Engineer

THE MAGAZINE FOR ARMY ENGINEERS

WINTER 1983-84

ENGINEERS IN GRENADA!

ALSO: A SPECIAL LEADERSHIP SERIES □ THE NEW EOAC □ PUBLICATIONS FROM CERL

LEADERSHIP:

A Personal Viewpoint

By MAJ Wayne L. Dandridge

Leadership is taking the point position when your unit is expecting contact with the enemy or being the last person to abandon ship. Leadership is flying a crippled bomber to the ground when one of your wounded crew members cannot bail out. Leadership is keeping your young soldiers, marines, airmen and sailors alive and never leaving your wounded behind. Leadership is writing a dead trooper's family a personal letter immediately after the battle.

Leadership is not glorifying war. Leadership is not doing "anything" just to get promoted. Leadership is not winning the battle at all costs, nor is it losing a war to avoid casualties. Leadership is not found in the security of a well-fortified command bunker, nor is it found in a plush officers' field mess.

Leadership is rewarding a soldier, sailor, airman, marine, or civilian with the appropriate recognition immediately after an exceptional deed or service. Leadership is commanding and managing. Leadership is establishing, and meeting in priority, specific objectives. Leadership is managing by exception, using job enlargement, and seeking job enrichment.

Starting with this issue, ENGINEER will feature *A Personal Viewpoint*, a replacement to the *Forum* department. This space is provided to give our readers the opportunity to express their personal opinions concerning the Corps of Engineers and the military. This issue features MAJ Wayne L. Dandridge's personal view of leadership.

A leader is humanistic. A leader believes in God, family, and country, in that order. Leadership is treating men and women equally without regard to race, color, creed, religion, age, or custom. Leadership is visiting your wounded and sick frequently. Leadership is knowing and living by the Constitution, the Code of Conduct, the Geneva Convention, and the basic human rights of all mankind. A leader is assertive, but not aggressive.

Leadership is not ruthless nor mindless discipline, but it is the ability to do the right thing at the right time by putting the whole before the parts. Leadership is not a good efficiency report, nor is it paper readiness. Leadership is not a court-martial for every offense nor punishment for every mistake. A good leader is fair, predictable, and consistent.

Giving a superior sound professional advice when you know he or she does not want to hear it is leadership. Leading when you can; following when you should; and getting the hell out of the way when you have nothing to offer, is leadership. Learning the language and customs of a host country is leadership. Staying in top physical condition is leadership.

A leader does not forget that the past is our heritage, the present is our challenge, and the future is our responsibility. Leadership is not being overweight, not smoking, and not drinking alcohol. Leadership is not being right all the time, and it is certainly not being wrong most of the time.

Leadership is a general who knows the friendly and enemy situation, knows the immediate action sequence for the M16 rifle, knows his driver's first name and family, and can recite the Lord's Prayer. Leadership is a private who knows that he or she is in the chain of command and may have to take over when senior in rank.

A leader knows why there are air, land, and sea forces; why there are cavalry, infantry, armor, artillery, aviation, and logistical forces; and why combined arms and concentration of combat power are important. A leader knows about defense in depth and how to us it.

No compromise of the integrity of one's word, deed, or signature is leadership. Setting high standards and seeing that they are met is leadership. Intelligence, dedication, creativity, and selflessness is leadership. Stamina, vigor, and commitment is leadership. Spontaneous, contagious enthusiasm is leadership. Initiative, self-improvement, and professionalism is leadership.

Leadership is adaptability, appearance, cooperation, and decisiveness. Ingenuity, sociability, tact, and tenacity is leadership. A leader displays knowledge, manages resources efficiently, and plans beyond the immediate requirements of assigned duties. Delegating authority, commanding confidence and respect, and accepting full responsibility for your actions is leadership.

Leadership is embodied in Martin Luther King Jr., Robert E. Lee, Pope John Paul II, Abraham Lincoln, Irwin Rommel, Jesus, Mohammad, Joan of Arc, John Paul Jones, Sister

(Continued on page 10)

Engineer

VOLUME 13 NUMBER 4 WINTER 1983-84

On The Cover

Soldiers of B Co., 307th Engineers, display a Marxist flag they captured in Grenada. From left, CPT Don Davis, 2LT Hugh Enicks, SFC Raymond Scott, SSG James Dematteo, 1SG Harold Lockwood, 1LT Scott Snook. Rod Hafemeister photo, courtesy *Soldier of Fortune* magazine.

FEATURES

DEPARTMENTS

ENGINEER is an authorized publication of the U.S. Army Engineer Center, Fort Belvoir, Va. Unless specifically stated, material appearing herein does not necessarily reflect official policy, thinking nor endorsement by any agency of the U.S. Army. The words he, him, and his are used to represent personnel of either sex. All photographs contained herein are official U.S. Army photographs unless otherwise credited. The use of funds for printing this publication was approved by the Secretary of the Army on December 1, 1983. Material herein may be reprinted if credit is given to ENGINEER and to the author. ENGINEER's objectives are to provide a forum for the exchange of ideas, to inform and motivate and to promote the professional development of all members of the Army engineer community. Direct correspondence with ENGINEER is authorized and encouraged. Inquiries, letters to the editor, commentaries, manuscripts, photographs and general correspondence should be sent to: ENGINEER Magazine, ATZA-TD-P, Stop 163F, Fort Belvoir, VA 22060. Phone: (703) 664-3082, AV 354. Subscriptions to ENGINEER are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. A check or money order payable to Superintendent of Documents must accompany all subscription requests. Annual rates are $8.50 for domestic (including APO and FPO) addresses and $10.65 for foreign addresses. Individual copies are available at $4.50 per copy for domestic addresses and $5.65 for foreign addresses. Second Class postage paid at Fort Belvoir, Va., and additional mailing offices. ISSN 0046-1989.

News & Notes

The Army is looking for volunteers to attend scuba training, according to officials at MILPERCEN. Soldiers in primary MOS 12B, Combat Engineer, and 12C, Bridge Crewman are invited to apply if they meet the prerequisites of AR 611-75, *Selection, Qualification, Rating and Disrating of Army Divers:*

- Volunteers for scuba training must be 30 years old or younger and be serving in grades E2 through E5. Soldiers in E6 and E7 grades will be considered as exceptions to policy.
- Aptitude test score minimums are GM 100, GT 110, and APRT 250. (Although AR 611-75 specifies an APRT score of 240, school officials stress that 250 points are required for the scuba program.)
- Applicants must have completed a Type B medical examination, approved by the Department of the Army Surgeon General, according to chapters 7 and 10 of AR 40-501, *Medical Service/Standards of Medical Fitness.*

Enlistment bonuses or selected reenlistment bonuses may be waived for soldiers accepted for the training.

For more information, contact your personnel services NCO or local military personnel office. □

ECTC '83

Experiences in Grenada, the development of training for the 1990s, and Soviet engineer capabilities were among the topics discussed at the recent Engineer Commanders' Training Conference (ECTC) held in Arlington, Va.

The conference is an annual event bringing Active and Reserve Component commanders (battalion level and above) together to exchange ideas and information in a variety of military engineering concerns. The theme of ECTC '83 was "Excellence Starts Here—Training to Fight and Win."

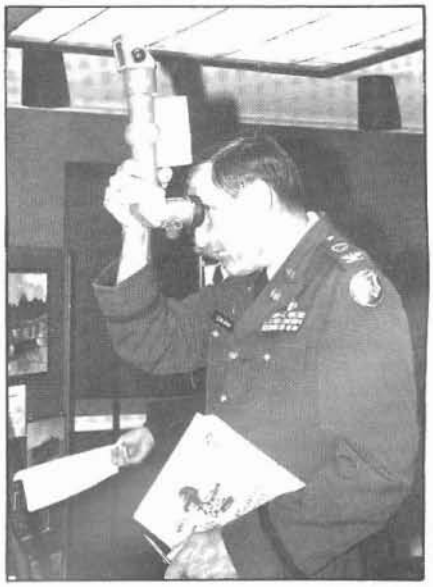
The keynote address was presented by LTG Fred K. Mahaffey, deputy chief of staff for operations and plans, Department of the Army. The general voiced his impressions of several areas of emphasis in Army planning; these included the formation of additional light (10,000 men) divisions,
innovative logistics, development of the capability to fight at night, rapid worldwide deployment, and improvements in weaponry.

The conference included seminars on the new Engineer School model, women in the Army, and the restructuring of Specialty Code 21 (see "Restructuring SC 21" on page 31).

