chain of command stressed demanding and physically challenging training. Upon completion of training, the 291st received very high ratings in both unit training and physical fitness tests. When the unit was ordered to prepare for overseas movement to Europe, Pergrin, a 26-year old major, assumed command.

After the battalion arrived in England, MAJ Pergrin continued to stress demanding training. He em-

phasized communications within the unit and independent decisions by junior leaders. Soldiers were cross-trained to perform more than one job within their squad. He continued to rotate officers between positions. His goal was to ensure that when the battalion went to the mainland of Europe, each leadership position would be occupied by the most qualified individual.

For the remainder of the book the author describes the exploits of the 291st during its march across Europe. Underlying themes include the soldiers' devotion to the unit and the initiative of the battalion's junior leaders. The battalion's involvement in two critical incidents are explained in detail. The first was the 291st's participation in the Battle of the Bulge, in December 1944. They established and maintained roadblocks and destroyed key bridges in the path of Kampfgruppe Peiper. These actions were critical in stopping the German breakthrough.

The second incident concerned bridging the Rhine River. The battalion, with the assistance of several other engineer units, built the first float bridge across the river near the heavily damaged Ludendorff Bridge at Remagen. This action contributed to the successful penetration of the First Army into the heart of Germany. COL Pergrin describes the 291st's movement across Germany until the European war ended in May 1945.

The author convincingly shows the relationship between training, leadership, and unit effectiveness in battle. COL Pergrin performed a great service to the Army by recording and preserving a first-hand history of the 291st.

This book is applicable to today's Army. It reinforces the timeless concepts of challenging training, effective leadership, and team building, and their impacts on unit combat readiness. It also vividly portrays engineers in close combat with the enemy (as both engineers and infantry) in modern warfare. I highly recommend this book to Army engineers and those in combat arms who may operate with engineers.

By Major Boyd D. Houck, doctrine developer, U.S. Army Engineer School.



Engineer Problem

This is the last of four Engineer Problems dealing with breaching operations. The problems reflect concepts outlined in FM 90-13-1, Combined Arms Breaching Operations, which was distributed in February 1991. Previous issues of ENGINEER included Engineer Problems on the following breaching operations: in-stride (January 1991), deliberate (April 1991), and assault (July 1991). This problem focuses on a covert breach.

The scenario depicted in each problem illustrates specific teaching points on that type of breach. An excerpt from FM 90-13-1 describes the characteristics of the breach and when it will be used. The problem-solving process is presented using the engineer estimate process and includes some key discussion points.

COVERT BREACH

Problem: You are the platoon leader of 3d platoon, Company A, 21st Engineer Battalion (3/A/21), attached to Task Force Bayonet, a light infantry battalion task force (TF). TF Bayonet's mission is to secure Objective (Obj) Polk, clear Sandt Road, and pass an armored task force (TF Steel) down Sandt Road to the east. As the task force engineer of TF Bayonet and the engineer platoon leader, you are to recommend a task organization of engineer assets to the task force commander.

Task Organization: TF Bayonet consists of one light infantry battalion, two stinger teams, and your sapper platoon.

Enemy:

Terrain. Spur Ridge (Figure 1) is the dominant terrain feature in TF Bayonet's zone. Due to the dense vegetation on Spur Ridge, no significant advantage is achieved by securing the ridge, except for possible use in air defense operations. Thick vegetation and restrictive terrain prohibit cross-country movement in zone, and keep wheeled or tracked movement to existing roads and trails. Small streams cross the area. The terrain favors light infantry operations.

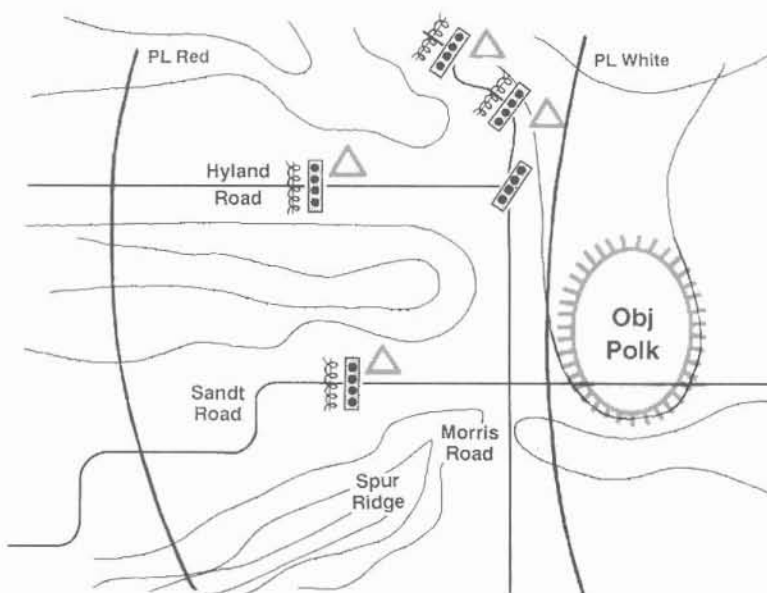
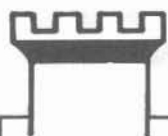


Figure 1



Engineer Problem

Enemy Activity. A threat airborne regiment (-) is conducting a guard force mission in your division's sector. Four threat companies (-) from the airborne regiment are defending in your division's sector. A threat company (-) dug in on Obj Polk has been there for at least 90 hours, and their strength is estimated to be at 60 to 70 percent. The threat is armed with assault rifles, medium machine guns, rocket-propelled grenades, and their organic BMDs, which are dug in. The threat on Obj Polk is in range of the regiment's mortar battery and a supporting regimental artillery group (RAG).

A four-man sapper team from your platoon was attached to the battalion scouts. They assisted in conducting reconnaissance of the battalion's infiltration lanes, roads in the task force sector, and Obj Polk. The reconnaissance team reported the following information to the tactical operations center (TOC):

- No obstacles were found on the dismounted infiltration lanes.
- Obstacles were located on the three roads in the task force sector (Figure 1).
- A wire/mine obstacle is positioned at a choke point on Hyland Road. It consists of 15 rolls of concertina that are staked down with barbed wire, and a surface-laid TM-62M row anti-tank (AT) minefield. The minefield, which is located directly behind the concertina, is about 12 meters deep, goes completely across the road, and is tied into the trees on both sides. This wire/mine obstacle is secured by a two-man listening/observation post (LP/OP).
- Morris Road has the same type of obstacle set up in two locations, approximately 500 meters apart. The recon team noted that the positioning of these two obstacles enables the two LP/OPs to secure them very effectively.
- Another wire/mine obstacle with the same configuration is approximately 1000 meters west of the objective on Sandt Road. It appears that at least one of the BMDs on the southern side of Obj Polk can observe and place direct fire on this obstacle. An LP/OP also secures this obstacle.
- A surface-laid row minefield of TM-62M mines is at the intersection of Hyland and Morris Roads. It consists of two rows with alternately spaced mines. Together, the two rows are about 100 meters long and 20 meters deep. The LP/OPs on both Hyland and Morris Roads and some positions on Obj Polk can observe this minefield.
- No anti-personnel (AP) mines were observed at any of the obstacles on roads in the sector. All of the observed mines were surfaced laid, and there was no indication that any had been buried.

Objective Polk. Objective Polk is situated on very restrictive terrain that is covered with heavy vegetation. The southern end of the objective physically secures Sandt Road and prevents any vehicular movement on the road. A protective obstacle belt encircles Obj Polk. It consists of an AP minefield, a triple-strand concertina fence, and tanglefoot. The only significant break in this belt is where Sandt Road crosses the objective.

The AP minefield is about 15 to 20 meters wide and lies from 20 to 75 meters in front of the fighting positions. All of the AP mines appear to be surface laid, and some have trip wires. The sapper (recon) team leader recognized one of three AP mines at the objective as a POM-Z mine. Trip wires attached to the POM-Z type mines are tied in with the concertina fence, and some are strung into the tangle foot.

One type of mine he did not recognize is small, round, and fairly flat. The mine appears to be about 5 inches in diameter and 2 to 3 inches tall. It has a black cover, and something like a small stem sticks out about 1 inch on one side. The majority of mines in the AP minefield are of this type, and they are surface laid in a random pattern.

The last visible, unrecognized type of mine is placed about every 30 to 50 meters around the perimeter, behind the tangle foot. These mines look like olive-drab dinner plates standing on end, and they are about 10 inches in diameter and 3 to 4 inches thick. The sapper team leader believes that



Engineer Problem

they are some type of directional mine, due to their employment.

The triple-strand concertina (TSC) fence is laid on the far side of the AP minefield. Metal pickets hold the rows in place. The fence is anchored with barbed wire, which is strung on top of the two base rolls of concertina and tied off either to the bottom of the pickets or to one of many trees on the objective.

On the near side of the AP minefield is the tangle foot obstacle, which is about 10 meters wide. It is well camouflaged and is tied into the AP minefield.

Two anti-vehicular wire obstacles and a point minefield block Sandt Road where it passes through the objective. These wire obstacles consist of 15 rolls of concertina that are staked down with barbed wire. They are about 70 meters apart. Between them is a surface-laid minefield that has about 10 TM-62M mines. Threat soldiers have been observed physically picking up these mines and moving them, allowing vehicles to come and go from the objective. These mines do not appear to have any anti-handling devices.

The scouts found two places in the perimeter where dismounted patrols enter and exit regularly. One opening is located in the north and one in the south. Once a patrol passes, a makeshift gate made of two stacked rolls of concertina is slid back to close the opening in the TSC. A footpath appears to have been trampled down in the grass by threat patrols passing through the other perimeter obstacles.

The scouts counted six BMDs dug into hull defilade, oriented to the northwest. Single rolls of concertina appear to divide the objective into three sub-objectives. All of the fighting positions on the objective are well camouflaged and have at least 12 inches of overhead cover.

Divisional long-range surveillance elements have located the threat's regimental command and control site in the eastern part of your division's sector. It is protected by six T-62s and five BMPs. This force has about a 20-minute response time to react to any of the four threat companies in your division's sector.

Mission: Control of Objective Polk will allow your brigade to pass TF Steel through your battalion, and move down Sandt Road to attack the threat's regimental command and control site. The brigade commander's intent is for your task force to quickly secure Obj Polk, clear Sandt Road, and conduct a forward passage of lines of the armored task force. The attack must be conducted so that the armored task force can rapidly attack deep to destroy the threat command and control site before the threat can react.

Commander's Intent: The critical elements of this operation are the silent infiltration of TF Bayonet and the total surprise of the threat on Obj Polk. When TF Bayonet initiates their assault on Obj Polk, they must control the southern end of the objective before the threat reacts. TF Bayonet must quickly secure Obj Polk, rapidly breach all obstacles on Sandt Road, and pass TF Steel to the east so they can attack the threat regimental headquarters. After passing TF Steel, TF Bayonet will clear the last threat elements from the northern end of Obj Polk. Remember, the timing and speed of TF Steel's passage are critical.

Execution: The task force commander selects the scheme of maneuver shown on the Task Force's Operations Overlay (Figure 2, page 27) The operation for TF Bayonet will consist of four phases:

Phase 1 - Infiltrate into assault positions and continue interdiction fires.

Phase 2 - Conduct a covert breach and assault to seize the south side of Obj Polk.

Phase 3 - Pass TF Steel.

Phase 4 - Complete seizure of Obj Polk.

Phase One. TF Bayonet takes advantage of the restrictive terrain and darkness to infiltrate their force. The task force crosses the line of departure (LD) with company A in the lead, followed by Companies C and B in echelon. Company A and one stinger team infiltrate on lane North and occupy their assault position. Companies C and B infiltrate in echelon along lane Spur to assault positions C and B, respectively. The last stinger team moves with Company B and is left in position on Spur Ridge. Scouts locate bypasses to all obstacles and wait to link up and guide the companies into their assault positions. All three companies are prepared to conduct covert breaches of unexpected obstacles during Phase 1.

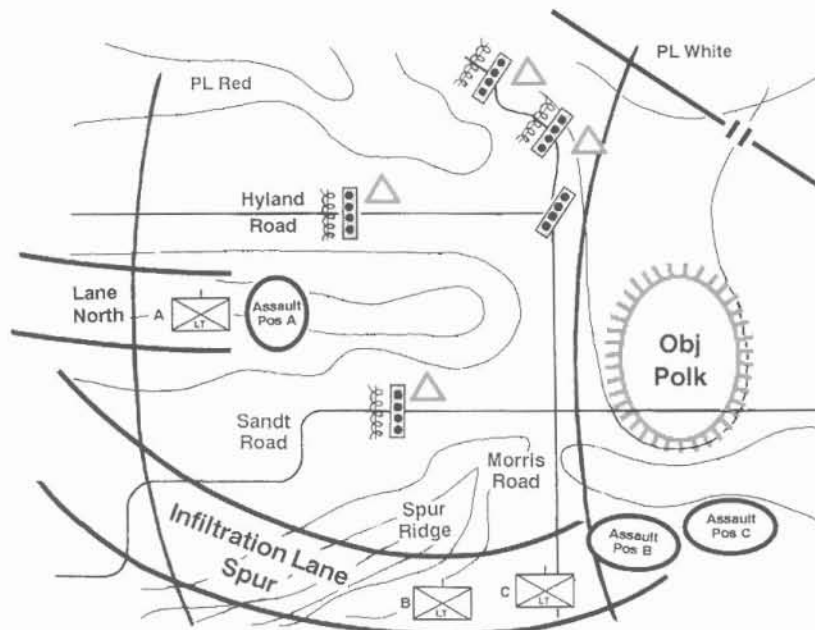


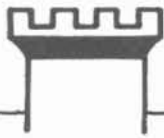
Figure 2

For the previous 48 hours, division artillery assets have conducted interdiction fires, smoke, and illumination throughout the brigade sector. These fires randomly target all known threat obstacle sites and objectives. The fires began before the infiltration, and they will continue until the actual assault on Obj Polk begins.

Phase 1 is complete when the three companies occupy their assault positions.

Phase Two.

- Company A occupies their ABF position and moves an element into position to breach the obstacle on Sandt Road.
- Company C moves out of their assault position (Figure 3, page 28) and into the selected breaching locations on Obj Polk.
- Company B moves into position so that, on order, they can pass through Company C and continue the attack on Obj Polk.
- Divisional interdictory fires are shifted from the southern end to the northern end of the objective. These fires have continued for almost three days. The intent is that, after almost three days of interdictory fires, lifting and shifting them around or off the objective will not raise threat suspicion, and will help mask TF Bayonet's actions.
- Company C conducts a covert breach on Obj Polk. They plan to use the southern path made by the threat dismounted patrols to enter and leave Obj Polk. The sappers who located this path will guide Company C soldiers to it. If the covert breach is detected, Company A will execute direct and indirect fires on the northern end of the objective in order to isolate the southern part. When Company C begins its assault, all planned suppressive and obscuring fires are initiated. These fires are directed at the northern end of Obj Polk to isolate the breach site and support the assault force.
- As the assault begins, an element of Company A breaches the obstacle on Sandt Road and eliminates the LP/OP (overwatch) position.



Engineer Problem

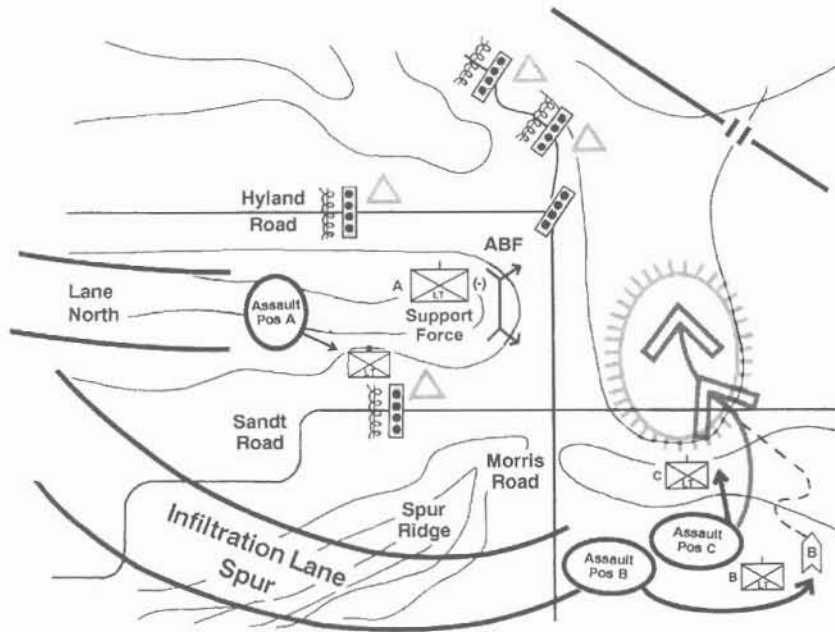


Figure 3

- After the southern end of the objective is secured, Company A lifts its fires and Company B passes through to secure the rest of Obj Polk.

Phase Three. On order, TF Steel passes through TF Bayonet on Sandt Road to attack and destroy the threat regimental command and control site. A speedy passage is critical to ensure the attacking force surprises the threat. TF Steel must pass through as soon as Sandt Road is open, during the final phases of the assault on the Obj Polk.

The commander of Company C informs you that he will assault Obj Polk with two platoons. The task force commander asks you to recommend a task organization to support this mission.

COVERT BREACH DESCRIPTION

Definition: A unit conducts a covert breach when stealth, surprise and quiet obstacle reduction techniques are required by the maneuver plan.

Application: A covert breach applies some characteristics of the other three types of breaching operations (assault, deliberate and in-stride). However, the planning and execution fundamentals used to suppress, obscure, secure and reduce (SOSR) are significantly different. Consequently, a covert breach must be separated from the other three breaching operations to ensure its success.

The main difference is the critical element of surprise required for a covert breach. In an assault, deliberate, or in-stride breach, the attacking force immediately applies overwhelming combat power to overcome the threat. In a covert breach, the attacking force stealthily prepares lanes and positions for the assault and support forces, taking care not to attract the threat's attention. The element of surprise delays threat reaction until the breach lanes are open and the assault is in progress.

In this problem, if the threat detects the covert breach, TF Bayonet is prepared to execute an assault breach. A key decision is where the assault breach will be initiated: Will the assault breach begin where the covert breach force is located, or will the covert breach force pull out and move to a different location? The transition from a covert to an assault breach must be explicitly rehearsed by all members of the combined arms team to ensure success.

ENGINEER Solution on page 43.

PRIME POWER ON THE BATTLEFIELD

By Major Kenneth E. Cockerham

Who has responsibility for the continuum of electrical power on the battlefield? First asked by chief of engineers, Lieutenant General Henry J. Hatch, this question appears to have a straightforward answer: "Tactical units have tactical generators, all others rely on available commercial power."

In reality, power requirements in the theater of operations are much more extensive and complex

than this simplistic response indicates—a fact of life that quickly became apparent during the early stages of Operation Desert Shield. In fact, tactical generator (TACGENS) power and reliable commercial power are at opposite ends of the battlefield electrical power spectrum—and there is a large gap between the two. To fill this gap, the Army formed new prime power units to meet a host of critical electrical supply needs.

The rift between TACGENS and commercial power occurs when commercial power is not available and TACGENS power is not suited for a particular application. It also occurs when commercial power is available but limitations on the existing distribution system preclude its desired use.