Directorates of the Engineer School, along with other organizations, set up displays which detailed their current programs. Included were a videotaped program on the M9 Armored Combat Earthmover, the new videodisc trainer, and a display of Soviet and Warsaw Pact military clothing and equipment captured in Grenada. □

An ECTC '83 participant peeks through a periscope from a Soviet BTR-60 armored personnel carrier captured in Grenada by B Co., 307th Engineer Bn. (Airborne), 82nd Airborne Div., Ft. Bragg, N.C. *(Dave Arter photo)*

The 117th
Annual Engineer Dinner,
8th Annual
Counterpart Dinner
and the
Castle Ball
for All Active,
Reserve Component
and Retired Engineer
Officers and Their Spouses
Will be Held on
Friday, May 11, 1984
at 6:30 p.m.
Mackenzie Hall
Fort Belvoir, Virginia
Mess Dress Blues,
Whites or Tuxedo (Retired)
with Black Bow Tie
Tickets Limited to 450
R. S. V. P. Protocol Office
(703) 664-3036, Autovon 354



The Videodisc Trainer: More Than A Game

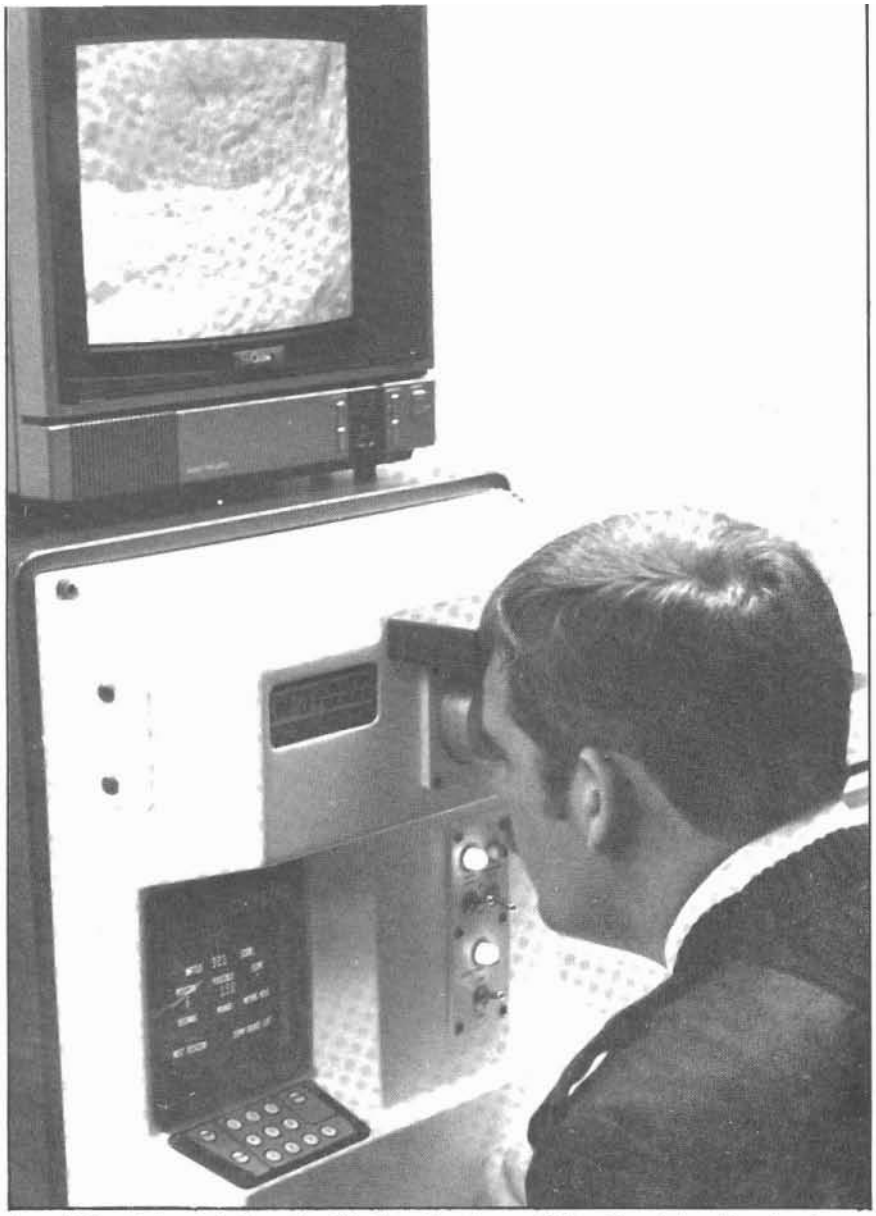
What may appear to be the Army's version of an arcade video game is actually a gunnery training device for the combat engineer vehicle (CEV). It comes complete with indicator lights, sound effects, and a digital readout panel similar to popular video games, but the real points scored translate into Army dollars saved.

Using an idea borrowed from the Armor School at Ft. Knox, Ky., the Engineer School's Directorate of Training and Doctrine (DOTD) is awaiting funding for the DA-approved videodisc trainer, according to 1LT Dexter Barge, a project officer for DOTD's training devices section.

When funded, 72 of the $25,000 videodisc trainers will be sent to CEV-equipped engineer battalions and separate companies. According to Barge, the devices were designed for soldiers in MOS 12F, Engineer Tracked Vehicle Crewman, in conjunction with CEV, AVLB and ACE training.

A programmed videodisc contains vidoetaped segments of realistic situations that could confront engineers in combat environments. Examples are fire missions that call for the destruction of a bridge and an enemy helicopter.

The gunner sits in front of the videodisc trainer and peers through an eyesite while manning the twin hand firing controls. A voice describes the target and fire mission. The target is engaged with the firing controls which permit vertical and horizontal movement of the gunsite. The trainer ticks-off seconds and chalks-up points on the digital display panel. Electronic bells and explosions add excitement and realism to the device.



A soldier tries his hand with the Engineer School's videodisc trainer. Videotaped, simulated combat situations are shown on the monitor while the "gunner" engages his targets with hand-held firing controls. Sound effects and a digital scoreboard make this device fun as well as practical. *(Dave Arter photo)*

The videodisc trainer is a portable combination of a television monitor, a vidoedisc player and a gunner's console. The device permits gunnery training in locations where firing ranges are inaccessible; it can be set-up in the corner of a classroom.

In addition to convenience, the trainer will reduce costs associated with live ammunition training. Barge says that the videodisc trainer and a subcaliber live firing device will allow CEV gun crews to qualify and maintain proficiency with smaller rounds, saving approximately $48,760 per year, per crew. Says Barge of the videodisc trainers, ". . . as you can see, they would soon pay for themselves."

12F BNCOC

A BNCOC (basic NCO course) for MOS 12F, Engineer Tracked Vehicle Crewman, was implemented in USAREUR in 1983; however, only 50 percent of the allocated slots were filled. The course prepares 12F NCOs for the duties and responsibilities of CEV commanders and AVLB section sergeants. There are six student allocations for each six-week cycle of the course. To ensure the continuation of the 12F BNCOC in USAREUR, the allocations must be filled this year. Commanders are urged to get qualified soldiers into the course.

News & Notes

School Wants Your Feedback On MOS Merger

The Engineer School is studying the possibility of combining MOS 82B (Construction Surveyor) and 82D (Topographic Surveyor) into on "Engineer Surveyor" MOS.

The study was prompted because these two MOSs have many similarities, and to a certain degree, a duplication in training and purpose. Combining the MOSs into an "Engineer Surveyor" MOS is probable because both have very small career fields (less than 450 soldiers combined) spread over four skill levels (two in 82B and four in 82D). A future reduction in authorized spaces brought on by new equipment and changing missions would create a severe structure imbalance within the skill levels of both MOSs.

Feedback from field units indicates that combining these two MOSs would come much closer to the "ideal structure" than keeping the MOSs separate.

It would, however, cause an imbalance at the E5-E6 level if these MOSs were combined without a rank redistribution. Therefore a TOE change would be required, possibly adding an E6 survey party chief in combat and dropping an E4 position.

Please send your comments and/or ideas on this study (pro or con) to:
U.S. Army Engineer School
ATTN: ATZA-TD-I-T
Fort Belvoir, VA 22060 □

Have something for News & Notes? Please send your item (with photographs) to ENGINEER Magazine, ATZA-TD-P, Stop 163F, Ft. Belvoir, VA 22060.

Test Windows For MOSs 12B, 12C Extended

The SQT test windows for MOSs 12B and 12C have been extended one month due to publication problems which have affected the distribution of revised soldier's manuals for these MOSs. The 1984 tests are based on these soldier's manuals; test results could be affected if these manuals are not used for study prior to taking the SQTs in these MOSs. Units which have not received these soldier's manuals should contact their local AG Publication Centers regarding the possibility of obtaining the manuals. The revised test windows for MOSs 12B and 12C will be April 1 through July 31, 1984, instead of April 1 through June 30, 1984. Inquiries concerning this action should be addressed to: Individual Training Evaluation Directorate, ATTN: ATIC-ITT, Fort Eustis, VA 23604. □

SMs In The Works for CMF 81

New soldier's manuals in an evaluative format are being developed at the Engineer School for five of the MOSs in CMF 81 (Topographic Engineering). The manuals for supervisory skill levels include a comprehensive MOS training plan and expedient squad job books.

The remaining MOS in CMF 81, 41B (Topographic Instrument Repair Specialist) is scheduled to have a soldier's manual in the field by December 1986.

TENTATIVE FIELDING DATES

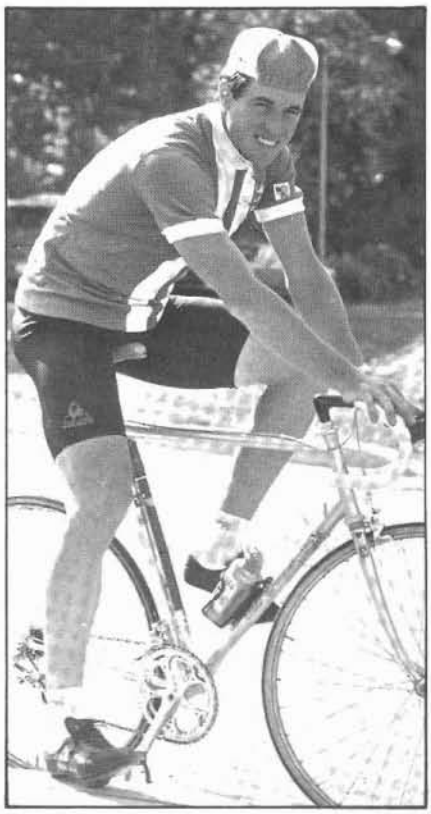
STP	5-83F1 (Photolithographer)	Nov. 1984
STP	5-83F2/3/4/TG (Photolithographer)	
STP	5-82D1/2 (Topographic Surveyor)	Jul. 1985
STP	5-82D3/4/TG (Topographic Surveyor)	
STP	5-83E1/2/TG (Photo and Layout Specialist)	
STP	5-81C (Cartographer)	Nov. 1985
STP	5-81C2/3/4TG (Cartographer)	
STP	5-81Q1 (Terrain Analyst)	
STP	5-81Q2/3/4/TG (Terrain Analyst)	

□

DMS to Host Seminar On Terrain Analysis

On April 17-19, 1984, the Defense Mapping School will host the 2nd Annual Terrain Analysis Seminar at Wheeler Hall, Fort Belvoir. The purpose of the seminar is to provide terrain warrant officers with a forum for ideas and methods of operation in terrain analysis. Topics discussed will include terrain analysis support experiences in Grenada and REFORGER, Air Force weather support, new lessons learned, the use of computers, and software developments in support of terrain analysis. A final report will be prepared and provided to terrain teams, other participants and concerned offices. □

Engineer People



CPT Bill Watkins. (Cynthia Barnes photo)

Summer Games Await Engineer

As all eyes in the world of sports focus their gaze on Los Angeles for the upcoming summer Olympic Games, one Army engineer is busily planning to be there—not as a spectator, but as a participant.