An overview of the pros and cons of TACGENS and commercial power illustrates the need for the prime power units.

TACGENS

TACGENS power is well suited for use in remote areas for relatively light electrical loads. Such generators are available in sizes up to 200 kilowatt hours (kw). Some TACGENS are capable of being installed and operated in parallel to provide more power to a larger load. They are relatively small, light, mobile, and can be easily installed and operated. They can be connected to provide a variety of output voltages, both single phase and three phase. TACGENS also provide a robust power source, since failure of one generator doesn't cause widespread power failure. The disadvantages of these generators include:

- *Limited output capacity.*
- *No long-term reliability.* The yardstick for power system reliability is the ability to meet the power demands of all users without failure for a long period of time. TACGENS are not designed to be operated continuously for long periods.



Prime power engineers work with local Iraqi electricians to restore power to Dihok, Iraq.



Staff Sergeant Kelly Revell, right, a prime power technician, makes adjustments to a power line while a Navy Seabee looks on.

Fluctuating power quality. Clean power maintains constant output voltage, frequency, and AC (alternating current) sinusoidal waveform over a wide range of load and usage conditions. TACGENS are susceptible to voltage, frequency and waveform deviations during load swings.

- *Burdensome logistical requirements.* TACGENS have significant maintenance and fuel requirements.

Commercial Power

Commercial power is produced by stationary power plants and distributed on a permanent transmission and distribution network called a power grid. Power plants may be of various types: hydroelectric, fossil fuel or nuclear-powered steam, gas turbine, or diesel.

The major advantages of commercial power are high reliability and low maintenance (after construction of the grid). Commercial power is considered to be a highly reliable source of clean electrical power. "Clean" means that the AC

frequency is constant and that voltage is relatively constant, even during sizable load swings.

Once installed, commercial power requires little or no maintenance by the user. User fuel requirements are eliminated. Commercially produced power usually has enough capacity to carry very large electrical loads.

Disadvantages of commercial power include:

- *Regional availability.* Commercial power is frequently not available in remote locations. In some contingency theaters, it may not be available at all.
- *Less flexible.* Commercial power is usually tied to previously developed, fixed facilities. Significant construction and materials are required to deliver commercial power to new locations. Extensive technical expertise and skill are also required to connect commercial power to new users.
- *Vulnerability.* Commercial power plants and their associated power grids are vul-

nerable to acts of sabotage. Because of their long expanses, transmission lines are particularly difficult to protect from this threat.

- *Less Robust.* Damage to power plants or to the power grid may cause extensive and widespread power outages. Repair of these damaged facilities can be time consuming.
- *Voltage and frequency incompatibility.* In some theaters, voltage and/or frequency of commercial power are not compatible with the users' equipment.

Prime Power in the Gulf

The need for prime power support was recognized early in Operation Desert Shield. With the rapid development of the theater of operations, coalition forces required more and more power. To provide the needed electricity, war planners recognized that they needed soldiers with the technical expertise and equipment to expand the commercial power grid, and

install and operate power plants.

Initially, some desperately needed electrical work was accomplished by civilian contract labor. But skilled civilian manpower was scarce and expensive. Workers were also understandably reluctant to work very far forward because of the threat of hostilities.

Too, contracted work was not very responsive because of lengthy contracting procedures. This situation was exacerbated by a shortage of military personnel who had the technical expertise to write electrical contract specifications.

In late August 1990, Desert Shield planners sent a request to Forces Command (FORSCOM) for a unit which could accomplish the necessary electrical work. While acting on the request, FORSCOM found that no such specialized unit was prepared for the job. Only through extensive efforts on the part of the Prime Power Directorate of the Army Engineering and Housing Support Center (USAEHSC) (a USACE field operating agency) was a prime power unit designated and scheduled for deployment.

This unit was the 535th Engineer Detachment, formerly a power generation unit, headquartered at Fort Monmouth, New Jersey and commanded by Major (then Captain) Dale Knieriemen.

In September 1990, a 16-man prime power team deployed to Desert Shield from Fort Bragg. The team consisted of elements of the 535th Engineer Detachment which had been stationed at Fort Bragg, Fort Monmouth and Fort Campbell. Personnel from the Prime Power Directorate at Fort Belvoir were also deployed with the unit. The team shipped 16 750kw generators and a large quantity of power distribution and transformer equipment. Though the team arrived in theater far ahead of its equipment, it went to work immediately, expanding the commercial grid and delivering power where it was needed.

But the tremendous demand for prime power services and expertise soon overwhelmed this small team. In November a second team from the 535th was deployed to reinforce the effort. This team, from Fort Benning, was made up of personnel from the 535th, and from Detachment II and Detachment IV, two TDA prime power detachments.

Throughout Operation Desert Shield and well into Operation Desert Storm, these two prime power teams were the only soldiers in the theater of operations with the expertise and equipment to "bridge the gap" between TACGENS and commercial power.

Since no doctrine existed which established control and utilization of prime power teams, the 535th commander found it necessary to educate other engineers on the mission, capabilities and role of his unit. He had to institute the proper command and support relationship which would allow him to support the entire theater with the small prime power force.

Through trial and error, he and the theater engineer found that prime power units, to be most effective, must be retained as theater assets and work directly for the regional wartime construction manager (RWCM)—the senior engineer commander.

The two prime power teams continued to carry an enormous workload throughout Desert Shield. In December 1990, the theater requested that two more prime power teams be deployed.

The Prime Power Directorate of USAEHSC had anticipated this request and had already created Task Force Bravo (Prime Power). The task force was made up of personnel from TDA prime power detachments at Fort Bliss, Fort Lewis, Fort Bragg, Fort Leonard Wood, and Germany. The task force was configured with two 16-man teams and a command and control headquarters. Its mission was to reinforce the 535th



The prime power plant at the west heliport, Dhahran Airbase, Saudi Arabia. Each generator produces 750 kilowatts.

— Prime Power Scenarios —

Some theater operations require prime power assets because of location, specialized equipment, or other circumstances. The following scenarios highlight some situations where prime power is the best—and sometimes only—choice.

Situation: A major command and control headquarters is located in a fixed facility in the COMMZ (communications zone). The facility is powered by the commercial grid. Power must be provided to support units located in temporary facilities close to the headquarters. Prime power teams can tap into the commercial grid, design and install an expansion to the distribution system, and provide needed power to these support units and activities. They can also provide reliable emergency backup power to the headquarters in the event of commercial power outage.

Situation: Patriot missile batteries require continuous, reliable power for their systems. But they are seldom deployed to areas with readily available commercial power. Their on-board TACGENS require heavy maintenance and repair. Prime power personnel can design, install and operate a reliable power system using 60 to 400 hertz converters, greatly enhancing the reliability of these critical missile systems.

Situation: Theater engineers construct critical facilities such as life-support areas, prisoner of war camps, aerial ports of debarkation/embarkation, equipment maintenance and wash facilities, and rest and recreation complexes. These are often constructed in remote areas. Prime power teams can design and install power distribution systems for these facilities. They can tap into a commercial grid or install and operate power plants to produce large quantities of reliable electricity.

Situation: U.S. Army Evacuation Hospitals rely on organic 100kwh TACGENS for power. After months of continuous running, the TACGENS' reliability is diminished. Prime power units can install a replacement power plant and distribution system, allowing the hospital's TACGENS to be used for backup power.

Situation: In the aftermath of war, Kuwait's ability to provide commercial power was non-existent. Prime power soldiers can go in immediately behind liberation forces, assess damage to the power grid, repair backup generators in critical facilities such as hospitals, airports, and government buildings, and restore emergency power to these critical facilities. They can then work with civilian engineers to make expedient repairs to large commercial power plants, and bring them back on line.

Situation: An area support battalion (ASB), with many of its subordinate support units, occupies a fixed facility in the COMMZ. The facility is powered from the commercial grid. Due to overloaded circuits and substandard or nonexistent host nation electrical safety codes, a serious electrical fire hazard is created. Prime power units have the technical expertise to evaluate and fix this dangerous condition.

Situation: Iraqi forces damaged or destroyed the infrastructure of several Kurdish population centers in northern Iraq. A significant element of the subsequent U.N. relief effort was the restoration of basic utilities, including electrical power. Prime power teams have the knowledge of power systems and the technical expertise to assess the damage, and restore emergency power to hospitals, water pumping stations and even entire cities.

Detachment prime power teams.

Conflicting deployment and transportation priorities delayed the deployment of Task Force Bravo until late February 1991. By the time Task Force Bravo arrived in theater on March 1, Kuwait was liberated and the cease fire was in effect.

However, the liberation of Kuwait did not diminish the theater's need for prime power support. Power was still required at Patriot missile sites, evacuation hospitals and major command and control centers. Elements of the 535th, now reinforced by Task Force Bravo, were heavily involved in damage assessment and restoration of emergency power in Kuwait. Prime power experts were even called upon to provide power for the peace talks between coalition leaders and Iraqi representatives.

With the war won, the theater's main effort quickly turned toward redeployment of troops and equipment. In April, the 535th returned to their home stations, and Task Force Bravo assumed responsibility for prime power support to the theater. New aerial ports of embarkation were constructed at Dhahran and other sites, and power was provided to these facilities by Task Force Bravo.

Major new projects requiring prime power expertise arose almost daily. These projects involved repair, maintenance and new construction of power distribution systems, as well as power production. In May 1991, when the overall redeployment schedule was published, Task Force Bravo was slated for an August redeployment.

But in late May, Task Force Bravo was assigned to support the relief efforts of Operation Provide Comfort. The task force executive officer and one NCO electrician were sent to northern Iraq to repair a generator at a hospital in Zahko. They were also assigned to assess the need for additional



Prime power team member Sergeant Sidi Hassaneodin opens a fused disconnect on a medium voltage distribution network.

prime power support. Initially expecting to be gone only a week, the two were kept busy for 54 days. During this time, they not only fixed the generator but also restored emergency power to several other critical facilities and the entire city of Dohuk, a community of over 320,000 people.

As Task Force Bravo's scheduled redeployment approached, the theater recognized that it could not do without the services provided by the prime power teams. In June, the theater requested a prime power team to replace Task Force Bravo upon its redeployment. On August 1, 1991, a prime power team from Fort Leonard Wood arrived in theater and assumed mission responsibility from Task Force Bravo on August 19. The team redeployed to home station in January 1992.

Out of simple necessity, prime power teams were stationed in the Gulf theater of operations longer than any other engineer unit. No other unit had the technical expertise to perform the critical power missions handled by the teams. Lieutenant Colonel William Vogel, commander of the 864th Engineer Battalion (C)(H), said, "Prime power soldiers were absolutely the experts in power generation and distribution for the entire theater of operations. They accomplished

every mission given them. Their performance was magnificent. No one else could have provided the critical support and services they provided."

Prime power soldiers were recognized as experts in their field. Prime power units completed more than 300 power-related missions in the Gulf theater. They produced over 10 million kilowatt hours of reliable, commercial-grade electricity, using their organic equipment. Prime power units proved themselves an essential element of sustainment engineering operations.

What's Next?

The critical need to bridge the gap between TACGENS and commercial power was clearly identified in the Gulf War. The coordinating draft of FM 5-422, *Engineer Prime Power Operations*, is now under review. Other doctrinal literature and practices must also be updated to reflect the role and proper utilization of prime power assets across the operational continuum.

Prime power doctrine also needs to be integrated into higher level doctrine and published in revisions of Field Manual (FM) 5-104, *General Engineering*, and FM 5-116, *Engineer Operations: Echelons Above Corps*. It also

needs to be included in new doctrinal publications such as FM 5-114, *Engineer Operations Short of War*.

The prime power organization must be tailored to support future military operations. On July 23, 1991, the chief of engineers granted authority for the Prime Power Directorate of USAEHSC to reorganize into a provisional engineer battalion. This reorganization is the first step toward the formation and activation of a TOE (tables of organization and equipment) prime power engineer battalion. This battalion will provide the technical expertise, equipment and manpower to close the rift between TACGENS and commercial power.

It should also give a solid answer to General Hatch's question. 

Major Cockerham is currently writing prime power doctrine at the Engineer School on a detail assignment from the provisional prime power battalion. He previously served as commander of Task Force Bravo (Prime Power) in the Gulf War. Other assignments include commander of Prime Power Detachment II; engineer advisor to Readiness Group Jackson, and company commander, executive officer and platoon leader for the 4th Engineer Battalion. He holds a master's degree in electrical engineering from the Naval Postgraduate School.

ERI Adds Agility to the Engineer Force

By Lieutenant Colonel Roger J. Somerville

Combat engineers are on the bow wave of changes occurring within our Army's doctrine and organizations. Efforts by the Engineer School to make engineers full players on the combined arms team resulted in approval of the Engineer Restructure Initiative (ERI) by the Chief of Staff of the Army on 5 March 1991. This long overdue reorganization benefits the combined arms forces and will eventually be integrated into the Total Army.

Unfortunately, non-supportive remarks by engineer officers in the field and at higher level staffs could undermine ERI as it is being implemented. These comments reflect a lack of understanding about the ERI reorganization. I feel we must all stop complaining, learn about the reorganization, work to make the transition occur smoothly, and document any shortfalls discovered during the process.

Echelon Of Engineer Forces

Under the ERI concept, engineers are organized in three distinct echelons: division, corps, and echelons above corps. These units have different type missions and organizations. Up front with the infantry and armor units are engineers "at the point of the spear." They are the sapper companies and battalions that "clear the way" and provide mobility for the maneuver forces.

Combat engineers at corps have a broader mission based on the corps commander's intent in the fight. They may fight forward with

the divisions, work in the division rear area, or work in the corps rear area. These corps combat engineers must be able to perform topographic, mobility, counter-mobility, survivability, and sustainment engineering missions. They are combat engineers with sapper skills, but they have more equipment and a larger organization to execute the tactical and more technical missions.

Engineers at echelon above corps are focused on the construction of airfields, ports, bridges, and roads. They provide sustainment engineering to units that sustain the fighting forces. At times they will go forward into the corps or division rear areas to help the division sappers or corps combat engineers complete their survivability or sustainment missions.

ERI Concept

In Southwest Asia (SWA) the Army proved it is a very lethal force. Once deployed into the area, it proved it could move quickly on the battlefield if there were no threat or terrain mobility restrictions. To keep up with this fast-moving lethal force, the engineers in SWA developed an ad hoc command and control structure using division and corps engineer assets. We have been doing the same things in Germany for years. ERI fixes this command and control shortfall. In accordance with AirLand Battle (Future) or AirLand Operations, ERI organizations at division are focused on fixing the command and control and logis-

tics shortfalls, and providing mobility to the force over expanded areas of operation.

With ERI, we have a mechanized sapper battalion habitually associated with each division armored (mechanized) maneuver brigade. This sapper battalion commander is the brigade engineer. He will organize his headquarters to synchronize engineer missions throughout the depth of the brigade battlefield. His battle planning staff will be integrated into, and collocated with, the maneuver brigade battle staff. The battalion will have the capability to quickly integrate additional engineer assets into the brigade's operations.

Also, a sapper company will habitually associate with an armored (mechanized) battalion task force. The training and wartime integration provided by this association will promote a better understanding of each unit's capabilities and the commander's intent in all operations. This is how most units preparing for training rotations at the National Training Center (NTC) or Combat Maneuver Training Center (CMTTC) do it. ERI will now provide better engineer responsiveness and greater flexibility to engineer operations at the task force and brigade levels.

Echelons Above Brigade

The new engineer brigade commander at division level is the division engineer (DIVEN). The sapper battalions organic to this engineer brigade are initially

attached to their habitually associated maneuver brigades. The division engineer will organize his headquarters to plan and synchronize all engineer missions conducted across the entire division's battlefield area. Representatives from the DIVEN headquarters detachment (HHD) will be at the division tactical command post and the main and rear command posts.

Usually the division engineer will receive corps engineer units and direct the execution of their specific missions. These units may assist in setting up a deliberate defense, assist in conducting a deliberate breaching operation, provide additional support to a main effort, assist in conducting a river crossing, or provide sustainment engineering in the division rear area.

The corps engineer will influence the corps commander's fight by sending units to the divisions, or by employing them in the corps rear area. If a corps combat engineer battalion is tasked to a division, it will almost always operate as a complete battalion, with the combat engineer companies receiving all orders from their parent headquarters. Corps combat support equipment companies may be attached to combat engineer battalions to provide additional horizontal construction capabilities, or they may be sent forward to support a division.

Most combat heavy engineer battalions (which are more appropriately called combat construction battalions) will be organized at echelons above corps. This does not mean they cannot work in the corps area. The division and corps engineers will request these units to support their requirements and missions.

Engineer Battlefield Missions

The engineer battlefield missions and associated critical

tasks determine the engineer organization and equipment required in the new units. The sapper battalions will provide mobility and survivability (M/S) to the maneuver brigades. (Note that countermobility is considered a component of mobility in TRADOC Pamphlet 11-9, "Blueprint of the Battlefield," a battlefield operating systems (BOS) model). These sapper battalions will be outfitted with vehicles and equipment that can keep up with the maneuver forces on offensive operations. They will also support the requirements to construct combat roads and trails for the maneuver forces and combat service support elements, and to place flank and frontal tactical obstacles.

When the maneuver brigade transitions to the deliberate defense, corps combat engineer battalions and combat support equipment companies will move forward to assist the sapper battalion. They will provide additional countermobility, survivability, or sustainment engineering required in preparing the defense. When those missions are completed, corps units will move to other corps priorities.

The armored division sapper battalions are new engineer organizations that focus on providing mobility. They are not organized the same as the old J-series division battalions. These sapper battalions improve the engineer command and control by integrating into the maneuver brigade, adding the flexibility engineers have been missing in the M/S BOS. They can be task organized within the division just like any of the mechanized or armored battalions. They can receive other engineer units and quickly integrate them into the engineer work effort.

The corps combat engineer battalions may receive any of the engineer missions. They must be

balanced and flexible organizations that can move quickly around the battlefield to accomplish their missions. In most cases they will operate behind the brigade rear boundary, using the existing road network. Here the wheeled units will have a mobility advantage over the tracked units. We must ensure the corps combat engineer battalions retain the all-purpose, flexible engineer organizations that we had in the past and that have traditionally been the engineer combat multiplier on the battlefield.

Building And Training ERI

Combat developers at the Engineer School used the ERI concept just described to produce a table of organization and equipment (TOE) for the units. FORSCOM or appropriate major commands then developed modified TOE (MTOE) organizations based on the projected resources available.

Engineer commanders of field organizations will be challenged to make the MTOE structures work. It is essential that unit leaders exercise these MTOE to find their strengths and weaknesses, document them, and provide input to FORSCOM and the Engineer School. Let us know what works and what you need!

Engineer commanders must train their division and corps units and educate the Army about ERI. Remember, ERI is different—most engineer units do not have the same capabilities as before, and the sapper battalion in armored (mechanized) divisions is a new organization. The muscle to do rear area survivability and sustainment tasks for the division will come from the corps combat engineer units. Be aware that most of these corps units are located in Reserve Component

forces. This will demand that division engineers better integrate Reserve Component units into their division's training cycle, which includes taking them to the combat training centers.