CPT Bill Watkins, recently assigned with the Course Development Div. of the Directorate of Training and Doctrine in the Engineer School at Ft. Belvoir, will be one of five members of America's 100-kilometer road cycling team.

The 29-year-old West Point graduate from Delafield, Wis., joined the Olympic Development Team for bicycling in 1981, along with 99 other national competitors. The five-man 100-kilometer team, which includes Watkins, will be officially announced July 10th at the national olympic time trials in Spokane, Wash. One of the five will be designated as the alternate cyclist for the four-man event. In all, seven American cyclists will compete in the cycling events.

Watkins logs over 350 miles each seven-day training week on his Serotta ten-speed. His training also consists of swimming and exercising with weights. He says he sleeps a minimum of eight hours every night. His diet, dictated by a program called macrobiotics, is low in meat and high in carbohydrates. He eats nuts, seeds and low-calorie protein sources like chicken and fish.

Now training at the National Olympic Training Center in Colorado Springs, his schedule will take him to Austin, Texas, and to pre-olympic competitions in Europe. Watkins predicts that America's toughest cycling foes in the Los Angeles Games will be the Soviet Union, East Germany, Switzerland and Poland. □

Engineer Bagpiper Sounds Off; Plays Pipes for Fun and Relaxation

Amateur musicians abound in the military as in any other field, but CPT Brian Roby, 2nd Bn., 4th Bde., Ft. Leonard Wood, Mo., opts for a more unusual instrument than the usual guitar or trumpet; he plays a set of Scottish bagpipes.

Born of Scottish descent, Roby has played the pipes for six years. "I was in a band at West Point and someone asked me if I wanted to learn how to play the bagpipes," said the USMA graduate, a native of Toledo, Ohio.

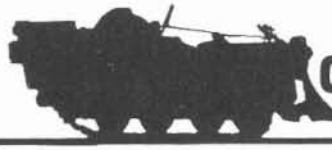
Roby bought his first set of bagpipes while assigned to the 12th Engineer Bn. in Dexheim, Germany.

Roby, a recent advanced course graduate, described his instrument as having "wooden reeds, like a clarinet or an oboe. The bag is made from goat's skin and is covered by a wool, plaid cloth. My set has a Scottish, Gordon-Clan plaid pattern covering the bag. And yes, my bagpipes were made in Scotland."

Roby said he plays for relaxation and for enjoyment—usually outdoors and at night, because the pipes are so loud. □

Send submissions for Engineer People to ENGINEER Magazine ATZA-TD-P, Stop 163F, Ft. Belvoir, VA 22060. Please include photographs and a point of contact.

CPT Brian Roby. *(Gerry Gillmore photo)*



CLEAR THE WAY

by MG James N. Ellis, Commandant, U.S. Army Engineer School

For Success, We Need Strong Leaders

Nothing influences battle as much as a strong leader.

As the Army moves to update its structure, training, tactics, arms, equipment and doctrine to meet the new challenges of the battlefield, so must combat engineers look to the future. As we stiffen the backbone of our combat battalions by introducing new systems such as the M9 ACE, and others, we must not neglect to also develop the soul of the Engineer branch—its leaders.

The accelerated pace, lethality, and decentralized nature of the AirLand Battlefield places a premium on sound and aggressive leadership. As noted by COL Stanley Johnson in his article on page 18, decisions made quickly under the stress of battle can alter the course of an entire campaign. Our leaders, especially at battalion level and lower, must reflect the attributes of what a leader must *be*, *know*, and *do*.

Good Values Build Trust

Character shapes the performance, attitudes and bearing of leaders. Our leaders consistently must think and act in accordance with values such as loyalty, corage, confidence, candor, commitment, responsibility and initiative—all of which determine combat readiness. Behavior inconsistent with these character traits corrodes the trust and confidence soldiers must have in those who lead them in war.

In his article beginning on page 11, COL William Burns defines leadership as "a moral force that is used to inspire individuals to accomplish difficult tasks." That is a good definition, one implying that leaders must go beyond technical and tactical competence. They also must know human nature. They must understand the needs and emotions of their soldiers and how people respond to stress. They must understand how the four factors of leadership—follower, leader, communication, and situation—affect one another. They must know how to use this knowledge to develop cohesion, to foster discipline and to build individual and team skills. Today, more than ever before in history, determining who controls the battlefield is more a factor of forging a strong will to fight than of simply fielding new arms and equipment.

Leaders Must Pursue Excellence

Finally, our leaders must plan missions, make decisions, solve problems, and establish goals as they guide their units to reach and to sustain combat proficiency. To achieve this level of readiness, leaders must communicate high performance expectations to soldiers; they must persistently pursue excellence in training, maintenance and troop welfare; and they must ensure a united effort by convincing subordinates that objectives are possible and thus deserve total dedication.

In this vein, the Engineer School has taken the lead in training and in educating our junior engineer leaders, NCOs and officers. We have expanded our instruction in ethics and leadership for students at the NCO advanced course, and at the officer basic and advanced courses. This expanded training will provide these engineers with a solid basis for continued leadership development. But the process must not stop there! Once these students graduate and move on to their units, supervisors in the field must take an active, personal interest in ensuring that our junior leaders use and expand the skills and knowledge acquired at the Engineer Center. Doing less undermines all of our efforts to prepare for modern battle.

by CSM O.W. Troesch Jr., U.S. Army Engineer Center & School

A Special Brand of Leadership

We are the vital link ensuring that our soldiers train hard and fight to win

Although noncommissioned officer leadership is taught from the same leadership manual used for officers, NCO and officer leadership must differ because of the needs of the unit and because of the differences of each group's duties.

A trait of officer leadership, for example, is leading by reputation. The battalion commander can't be with all his soldiers every day. However, if he is a strong leader, his subordinates know what his standards are and what he expects. Those standards are met, even when the commander is not present.

As noncommissioned officers, however, we lead soldiers by daily personal example in everything we do or fail to do. We are the catalyst that makes things happen. We are the indispensible linkage upon which the commander depends for his unit to train professionally and to fight hard and win. We must develop a brand of personal leadership that will inspire soldiers to train hard, to learn well, and to be free of bias and prejudice.

Be Totally Committed

Leading today's soldiers takes a total commitment to duty. We must be willing to inconvenience ourselves to improve our soldiers' training and discipline. As an example, if for some reason a soldier fails to master a required task, then we must be willing to devote our own personal time—nights or weekends—to retraining that soldier.

Many times noncommissioned officers must be unpopular leaders by requiring that soldiers adhere to standards, and obey orders and regulations for the good order and discipline of the unit. We must resist the temptation to selectively enforce orders or regulations because we don't necessarily agree with them. Avoiding this temptation is the mark of a good noncommissioned officer and leader, and of a true professional. It is also an instance of leading by example, and of being the linkage to ensure that the commander's standards are reflected at the individual soldier level.

Victor of Statistic?

There is another important reason why we must be strong leaders—winning in war demands it. To win on the battlefield is the only reason our profession exists. Units with strong leaders and motivated, well trained soldiers are the battlefield victors. Units less professional become the battlefield statistics. In wartime, crucial combat engineer tasks will be executed by engineer squads and platoons operating separately from their engineer headquarters. Our young soldiers must be technically, physically and psychologically prepared to perform under the stress of combat. It is no exaggeration to say that an entire battle could hinge on the actions of a single squad of combat engineers.

We are a part of the greatest force modernization effort the Army has ever undertaken, and our soldiers are the highest quality ever. It is incumbent upon us to learn, to develop, and to use leadership techniques that will make our units and soldiers the leading edge in a high-technology Army. More than ever before, our nation needs a professional Army to provide a deterrent to war or, if necessary, to fight and win.

Let us, the noncommissioned officers, be the means by which the Army can "bridge the gap" from today's Army to the Army of the future. Let's rededicate ourselves to providing our soldiers and our engineer units with the strongest, most professional noncommissioned officer corps in the Army. Really strive for excellence. Be all the leader you can be.

School News

Directorate of Combat Developments

Army 21 Engineer Concept: Army 21 is an evolving concept of the engineer system for the years 1995 through 2030 and is not to be confused with AirLand Battle doctrine. The Concepts Branch is continuing to study the engineer mission and capabilities for the 21st century. An engineer company and regimental engineer section organic to each maneuver regiment will provide mobility, countermobility, survivability (M-CM-S) and terrain analysis support for the regiment.

At the AirLand Force (ALF) level, engineers organized into companies and battalions under an engineer regiment will provide additional M-CM-S capabilities, the bulk of bridging and general engineering, and further topographic support. While moving, engineer countermine vehicles will be capable of detecting and neutralizing mine targets to spearhead armored drives through enemy-held terrain. Robotic and "intelligent" mine systems will supplement the regimental obstacle capabilities.

Tentatively, publication of the Army 21 concept, including the Engineer appendix (combat support, engineering and mine warfare) is scheduled for December 1984. The Engineer School's concept was briefed in January at an action officers' workshop at HQ, TRADOC.

Directorate of Training and Doctrine

New Welding Shop: U.S. Army maintenance facilities in Europe will be receiving a new mobile welding shop beginning this Spring. Mounted on a 2½-ton trailer, the new welding shop's capabilities are arc, metal inert gas (MIG) and tungsten inert gas (TIG) welding, as well as carbon air arc cutting. Additionally, the shop has oxyacetylene cutting and welding capabilities. This new item will be issued as a one-for-one replacement of the old arc welder with priority given to units which already have the five-ton trucks required to pull the new welding shop. A skid-mounted version having arc welding capability will only go to U.S. forces in Korea.

51H30 BTC: The new 51H30 Basic Technical Course is being offered at Ft. Leonard Wood. It is designed to introduce the 51H to the skills of the feeder MOSs and to develop construction foremen's skills. The six-week course is held 12 times annually. Each class has a 25-student capacity. The course is attended on a TDY or TDY-enroute basis. Personnel interested in attending should submit a completed DA Form 4187 with copies of DA Forms 2 and 201 through command channels to MILPERCEN, ATTN: DAPC-EPT-F, 200 Stovall St., Alexandria, VA 22332.

Directorate of Evaluation and Standardization

Professional Development Pamphlets: The Engineer School completed new professional development pamphlets for both the officer and enlisted ranks. The officer pamphlet updates the current, grey officer professional development pamphlet and covers all specialty codes. The enlisted professional development pamphlet covers information for engineers in grades E1 through E9. Both pamphlets, completed in December 1983, give engineers in the field a current professional development reference.

Name Changes: Effective October 1, 1983, the Directorate of Engineer Force Management (DEFM) became the Directorate of Evaluation and Standardization (DOES), and DEFM's Engineer Force Management Division became a separate office—the Engineer Proponency Office (office symbol is ATZA-EP). A toll-free hotline is open 24 hours a day for proponency related questions. To use it, call 1-800-336-3095, Ext 44172.

Defense Mapping School

Digital Topo Data Course: The Defense Mapping School offers a course about digital topographic data three times each year. The course is to help managers understand digital data and what it represents, especially since Army systems are increasingly relying on digital data for guidance and graphic presentation. The course is particularly appropriate for topographic officers and non-engineers involved in weapons or command and control systems acquisition. The six-day course gives military and civilian students a basic understanding of digital mapping, data acquisition, topographic data processing, and the use of digital data in weapon systems, maneuvers, simulations, and command and control.

Department of Military Engineering

MOS 12E AIT: The Atomic Demolition Munitions Branch of the Engineer School has revised a TRADOC program of instruction (POI) for the MOS 12E Advanced Individual Training course for skill level 1. The new instructional program covers 18 critical tasks as outlined in the POI.

As before, the course is three weeks (or 103 hours) long. Within the 29 modules are 12 written tests, 21 hands-on performance tests and five practical exercises. The student must score at least 80 percent to receive a "go" for each written test; the performance tests are graded against the soldier's manual and Common Task Test standards.

The POI includes timer calculations; operational, emergency destruction, safety and security procedures; and performance and written tests.

Leadership: A Personal Viewpoint, continued

Teresa, Winston Churchill, Margaret Thatcher, and many other well known figures. Also leaders are Robert Lightle, Herman Perez, Bill Waters, Sandy Dandridge, and thousands of other unknowns.

Leadership can be good or bad, centralized or decentralized, warm or cold, offensive or defensive, macro or micro, or expensive or free. Leadership can be Protestant or Catholic, Jewish or Moslem, Hindu or Morman, atheist or agnostic.

Leadership is guiding. Leadership is legendary. Leadership is foresight. Leadership is absorbent, abstinent, and, unfortunately, at times it is abominable. Leadership is baccalaureate, balanced, basic and too frequently backward and barbaric. Leadership has saved lives, killed, stopped wars, and started wars. Leadership has walked softly and carried a big stick, but it has also been loud and nonviolent.

Leadership is honesty, enthusiasm, loyalty, courage, and wisdom. Taking care of your soldiers', civilians', sailors', airmens', and Marines' dependents is leadership. Leadership includes being a good boss and friend, father or mother, son or daughter, sister or brother, and husband or wife. Knowing that the profession of arms is much more than just a job is leadership.

Leadership is helping, training, encouraging, understanding, motivating, disciplining, crying, laughing, standing firm, giving way, counseling, correcting, giving a second chance, and trying again and again. Leaders are tall, short, thin, heavy, male, female, black, brown, white, yellow, old, young, naturalized and unnaturalized. Leaders are from the city and from the country. Leaders look you in the eye, kick you in the ass, cover your flank, and take your place on the most dangerous mission.

Leadership comes from experience, but experience comes from making mistakes. A leader changes the odds and knows the risks. Leaders develop teamwork. The tides, the channels, the seasons, the winds, the weather, and the best forecast are all known by leaders. Leaders often make good grades in school and have numerous years of formal education and many important degrees. But they also have been known to fail math, English, and other equally important subjects.

Leadership comes from family, friends, teachers, coaches, and pastors. Simple, easy-to-understand orders come from leaders. Complex tasks are changed into short and accurate plans through leadership. Leadership can be learned and taught, but it cannot be forgotten nor bought. Leadership can be seen, tasted, smelled, felt, and heard, but it can come from a blind person with no hands who cannot hear nor walk.

Finally, a leader is so in love with life that he or she is willing to die to ensure that others' lives will go on!

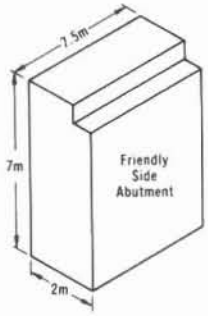
MAJ Wayne L. Dandridge is a member of the Host Country Support Team, U.S. Army European Command. He has served as a maintenance test pilot, instructor pilot, and in various command and staff positions. He is a graduate of the Armed Forces Staff College and of the Transportation Officer Advanced Course. He has a bachelor's degree in aeronautical science from Embry Riddle Aeronautical University and a master's degree from the Florida Institute of Technology.

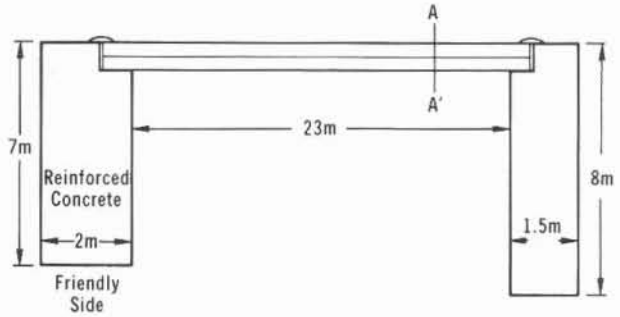
Engineer Problem

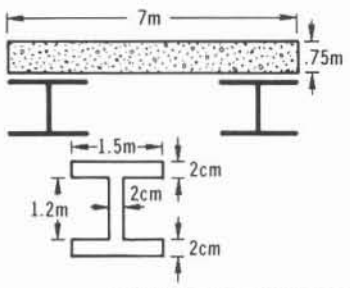
You were tasked to relieve a British recon team and destroy a bridge north of your sector. The British team leader hands you a target folder that is only partially filled in. The sketches are accurate but the planned charge placement is inadequate. Your headquarters specified that the bridge demolition create at least a 25-meter gap.

Your company commander arrives to check on your situation. You discuss the problem with him and decide that simply cutting the span will not create the 25-meter gap. The British team prestocked adequate blasting caps, time fuzes, fuze igniters, and detonation cord. However, they did not leave enough explosives. You only have one 2 ½ ton truck (M35A2) to transport additional demolitions and the nearest ammunition supply point is 30 km away (45 minutes one way).