Conclusion

The opposing force (OPFOR) at the National Training Center has agility because of their command and control system, well trained soldiers, and well developed tactics, techniques and procedures (TTP). The divisions that trained and fought in Saudi Arabia had agility because they increased

their command and control capabilities, and had time to train and learn their doctrine and TTP. With ERI, the engineer force will now add engineer agility to the maneuver force. We have taken a big step forward with our new organizations. The doctrine to fight is out in draft form, and we must train on it at every opportunity.

We are now on the bow wave of changes in the Army with this improved command and control and integrated planning capability. Smaller organizations in the division will make it easier to move engineers laterally on the battlefield. Now it is up to engineers in the field to learn the

doctrine, expand on the strengths of the new organizations, discover and document the difficulties, and develop workable solutions. Sappers forward!

Lieutenant Colonel Somerville is a sapper who is currently chief, Tactics, Training, and Doctrine Division, at the Engineer School. He has served with the 177th Armored Brigade at the NTC, two tours with the 1st Armored Division, and one tour with the 82nd Airborne Division. He has a degree in civil engineering from Montana State University and is a certified professional engineer.

The ENGINEER Writer's Guide

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

If you're a potential contributing writer, here are a few "writer's guide" tips that should help steer you in the right direction:

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

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

Articles should generally come from contributors with first-hand experience with the subject being presented.

Avoid theatrical writing styles like: "It was a dark and stormy night..." or "...the soldier blazed through the jungle on his lumbering D7, providing a trail of freedom for the other vehicles..."

Articles should be concise, straightforward, and in the active voice.

Length should range between 2,000 and 4,000 words, and the text should be typewritten and double-spaced. Generally, each such page will contain from

200 to 250 words.

Articles containing attributable information or quotations not references within the story should carry appropriate footnotes.

Manuscripts must be original, unpublished, and not under consideration by another publication. Normally, you can expect a reply to your submission within two weeks after we receive it.

All submissions are subject to editing.

Contributors are encouraged to include black-and-white photos, artwork, and/or line diagrams to help illustrate your article.

Include your full name, rank, current unit and job title. Also include a list of your past assignments, experience and education, your mailing address, and daytime phone number—preferable Autovon. Send your articles to: Editor, *ENGINEER* Professional Bulletin, ATTN: ATSE-TDM-PB, Fort Leonard Wood, MO 65473-6650.

If you have any questions about an article you're working on—or considering writing—give our features editor, Phil Howell, a call at DSN 676-7643, or commercial (314) 563-7643.

We look forward to hearing from you.

P.S. ENGINEER welcomes response from our readers. Letters regarding information in our magazine are published in our "Letters to the Editor" department. Let your thoughts be heard.

The Role of Joint Task Force-Bravo in Nation Assistance

By Major Scott Brubaker

Your unit has just been notified that it will deploy to Honduras. What now? Where do you start your planning? Is there anyone who can help? The answer to these and many other questions can be found at Joint Task Force-Bravo (JTF-B), a subordinate command of the United States Southern Command (USSOUTHCOM).

The purpose of this article is to discuss the missions and capabilities of JTF-B and how it assists deploying units to have successful training events in Central America. It is not intended as a definitive "how to" article, but as an overview of what you can expect and things you can do to enhance your unit's deployment.

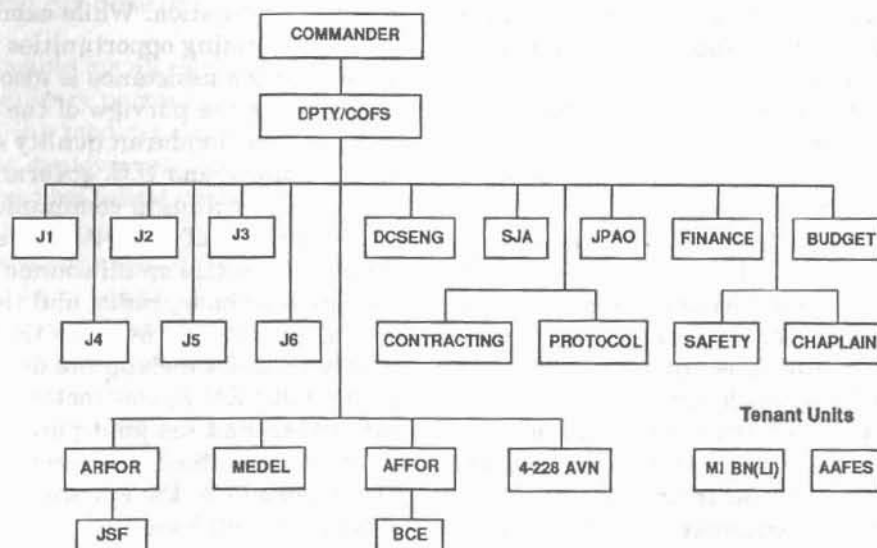
Based in central Honduras at Soto Cano Air Base approximately 60 miles north of Tegucigalpa,

the capital of Honduras, JTF-B is ideally situated to support all U.S. forces exercises. Soto Cano Air Base, home of the Honduran Air Force Academy, is located along the main north-south highway in Honduras and has the only C-5 capable runway in the country. The organization of JTF-B is shown below.

Missions and Capabilities

The JTF-B External Standing Operating Procedures (SOP) provides the following unclassified mission statement: "JTF-B exercises operational control of designated U.S. military forces and exercises area command responsibilities for all U.S.

Joint Task Force-Bravo





Camp Guayacan, a 700-man basecamp in Honduras. Soldiers stationed at the camp were part of Fuertes Caminos 91.

military forces in Honduras to secure unity of effort in all operational missions, ensure compliance with command policy and to coordinate defense, security, logistics and the use of available facilities; ensures effective intelligence coordination to provide all U.S. forces with indications and warnings intelligence; acts as USCINCSO's directive authority in the field of logistics and coordinating authority in Honduras on engineering functions; plans and conducts joint/combined exercises in Honduras as directed by USCINCSO..."

Restated, this simply says that JTF-B is responsible for providing the assistance to make your training in Honduras safe and successful. Key phrases are "providing...assistance" and "your training." JTF-B will not do the planning for you, nor will they tell you exactly how to accomplish the project(s) you've been assigned. They will guide you through the maze of regulatory requirements and provide necessary resources. You will be expected to plan and execute your own training.

The JTF-B primary staff, J-1 (personnel), J-2 (intelligence), J-3 (operations), J-4 (logistics), J-5 (civil-military operations), and J-6 (communications), performs all staff functions normally associated with these positions. Some functions critical to your deployment are worth highlighting.

Units deploying to Honduras operate in a low intensity conflict environment, which makes the J-2's 24-hour-a-day intelligence and Indications and Warning (I&W) support extremely important. This support, along with the advice and guidance of J-3 Force Protection, will help ensure your unit's safety.

The J-3 consists of Operations, Plans, Exercises, Force Protection, and Air sections. J-3 Exercises is the first in-country contact for units deploying to Honduras and provides coordination with other staff sections as well as the Honduran government and military. Much of your unit's movement while in Honduras will be by air. The J-3 Air provides assistance in planning for rotary and fixed wing aircraft support.

Deployment and redeployment can be a daunting experience. The J-4 guides unit planners through the maze of logistics requirements covering port operations, bulk fuel, customs clearance, and support from other JTF-B elements, the U.S. MILGRP, and the host nation. While exercising in Honduras provides training opportunities not available elsewhere, nation assistance is also part of the equation. This is the purview of the J-5, which works to improve the Honduran quality of life and enhance the Honduran and U.S. government images. Assisting units to maintain communications in Honduras is the function of the J-6. This section provides in-country expertise on all communications systems including telephone, radio, and television.

The special staff sections that are important to deploying units include the deputy chief of staff, engineer (DCSENG), contracting, the staff judge advocate (SJA), and the joint public affairs office (JPAO). While the remaining special staff sections are important to the success of any deployment, most units will have little contact with them.

The DCSENG is responsible for all engineer-related exercises, from two-week deployments for

training to the engineer phases of JCS-sponsored exercises such as FUERTES CAMINOS and AHUAS TARA. The section allocates projects, assists with material acquisitions and equipment support, oversees quality control, and operates "Engineer Village." This area houses engineer units working on or near Soto Cano Air Base as well as units requiring temporary housing during deployment/redeployment.

Contracting is the point of contact for all in-country material, equipment, and service needs. They purchase materials locally that are unavailable through the supply system or required on short notice, lease vehicles and equipment, and contract for billets and messing in local hotels. The SJA assists units in negotiating real estate leases and settling claims against the U.S. government. Finally, the JPAO ensures deploying units get the media attention they deserve both at home and among the Honduran people.

Subordinate elements of JTF-B are the Army Forces (ARFOR), the Air Force Forces (AFFOR), the Medical Element (MEDEL), and the 4th Battalion, 228th Aviation Regiment.

The ARFOR provides command and control of all U.S. Army elements in Honduras, including U.S. Air Force members of the joint staff, and works closely with deploying units for all in-country logistics support. The Joint Security Force (JSF) provides convoy planning assistance and escort vehicles/personnel when required.

The AFFOR provides command and control of all U.S. Air Force elements in Honduras, except U.S. Air Force members of the joint staff. The base civil engineer (BCE) is responsible for operations and maintenance of all JTF-B facilities, much like an Army DEH. Most units deploying to Honduras will deal with the BCE only when assigned construction projects on Soto Cano Air Base or at other JTF-B remote sites.

MEDEL is responsible for all medical and health activities for U.S. military personnel. They provide assistance in satisfying medical requirements prior to, during, and after deployment. The Preventive Medicine section provides initial preventive medicine briefings to all personnel arriving in Honduras. MEDEL also coordinates medical and dental unit deployments to treat people in remote areas. These medical deployments are often coordinated with engineer deployments to improve sanitation facilities for local citizens.

The 4th Battalion, 228th Aviation Regiment, is a composite aviation battalion that provides UH-1H and UH-60 utility helicopters, UH-60 medevac helicopters, and CH-47 cargo helicopters. Its pilots are a valuable source of information on landing zones and airstrips throughout Honduras.

Training In Honduras

Engineer training in Honduras generally falls under one of two categories: nation assistance projects or exercise-related construction. While the difference between the two is primarily a function of funding and beyond the scope of this article, the following provides a simplified description of the two broad categories.

Nation assistance projects are those that enhance the quality of life for the Honduran people and provide viable training opportunities for U.S. forces. They are typically single service, short-duration projects including well drilling and building/repairing schools, clinics, gymnasiums, community centers, and bridges. Nation assistance projects in Honduras fall under the "1/3 Rule" which simply means that the work force is 1/3 U.S. military, 1/3 Honduran military, and 1/3 Honduran civilian.

The theory behind this rule is two-fold. First, human nature suggests that people tend not to appreciate and take care of things that are simply handed to them. Therefore, it makes sense to have local civilians involved, both to make them feel a part of the project and to teach them the skills to maintain it once completed. Second, having Honduran military participation suggests to the local population that their government, not just the U.S., is doing something for them which contributes to political stability.

Exercise-related construction projects occur during JCS-sponsored exercises and are focused on supporting exercise training objectives which may or may not contribute to the Honduran quality of life. These projects tend to include more than one service and are of longer duration—sometimes, as in the case of EX FUERTES CAMINOS, a period of years. They include construction of basecamps, forward landing strips, roads, POL facilities, and logistics-over-the-shore (LOTS) facilities. It is important to note that nation assistance projects are also constructed in conjunction with many JCS-sponsored exercises.

Predeployment

Your unit has been notified that it will deploy to Honduras and has been given authority to coordinate directly with JTF-B. Your first point of contact at JTF-B is the J-3 Exercise officer, who will provide JTF-B points of contact and try to answer any initial questions you may have. He will suggest dates for your initial site survey and explain USSOUTHCOM and JTF-B requirements for theater and in-country clearances. Although you will probably know what project(s) your unit has



An engineer finishes placing window frames in a new school building in Macora, Honduras.

been assigned, you should also contact the DCSENG project officer for verification and status. The project officer can verify your equipment requirements.

Generally, units working on vertical projects will only require tool kits and generators for power tools. Vehicles for hauling troops, materials, and small pieces of construction equipment, such as concrete/mortar mixers and compactors, will be provided. On the other hand, units working on horizontal projects or projects requiring specialized equipment, such as well drilling and quarrying, will be expected to deploy with their equipment.

The initial site survey mentioned earlier is critical to the success of your deployment. It is the first opportunity for an on-the-ground reconnaissance. You will meet and be briefed by the JTF-B staff, visit project site(s), verify bills of materials (BOM), and begin coordinating the details of your deployment.

Ideally, you should schedule your survey 150-180 days before deployment and plan for three to five days on the ground. Team size is up to you, but is limited by transportation and security considerations and must be coordinated with, and approved by, JTF-B. Once dates have been determined, the J-3 Exercise officer will coordinate your visit with

the JTF-B staff.

As soon as travel arrangements for your site survey have been confirmed, contact the J-3 Exercise officer who will coordinate for your arrival. Make sure to travel via Military Airlift Command (MAC) aircraft. You will fly directly to Soto Cano Air Base and be met by a member of the JTF-B staff. Travel via commercial airline should only be considered as a last resort, otherwise you may experience lengthy customs delays at the civilian airport in Tegucigalpa.

Once your site survey team has arrived at JTF-B and has a chance to settle in, you will meet the JTF-B staff and receive a series of briefings covering, among other subjects, JTF-B, the current threat, force protection, and preventive medicine. These briefings are important to safe training and will be required for every member of your unit immediately upon deployment. You should also call on the JTF-B commander to discuss your training objectives and gain an understanding of his philosophy on training in Honduras. Prior to your arrival, the JTF-B staff and subordinate elements will have completed their staff estimates, discussed your deployment, and will be prepared to discuss specific details with you.

For example, the J-2 and J-3 Force Protection staffs will have analyzed the threat and

coordinated with the Joint Security Force (JSF) commander for the appropriate security requirements. Air and ground transportation will have been coordinated as well as billeting, if required, in an approved safehouse.

The J-5 will have made initial contact with local officials and discussed the "1/3 Rule" with them. The DCSENG project officer will have developed a detailed project folder that includes a bill of materials, maps, detailed directions to the site, points of contact, special equipment requirements, and any significant site considerations. He will also be prepared to discuss tool and equipment requirements unique to your project(s).

The J-4 will have discussed transportation requirements with your higher headquarters and will be prepared to provide details about customs clearance and ports of entry for both personnel and equipment. Finally, the ARFOR staff will have identified virtually all of your in-country logistics requirements.

While conducting the reconnaissance of your project site(s), you will be accompanied by the DCSENG project officer, a Spanish speaking J-5 representative, a JSF security element, and other required JTF-B personnel. At the project site you should discuss with local officials how Honduran civilian and military personnel will be incorporated into your work force. The regional military or police commander will provide jobsite security during your deployment, including movement to and from the project site(s). It is important that you discuss security requirements with the unit commander tasked to provide the security. The JSF security element accompanying your survey party will assist you in ensuring all requirements are addressed.

During the site survey you should also look carefully at proposed billeting and messing arrangements to ensure they meet your needs. When the location of project sites precludes units from being billeted at Soto Cano Air Base, other arrangements must be made. Due to security and health requirements, options are limited. While JCS exercise units generally live in temporary basecamps, that is usually not feasible for units working on nation assistance projects. These units can either stay at Honduran military installations or in approved hotels. Both offer advantages and disadvantages, but the decision will often be made solely on availability. One of the primary purposes of the site survey is for you to verify the scope of work and BOM. The best time to do that is during your project site reconnaissance.

Once you're satisfied with the scope of work and BOM, the DCSENG project officer will requisition materials and special equipment through the ARFOR S-4 and Contracting. Immediately after returning from your ground reconnaissance, take some time to think through everything you saw and heard. Ask questions about anything that's not clear.

Prior to departing Honduras you will participate in a final coordination meeting with the JTF-B staff and subordinate units. This is the time to review your visit, identify unsettled issues, and ensure you know who is responsible for resolving them. Your final task before departing should be to outbrief the JTF-B commander.

When time and funds permit, you should attempt to make a final coordination visit approximately 90 days prior to deployment. You will have had an opportunity to discuss your initial site survey with other members of your unit and



With the old school serving as a backdrop, an engineer smooths the concrete foundation for a new school in the Honduran village of El Corozo.

incorporate their comments into your training plan. This final visit will allow you to meet with the staff one last time and ensure all the details agreed to during your previous visit are being finalized to your satisfaction.

Deployment, Execution, Redeployment

Deploy your advance party one or two weeks before the main body. The advance party should have sufficient personnel to ensure preparations are made for the arrival of the main body. This can make the difference between exercise success or failure. Tasks will include receiving equipment and baggage shipped from home station, coordinating required briefings with the ARFOR S-3, and conducting any last minute coordination. Preparations will also include receiving materials and equipment and preparing billets for the main body at the project site(s) or at Soto Cano Air Base. Depending on ports of entry and location of project site(s), it may also include arranging for air transportation and/or ground convoys to move troops and equipment.

During your unit's deployment you will be expected to provide a liaison officer (LNO) (senior NCO or officer) who will represent you at Soto Cano Air Base. An engineer unit LNO is usually provided desk space in the DCSENG section. However, his or her primary staff responsibility is to the J-3 Exercise officer. The LNO is responsible for coordination with the JTF-B staff to ensure all your needs are met and all required reports are submitted accurately and on time. Each morning, Monday through Saturday, he will attend the JTF-B command and staff meeting where he will brief your project status. The LNO will be important to the success of your deployment and should be one of your best people.

Except for rare occasions, your main body must transit Soto Cano Air Base to inprocess before moving to your project site(s). This gives the JTF-B commander the opportunity to ensure all of your personnel receive the information they need for a safe deployment. Your soldiers will be welcomed by the JTF-B commander and receive briefings covering JTF-B, the current threat, force protection, reporting civil rights violations, and preventive medicine. Depending on the time of arrival and the location of project site(s), your soldiers could easily complete inprocessing, move to their billets, and be prepared to start work the day after they arrive.

Once you've arrived at your project site(s), project completion is up to you. JTF-B will provide a Spanish speaker if there are none available in your unit. You will also be provided a security team of one or two military policemen to assist you in en-

suring the Honduran security element is providing adequate protection. During your deployment you will be visited by the DCSENG project officer and quality assurance NCO as well as other members of the JTF-B staff.

You will be required to maintain contact with the JTF-B command post 24 hours a day. Primary means of communications is secure tactical satellite (TACSAT) which the J-6 can provide. At the end of each day you will be required to account for all of your personnel and sensitive equipment and submit a report, called "Tubes Up," to the JTF-B command post.

Prior to redeployment you will meet with the JTF-B staff to review and finalize plans to complete your project(s), turn them over to the users, and redeploy your unit to home station. If you've followed my advice and assigned LNO duties to one of your best people, this meeting will merely be a review of completed actions. If not, there will be some work to do. Redeployment will include cleaning and turning in equipment, turning over billets, preparing unit and personnel property for customs check, and getting your personnel back to home station. Before leaving Honduras, get your soldiers together and conduct an after action review. Capture comments and use them to prepare your after action report and prepare for future training.

Summary

Construction training in Honduras can and should be a valuable training event for your unit and personally rewarding for your soldiers. Whether deploying for six months in support of exercise FUERTES CAMINOS, or for two weeks to execute nation assistance projects, your unit will improve its readiness, provide much needed help to the Honduran people, and contribute to stability in Central America. Joint Task Force-Bravo is available with the experience and expertise to help ensure your training objectives are met and all of your soldiers return home safely. The commander, staff, and subordinate elements are committed to your success.



Major Brubaker is S-3 of the 589th Engineer Battalion at Fort Leonard Wood. He previously served as assistant deputy chief of staff (engineer), JTF-B, Soto Cano Air Base, Honduras. Other assignments include senior team leader (instructor) for the Engineer Officer Advanced Course, Army Engineer School; division engineer (FWD), 2nd Armored Division (FWD); two tours as a company commander; construction officer, and platoon leader. He holds a bachelor's degree from the University of Maryland.



Engineer Solution

DEVELOP A SCHEME OF ENGINEER OPERATIONS

Step 1. Analyze relative combat power. This analysis of relative combat power is based on the situation template (Figure 1, page 24) and an engineer battlefield assessment of threat and friendly engineer capabilities.

- **Threat engineer capability.** No obstacle activity has been located from the line of departure (LD) to phase line (PL) Red. From PL Red to PL White, tactical obstacles in place are oriented to an armored force using the roads. All of the mines appear to be surface laid and under the observation of at least one LP/OP. These obstacles are in range of threat indirect fire assets.

Protective obstacles on Obj Polk are extensive, but a clear picture of the objective can be created from intelligence gathered by your scout/sapper element. You plan for the sappers attached to the scouts to link up with Companies A, B, and C before the companies begin their assaults. The sappers will inform the company commanders about preselected breaching sites, and threat strengths and vulnerabilities. You work closely with the battalion S2 to ensure that the situation template is accurate and up-to-date.

- **Friendly mobility/survivability (M/S) capability.** For this problem, the assessment of friendly capability is based on the available mobility assets. TF Bayonet has your engineer platoon of 27 personnel. You have complete demolition boxes, satchel charges, bangalore torpedo kits, and bolt cutters. Each of the nine infantry platoons is capable of conducting limited breaching operations. Your sapper platoon has trained extensively with this battalion and can quickly integrate into the combined arms team.

Step 2. Identify missions and allocate forces. In this step, use the reverse planning process to identify engineer tasks, working from Obj Polk back to the line of departure. Each time an engineer mission is identified, allocate the force needed to accomplish it. This is an unconstrained allocation.

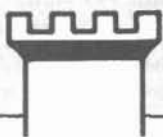
Lane North

1. Assist in a covert breach of obstacles while infiltrating the task force.
2. Clear the wire/mine obstacle on Sandt road, and mark the lane and position guides.

Lane South

1. Assist in a covert breach of obstacles while infiltrating the task force.
2. Breach one footpath through protective obstacles on Obj Polk for each dismounted platoon.
3. Assist in clearing bunkers and destroying BMDs, as required.
4. Clear anti-vehicular obstacles off Sandt Road, and mark lane(s) and position guides to pass TF Steel.

As you allocate resources, you realize there are not enough engineer assets to conduct all engineer mission support requirements. You bring this to the attention of the S3.



Engineer Solution

He requests additional assets from the brigade, but tells you to complete the task organization on the assumption that no additional assets will be received.

Step 3. Develop a scheme of engineer operations. The goal of this step is to integrate the following into the maneuver scheme of operations: force allocation, the execution of all engineer tasks identified in Step 2, and engineer priorities. The scheme of engineer operations is developed by working the maneuver plan from the line of departure, through the attack on Obj Polk, and to consolidation on the objective. When you "wargame" the maneuver plan, keep in mind that all engineer tasks must be accomplished with the assets available. Experiment with different resource allocations, keeping in mind the commander's intent, the priority of effort, and TF Bayonet's mission.

As assets become scarce, identify where mobility assets can reasonably be expected to complete several tasks. Do not forget mobility assets that are available in the maneuver force. Remember, you are the TF engineer, not just the platoon leader.

Possible Scheme Of Engineer Operations

Step 4. Balance force allocations with available assets. Infiltration lane South has priority. At the end of Phase 1, an engineer platoon is required at Obj Polk, and an engineer squad is required with Company A, on Sandt Road. The commander said that surprise and speed are critical to the covert breaches on Obj Polk, so the engineer effort at the objective is key.

Company A will conduct detailed breaching rehearsals with the sappers before crossing the LD. Then, with assistance from the sapper team, they will breach the obstacle on Sandt Road. Consider using some of the sappers that went with the scouts. Those sapper's hard intelligence about the obstacle could simplify this breach for Company A.

Two sapper demolition (demo) teams will work with Company C to clear bunkers and BMDs on the southern end of the objective. After the southern end is secured, the engineer effort will shift to passing Company B through Company C's breaches to continue the assault. The demo teams with Company C will shift to Company B's control to continue the assault on Obj Polk.

Two engineer squads will be required to breach the obstacles on Sandt Road at the objective. One squad probably could complete this task, but speed in breaching these two obstacles to allow the passage of TF Steel is critical. Both obstacles must be breached and marked at about the same time. Infantry platoons from Company C will assist in these breaches.

Step 5. Integrate your plan into the maneuver course of action sketch. Prepare a statement describing the scheme of engineer operations. Your statement must include:

- Task organization for the mission.
- Engineer mission priorities for each phase.
- How engineer assets will support the maneuver course of action.



Engineer Solution

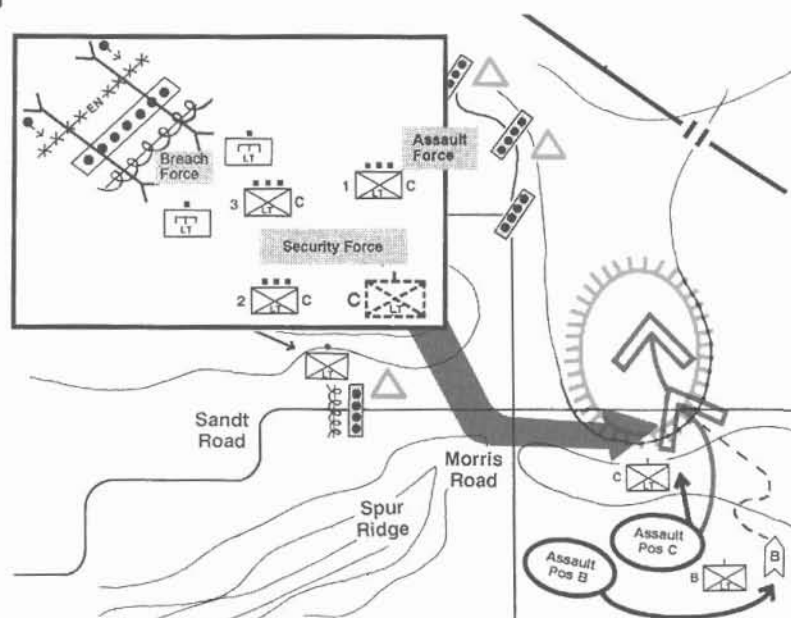


Figure 4

Wargame and refine the engineer plan. Visualize the execution of the operation, from Phase 1 through Phase 3, through the eyes of the commander. Pay particular attention to any shortfalls with your plan. Be knowledgeable about all other staff members' plans, and ensure they are mutually supporting. Remember, this must be a combined arms plan.

After the southern end of the objective is secured, Company B will be passing through to continue the assault. Securing the southern end of the objective (Figure 4) has two benefits. It will eliminate the overwatching fires on the obstacle located west of Obj Polk, and it will allow Company A to eliminate the LP/OP and breach that obstacle.

During the wargaming process, you identify a potential problem at the objective. After the southern end of Obj Polk is secured, your mission will shift to assisting Company B as it passes through Company C's breaches. Simultaneously, the demo teams must switch from Company C to Company B and continue the assault. Your other two sapper squads must breach the three anti-vehicular obstacles that block Sandt Road on Obj Polk, and pass TF Steel through to the east (Figure 5, page 46). To eliminate this potential problem, you decide to place yourself with Company C for the covert breach and to clear the obstacles on Sandt Road. Your presence will ensure the smooth transition of forces as they support this operation.

Recommend a course of action. According to the commander's intent, the speed of the breach is key. Thus, the mobility tasks required to get onto the objective and clear Sandt Road are the first priority. Because Company C must conduct a covert breach into Obj Polk and clear the southern end of the objective, you recommend attaching two engineer squads plus two teams from a third squad to Company C (Figure 6, page 46). Company B requires two demo teams, which will be picked up as Company B passes



Engineer Solution

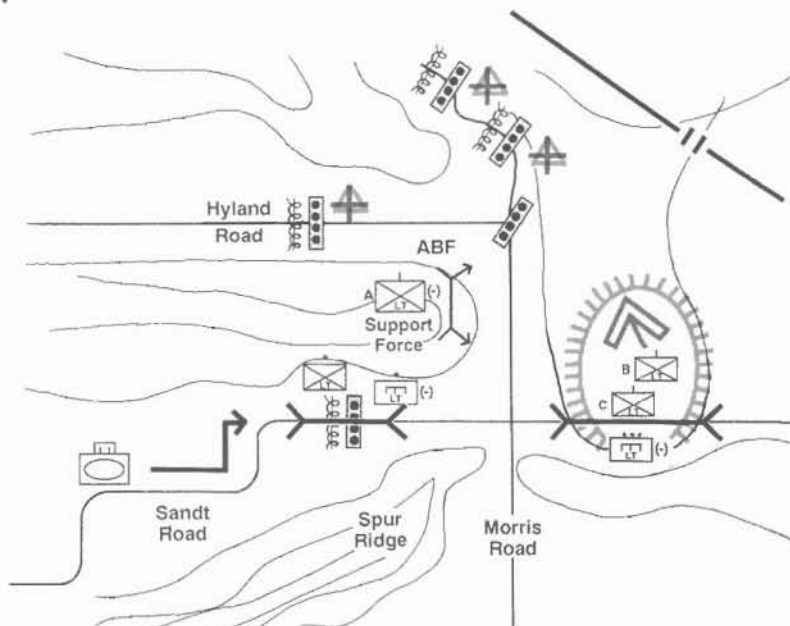


Figure 5

through Company C's breaches. Company A requires another squad to breach the obstacle on Sandt Road, but assets are not available. Therefore, a sapper team that worked with the scouts will link up with Company A and assist in the breach. If the sapper team fails to link up with Company A, previously developed and rehearsed contingency plans will be implemented.

You will locate with Company C during the covert breach operation. By doing this, you can ensure the demo teams' transition is completed as planned, the vehicle lanes on Sandt Road are cleared and marked, and that guides are in position to pass TF Steel through to their objective.

Task Organization

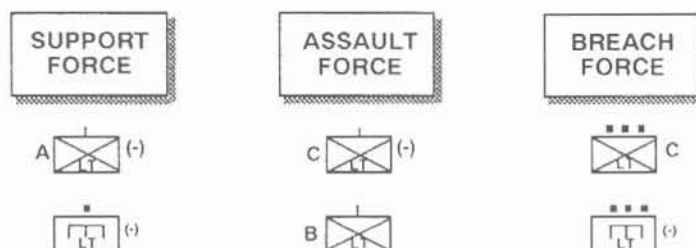


Figure 6

This Engineer Problem/Solution was submitted by Captain Scott Lind, a writer/instructor in the Department of Instruction at the Engineer School. He has previously served as an observer controller at the Joint Readiness Training Center, assistant division engineer, 6th I. D, (L) Alaska, and commander of A Company, 6th Engineer Battalion.



The Bullet Trap:

Hastening the In-Stride Breach

*By Captain Stephen R. Hesler
and
Captain Ronald N. Light*



The bullet trap set, as tested at the National Training Center (NTC) and Fort Benning. Used by combat engineers in force-on-force exercises, the bullet trap proved easy to use and effective in clearing trip wires.

Clearing trip wires complicates the already difficult and dangerous job of clearing minefields and other obstacles. The Belvoir Research, Development and Engineering Center (BRDEC), and Fort Benning's 72nd Engineer Company have come up with an equipment proposal to make the job faster and easier.

In April 1989, Frank Tucker, a civilian engineer at BRDEC, trained with the 72nd Engineers at the National Training Center (NTC) at Fort Irwin. His trip to the NTC was part of the Design Engineers Field Experience With Soldiers (DEFEWS) program. During his visit, Tucker recognized that the current method of clearing obstacles of booby trap wires was slow and dangerous.

The current method of using grapnel hooks to clear trip wires is extremely slow. It takes an experienced engineer four to five throws to clear a 100-meter minefield of trip wires. The in-stride breach, probably the most challenging and difficult combined arms task, must be executed rapidly.

Unfortunately, using a grapnel hook to clear trip wires nearly doubles the amount of time needed to conduct an in-stride breach. In addition, even with rigorous training, the cord attached to the grapnel hook routinely tangles, exposing the sapper team to additional enemy fire.

In the quest for a "better mouse trap" for trip wires, we contacted Dr. David Stefanye, a senior

"...The bullet trap takes the combat engineer one step closer to being able to match the momentum of modern mechanized warfare."

scientist at BRDEC. Stefanye suggested using a bullet trap to propel the grapnel out into obstacle areas.

Commercial bullet traps are hollow metal cylinders about a foot long which slip over the muzzle of a weapon. True to their name, they "trap" a live round as it leaves the rifle bore, and are propelled forward by the force of the round.

While the idea seemed to be workable, a couple of problems had to be solved. We recognized that using live rounds with a bullet trap would be impractical for training scenarios. First, they might pose a safety hazard to opposing forces during field exercises. Secondly, they had to be reusable (commercially available bullet traps are useless after one firing).

With the assistance of Steve Bennett, a design engineer at BRDEC, blank rounds provided a tentative solution. But tests with standard Army blanks showed they were not powerful enough to project the trap more than a few meters. However, a special high-powered blank manufactured by an Israeli company produced enough force to propel a 300-gram bullet trap more than 250 meters. After Bennett redesigned the trap to maximize its reusability and wire-catching capability, BRDEC again contacted the 72nd Engineers. The company was asked to give the device a

field test, and provide soldier comments on its usefulness.

In January 1990, DEFEWS participants David Nelson and Mike Stumbaugh accompanied the 72nd in field exercises at Fort Benning. In force-on-force exercises, the 72nd Engineers, Nelson, and Stumbaugh all found the device to be a success.

Using the bullet trap to clear wire obstacles cut an engineer's exposure time by about 90 percent. They also found that the bullet trap could be fired "buttoned up" inside a tracked vehicle. This protected soldiers from enemy shrapnel, small arms, and chemical agents.

A more extensive test of the bullet trap came when the 72nd deployed with the 197th Infantry Brigade to the NTC in February 1990. Mike Pocratsky, another DEFEWS participant, accompanied the unit. He brought with him four sets of the device, each consisting of a machined aluminum bullet trap and a pack tray, which holds the attached nylon line.

During force-on-force and live fire exercises, the 72nd Engineers successfully employed the new bullet trap. The trap proved to be a fast, safe, and reliable way of clearing obstacles of trip wires.

The device is simple to use and inexpensive to produce. In addition, its use is not limited to engineers. Mechanized infantry and other combat units could use the bullet trap with equal success.

As a tool for conducting the in-stride breach, the bullet trap takes the combat engineer one step closer to being able to match the momentum of modern mechanized warfare.

The bullet trap is currently undergoing further study by BRDEC and the Engineer School's Directorate of Combat Developments.



Captain Hesler is attending graduate school at Loyola University. An infantry officer, he previously served as a research and development coordinator at BRDEC, Fort Belvoir. He also served as a company commander and staff officer with the 194th Armored Brigade, and as a platoon leader with the 1st Armored Division. He is a graduate of the Infantry Officers Advanced Course.

Captain Light is attending graduate school at the University of Virginia. He previously served as commander of the 72nd Engineer Company, 197th Infantry Brigade, and as a company commander for the 43rd Engineer Battalion. Other assignments include battalion S-4, battalion maintenance officer, and platoon leader. He is a graduate of the Engineer Officers Advanced Course, and holds a bachelor's degree in environmental sciences and technical writing from Pennsylvania State University.



A Schoolhouse for Xepon

By First Lieutenant Walter P. Cole

For engineers, nation assistance missions provide challenges that are unique to each country. Climate, the quality and availability of materials and equipment, and even the current political situation are all factors which can wreak havoc with even the most carefully planned construction schedule.

When the Laotian government asked the United States for assistance in building rural schoolhouses, the 84th Engineer Battalion, Schofield Barracks, Hawaii, took up those challenges.

From December 1990 to May 1991, soldiers of the battalion were in Laos to conduct site surveys of three possible school locations in Xepon, Xam Neua, and Muang Nong. This article covers the construction of a school in late 1991 at Xepon, Laos, about five miles from Vietnam.

Site Conditions

Access to Xepon was by a five and one-half hour ride over 130 miles of difficult roads.

50 Engineer

Air service to the site was not available. Entry to the school building site was made by constructing a one-half mile road (combat trail) from the main route. Transporting materials up this trail, especially under muddy conditions, later proved to be very difficult.

The school site was covered with dense foliage and undergrowth which required clearing. Additionally, the site was suspected to contain unexploded ordnance from the Vietnam War. The site location provided easy access to construction water from the nearby Mekong River.

School Design

The design for the five-room, enclosed school (see diagram, page 52) had to consider the local availability of materials, and limited manpower, time and equipment. Fairly simple construction techniques were also required. No electrical fixtures or mechanical devices were requested. The final design included the following features:

- Concrete slab on grade
- CIP-reinforced concrete columns
- CMU block exterior and interior walls
- Wooden trusses
- Corrugated metal roofing
- Wooden doors and louvered windows

The structure was single story and offered 2,500 square feet (100' by 25') of usable space. The five classrooms were divided by interior masonry walls. Based on this design, and experience from a previous team deployment in the country, the bill of materials (BOM) was easily estimated and validated. Planning factors for construction outlined in TM 5-333 were used to establish a 45-day construction period.

Mission Preparation

The most critical part of mission preparation was selection of the construction team. Soldiers from Charlie Company were selected for the mission, based on their proven construction skills and recent experience with similar construction on the Hawaiian island of Oahu.

Team size was limited by the Laotian government to the minimum number of soldiers necessary to complete the school-house within the scheduled time frame. The final team consisted of 12 soldiers, including a platoon leader, platoon sergeant, carpenters and masons, two communications specialists, and a Special Forces medic.

The communications specialists were responsible for maintaining round-the-clock contact with the American embassy in Vientiane. They also provided a back-up communications link with battalion headquarters in Hawaii. The Special Forces medic, with his advanced medical training, was necessitated by the total lack of medical support at Xepon.