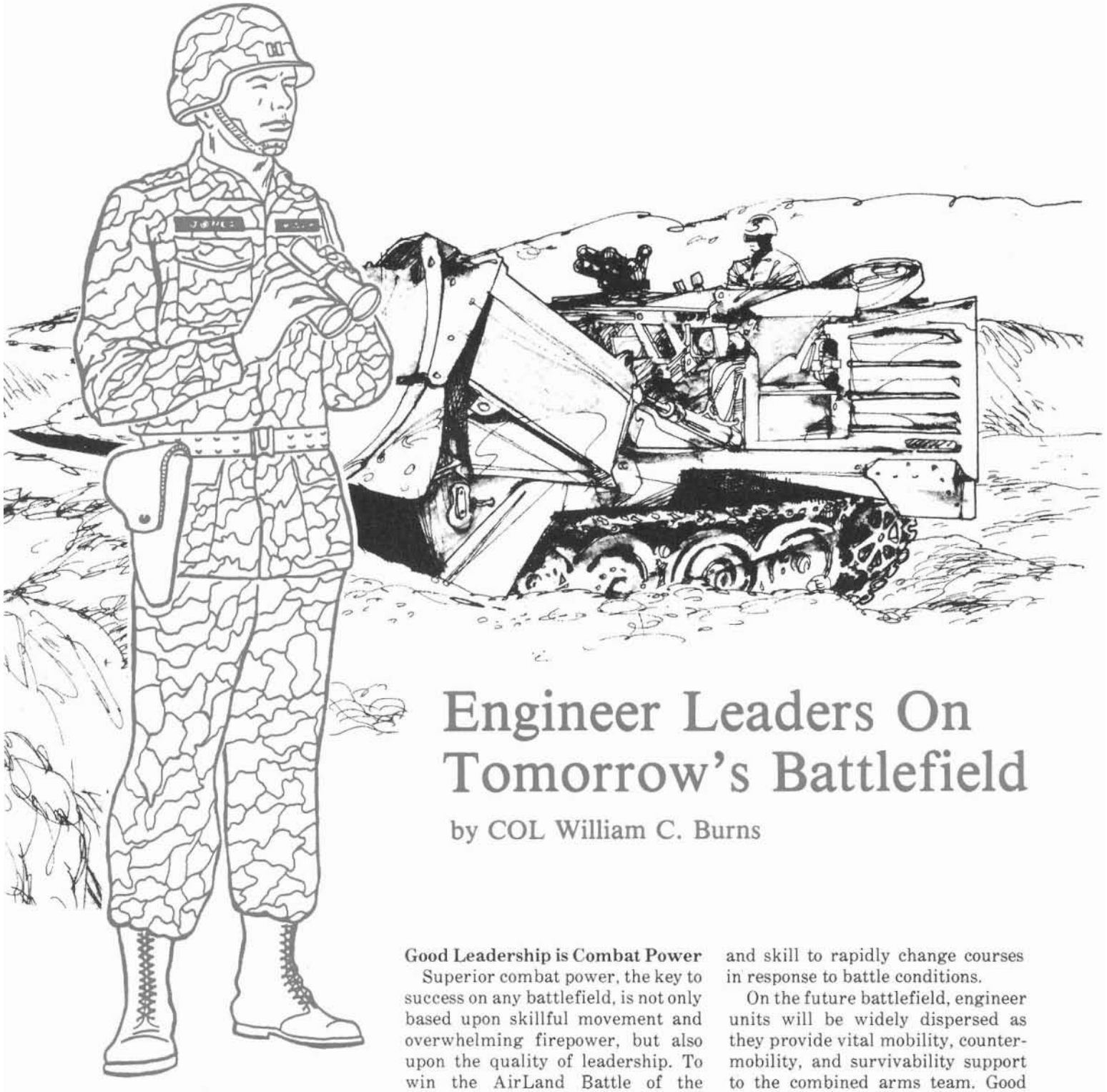
Determine the following: **I.** How much demo and what kind will be required? **II.** How and where will the charges be placed? **III.** Assigning one squad to the mission, how long will it take the squad to bring the target to state of readiness 1? **IV.** How long from state of readiness 1 to state of readiness 2 (Armed)? **V.** Is any special equipment required?







SOLUTION ON PAGE 17.



Engineer Leaders On Tomorrow's Battlefield

by COL William C. Burns

Effective leaders. The Army has always had them, but today that need is greater than it has ever been in our history.

Concepts for future battles include a battlefield with combat actions ranging from behind one's lines through the enemy's front line units to his follow-on forces.

Good Leadership is Combat Power

Superior combat power, the key to success on any battlefield, is not only based upon skillful movement and overwhelming firepower, but also upon the quality of leadership. To win the AirLand Battle of the future, we will need leaders who inspire confidence and the will to win in soldiers. Futhermore, we need leaders, who under extreme stress, can develop new solutions to unexpected problems. The leader must possess both the knowledge to develop sound operational and technical plans and the mental flexibility and skill to rapidly change courses in response to battle conditions.

On the future battlefield, engineer units will be widely dispersed as they provide vital mobility, countermobility, and survivability support to the combined arms team. Good leadership will be imperative at all levels of engineer command. The emphasis, however, will be on platoon and squad level leaders ensuring that their units are effective and carry out their missions in the absence of regular communication from the parent engineer battalion.

The isolation of an active NBC environment will stress units and their leaders. Leaders must be prepared technically, physically and psychologically for such battlefields. The engineer platoon leader must be knowledgeable, innovative, and have the moral courage to see the mission through!

Small Unit Leadership is Important

This issue of ENGINEER focuses on leadership at the platoon level, which is just as critical to accomplishing the engineer's mission as it is to accomplishing the infantry or armor unit's mission.

Although the engineer commander must exercise both leadership and management skills to be successful, leadership is the critical skill. It is the moral force that influences and motivates people to accomplish the assigned task. Leadership is a precious commodity in our Army. Our younger leaders must develop their leadership qualities as well as practice their leadership skills in order for the Army to carryout its mission.

Colonel Gerald Brown's article on page 15 particularly stresses the point that proficiency is a combination of both knowledge and experience.

Education is a continuous process both in and out of the classroom. Captain Ralph Graves' article on page 32 on the new initiatives for the Engineer Officer Advanced Course summarizes the Engineer School's innovative response to providing educational support to the career engineer officer.

Schools, however, only facilitate the opportunity for learning. The leader must be willing to spend many hours on self-education, both on and off "duty time." The military is a most demanding profession. It not only involves competence in the full spectrum of human psychology but of management as well. Meeting this challenge is critical if the leader is going to grow and be ready for the increasing responsibility inherent in a successful military career. In his article on page 20, Captain Willis Lee urges the new lieutenant to develop this self-education habit early in his career. True wisdom, whether you are sergeant, a lieutenant or a colonel, is the knowledge of what we don't know and recognizing the need to learn it. Modern technology has given the military weapons of tremendous destructive potential. We cannot afford to have amateurs leading the soldiers who employ those weapons.

> ***"It is the leader's values that determine the kind of Army we have."***

The Leader's Values

There is a good reason why each of the leadership articles address the qualities or values of a good leader. Skill and knowledge alone are not enough. The Army must operate according to a well defined value system. It is the leader's values that determine the kind of Army we have.

General William R. Richardson, the TRADOC commander, addresses on page 13 the importance of values in his discussion of the importance of commitment, competence, candor and courage. These are the four professional soldierly qualities listed in Chapter 4, FM 100-1, *The Army*.

The leader is on duty twenty-four hours a day and his actions, both professional and personal, establish his values in the eyes of his unit. The experience of senior leaders and countless studies have lead to the same basic truth, first and foremost, that the unit or organization reflects the values demonstrated by its leadership. The values you express and use to guide your actions must be consistent.

Our Most Valuable Asset

Although each author has expressed it differently, a point never to forget is that the ability to do our mission rests ultimately with the individual soldier. It doesn't much matter whether you classify yourself as a commander, leader or manager. What matters is that you recognize that people are our most precious and valuable asset. Without them the Army doesn't exist.

Our prime responsibility as leaders is to ensure that our people are members of a well-led, well-trained, disciplined unit or organization which is properly equipped and supported for its mission. If we as commanders, managers and leaders provide the opportunity for the individual to contribute to the success of the organization, they will to do so to the best of their ability.

Military service offers the opportunity to the individual not only to grow in skills and ability, but to contribute to something larger than himself. If a soldier feels that by making a solid contribution to his unit he has done something important in protecting this nation and the freedom it represents, then he will feel his service time was worthwhile. It is the responsibility of the leader to ensure that this is what happens.

Leadership, in the final analysis, is a moral force that is used to inspire individuals to accomplish difficult tasks that must be done. Successful leadership is firmly based in values and practices which encourage the soldier to succeed and to develop, both as an individual and as a member of his unit.

COL William C. Burns is chief of the Project Management Office, Directorate of Training and Doctrine, U.S. Army Engineer School. He will assume command of the Rock Island Engineer District this summer. COL Burns is a graduate of the U.S. Army War College, has an MBA from Long Island University, a master's degree in operations research from the Naval Post Graduate School, and a bachelor's degree from the U.S. Military Academy. COL Burns is a registered professional engineer in Virginia.

Remarks by
General William R. Richardson
at Commissioning Ceremonies
Fort Riley, Kansas, July 1983

4 Fundamentals of Professionalism

There are four basic qualities fundamental to the profession of arms. And it *is* a profession. Make no mistake about that. We are a unique society of individuals with our own professional ethic by which we govern our lives. It is the very foundation which gives us the confidence to meet any test offered us.

First, we believe in commitment. That begins with your oath. Your first leadership assignment is another commitment, both to those you lead and those who lead you and your unit. These commitments never stop. As you gain in rank and experience, you will face commitment to bigger and more far-reaching issues. The commitments you must always remember are those to your nation, your service, your leaders, and those you lead. You will, of course, be committed to excellence at all times. You must strive to improve whatever is in your power to improve. Leave everything with which you are connected better than when you found it.

There are benefits with commitment, too. Commitment is a safe harbor in which to anchor if the storms of disappointment sweep over you. It is a source of strength in the inevitable times when things go wrong or a positive source of confirmation when the good times come your way.

Second, we believe in competence. Lincoln said, "I will study and prepare myself, and someday my chance will come." You must do the same. If you are not competent in a

"First, we believe in commitment."

"Second, we believe in competence."

"Third, we believe in candor."

"Finally, we believe in courage."

tactical and technical sense, you will not be qualified to lead. If you're not qualified or not fit to lead, you are a danger to your soldiers. You may expose them to danger needlessly, and they are a precious resource. Even worse, you will destroy their confidence in themselves—and in you.

Remember always that a bad leader with the best troops can be a clear and potential menace to them and to himself. On the other hand, a competent leader—as history has proven time and time again—can take untrained but willing troops and inspire them to do wonders by his example.

The decision point in our profession is the battlefield. We do not *want it* to be so, but it is our duty to spend our lives training for something we hope never to do—wage war at the direction of our civilian leaders.

Soldiers are more aware than anyone of the hazards involved in war. But if we must fight, we must also have people who know what they are doing. There is simply no alternative to this.

Thirdly, we believe in candor. To us, candor means that you have no time or use for lies. You can't abide double meanings. You want communications which are accurate, straightforward, and honest. Let your soldiers see you as honest in all your dealings. Expect the same from them. Let your word be your bond and expect the same from your soldiers. You will rarely find a soldier to whom you cannot safely extend this expression of your regard for him or her. Candor is based on a strong sense of personal honor—a sense of what is right and what is wrong. This is not as easy as it sounds. Find a role model whose honesty and trustworthiness you respect. Watch him or her. You can gain more from understudying a proven leader than in any other way I know.