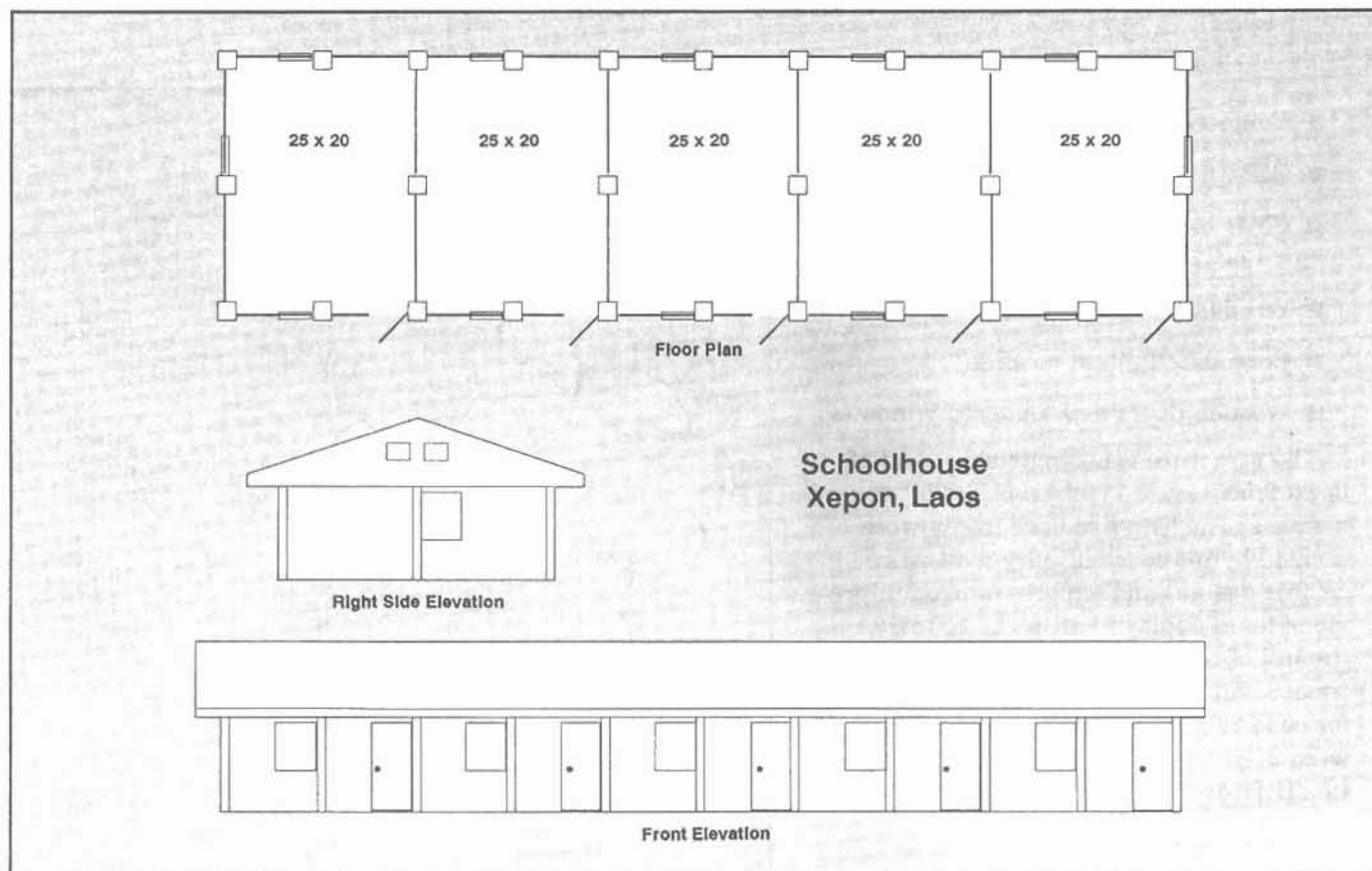
Other preparations included renting two 9-cubic-foot concrete mixers to be shipped along with the team's tool kits. Such mixers were not available in Laos, and a mobile, light-weight mixer was not on the unit's TO&E (tables of organization and equipment).



Execution

The advance party left from Hawaii on September 14, 1991. Their tasks included:

- Locating and purchasing all construction materials (except for louvered windows, which came from Hawaii).
- Coordinating transportation of all materials to the site and staging the materials.
- Coordinating and validating the clearing and grubbing of the site.
- Surveying the site for unexploded ordnance, with the assistance of the 6th Explosive Ordnance Detachment from Hawaii.
- Coordinating the movement of the main body and supplies into Laos.
- Establishing the base camp.



From the outset, the project's planned schedule had to be changed. Previously coordinated transportation for the advance party fell through, which directly affected the party's ability to locate and procure materials. Fortunately, a hotel owner in the region assisted the team with their transportation needs—saving the project from serious delay. Additional time delays were experienced in locating a bulldozer and letting a contract for its use in site clearing. Some difficulty was also experienced in finalizing the size of an accompanying Laotian security force, and settling their payment requirements.

But these challenges were minor compared to the team's discovery that the central government had placed a ban on timber cutting. Since lumber of the sizes and quantities necessary for the project were not in stock at lumber yards, the ban threatened the entire project. Fortunately, the Laotian liaison assigned to the team worked with the mayor of Savannakhet to have the ban temporarily lifted for the project. All of these events caused a one-week delay in the start of construction.

As soon as the main body and the construction materials arrived in Xepon, the remnants of a typhoon dumped heavy rain on the area for five straight days. Because of the site's remote location, with tents providing the only shelter, the use of power tools was halted during these rains. The construction schedule had to be revised once again.

To make the best of the difficult circumstances,

the team concentrated on preparing the pad and footers. This was made significantly easier by the amount of water that had soaked into the ground. During the Laotian dry season, the required earthwork would have required many hours of hard labor. With approximately 300 linear feet of footers to dig for the pad, this would have taken considerable time and effort.

In addition to making it easier to dig, the unwelcome rain provided another unexpected benefit. The site didn't have its own water source for construction of concrete placements and other construction needs. The team had a water truck, but it was empty after two concrete placements of about 10 cubic yards each. The heavy rains made the access trail impassable for the truck, and it was unable to reach the river to get more water. But rain had collected in the footing excavations. Using an electric water pump, the team collected this water for construction use over several days—until the truck could be refilled at the river.

The early bout of poor weather forced the team to rethink all phases of the construction schedule to accommodate the possibility of more inclement weather. One such change was to complete all perimeter walls before beginning the interior walls. This allowed the roofing system to be completed as quickly as possible. Then, if more heavy rain or wind occurred, inside work on the building could be tackled under cover.

While constructing the walls, the team came across the first of several material obstacles. The

concrete blocks used for the school walls presented several challenges. The blocks in Laos are of relatively poor quality, and selection is limited. In Savannakhet, only 3-inch-thick blocks were available. These blocks tended to be brittle and dimensions varied by as much as a one-half inch from block to block. Additionally, the height of these blocks was only 7 1/4 inches—three-eighths of an inch shorter than originally expected. As a result, the dimensions of the windows and doors of the school had to be changed. Field design changes were also made in wall height and to the tie-in of the walls with the roofing system.

Other problems were encountered with metal roofing and with plywood. The roof of the school was designed for 20 gauge corrugated metal, but the only roofing available in Laos was much thinner. So thin, in fact, that it could not support a person's weight, and dented easily when nailed to the wooden trusses. Extreme care was required to avoid such denting. It was also important to sequence roof construction to avoid any load on installed roofing panels.

The thickness of available plywood also caused problems. In Savannakhet, the thickest plywood available was one-eighth inch. Because of its susceptibility to warping, this plywood was too thin to be used in the ceiling. As a result, the team had to special order three-eighths inch plywood from Vientiane.

While these difficulties caused project delays, overcoming them with locally available solutions provided all members of the team with valuable experience in dealing with unexpected site problems.

Observations

The team used very little equipment to construct the school. Major items included two concrete mixers, two 3kwh (kilowatts per hour) generators, an electric water pump, and various hand power tools.

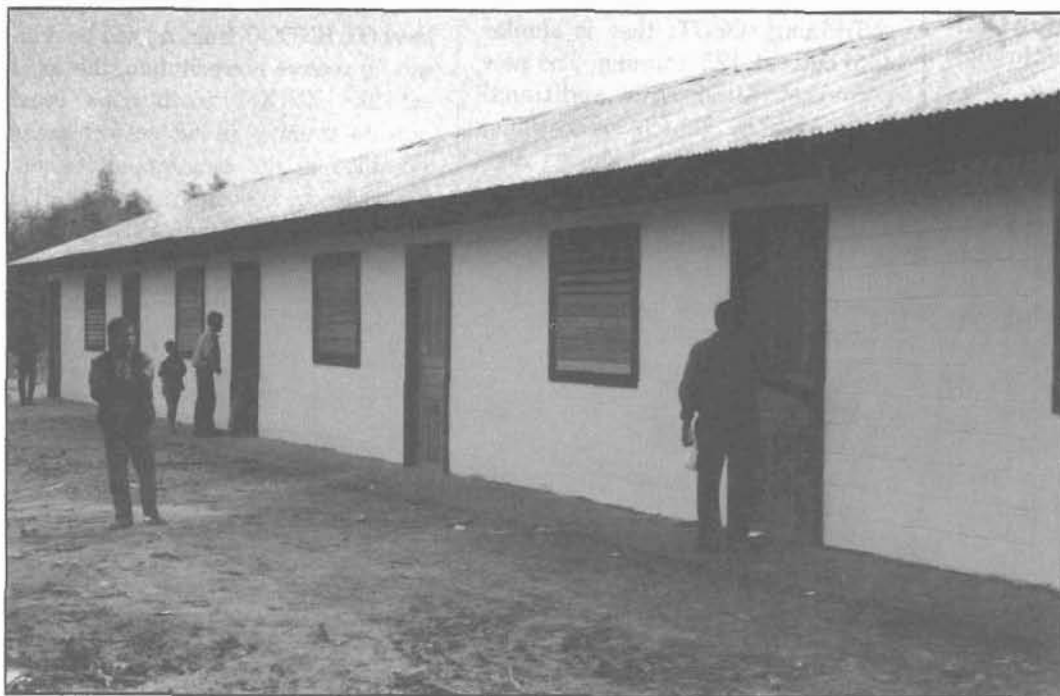
A significant challenge was placing more than 60 cubic yards of concrete with only two small mixers and ten men. In the hot climate of Laos, concrete sets quickly, requiring a fast placement rate. Both mixers were operated simultaneously to maintain an adequate rate. This taxed the stamina of the soldiers, who had to repeatedly lift 110-pound bags of cement to keep the mixers charged. This operation required the use of the entire team, yet daily concrete placement never exceeded 15 cubic yards.

With limited equipment and repair parts, maintenance was critical. Loss of any equipment could have caused failure of the entire mission. Round-the-clock maintenance on all equipment was required to ensure continued operations.

Complicating the maintenance problem was the poor quality of fuel in Laos. The low-grade fuel caused fouling of the spark plugs and fuel delivery systems. Constant cleaning of engine systems was required to overcome the problem.

The small team was hit hard by personnel losses during the deployment. One soldier was lost due to an emergency leave, one was medically evacuated to Thailand because of illness, and three others contracted Dengue Fever. However, redoubled efforts on the part of the remaining engineers pulled the mission through.

(Continued on page 61)



The new schoolhouse in Xepon, Laos. Despite many difficulties with materials and the weather, the project was completed on time.

MOS Consolidation:

Its Time Has Come!

The consolidation of Career Management Field (CMF) 12 for combat engineers continues to be a major thrust in the Engineer School. Military occupation specialties (MOS) 12B, 12C, and 12F will consolidate into MOS 12B (Combat Engineer) beginning in the 3rd quarter of fiscal year 1994. This article supplements and updates information presented in previous issues of *ENGINEER* (April 1991 and February 1992).

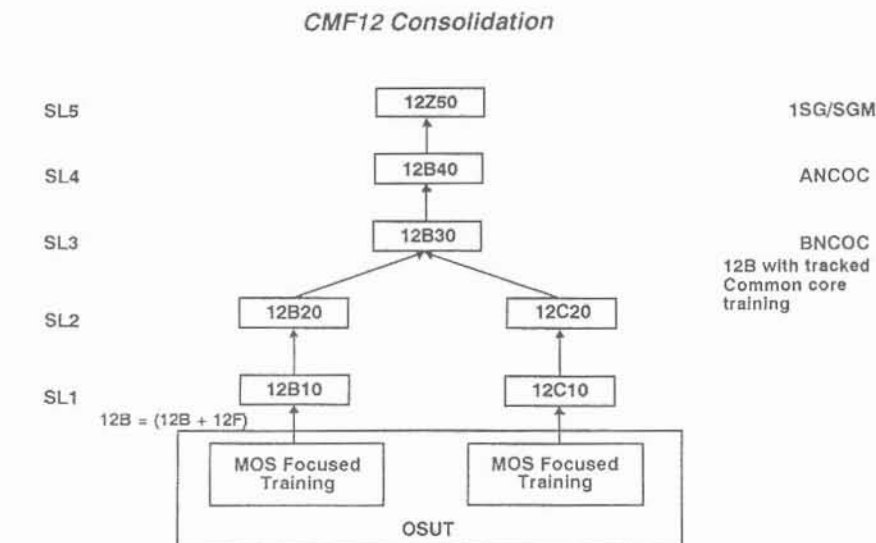
The final concept approved by MG Christman on February 11, 1992 will reduce the number of MOSs, improve upward mobility for soldiers in grades E-6 and E-7, and provide consistent promotion opportunities for all CMF 12 soldiers. Beginning in the 3rd quarter of FY 94—

- MOS 12B and 12F will become 12B at the initial entry level and will continue as 12B through all skill levels of CMF 12 (see figure).

- MOS 12C will track separately from the initial entry level through skill level 20. It will merge into 12B at skill level 30.

- MOS 12B will consist of all CMF 12 MOSs from skill level 30 through skill level 40.

Several time-consuming actions must occur before the consolidation can take effect. The Deputy Chief of Staff for Personnel Integration (DCSPI) (formerly the U.S. Army Personnel Integration Center, USAPIC), is the coordinating agency responsible for officially effecting and documenting changes to CMFs. The DCSPI process adheres to Military Occupation Classification windows and takes about 18 months to complete. During this process the DCSPI notifies the United States Recruiting Command (USAREC), who then implement a program to revise contracts, advertisements, and marketing used to recruit new



soldiers. Concurrently, course design and development efforts at the Engineer Center and the publication of Soldier Training Publications require almost a year to complete.

A plan is in place to ensure CMF 12 soldiers receive proper resident training:

- The 12B10 (12B and 12F) soldiers will receive One Station Unit Training (OSUT) that is similar to current 12B training. The new course will provide additional training in vehicle operations, with emphasis on vehicles normally found in mechanized combat engineer units.

- The 12C10 soldiers will track separately and receive OSUT training similar to their current program.

- At the 12B30 level, the Basic NCO Course (BNCOC) will include Common Leader Training, technical skill levels 1 and 2 refresher training, and skill level 3 training. The addition of refresher training on tasks NCOs were not responsible for before 12B, 12F and 12C

merged is the major change. The 12B30 BNCOC students will receive skill level 30 training on all bridging and combat engineering tasks taught in the resident course.

- The CMF 12 Advanced Course (ANCOC) will remain as it is today.

Because all MOSs merge at skill level 30, BNCOC training will be critical. To receive accreditation, the eight satellite BNCOC institutions must provide training in all subject areas identified in the program of instruction, without exception. Accreditation is the critical gate for this action.

The consolidation of CMF 12 will improve upward mobility for our engineer soldiers. Smart and efficient training will be critical to the success of the consolidation and to the on-going success of our soldiers and units. Engineer leaders must work together to make this happen. 

Captain Price is chief of the Course Development Branch, DOTD, at the Engineer School. He previously served with the 16th Engineer Battalion and the 20th Engineer Brigade.

Engineers Aid War on Drugs

By Sergeant Galen R. Putnam

Armed with dozers, graders and dump trucks, soldiers from the 39th Engineer Battalion (Combat) at Fort Devens recently played a vital role as part of the Department of Defense's (DOD) contribution to the President's National Drug Control strategy.

From July to October of 1991, the battalion's Alpha, Charlie and Headquarters Companies deployed to Arizona to build and upgrade border roads, and construct support facilities—such as helipads and training ranges—as part of Operation Borderline.

The large-scale operation, which falls under the auspices of Joint Task Force Six (JTF-6) (see

accompanying article, inset), has provided a badly needed service to law enforcement agencies in the region.

"The work that the 39th has done for us has been an absolute blessing," said Theo Hudson, intelligence officer for the Border Patrol's Tucson Sector. "The Border Patrol simply didn't have the funding, equipment or expertise to build the roads or facilities that the engineers have provided. To put it simply, the Army has changed the face of drug smuggling in these parts."

At first glance it may not seem like it, but the key to interdicting drug smugglers and illegal aliens

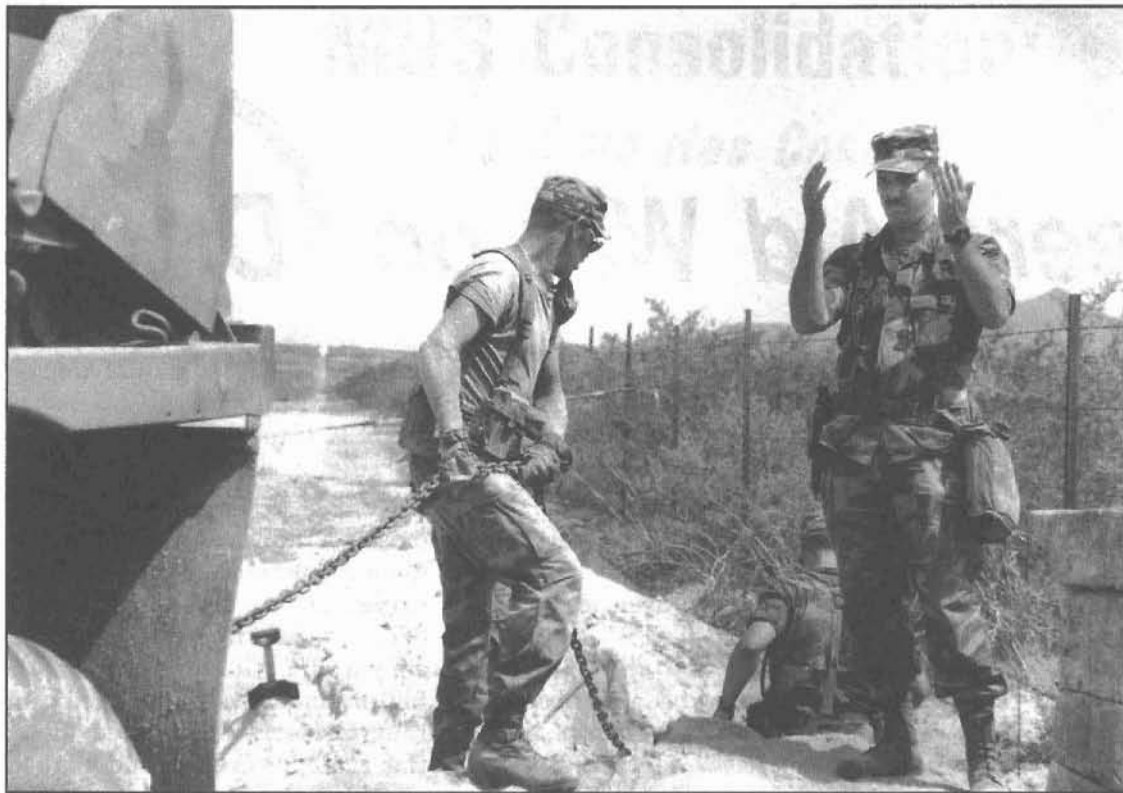
crossing the Mexico-Arizona border is a dusty road which has been carved out of the desert by the 39th. To the untrained eye, it's a simple dirt road; but it is a vast improvement over the rugged trail that formerly meandered along the rusted, three-strand barbed wire fence—often gaping with holes—which marks the international border.

The Border Patrol not only uses the now-negotiable road to patrol the expansive border with ease, but also to gather information on who or what has crossed the border.

"The border road is terribly important. It is the fundamental

For the 39th Engineers, the roadbuilding enemy was either choking dust or, as here, knee-deep mud. (Photo courtesy U.S. Border Patrol)





Charlie Company
First Sergeant
George J. Ruo
ground-guides a
5-ton truck
during culvert
construction.
(Photo by Galen
Putnam)

element in our intelligence-gathering effort. Everything else is based on that," said Hudson. The road tells us how much traffic is crossing and where. It's our number-one intelligence-gathering tool."

The road is dragged daily, much like a baseball diamond, in order to keep it smooth. When the Border Patrol detects vehicle tracks or footprints crossing the road, they not only learn where border crossings are taking place, they can estimate who crossed and when.

The idea is simple but effective, according to Hudson. "First of all, since we know when the road was last dragged, we can approximate when the crossing took place. When we examine the footprints, we can get a good idea of who crossed. For example, if a large number of people crossed and there are children's footprints, in most cases that will be a group of illegal aliens coming across the border. If there are only one or two sets of prints and they appear to be men's—but the steps are very short—that might indicate some-

one carrying a heavy load. That's how a lot of drugs are smuggled across the border. People simply carry as much across as they can."

By examining the footprints, the Border Patrol can estimate how many pounds of narcotics may have been carried across the border by multiplying an average-size load of 40 pounds by the number of suspect tracks found. Most importantly, however, freshly-made tracks can lead agents to those who have crossed illegally.

Through trial and error and sheer persistence, smugglers continue to search for ways to foil the Border Patrol, even going so far as to strap carpet or foam rubber to their shoes to conceal their tracks. Thanks to the new border roads, such tactics will become increasingly unproductive for smugglers. "They've got a lot of tricks up their sleeves," said Hudson. "But the improved road surface really gives us the upper hand."

Hudson points out that although the Border Patrol possesses an array of high-tech detection equipment—including motion

sensors and night-vision goggles—the road is still the most important tool they have. "That's an awful long border. We can't just place agents or detection equipment along the border at random," he said. "If we did that, we would spend 90 percent of our time chasing deer. By being able to determine where crossings are taking place, we best know where to place our resources."

Although it may seem to be easier to simply erect a solid barrier along the border, that can't be done for a number of reasons. "There is no way to keep people out," explained Hudson. "We don't have the money to build or maintain a Berlin Wall-type of structure along the border. Nor do we have the manpower to adequately man that type of structure. The border is just too long. We also have to take international relations into consideration. The border is a very sensitive issue."

With a wall out of the question, the Border Patrol is pleased with the additional interdiction capabilities the new road offers. "The

Army is doing an outstanding job, so good in fact, that I predict a 60 to 70 percent reduction in drugs coming across the border in the areas where the engineers have put in the new road," said Hudson.

While the border roads will be a boon to the Border Patrol, the other projects that the 39th worked on will be just as valuable. One of these projects is the recently completed Federal Law Enforcement Training Center range, built by the battalion's Headquarters Company in Marana, Arizona, near Phoenix. The range, which will be used by various law enforcement agencies, features a 30-point pistol range with 50, 25, 15, 7, and 3-yard firing lines—all with overhead cover. There is also a 360-degree, turn-and-shoot, combat-style range. A large support building was also provided.

In preparing the range, the company hauled, placed, and compacted more than 20,000 cubic yards of material. In all, that comes to approximately 2,850 dump truck loads of dirt. They finished the job in 30 days.

The importance of the mission which his soldiers performed wasn't lost on Lieutenant Colonel Kurt L. Kratz, commander of the 39th. "This isn't like an FTX or going to the NTC: you don't just leave and then assess how you've done afterwards," he said. "Here, we have actual customers who expected the Army to leave them with something they need."

While the emphasis was to provide support to others, the 39th reaped benefits as well. "We could have stayed in a hotel, rented our equipment, and worn yellow hard hats, but the Army and the taxpayers spend a lot of money to make sure that we can do our job under fire—with Kevlar on our heads," said Kratz. "You can't hire a contractor when bullets are flying. That's why we did it this way. This is the best possible training for an engineer battalion."



Alpha Company soldiers mark where they will place drainage tubes in a gulley. The large poles will support the tubes, forming a giant culvert. (Photo by Galen Putnam)

They are indeed training in a realistic environment—the only things missing are the flying bullets. "Home" consists of a small compound of camouflage-covered tents ringed with barbed wire. The "doorman" wears, not a tux, but full battle gear—and guests aren't welcome. At least the mess tent serves hot meals...sometimes.

The desert projects have also provided opportunities for many of the battalion's soldiers to try different skills.

"Since we don't have a great number of heavy equipment operators, we've cross trained many of our 12Bs. It's exciting for the guys to work on the heavy equipment," said Kratz. "Now they can step in and fill another important role if needed. That gives me tremendous flexibility as a commander and gives them a precious skill which is needed in the battalion."

Although the deployment has been challenging at times, Kratz



Soldiers from the 39th reinforce a dirt road after heavy rains damaged it. (Photo courtesy U.S. Border Patrol)

maintains that despite the hardships, it has been extremely worthwhile.

"This has been a tremendous learning experience," he said. "We took on a big mission and now I've got a lot of soldiers, NCOs and officers who will be leading battalions someday who have now seen that you can take something as big as this—and do it right! Something like this really makes you feel proud. Not only do we get great training, but we know that we are leaving something tangible behind."

Headquarters Company

Having perhaps the most diverse mission of the battalion's companies in Operation Borderline, Headquarters and Headquarters Company went from one extreme to the other, both in climate and projects.

Beginning in the mid-Arizona desert basin at Marana, the company encountered 115 to 120-degree Fahrenheit temperatures which forced them to work the "graveyard shift" while building the firing range.

"The elements presented a challenge, but the guys really pulled together and did a great job," said Captain Mark Morin, the company commander. "Of course, safety was a major concern because of the elements, but thanks to our NCOs, we've had an outstanding safety record."

After completing the range, the unit packed up and left the desert floor, heading 150 miles southeast—and 5,000 feet up—into the mountains near Naco, Arizona. There, the mission changed from vertical construction to road-building.

Said Morin, "The company adjusted well. Really, it's just like taking a hammer and pounding in an eight-penny nail, then switching to a ten-penny nail. The hammer is adaptable to both jobs."

While building 6.2 miles of border road near Naco was the crux of the company's job in the mountains, it was also tasked to fabricate 24 cement abutments for cattle guards, erect 300 feet of fence at the Naco Border Patrol Station, and wire and install a lighting system at the Douglas, Arizona, Bor-

der Patrol Station.

"The soldiers have done an outstanding job," said First Lieutenant Mark Guevara, company executive officer. "They are very proud of the job they did, because they know it's a real-life mission. They know that the contribution they made will help save lives and stem the flow of drugs into the United States."

Despite the work load, the spirits of the soldiers remained high. Said Specialist Darrel J. Freund, a heavy equipment operator, "The guys have done an excellent job, as good or better than any civilian contractor can do."

Alpha

During the project, Alpha company had been bivouacked on the outskirts of Nogales, Arizona, about a one-hour drive southwest of Fort Huachuca. The company's mission: build two roads and a weapons training facility.

The roads—one a border "drag" road, the other an access road to the training facility—totaled more than nine miles. Along the way,

the engineers had to install 19 culverts, five fords, and seven cattle guards.

The training facility, which will be used by the U.S. Customs Service and regional law enforcement agencies, consists of a 100-meter rifle range with overhead cover, three 50-meter pistol ranges with overhead cover, and a support building with classrooms and latrines.

"Things went very well and everybody had adapted well to the field," said First Lieutenant Allen Brannan, company executive officer. "...what we did is such a shot in the arm for the law-enforcement agencies who are fighting the war against drugs, the soldiers really dug in and did a great job. They put aside the hardships and concentrated on doing the best job they could. They really took pride in what they were doing."

That pride is particularly evident in the 90 percent equipment on-line rate, achieved despite the constant punishment the desert work inflicts. On top of that, they did it at their own on-site, makeshift motor pool—without engineer support from Fort Huachuca.

"You can't get the job done if you don't have the equipment to do it," said Brannan. "The maintenance guys have really done a great job. They've really kept us ahead of the game."

When it comes to building roads, however, getting the equipment into operational condition is only the beginning. It takes qualified heavy equipment operators to get the mammoth graders, rollers, dump trucks and other vehicles into the field to get the job done. Since the 39th is a combat engineer battalion, one asset they lack is a surplus of heavy equipment operators—a problem they solved through cross training.

"We did a lot of cross training," said Brannan. "We got a number of our combat engineers trained and working on heavy equipment, which is something they rarely, if ever, get a chance to do. It was a good learning experience for everybody."

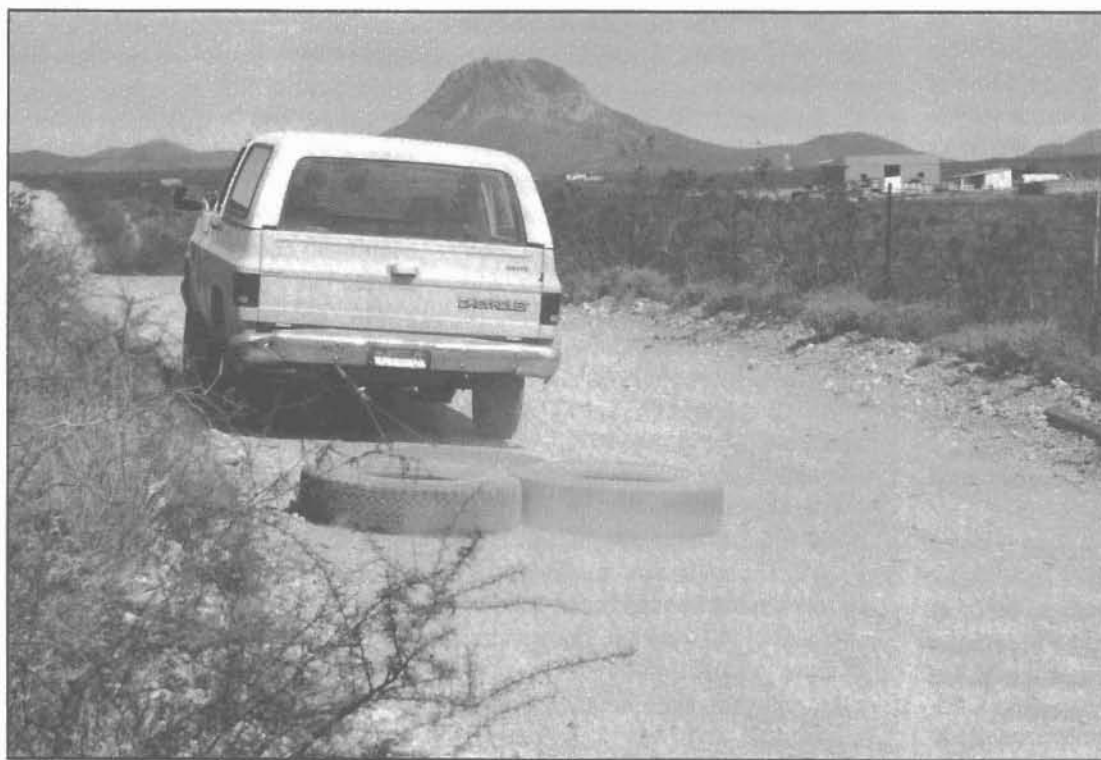
Charlie

In contrast to the hilly, almost lush terrain near Nogales,

where Alpha Company worked, Charlie Company found itself working along a long, straight, dusty, and lifeless stretch of border road. Besides fellow soldiers and equipment, the only other things around for miles were scrub brush, a few birds, and an occasional whirlwind.

The engineers of Charlie Company began their mission near Douglas, Arizona, about an hour-and-a-half drive southeast of Fort Huachuca. Their task was to upgrade 27 miles of border road, heading west from Douglas toward Naco. Along that stretch, they installed 18 cattle guards, 10 culverts, and eight fords. The unit was also tasked to construct a 60-by-60 foot concrete helicopter pad with marking lights and wind-sock, a grounding rod tiedown system, and a 150-foot sidewalk for the Border Patrol.

Challenges included rains that washed out portions of newly completed road. "We were flexible from the start, so the rains really didn't set us back at all," said company commander Captain Tom Anhut. "We turned it into a



A Border Patrol vehicle smooths a border road. The next morning, footprints across the smooth dirt will indicate a likely illegal crossing. (Photo courtesy U.S. Border Patrol)

learning experience so, in a way, it was actually beneficial."

After completing the work near Douglas, Charlie packed up and relocated to Naco, where they started work on another stretch of border road. Here, the mission was to head west to meet Headquarters Company, which was upgrading the road in an easterly direction from their location in Palominas.

"This was a great training opportunity for the company," said Anhut. "Being 2,500 miles from home in the field for two-and-a-half months gave us an unparalleled chance to evaluate our young leaders and for them to show what they can do."

Despite the grueling work and the length of the deployment, many of Charlie's soldiers remained upbeat, and said they were glad to make a contribution to the war against drugs.

On a job site during the deployment, Corporal James Conley, an engineer mechanic, perhaps summed up the Operation Borderline for the soldiers of the 39th: "Being down here is for a good purpose, a good cause. Even though this is keeping me away from my family, it's worth it to me because I'm so much against drugs. Most of the guys here feel the same way—especially guys with kids. We don't want our kids to be exposed to drugs, and this is just one way that we can help make sure that it won't happen."

Sergeant Putnam is a photojournalist assigned to the U.S. Army Intelligence School, and is stationed at Fort Devens. He is a graduate of the Department of Defense Information School's photojournalist and editor courses.

Sergeant Putnam's article is reprinted with permission from the Fort Devens post newspaper, The Dispatch.

JTF-6 and the War on Drugs

By Colonel George A. Woodbury

Joint Task Force Six (JTF-6) was established in November 1989 at the direction of the Secretary of Defense. Its mission is to employ forces and conduct training in support of federal, state, and local law enforcement agencies throughout the Southwest border region in order to help counter the flow of illegal drugs into the United States.

That mission is no small undertaking. The Task Force's area of operations includes the four border states of Texas, New Mexico, Arizona, and California—a land area of more than 600,000 square miles.

JTF-6 is headquartered at Fort Bliss, Texas, and is under the control of an Army brigadier general. The headquarters staff is responsible for the planning and coordination of all military support requested by law enforcement agencies. If operational support is appropriate, the task force identifies the unit which will provide the support, ensures the unit is operationally ready to deliver the support, and exercises control of the unit conducting the mission.

During its first year of operation, JTF-6 planned and coordinated more than 200 requests for support from 30 different federal, state, and local law enforcement agencies. To date, that figure has grown to more than 525, in support of more than 180 different law enforcement agencies.

Support provided to law enforcement agencies included engineer construction and repair, ground reconnaissance and surveillance, terrain denial, transportation, sensor and signal interception, the training of law enforcement officers in military related skills, and the loan of

military equipment and personnel.

Engineer support to drug law enforcement agencies presents some unique challenges. In addition to providing coordination between the requesting agency and Army units, the JTF-6 staff engineer must also ensure that the Army meets all provisions of the various environmental laws. These include the National Environmental Protection Act, the National Historic Preservation Act, the various Threatened and Endangered Species Acts, the Native American Graves Protection and Repatriation Act, the Native American Religious Freedom Act, and AR 200-2.

Compliance with these laws is coordinated through the four Army Corps of Engineer Districts that cover the border states. In addition, rights of entry must be obtained from all affected landowners, memorandums of agreement developed for state and public land access, and applications made for Section 404 (Clean Water Act) permits.

Finally, the requesting agency must pay for materials required for the mission. The engineer staff assists them with developing a bill of materials, contracting, and in some cases, even locating funding.

The assistance process begins with a support request forwarded from the requesting drug law enforcement agency to Operation Alliance. Alliance, collocated with JTF-6, is a coordinating agency manned by representatives of the various federal, state, and local drug law enforcement agencies.

Operation Alliance reviews the request and forwards it to JTF-6. The staff engineer receives the request and coordinates a site visit for an

initial assessment. These engineering assessments are frequently farmed out to units possessing the required capability (horizontal or vertical), or to Engineer Officer Advanced Course students during their seventh and eighth weeks of training.

Once completed, these estimates provide the planning details needed by JTF-6 to determine if the work can be performed by military engineer units. Before a mission can be accepted for execution, it must provide mission essential task list training for the unit, provide a benefit to the nation's counter-drug effort, and the requestor must be able to provide the necessary funds for materials.

A successful initial site visit leads to a follow-on detailed site visit by members of the Army unit most likely to be assigned the project. Following the initial site visit, all of the various environmental studies, agency coordinations, and real estate actions are also initiated. During the follow-on site visit, a bill of materials will be developed for the customer's review. It will provide the unit the information it needs to prepare a detailed operations order.

Needless to say, this can be a complex, torturous process which can be easily halted along the way by environmental concerns, uncooperative landowners, or the discovery of archaeological sites. During the past year, JTF-6 has discovered more than 140 previously unknown historical sites, more than half of which were eligible for inclusion in the National Register of Historic Places. Projects had to be designed to avoid any impact to these sites. Likewise, the task force has discovered a number of threatened and endangered species along the border.

In the end, it has all proved exceptionally rewarding. Engineers have improved nearly 200 miles of border roads, constructed seven ranges,

several operations centers, seven helipads, listening and observation posts, boat launch ramps, eight miles of border fence repair, and numerous other projects.

The road projects have increased access to the border, reduced response times to triggered sensors, reduced wear and tear on vehicles, and contributed to over \$100 million worth of drug seizures. The fence project in California has increased drug seizures by 154 percent, illegal alien arrests by 228 percent, and reduced incidents of vehicle damage due to rock throwing from 352 in 1990 to less than 20 in 1991. The project also reduced crime in neighboring communities by more than 40 percent. Additionally, the law enforcement agencies have been appreciative, Army soldiers receive excellent training, and taxpayers are saving money.

To date, support has been provided by Army, Marine, and Navy units, both Active and Reserve Components. The participating Army units include the 39th Engineer Battalion, 52nd Engineer Battalion, 34th Engineer Battalion, 46th Engineer Battalion, 43rd Engineer Battalion, 30th Engineer Battalion, 92nd Engineer Battalion, 244th Engineer Battalion, 62nd Engineer Battalion, and the 37th Engineer Battalion. The chance to improve military skills while supporting law enforcement officials is providing unique challenges and unrivaled opportunities to the soldiers, sailors, airmen, and Marines working for JTF-6.

Acting under Congressional authority—while complying with a long-standing legal tradition of non-interference in civilian law enforcement—the military has been able to provide responsive, quality support to the anti-drug effort. And JTF-6 and Army engineers are playing a critical role in the national effort to secure a drug-free America.