Finally, we believe in courage. We believe you can develop the physical courage to do your job of leadership under even the most terrifying conditions. If you are competent and confident in your ability and that of your command, you can meet and defeat war. Physical courage is rooted in believing in your unit, your own excellence at leadership, and your devotion to your service and your country.

Moral courage is often another story. It takes as much courage to take and hold an unpopular stand—when it might be easier to blend in with the faceless majority—as it does to face a line of oncoming armor. But if you believe that you are right—after sober and considered judgment—hold your position. When this stand applies to the pursuit of personal or unit excellence, you owe your country nothing less.

The officer corps must possess the highest sense of moral courage if it is to fulfill its purpose of leadership for the American soldier. This will not be easy, nor should it be.

And so, these four qualities symbolize the attributes and values of the American military professional. As officers, you men and women will face a difficult—and different—task which must be centered around these values, if we—and you—are to succeed in our pursuit of excellence.

The constancy provided the members of the officer corps by their belief in and adherence to the professional ethic I described has been the secret of our success for over 200 years. I know that none of you will ever dim the luster of our unique and storied profession. Your country and your Army expect nothing less from you.

You are a chosen few. A great many other men and women have chosen to drop out or failed to meet the challenges in the race for excellence along the way. You are the stayers—the ones who persevered. We expect you to demonstrate such perseverance many times in the years that lie ahead. We know you will not fail us.

General William R. Richardson is the commanding general of the U.S. Army Training and Doctrine Command.

ADVICE for Engineer Lieutenants

by COL Gerald Brown

The theme for this issue of ENGINEER is leadership. Assuming that many readers are junior officers, I shall try to provide advice on how to achieve success as an engineer officer in the U.S. Army.

Most engineer officers in the Army today have completed a compressed, yet comprehensive, study in engineering. For this achievement, I congratulate you. You have the good fortune to begin your careers at an exciting time. The future is bright in the troop arena and in facilities engineering.

Success is . . .?

To be successful, you must first decide what you mean by success. Do you aspire to high rank and positions of leadership? Do you desire a reputation as an expert in some particular field? Are you looking for experience in the Army that will later help you gain great wealth in life? Or, are you looking forward to a quiet, useful career in which you can develop to your maximum potential? You must look at your career in a realistic manner and develop realistic objectives. Everyone can't be a general officer. Everyone can't be a renowned expert in a narrow field. You won't obtain wealth as an Army officer, although you will live comfortably.

Success to you will mean accomplishing your objectives. The best chance of achieving success is through lifelong dedication, perseverance and preparation. A philosophy on professional success was captured by William Jennings Bryan when he wrote:

Destiny is not a matter of chance, it is a a matter of choice. It is not a thing to be waited for, it is a thing to be achieved.

Your degree of success will depend on your intelligence, the amount of general knowledge you acquire, your knowledge of your particular field and your ambition to progress. Also important will be your integrity and your ability to work with others as a team.

What you achieve in your career will be the result of choices you make along the way. The key is constant professional development—to be prepared when opportunity calls.

Keep up with developments in your field. Read professional journals, participate in professional societies and attend continuing education courses.

You may have heard the story of the Nobel Prize winning scientist who was asked how it felt to wake up famous. The scientist replied, "No one wakes up suddenly and finds himself famous. I've been at work night and day for 15 years." In life, the law of cause and effect works this way.

Attributes for Success

You should realize that knowledge and experience are two distinct attributes. Together they can lead you to success. From your first assignment, start to build your experience. Seek positions that will broaden and increase your professional development. One of my college professors, Dr. Ralph Peck of the University of Illinois, studied under the great soils engineer, Karl Terzaghi. Terzaghi told his students that early in one's career, experience is far more important than salary or position. He persuaded young Peck to accept a position in the construction of the Chicago subway system. This job started him on the way to becoming our country's leading foundation engineer.

To gain experience, don't be afraid to request new jobs if your duties fail to absorb your energies completely. Do this primarily during the first five to ten years of your Army career. After that, you should be established in one or two specialty fields. If you change too often, later in your career you risk the reputation of being a rolling stone. Five years from now, make sure you have five years of experience and not one year of experience five times.

Dr. Peck also advised my class to build "engineer judgment." For

example, when someone talks about a 600-kip column load, that should create an image in your mind—the size of the column. You should know where to expect such a column—in a parking garage or in the Empire State Building. (In the Empire State Building—right?) When someone tells you that the calculated charge to cut a steel beam is five pounds of C4, you should be able to approximate in your mind what you would expect to see in place. Develop good engineer judgment, and you will be surprised (and dismayed!) at the mistakes you will find on plans and at job sites.

Knowledge and experience are crucial to success in the engineer profession. Both require years of hard work and dedication. Of course, there may be occasions when one's future depends on being at the right place at the right time. Frank Forker, an executive with AMF, Inc., said in a recent article:

> *It may be that life will never present us the real opportunity we seek or desire. But I am determined to so prepare myself that if such an opportunity does come, I shall be ready. I shall have my homework done, the seeds sown and the foundations laid.*

This wisdom is applicable perhaps more in the military than anywhere else. Success is not reached by the easy road. As Disraeli said, "The successful man is the one who has the best information."

The Foundation of Our Profession

Leadership is the foundation of our profession. That is where the greatest contribution is made. Aspire to such positions. Most of you will serve your initial assignment as a platoon leader. Army leadership starts there.

Becoming a leader will not be easy. To get a platoon to follow you without question to clear a lane through a minefield that is under fire is leadership. Develop those skills within yourself. There are some who say that leadership cannot be taught, rather, that leaders are born. They are wrong. Leadership traits can be learned and developed. The essential elements of leadership are knowledge and experience, but leadership also encompasses other traits such as dependability, decisiveness, and selflessness—traits that are commonly known as character.

Here are a few thoughts on some of the qualities required of leaders.

- ***Leaders accept responsibility.*** You cannot exercise the power of leadership without assuming the responsibilities that go with it. These responsibilities will require an extra measure of hard work.
- ***Leaders are courageous.*** They have the moral strength to make decisions and to put thoughts into action. Remember, those who fail are those who never try.
- ***Leaders are decisive.*** Never use the lack of time as a reason not to do something. Leaders must train themselves to make decisions quickly after receiving the facts.
- ***Leaders have vision.*** They have a perspective, a sense of where the organization is, where it is going, and how to get there. Leaders must not become mired in the day-to-day minutiae of the desk "IN" basket.
- ***Leaders are compassionate.*** That does not mean "soft," although empathy certainly is a part of compassion. Compassionate leaders know what is best for subordinates and set them steadfastly on course. Sometimes that means being very tough. Examples of sports leaders come to mind, such as basketball's Bobby Knight of Indiana and football's late "Bear" Bryant of Alabama. Their brand of leadership mixes compassion with toughness. Both are superb leadership examples.
- ***Leaders set and demand high standards of excellence.*** They never accept mediocrity from self or anyone else. They set fair, tough standards and demand excellence in performance.
- ***Leaders must be technically competent.*** One quick way to tarnish leadership is to allow subordinates to discover that their leader doesn't know what he talking about. Leaders never stop learning.
- ***Leaders understand people.*** They are motivators, communicators, listeners, inspirers, and most of all, teachers. The most important quality is consistency. Leaders never waiver from their leadership philosophy. People must know what to do expect from them. One of my favorite books is Douglas Southall Freeman's *Lee's Lieutenants.* It may be the best book on leadership ever written by an American. It shows the leadership style of Robert E. Lee, which varied with his subordinates. To Stonewall Jackson, Lee had but to make a suggestion and the task would be done. On the other hand, James Longstreet required firm orders and close supervision. Lee knew his men!
- ***Leaders are physically fit.*** Participation in sports is ideal, a diversion needed for variety and change of pace. Choose sports that you can rapidly dip into and out of at will.
- ***Leaders are moral in personal habits.*** They never become intoxicated. They are always proper and discrete in relations with the opposite sex. Even in our permissive times, leaders are held to higher standards.
- ***Leaders are honest.*** Lack of integrity disqualifies one for leadership. Thomas Jefferson said it best: "In matters of principle, stand like a rock."
- ***Leaders can accept failure.*** Even the best are not going to be successful in everything attempted. The best plans can be thrown out of gear. When this happens, leaders try again with renewed vigor. Ultimately, leaders are bound to succeed, and that is the road upward, not the path of least resistance.
- ***Finally, Army leaders must have a solid concept of public service.*** For the good of all, they aspire to a leadership role to serve others and society, rather than themselves.

There are plenty of perfectly qualified engineers in our society. Those who measure, who design, who inspect, who put brick and mortar together, but few are leaders. We need you—Army Engineers with vision, innovation and inspiration to move and rally soldiers, and perhaps even a nation, to great achievement. Ultimately, you may settle into a comfortable, well-paying engineering position with only technical responsibility, but, by God, strive to achieve the magic of leadership before you settle for that lesser role!

To summarize the elements needed for professional success, I should place intelligence first, followed closely by knowledge and

experience, integrity, modesty, sincerity, ability to work with others, devotion to your work, confidence in your ability, and faith in our country. And, last but not least, you need a strong religious faith to provide the framework for you to decide what is right, just, and good, and also to provide you the strength to carry out your decisions.

COL Gerald Brown commands the Corps of Engineers' Baltimore District. He has served as chief of doctrinal literature management at the Engineer School, as an associate professor of military history at West Point, and commanded the 82nd Engineer Bn., VII Corps, USAREUR.

He is a graduate of the Army War College, has a master's degree in civil engineering from the University of Illinois and has a bachelor's degree from the U.S. Military Academy. COL Brown is a registered professional engineer in Texas.