Colonel Woodbury is chief of engineers for JTF-6.

(Continued from page 53)

Despite the unexpected problems, from poor weather to substandard materials, the mission was a success. By working from daybreak until early evening every day, the school was completed in 29 days. It was formally turned over to the government in a dedication ceremony on November 19. This turnover date met the original completion milestone established prior to any construction delays.

The cost breakdown for the Xepon schoolhouse mission includes:

Equipment	Cost
Deployment (Military Airlift Command)	\$50,000
Retrograde (Military Airlift Command)	13,000
Personnel	
Per Diem	15,000
Travel	13,000
Materials and Service	
Lumber	2,100
Hardware	6,800
Block	1,700
Sand & Gravel	450
Lime	100
Land Clearing (Dozer)	600
Plywood	1,100
Gas	650
Caulk	200
Truck Loading Labor	850
Truck Transportation	9,300
Water Truck Rental	2,600
Currency Conversion	250
Total	\$117,700

Conclusion

The Xepon mission was a complete success. The engineer training was first-rate, and the Army served an important role in fostering good relations with Laos. But in this small part of the "everybody-wins" nation assistance program, the real winners are the children of Xepon.

First Lieutenant Cole is a platoon leader with Charlie Company, 84th Engineer Battalion. He previously served as a staff officer for the 25th Infantry Division's assistant division engineer. He is a graduate of West Point, and the Engineer Officers Basic Course.

Observations From Just Cause

By Captain Gordon J. Taras

While the "lessons learned" spotlight remains on Desert Storm, valuable observations are still being gleaned from Operation Just Cause in Panama.

The Engineer School has collected the comments of soldiers who participated in the operation, and the information is now being evaluated for use in updating engineer doctrine. However, many of their observations can be used now by engineer leaders.

This article will provide some of the engineer experiences and recommendations that resulted from Just Cause. These observations should be helpful in preparing units for rapid deployment, direct combat, and civil-military operations.

Are You Prepared To Go?

A continuing problem in all deployments is a shortage of airframes. Most units have standing operating procedures (SOPs) specifying a light package of equipment. However, during a

hectic deployment, it is sometimes difficult to convince the maneuver commander that engineer equipment also needs to have some measure of priority. Make sure that engineer assets are included in battalion/task force plans for deployment, and are prioritized by the mission essential task list (METL). Mass is usually the governing factor in load planning, but engineer-assisted maneuver and sustainment are also critical tasks.

Sleep is always an issue, both during realistic training and actual combat. It's important to plan for lack of sleep so soldiers can mentally prepare themselves to cope with it. In other words, it's a lot easier for soldiers to accept that they will get no sleep in the next 48 or 72 hours, than to be left wondering if a sleep plan is in the works.

There's a lot going on during a deployment—but there will be a lot more happening once your soldiers hit the combat zone.

To give more time to your soldiers, try not to "over brief." Concentrate briefings on your soldiers'

area of operations and area of interest. It's an unnecessary distraction and waste of time to track every action in the theater of operations. Better that they get some rest while they can—or at least have the peace of mind to know what level of fatigue they will have to cope with.

Are You Prepared To Fight?

After the operation, some soldiers said they needed more training in combat skills. The first of these is MOUT (military operations on urbanized terrain) training. Cities are the centers of transportation and government. They are also the ports of entry for your resupply. During a rapid deployment situation like Just Cause, these are the first places that must be secured. Make sure MOUT training is included in your training schedule. Also, don't forget that MOUT operations are often complicated by the presence of civilians. Try using some of your soldiers as mock civilians during MOUT training.



Combat engineers place wire obstacles around the U.S. Embassy during Operation Just Cause.

Obstacles generally unique to MOUT combat presented unfamiliar tasks for some engineers. Cars, rubble, and trash often litter the MOUT environment. While these are addressed in FM 90-10 and FM 90-10-1, most MOUT training sites do not include these obstacles in training. Insist on realism during your unit's urban combat training.

One obstacle not mentioned in the manuals is chain-link fencing. Engineer units in Panama found that simple, garden-variety chain-link fence is a significant obstacle. One solution used under fire was Bangalore torpedoes placed vertically against such fencing.

Soldiers also felt tunnel clearance needed more training emphasis. The following are just a few tunnel clearance techniques, derived from *The Tunnels of Cu Chi*, by Tom Mangold and John Penycate:

- Enter a tunnel with a minimum of three soldiers
- Leave two soldiers at the entrance
- Keep five meters apart within the tunnel—or within sight each other
- Leave one soldier at each intersection
- Avoid using grenades and demo while in tunnels (explosives rob your oxygen)
- Exit with a visual signal (flag or rifle)—not your head
- Use infrared light with night vision goggles in tunnels

MOUT vehicle hardening also needed work, and Vietnam era lessons learned suggest the following:

- Line vehicle cabs with flack vests and sandbags (include

doors, windows, floorboards, and seats)

- Protect engines, drive trains, and tires with flack vests
- Protect troop compartments with sandbags
- Have a rear gunner in each vehicle

Soldiers also felt they needed to be more familiar with the effects of weapons on the MOUT environment, including:

- Wood frame structures
- Concrete block
- Mass concrete
- Sandbags
- Vehicles
- Chain-link fence
- Glass



An Army bulldozer takes part in clean-up operations after the main fighting was over.

Are You Prepared To Stay?

Initial assault forces should not expect early relief by follow-on units. If the initial combat actions are successful, units will transition to stability operations. Combat engineers will perform civil assistance tasks as soon as the fighting winds down. These tasks include:

- Repair airfields (also a combat task)
- Restore power, water, and sewage systems
- Remove trash
- Clear combat debris from roads
- Provide facilities and utilities to civil relief organizations

In supporting such operations, Just Cause engineers felt they

needed more experience in light vertical construction. Potential sources of vertical construction training include:

- Correspondence courses
- Troop construction
- Barracks maintenance
- Range facility improvement
- Soldier apprenticeship to the local DEH (Directorate of Engineering and Housing)

As follow-on engineer activities were initiated in Panama, units experienced a shortage of hand tools. Commanders should explore the possibility of purchasing hand tools at home station, and assembling tool kits for future deployments. These tools could be sent on one of the resupply pallets. Another option is to arrange to have a couple of your officers trained and authorized to serve as purchasing officers. On deploy-

ment, these officers could buy the needed tools and supplies.

Many leaders said their soldiers do not have enough training with unexploded ordnance. The Explosive Ordnance (EO) Reconnaissance Course can provide valuable training in this area. All explosive ordnance detachments offer this 40-hour certified course. All military policemen are required to attend the course—why not all engineers?

Graduates of the course are qualified to identify and mark all EO. In combat, they are authorized to destroy EO (in place) up to 90 millimeter. In Just Cause and Desert Storm, engineer units destroyed massive amounts of EO—but some mistakes were made. This course will give soldiers first-class training on EO and help prevent accidents. Of course, destruction of large ordnance and ammunition stockpiles should be left to EO detachments.

Just Cause operations also pointed out that commanders of corps level engineer assets need to analyze their METLs for rapid deployment and low intensity conflict (LIC). In such operations, initial battlefield requirements call for small team missions over wide areas. This is primarily because immediate combat tasks are a higher priority than sustainment tasks.

As the battle settles and brigades start planning for follow-on missions, corps level assets will be relieved from attachment to forward combat units. These assets will then be allowed to reorganize for platoon and company missions. However, there will still be a need for small slices of equipment. Commanders must train junior leaders to expect—and cope with—a wide variety of missions.

The Engineer School, in coordination with the Center for Army Lessons Learned, is now addressing many of these issues by updating doctrine, training, and equipment. Engineers having additional comments or suggestions should send them to: The Engineer School, Directorate of Evaluation and Standardization, ATTN: ATSE-ESA (Captain Taras), Fort Leonard Wood, MO 65473, or call DSN 676-5317 or (314) 563-5317.



Captain Taras is an evaluation officer with the Engineer School's Directorate of Evaluation and Standardization. He previously served as a liaison officer, division tactical command post engineer, and platoon leader in the 101st Airborne Division. He is a graduate of the Engineer Officers Advanced Course. He received his commission from West Point.

Engineer School Directory



Commandant

MG Daniel W. Christman
ATSE-Z
DSN 676-6116
(314) 563-6116

Engineer Center Command

Sergeant Major

CSM Richard N. Wilson
ATZT-CG-SM
DSN 676-6149/6151
(314) 563-6149/6151

Assistant Commandant

BG Joe N. Ballard
ATSE-AC
DSN 676-7117
(314) 563-7117

Deputy Assistant Commandant

COL Henry S. Miller, Jr.
ATSE-DAC
DSN 676-6330
(314) 563-6330

Directorate of Training and Doctrine (DOTD)

Director

COL Robert N. Martin
ATSE-TD
DSN 676-7740
(314) 563-7740

Sergeant Major

SGM Donald E. Rasmus
ATSE-TD
DSN 676-7528
(314) 563-7528

Directorate of Evaluation and Standardization (DOES)

Director

LTC(P) William T. Maddox
ATSE-ES
DSN 676-5270
(314) 563-5270

NCOIC

MSG Archard Uttley
ATSE-ES
DSN 676-5310
(314) 563-5310

Directorate of Combat Developments (DCD)

Director

COL Frederick J. Charles
ATSE-CD
DSN 676-7955
(314) 563-7955

Sergeant Major

SGM Serbrepster Hewitt
ATSE-CD
DSN 676-7880
(314) 563-7880

Department of Instruction (DOI)

Director

COL Charles R. Huggins
ATSE-DI
DSN 676-5683
(314) 563-5683

Sergeant Major

SGM Audley G. Hendon
ATSE-DI
DSN 676-5752
(314) 563-5752

Engineer Personnel Proponency Office (EPPO)

Director

LTC R. O. Buck
ATSE-EP
DSN 676-6337
(314) 563-6337

Sergeant Major

SGM John Cooper, Jr.
ATSE-EP
DSN 676-5354
(314) 563-5354



ENGINEER UPDATE

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

Directorate of Training and Doctrine (DOTD)

MOS 52E Self-Development Tests (SDT). The FY 93 SDT will test only the Soldier Training Publication (STP) tasks in subject areas 1, 2, 3, 4, 5, and 22. These subject areas and tasks are in the three 52E STPs dated August 1988. Questions will be taken from the references listed at the end of the task summaries. All organizations with 52E NCOs should ensure their library includes these references. POC is Jim Evans, -7510.

Preliminary Self-Development Test Scores (SDT). Analysis of Army-wide scores on the SDT show that NCOs are scoring significantly lower on the Training segment than on the Leadership and MOS Specific segments. While no engineer soldiers' scores were available for comparison, NCOs may want to spend more time preparing for the Training part of the SDT. POC is Jim Evans, -7510.

Combined Arms Training Strategy (CATS). Engineer unit CATS is scheduled for distribution as a special publication in May. Units are requested to use their respective strategy and provide feedback to DOTD on DA Form 2028 before September 30. ARTEP 5-402-33 (Engineer Brigade and Group Headquarters), the first MTP to incorporate CATS, will be fielded in the 3rd quarter of FY 93. POC is CPT Frank Barry, -7594.

Directorate of Combat Developments (DCD)

AN/PSS-12 Hand Held Metallic Mine Detector fielded. Distribution of the new AN/PSS-12 hand held mine detectors began on March 20, 1992. The U.S. Army Troop Support Command has awarded a contract to purchase the Schiebel mine detector, which will replace the aging AN/PSS-11 model. The first units equipped will be the 27th, 37th, and 307th Engineer Battalions, Fort Bragg; the 13th Engineer Battalion, Fort Ord; and the 326th Engineer Battalion, Fort Campbell. POC is SFC Michael Craig, -7993.

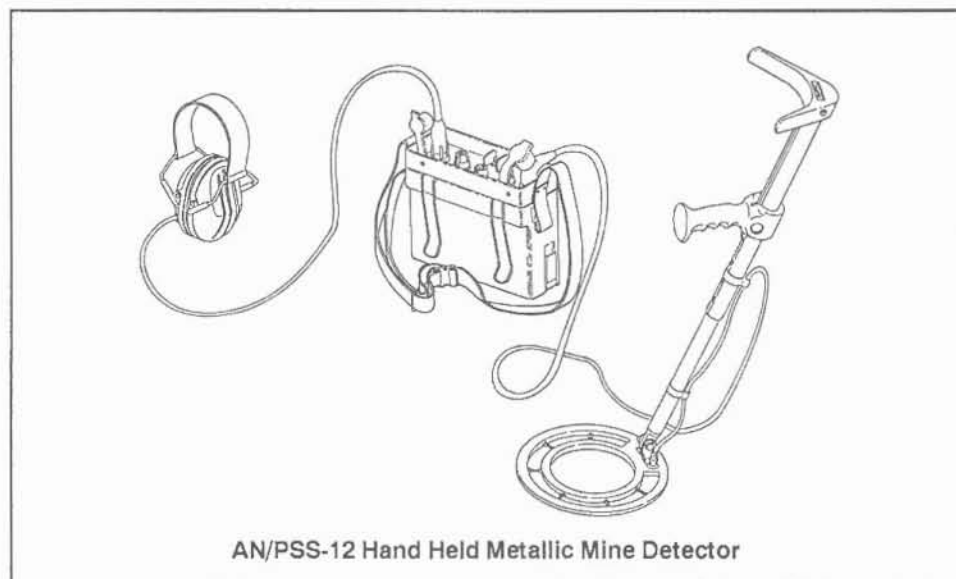


Illustration by Richard vonHeeger

MICLIC/Tracked Trailer Upgrade. The U.S. Army Tank and Automotive Command has accepted the first three tracked trailer kits that will be used to upgrade modified M200 trailers. The 24th ID (mech), the first unit to be equipped, is scheduled to receive their upgraded trailers by May. Other units scheduled to receive the tracked trailers are (in order of priority) the 1st Cav Div, 3d ACR, 3d ID (mech), 1st AD, 11th ACR, V Corps, 2d ID, and 1st ID (mech). Additional tracked trailers will be designated for the Engineer School, the Ordnance School, and the National Training Center, Fort Irwin. POC is CPT Jon Siltala, -7323.

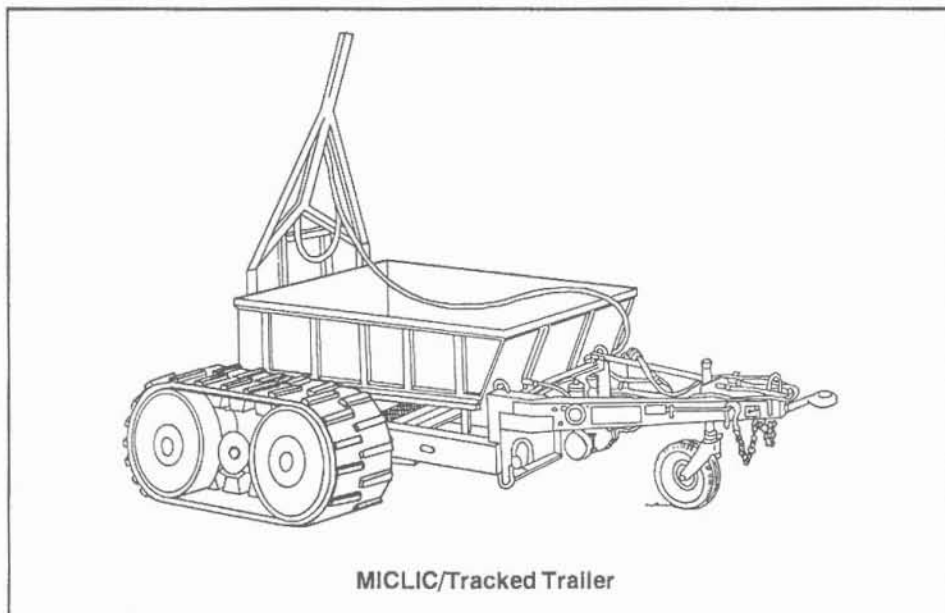


Illustration by Tammy Morris

Field Assistance in Science and Technology (FAST) Program. Field Commanders can use the FAST program to get solutions to technical materiel problems. The program provides a link between soldiers in the field and scientists and engineers in the Army's research, development and engineering centers. In its 5 years of existence, the program has documented many successes, including development of a gun tube exerciser for tanks in storage. For information, call your science advisor or FAST Headquarters at DSN 354-5482, or (703) 664-5482. POC is Merrill Stevens, -7500.

Systems Engineering. The Engineer Center makes every effort to purchase equipment and field systems that are dependable, easily maintained, and free from hazards to operators and maintenance personnel. But no system can be designed for every possible environmental condition or operational scenario. We need feedback from field personnel about problems encountered on the job. Report potential hazards or design flaws in engineer equipment to your Safety Engineer (-7346) or Reliability Engineer Team (-7969/7976). Your input will be incorporated into the design process for a new system, or used to develop countermeasures to fix the problem. POC is Mark Totzke, -7346

Department of
Instruction (DOI)

Unit Designation Terminology Changes. Unit designations have changed as a result of the Engineer Restructure Initiative (ERI). Field Manual (FM) 101-5-1 (*Operational Terms and Symbols*, dated 1985) will be updated when FM 100-5 is rewritten in 1993. Until the revised FM 100-5 is available, field units should use the following unit designations:

Division engineers (DIVEN) units:

Sapper battalion (put type of unit)
Sapper company (put type of unit)
(Unit types are: armored, airborne, airassault, light)

Corps engineer units:

Combat engineer battalion (put type of unit)
Combat engineer company (put type of unit)
Combat support equipment company
Bridge company (put type of unit)
(Unit types are: mechanized, wheeled, ribbon, MGB)

The term "Armored" replaces "Heavy" in maneuver unit designations (TRADOC PAM 525-5, 1 August 1991, page 10). We now have armored battalions, light battalions, and armored/light operations. POC is MAJ Kenneth Dobbins, -5802.

River Crossing Terminology Changes. The Combined Arms Center has agreed on terminology for FM 90-13, River Crossing Operations. The manual is scheduled for distribution in the 4th quarter of FY 92. A river-crossing operation will have four phases: Advance to the river, assault crossing of the river, advance from the exit bank, and secure the bridgehead line. Three forces will be involved:

Bridgehead force - responsible for seizing and securing the bridgehead.

Support force - responsible for providing direct and indirect fires to the bridgehead force and controlling the crossing area.

Breakout force - responsible for passing through the bridgehead to continue combat operations. POC is LTC Allan Carroll, -5807.

Doctrinal Writers Request Ideas. If you have a system, drill, or workable idea to share, send it to the DOI staff. Good ones may be included in future doctrinal field manuals. Send suggestions to U.S. Army Engineer School, Attn: ATSE-DI-TT, Fort Leonard Wood, MO 65473. POC is LTC Allan Carroll, -5807.

Engineer Personnel
Proponency Office
(EPPO)

Army Divers Needed. The Army is seeking volunteers for Military Occupational Specialty (MOS) 00B (Diver). Soldiers who qualify and graduate from the Navy Diving and Salvage Training Center will be assigned to Engineer Diving Detachments. These detachments provide specialized underwater support for all missions in the Army theater of operations and are presently located in Europe, Panama Canal Zone, Korea, and Fort Eustis, Virginia.