Engineer Solution

The general approach is to destroy the friendly side abutment. Plan to cut the span once to ensure that the bridge will fall completely into the gaps, leaving no framework for the enemy to use in trying to rebridge the gap.

I. Demo Requirements

A. For destroying abutment:

1. Top of Abutment: $P = R^3$ KC[R = 6.56'; K = 0.54 (reinforced concrete); C = 1.0 (ground placed, tamped)]. Calculation gives 153 1-pound blocks of TNT (or equivalent) per charge. Number of Charges: N = W/2R gives 2 charges required. (Total: 306 1-pound blocks TNT).

2. Bottom/River face of abutment: Use the same calculation with the exception of the tamping factor. Using C=3.6, you find that 549 1-pound blocks of TNT (or equivalent) per charge are required. Again, there will be 2 charges required. (Total: 1,098 1-pound blocks TNT.)

B. For cutting the span:

1. Steel cutting charges for two I beams: cross-sectional area (A) of the steel beam is 840 cm^2 or 130.2 in^2. (Due to the dimensions of the beam, the ribbon charge would not be practical.) P = ⅜A, (A = 130.2) gives 49-1 pound blocks of TNT/per charge required: There are two beams requiring two charges. (Total: 98-1 pound blocks TNT.)

2. Breaching charges to cut reinforced concrete roadway: $P = R^3$ KC [(R = 2.46'; C = 1.8 (untamped)]. Calculation gives 26 1-pound blocks TNT per charge required. Number of charges N = W/2R gives 4.667 or 5 charges required. (Total 130 1-pound blocks of TNT).

II. Location of charges

A. For destroying abutment:

1. Top of abutment: Bury charges behind abutment 2R distance apart at a depth of 2 meters.

2. Bottom/river face of abutment: Place charges 2R distance apart at the base of the abutment.

B. Place charges on each side of each I-beam and on the roadway at A-A', spaced 2R distance apart.

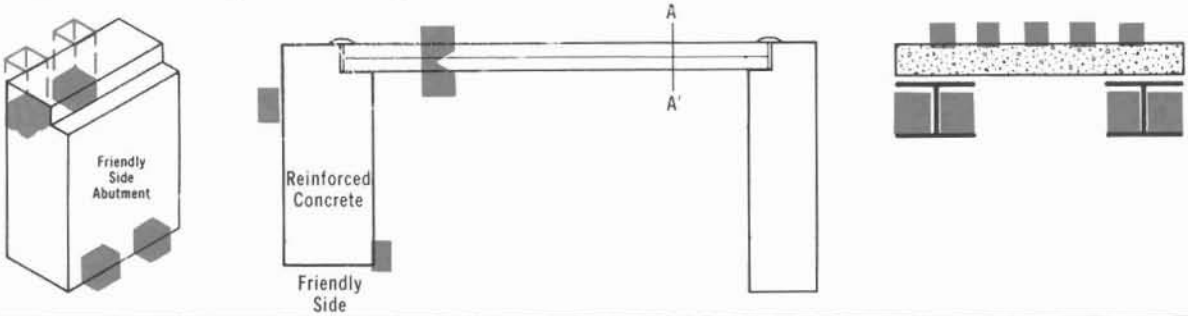
III. You estimate 4 squad hours to prepare the target and bring it to state of readiness 1. This includes travel time for the 2 ½-ton truck to and from the ASP (including loading time—2 hours). You assume that the additional equipment mentioned in V below is available and you can immediately begin cutting holes to place charges behind the abutment.

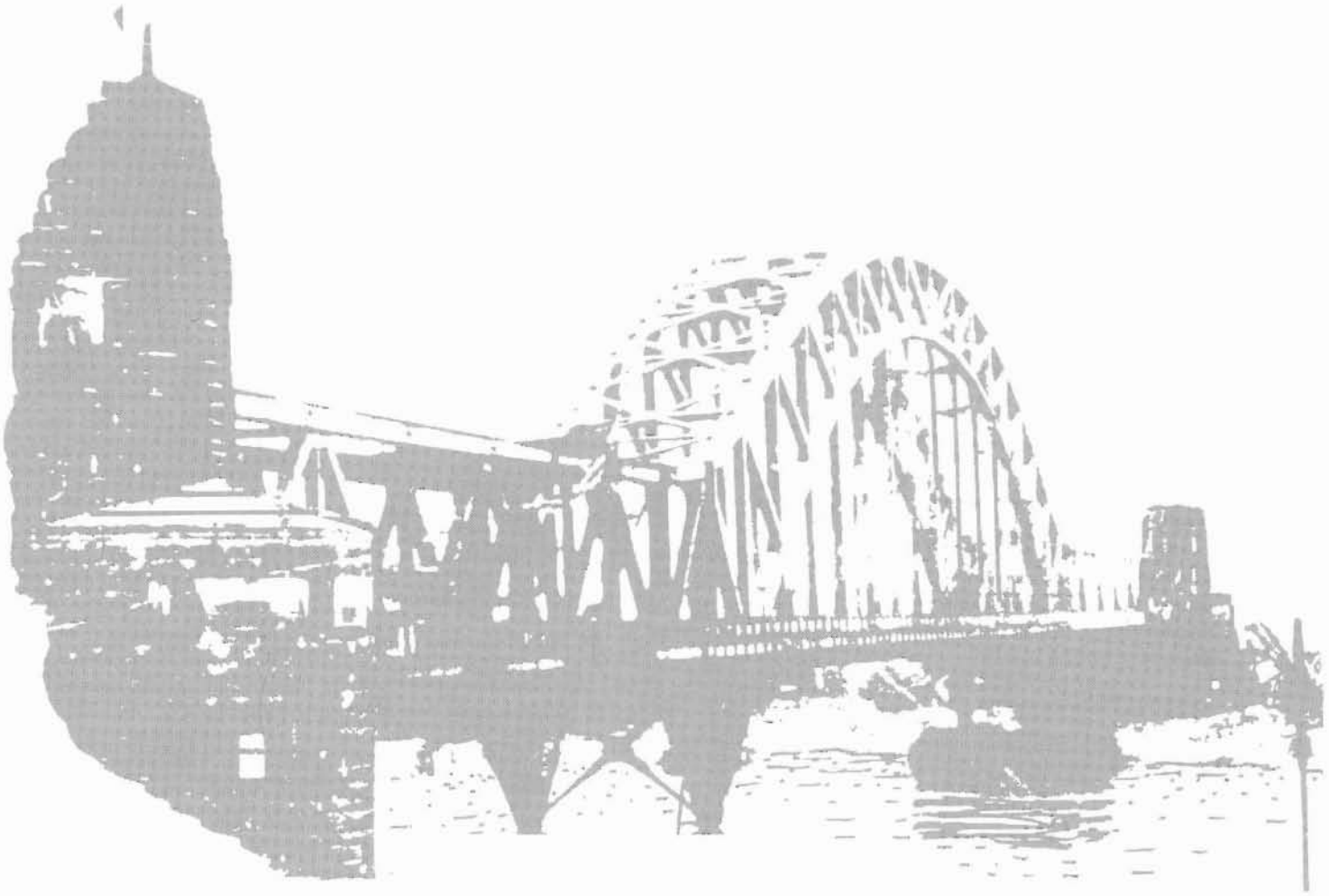
IV. You estimate 10 minutes to bring the target from state of readiness 1 to state of readiness 2 (Armed). You prime all charges with detonation cord and only caps used will be attached to the ring mains and initiated with a time fuze.

V. Special equipment required.

A. One backhoe to cut behind the abutment and to then backfill over the charges.

B. All other equipment should be carried by the squads in their vehicles as specified in the TOE.





Small-Unit Leadership: Past and Future

by COL Stanley R. Johnson

The outcome of battles and of entire campaigns often rests on the decisiveness of a few small units. Recent experiences in Grenada and the Falkland Islands have confirmed once again the need for resourceful, courageous leadership at the small unit level.

AirLand Battle doctrine places even greater reliance than in the past on the small-unit leader's ability to understand the concept of the operation and on his ability to carry out that concept in the absence of regular communication and guidance from his commander. This is true even more for the engineer leader than for leaders in many other arms.

It has become common practice to detach engineer platoons from their parent unit to support combined arms, battalion-sized task forces. In the AirLand Battle setting, the platoon leader, platoon sergeant, and the squad leaders could be widely separated from their normal engineer headquarters. Even so, they must continue to provide knowledgeable advice to the task force leadership during the planning and decision making processes, and then support the chosen scheme of manuever with engineer work.

The engineer work may take the form of traditional mine warfare or demolitions tasks, or it may be some clever solution to a critical manuever problem. The key point is that ingenuity, hard work, and combat readiness must be the hallmark of the engineer leader on the battlefield.

Two examples from World War II demonstrate the kinds of situations and challenges that could face engineer leaders on the AirLand Battlefield. The leader's reactions in these situations determined the course of entire campaigns. The first incident

is the often discussed Remagen Bridge capture, and the second took place during the unheralded Aleutian Campaign in Alaska.

As described in *The Last Offensive* by Charles B. MacDonald, a classic case of mobility versus countermobility took place at Remagen. In addition, there was the confrontation of the two classic philosophies of command—rigid central command (on the German side) versus generalized mission-type orders (on the American side).

When 2LT Emmet J. Burrows, an infantry platoon leader, emerged from the woods on a bluff overlooking Remagen on March 7, 1945, he was surprised to see a bridge still spanning the Rhine River.

A quick report to his battalion commander resulted in the order to move toward the bridge. Quick analysis by BG William M. Hoge, commander of Combat Command B of the 9th Armored Division, was that even though a crossing of the Rhine at that point didn't fit the larger scheme, the potential benefits far outweighed the risks.