Diving detachments are capable of diving operations involving scuba (self-contained underwater breathing apparatus) and deep sea surface supplied air equipment. Due to the hazardous operating environment, divers receive

an additional \$110 special pay. To apply, soldiers must comply with criteria outlined on the Marine Diver Training Application (DA Form 5030-R, Nov 90). For more information, call the Army Liaison Office, Naval Diving and Salvage Training Center, DSN 436-5261. POC is SFC Don Eelman, -5706.

DA Pam 600-3 Revised. Publication of the revised DA Pam 600-3, "Commissioned Officer Development and Career Management," is scheduled for the 4th quarter of FY 92. The updated pamphlet will clearly define the standards of qualification at each grade, delineate key branch assignments in addition to the traditional "command track," and illustrate typical Reserve Component developmental patterns and requirements. POC is LTC Buck, -6337.

EOAC-RC Program Changes. The Engineer Officers Advanced Course-RC (EOAC-RC) will change from four phases to two phases in October 1993. Effective October 1, 1992, officers will be unable to enroll in the four-phase EOAC-RC program. Officers currently enrolled will have until September 1993 to complete any remaining phases of the four-phase program. Those who fail to do so will be required to take the new two-phase course. This means that work done in the old course cannot be carried forward to the new course.

The new EOAC-RC will consist of Phase I, Correspondence; and Phase II, Resident. Officers must be at least a first lieutenant to enroll, and will have two years from the date of enrollment to complete the work. The new course is designed so that knowledge gained during the correspondence phase will be reinforced by practical exercises conducted in the resident phase.

Enrollment for Phase I (Correspondence) of the new course will begin in January 1993. Phase I will contain 120 hours of correspondence studies and will be a prerequisite for attendance at Phase II.

Training for the new Phase II (Resident) EOAC-RC will begin in October 1993. Phase II will be two weeks of resident training at the Engineer School.

The Army Correspondence Course Program (ACCP) catalog, DA PAM 351-20, and the Army Training Requirements and Resources System (ATRRS) will be updated to reflect the new course requirements.

POC is COL Shoff, -6336.

Engineer RC Weekend Refresher Classes Cancelled. The Engineer School will not conduct engineer RC weekend refresher classes in FY 92. Those refresher topics generally are available to the RC through their respective Readiness Group or Engineer Team.

A 5-day engineer staff refresher course will be taught at the Engineer School on September 14-18, 1992. Units can obtain seat quotas for this course by calling the Deputy Assistant Commandant-RC office (Ms. Holland) at -7742/6336. Address questions concerning course content to the Department of Instructions (CPT Singleton), -5747. Address questions concerning Reserve Component Configured Courseware (RC³) to the Directorate of Training and Doctrine (MAJ Davison), -7522. POC is MAJ Davison, -7522.

Reserve Component (RC)

Corps Rebuilt Greek Infrastructure

"to help friendly nations help themselves"

By Dr. Paul Walker

When the U.S. Army Corps of Engineers has engaged in major international activities during the post-World War II era, it has used its district organization as a model to manage the work. The approach is firmly grounded on experience. The Corps' involvement in Greece between 1947 and 1949 set the pattern.

At the end of World War II, Greece stood in virtual ruin. During the Ger-

man occupation, which lasted until October 1944, the economy nearly collapsed. Allied bombing raids destroyed miles of railroads and devastated the major port cities of Salonika, Volos, and Piraeus. A combination of heavy military traffic and neglect left the country's highway network in a precarious condition. Then, as the Germans withdrew, they blew up bridges, highways, and portions of the 4-mile-long Corinth Canal, which

was a vital link between Athens and the Adriatic Sea.

British troops entered Greece and restored the monarchy as the Germans left, but conditions scarcely improved. A strong communist-led Greek underground had formed during the war, survived, and challenged supporters of the king. Unable to manage the situation, British officials informed the United States that they intended to withdraw by April 1, 1947.

The threat of civil war and the possibility of a communist takeover convinced President Harry Truman that America had to act quickly. In March the President asked Congress for \$400 million in aid for Greece and Turkey. "It must be the policy of the United States," he argued in what became known as the Truman Doctrine, "to support free peoples who are resisting attempted subjugation by armed minorities or by outside pressures." The primary way to accomplish this, he concluded, was "...through economic and financial aid which is essential to economic stability and orderly political processes."

Congress wasted little time. On May 22, President Truman signed an Interim Aid Bill establishing the American Mission for Aid to Greece (AMAG). Less than a month later, expanding on the principles of the Truman Doctrine, Secretary of State George Marshall proposed his plan for long-term economic recovery for all European nations. By spring 1948, the Marshall Plan was channeling dollars to Europe through the Economic Cooperation Administration. Some of the money supplemented AMAG funds for Corps projects already underway.

To address the immediate crisis in



Corps of Engineers projects in the Grecian reconstruction program, 1947-1949. (Map reprint from 1949 *Military Engineer*)



The Dredge *Poseidon* (right center) at work clearing the Corinth Canal. (Photo courtesy USACE Office of History, Research Collection)

Greece, AMAG focused on restoring the ports and transportation system. As word spread in late spring 1947 that the program would include construction projects, the State Department received nearly 100 inquiries from interested American firms. Lacking experience in contracting and construction, the State Department sought advice from the U.S. Army Corps of Engineers, an agency with a proven record in contracting and construction management.

AMAG's Reconstruction Division and the Corps weeded the list of qualified contractors down to 26 but agreed that joint ventures would be the most effective approach. The two organizations cooperated closely during contract negotiations, and two contracts were finally awarded. The J. Rich Steers Company and Grove-Wilson-Shepherd and Kruege, as the joint venture Steers-Grove, would reconstruct port facilities and clear the Corinth Canal. Guy F. Atkinson Company, Johnson-Drake and Piper,

and Starr-Park and Freeman, as the joint venture Atkinson-Drake-Park, would reconstruct highways, railroads, railroad bridges and tunnels, and airfields.

When State Department representatives met with the Office of the Comptroller General, they discovered that these contracts required an extensive construction organization and numerous accountants to provide the required level of oversight. They concluded that administering and supervising the contracts was also a job for the Corps of Engineers.

To manage the construction program, the Corps used its proven district organization, including some seven area offices. The Grecian District, with headquarters in Athens, was organized as part of the North Atlantic Division on August 1, 1947. The district drew personnel largely from existing Corps organizations. Colonel David W. Griffiths left his position as Galveston District commander to become the district engineer in Athens.

District personnel went to work immediately with contractor personnel and the Greek Ministry of Public Works. The contractors successfully recruited Greek nationals but had difficulty attracting American contract supervisors because of the unstable political conditions in Greece. At the peak of the recovery effort, government and contractor forces totaled 629 Americans and 12,131 Greeks.

The reconstruction program initially was scheduled to be completed in one year, and a demobilization plan was in place early. However, guerrilla activity, unusually severe winter weather, and additional new projects resulted in extensions through March 1949. Real and threatened guerrilla attacks were a major problem that resulted in about 214 incidents involving loss of life and construction time. Contractors also had difficulty obtaining equipment and supplies. They amassed the necessary materials—more than 5,200 pieces at the peak of construction—by combining

items procured in the United States and Greece with items loaned by the Greek government.

The first reconstruction project was at Piraeus, a key port city that served as Athens' harbor. As elsewhere, damage there had resulted from a combination of intense British and American air raids and calculated demolition by retreating German forces. Germans destroyed or damaged most of the 3,300 meters of concrete quay walls and used machinery, steel girders, and debris to block key points in the harbor. Gone were a grain silo, conveyor system, warehouse, and equipment which served the port.

Steers-Grove, with the Knappen Engineering Company as consultants, began repairs on November 18, 1947. By December 1948, they had reconstructed 2,100 meters of quay walls. In the same 11-month period they removed 16,000 cubic meters of debris and placed 4,674 cubic meters of concrete to make the port's two dry docks operational. Dredging was a cooperative effort. The Grecian District confined itself to the area around the quay walls, while the Ministry of Public Works dredged the rest of the harbor. Steers-Grove completed similar, but less extensive work at the ports of Volos and Salonika, on the Aegean sea in central and northern Greece.

The Corinth Canal presented one of the greatest challenges. Only 7 kilometers (about 4 miles) in length, the canal could save shippers about 200 kilometers on the trip from eastern to western Greece. Damage rendered by the retreating Germans was severe. Explosions triggered at two points dumped 645,000 cubic meters of earth and rock into the canal. Other debris included a duplex highway-railway bridge, 130 railroad boxcars, six locomotives, mines, and the 3,400-ton steamship *Vesta*, which had been wrecked and sunk in the canal. Lack of maintenance had affected the entrance breakwaters, and the channel was heavily silted.

Work to repair the canal began in October 1947. The silt and debris

removal effort required special equipment and had to be timed to support the overall excavation schedule. Steers-Grove used dredges, floating derricks, tugs, and dump scows in the cleanup effort. When full-scale traffic resumed in December 1948, a total of 321 ships carrying 58,838 tons of cargo cleared the waterway that month.

Atkinson-Drake-Park undertook road, bridge, and tunnel repair and eventually airfield construction. The highway networks presented a significant challenge. At the end of the war, most major highways were impassable. Ninety percent of the bridges and culverts had been destroyed. Contractors used nearly 30,000 tons of asphalt and more than 650,000 tons of aggregate to restore and surface 1,216 kilometers of highway. As district engineer Griffiths noted, the job was a worthy accomplishment "considering the mountainous topography, the unprecedented cold and snow...and the insecure conditions in all field areas." The Greek Ministry of Public Works simultaneously constructed highway bridges and secondary roads and later completed surfacing at several Corps projects.

Atkinson-Drake-Park was also responsible for reconstructing twelve steel railroad bridges, two tunnels, and a highway bridge. After this work was underway, the Greek Air Ministry requested that ten airfields be included in the Corps' contract. That effort involved new air strips and control towers as well as repairs and improvements to existing runways and administration buildings.

In Greece between 1947 and 1949, the Corps of Engineers played a significant role in carrying out the United States' initial post-World War II assistance programs involving direct economic aid. The goal was to rebuild the national infrastructure, which would provide the basis for economic recovery and political stability. Dedicated to containing communism, American policymakers believed the future of the entire

region was at stake.

While the engineers' work was only part of AMAG's total aid program, it was a most visible part that was appreciated for many years. Once Corps' contracts were completed, the district organization closed down. Thus the Corps demonstrated very early that it could put together an effective organization rapidly and disband it just as quickly.

Beginning in the early 1950s, the Corps returned to the Mediterranean region as part of economic aid and more ambitious military assistance and reimbursable programs. Over the ensuing decades this included programs in Saudi Arabia, Turkey, Iran, Pakistan, Afghanistan, and North Africa, as well as Greece. In nearly every instance the Corps employed many of the same approaches evident in their initial effort in Greece: use of the engineer district organization, provision of technical assistance in conjunction with economic aid, and training indigenous contractors and workers to perform as much of the work as possible. The total effort was designed to help friendly nations help themselves.

Today, the Corps is involved in numerous international activities in support of CINC South, the Department of State, the Agency for International Development, and Voice of America. The Corps does not possess separate program authorities and funding for international work, but stands ready when deemed appropriate to become involved in additional projects.

Dr. Walker is chief, Office of History, Headquarters, U.S. Army Corps of Engineers, Fort Belvoir, Virginia.

Sources:

Dod, Karl C., "Overseas Military Operations of the Corps of Engineers, 1945-1970," unpublished manuscript, Office of History, Headquarters, U.S. Army Corps of Engineers, Fort Belvoir, Virginia.

Griffiths, D.W., "Reconstruction in Greece," *Military Engineer*, XLI (July-August 1949): 252-257.



BRIDGE THE GAP

*By Command Sergeant Major Richard N. Wilson
U.S. Army Engineer School*

As Army leaders struggle with the build-down, many Noncommissioned Officers (NCO) are struggling with career decisions. Now more than ever, many NCOs are asking what they can do to remain competitive throughout their Army careers.

The promotion board for sergeants first class recently identified criteria used to select the "best qualified" candidates for promotion. An analysis of their selection process provides valuable insight into career planning and promotion opportunities.

The board used evaluation reports (NCOER) as a tool when selecting individuals for promotion. Concise, hard-hitting, factual ratings with bullet-type comments carried the most weight. For example, scoring 300 on the Army Physical Fitness Test (APFT) was a bullet of excellence. Conversely, vague, wordy, meaningless, or unsubstantiated ratings carried little weight and tended to penalize a soldier.

Senior raters' comments on an NCOER concerning the soldier's "potential" were a key factor in an assessment, but were included in only 50 percent of the records. However, a "nonconcurrence" by a reviewer adversely impacted a rating because of the higher rank and experience of the reviewer and because that option is seldom used.

Successful completion of appropriate Noncommissioned Officers Educational System courses was another key factor. Selection for a course indicated a soldier's potential, and graduation signaled competence. College credits were not a requirement for selection, but the presence (versus absence) of credits did become a factor. Given the Army's goal for post-secondary education, NCOs must show initiative through a program for self-development.

The board looked for leadership positions and compliance with DA guidance to clearly define responsibilities in terms of soldiers, material, equipment supervised, and special duties. An NCOER that adhered to this guidance provided a much stronger picture of the soldier's training and experience.

Several "show stoppers" that can effectively end or severely hinder a soldier's career were identified. These included failed skill qualification tests (SQT), exceeding weight standards, letters of reprimand, and misconduct offenses under UCMJ.

The board critically evaluated issues surrounding

values, ethics, and discipline in the NCO Corps. Recent incidents, especially those occurring in an NCO's present grade, affected the rating. The use and abuse of alcohol was the most damaging problem. Driving under the influence (DUI) was the detrimental factor that eliminated most otherwise fully qualified NCOs from the promotion list.

Inconsistent enforcement of standards was apparent in some records, and the board raised serious questions about the validity of "meeting height/weight standards" in accordance with Army Regulation 600-9. For example, records showed that some NCOs' height increased as their weight increased, and decreased as their weight decreased. Also, some photographs did not support the statement "meets body fat standards." This area needs fixing! NCOs *must* meet screening weight and body fat criteria and appear fit.

Photographs remain a powerful tool. Lack of a photograph, when coupled with questionable height/weight status, conveyed a negative impression and typically prompted an inquiry.

Physical fitness and weight control are areas where many NCOs need improvement. Analysis of promotion board decisions indicate that exceeding the standards for physical fitness benefitted an individual, while poor performance lowered the overall assessment.

The board recommends the following criteria for NCOs and their leaders: All newly promoted NCOs should serve 12 months in a leadership position and attend the next higher leadership school before being assigned outside their career management field. Also, special duty assignments should not exceed 4 years (i.e. drill sergeant, instructor duty, garrison staff, readiness duty, or back-to-back TDA assignments). After 4 years, these assignments become a detrimental factor, not an enhancing one.

Our ability to sustain a high-quality force during this period of diminished advancement opportunities is a challenge facing all combat arms leaders. We, as engineer leaders, can help meet this challenge by educating our NCO Corps about factors affecting their careers. We must guide and support our NCOs as they face the challenge of a smaller but more demanding Army.

DEPARTMENT OF THE ARMY

ENGINEER PROFESSIONAL BULLETIN

US ARMY ENGINEER SCHOOL

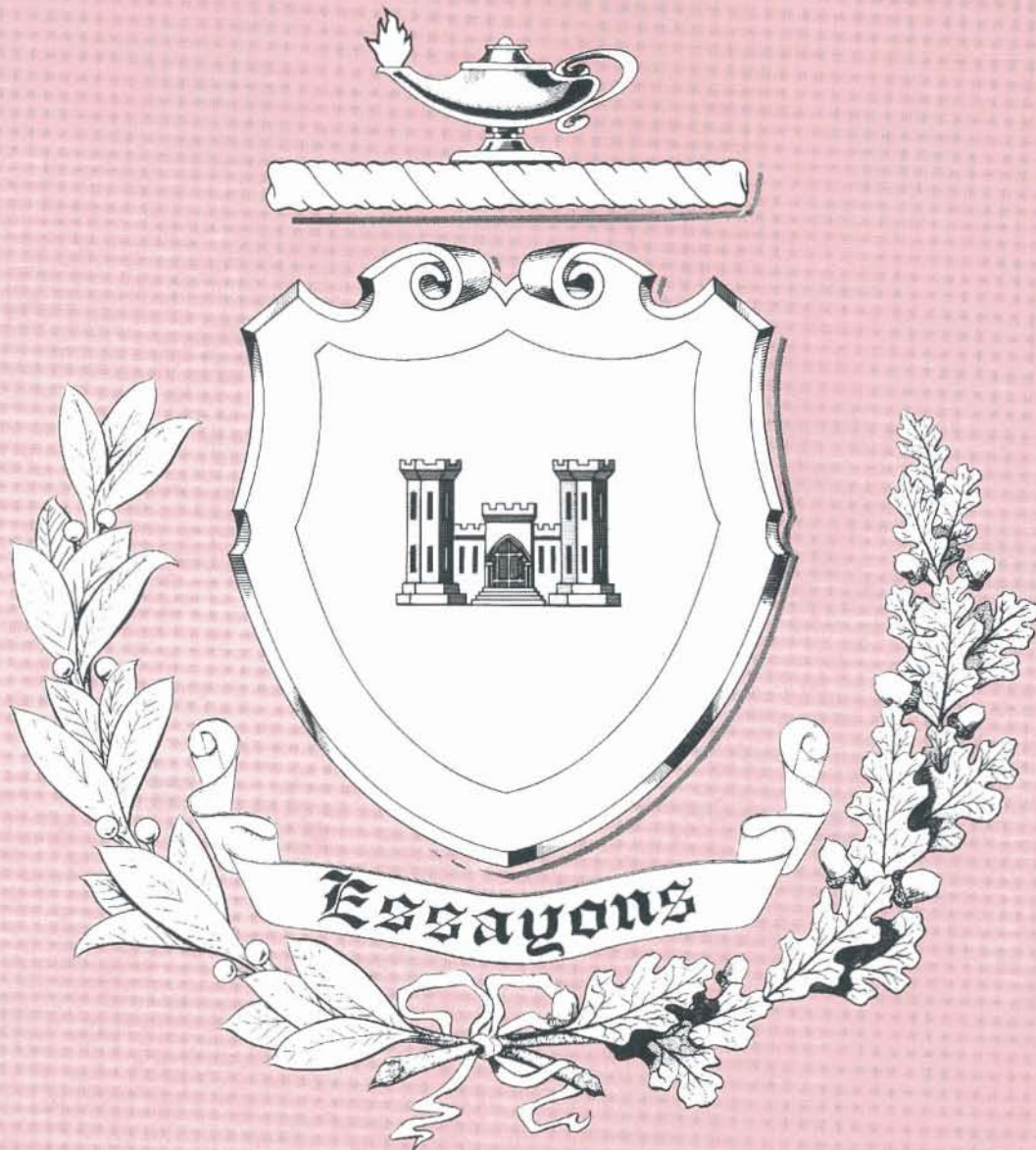
ATTN: ATSE-TDM-PB

FORT LEONARD WOOD, MO 65473-6650

USPS 522-390

OFFICIAL BUSINESS

SECOND-CLASS MAIL
POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
ISSN 0046-1989



PIN: 069694-000