On Hoge's order, an engineer officer, Lieutenant Hugh Mott, and two engineer sergeants, supported by attacking infantry, worked their way across the bridge swiftly cutting firing wires and dropping the German explosive charges into the river. In a short period, the bridge was secured and a bridgehead across the Rhine was established.

The German officers responsible for destroying the bridge were constrained by a rigid directive that written orders were required before a bridge across the Rhine could be destroyed. With the U.S. Army approaching the bridge, a German captain insisted on waiting to destroy the bridge while a lieutenant wrote down the exact timing and wording of the verbal firing order given by the major in charge. This delay, caused by rigid procedures and fear of failure, might have made the difference in the capture of the bridge. This was a case when Americans got "inside the decision loop" of the opposing force, one of the key elements for success in the AirLand Battle. As a result of the decisive action of the manuever unit commander and supporting engineers, a bridgehead across the Rhine was gained much earlier, and at far less cost, than might otherwise have been possible.

In the Aleutian Campaign, Army engineers, in extremely harsh climatic conditions, accomplished all of the broad range of engineer missions from combat support to airfield construction but it was their capability to fight as infantry that determined the outcome of the campaign. In the key battle for control of the island of Attu, the beleaguered Japanese launched a surprise suicidal counterattack to gain control of the U.S. artillery position. The Japanese fought through the infantry line and attacked toward the high ground known as Engineer Hill. Brian Garfield describes in this book, *The Thousand Mile War*, how within minutes the engineers converted to an infantry role.

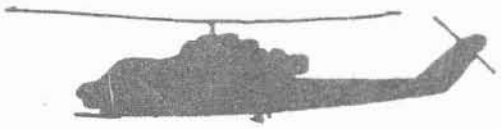
The Japanese fought their way to the top of Engineer Hill where men of the 50th Engineer Battalion met the charge head-on with bayonets and rifles used as clubs. The Japanese never reached the artillery emplacement.

On the point of victory, Hill wrote, *the Americans had come frighteningly close to losing everything they had gained in* (the previous) *three weeks of ferocious, bloody fighting. Only the precarious line of the 50th Engineers, desperate but steadied by discipline, had kept Yamasaki's charge from reaching the all important artillery. But the Engineers had held. It was over.*

The lesson here is that engineers who must work most of the time on traditional tasks—mobility, countermobility, survivability and general engineering—are often called upon on short notice in the most crucial of situations to quickly reorganize and fight as infantry.

The engineer small-unit leader of today and tomorrow has the burden of studying and developing his own technical and leadership skills. Concurrently he must assure that his unit is well trained to react quickly, applying their unique skills at the crucial point to assure success of the American effort. The engineer leader who prepares himself and his unit in this manner will be prepared for the demands of the AirLand Battlefield. Entire campaigns can rest on that preparation.

COL Stanley R. Johnson is director of the Directorate of Training and Doctrine, U.S. Army Engineer School.



Be The Expert!

by CPT Willis Lee

"You are an engineer, a leader of soldiers and a member of the commander's special staff. You must be an expert about all engineering-related subjects."

Many engineer lieutenants begin their careers as platoon leaders in the engineer battalion of an armored or infantry division. As a combat engineer your mission is to increase the combat effectiveness of the maneuver forces by supplying engineer combat support. As an engineer platoon leader, you face many technical and leadership challenges. There is a lot to learn.

To be successful on the battlefield and in your career you must accomplish your missions. When you accomplish them skillfully, you will save time and effort . . . and lives.

No Time On The Battlefield

As a lieutenant, you have to become more educated to compensate for your lack of experience. To perform effectively you must, at least, know engineer operations. You must be able to forecast, to recommend, and to request engineer materials. You must be able to work with unfamiliar people in unfamiliar places. You must be able to communicate with your company headquarters, which might be 10 to 20 kilometers to the rear. And, you must be proficient in soldiering and leadership. There will not be enough time on the battlefield to master all those things, so begin now.

Presented here are ideas for the engineer platoon leader. They are not of a technical nature; some already may be familiar to you. Hopefully, these thoughts will inspire actions on the part of engineers and maneuver leaders alike.

Difficulties arise daily that inhibit the effective use of the engineer line platoons by maneuver task forces on the battlefield. By being a soldier, a leader and a qualified engineer platoon leader, you can improve coordination between your engineer unit and the armored and mechanized infantry combined arms task force you support.

In addition to being an engineer and a leader of soldiers, you are a member of the commander's special staff. Within that task force, you are expected to be the expert on all engineering-related subjects. You should be as knowledgeable in your duties as is the task force motor officer or signal officer.

You cannot know it all, and commanders understand that. However, every officer has the duty to strive to succeed by growing more knowledgeable and better qualified.

How well you can do your job will become evident very quickly. Your expertise will influence the way the task force commander uses and respects you, and it will affect the success and morale of your platoon. It may also influence future assignments within your unit. Hard work is not too great a price to pay to influence the battle and to save lives.

A Soldier First

Establish yourself as a soldier. This must be every officer's priority. Many lieutenants don't take the time to become technically proficient in the art of soldiering. The basics of soldiering must be mastered. Learn from the soldier's manuals. A soldier whose discipline and appearance reflect the Army standard will also train and fight to that standard. Remember, to lead soldiers you must be a soldier.

Establish yourself as a leader. The average lieutenant will be the leader of his platoon. But don't take that fact lightly; many lieutenants never become the leaders of their platoons, except in title. Use the leadership techniques you have been taught and formulate your own style. Your top priority always should be the welfare of your soldiers.

The discipline of your platoon is what you make it. As you gain experience, you will better tailor the level of discipline to the personality of your platoon. Many people will use

the appearance of your soldiers and equipment, in war or peace, as a basis for developing a first and lasting impressions of your platoon. Soldiers who appear undisciplined are usually poorly trained. Vehicles whose appearance and maintenance meet Army standards are usually manned by well-trained, disciplined soldiers.

Training and Teamwork

Use the basics in training. Train yourself first. Don't expect your men to willfully follow you into combat if you can't read a map.

Training resources—especially time—are limited at all levels. On the fluid nuclear and chemical battlefield, your men must move quickly, foresee priority changes, and work without guidance or supervision. Often your platoon will be spread across a task force sector. The ability to give orders on the move by radio is hard to develop, but it is indispensable on the fluid modern battlefield.

Your personnel must have intimate knowledge of the situation and be trained to perform independent operations. Personnel from the newest private to yourself must be able to give concise, essential instructions in obstacle execution to squad leaders and to tank commanders. The lives of your men depend upon the amount of good training they have received.

Emphasize teamwork. While fostering healthy squad competition, continue to work toward a high level of platoon cohesion. It is extremely difficult for a platoon to meet ARTEP Level 1 standards, much less perform well in combat, without a high degree of teamwork.

In most of the tasks you undertake as a leader, you will have to be imaginative and patient. Your results will not always be immediately recognizable. You may have to introduce the concept of teamwork to your platoon, and you may have to force it upon some of your soldiers. Personality conflicts will have to be resolved. Over time, the benefits will far exceed the effort.

FM 100-5, *Operations*, emphasizes that "superior combat power derives from the courage of soldiers, the excellence of their training and the quality of their leadership."

The responsibility you are given when you pin on your green leadership tabs is greater than you can understand at the time. The trust and faith the president embodies in you when you take your commissioning oath is the same trust and faith your men will give you in a disciplined, well-trained unit.

Be Technically Proficient

Establish yourself as an educated engineer and a qualified combat engineer. Know the capabilities of your platoon, your company and your battalion. Know what you can accomplish, what you have to accomplish it with, and how long it will take.

Be knowledgeable of other engineer units. For instance, you should be familiar with the composition of a corps engineer unit that is coming into the task force area of operations. Familiarize yourself with the who, what, where and how of resupply of barrier materials.

Meanwhile, know to whom you can turn for help. Usually, it will be your company commander. Do not hesitate to ask peers, the S3, the commander or anyone else that might help you accomplish your mission and save lives. Become an expert yourself.

Combined Arms

You must establish yourself as a member of the combined arms team. The field manual that covers combat engineer doctrine, FM5-100, *Engineer Combat Operations*, notes, "Engineers move and fight side by side with other combined arms."

How well you can do your job will become evident very quickly. Your expertise will affect the morale and success of your platoon.

Avenues For Professional Development

The following are excellent sources for increasing your military skills.

Army Correspondence Course Program (ACCP): The Army developed this program to enable its members to further their professional education. You can enroll in these courses regardless of the type or location of your unit. Your facility education center will provide the details. You can bite off a big piece like an officer advanced course, or a small piece such as a specific supply course to help you with an additional duty.

People: Your company commander has a wealth of knowledge and experience. He knows where to go for answers, can empathize with your situation, and will talk informally on almost any occasion. For senior platoon leaders, the battalion S3 and the battalion commander also will provide educational assistance.

Your battalion's officer and NCO professional development program may already cover some of the topics discussed in this article. This may provide you with an outline or ideas you can use later in the field with the task force.

Do not discount war stories. Everyone has one, and they can be one more way to increase your knowledge.

Manuals: Principles and doctrine guide the things we do throughout our careers. They are guidelines but each one should be followed to some extent.

FM 71-1, *Tank and Mechanized Infantry Company Team;* and FM 71-2, *Tank and Mechanized Infantry Battalion Task Force,* are easy to read and are used daily in maneuver battalions. TT 71-1/2, *The Abrams Battalion, Division 86,* has been implemented in some units, and the manuals are available.

As you increase your education, seek more specific knowledge of FM 100-5, *Operations;* and FM 71-100, *Armored and Mechanized Division Operations.* All that you can learn of Soviet doctrine, tactics and organization will supplement your soldiers' limited and general knowledge on the enemy. Detailed knowledge of FM 5-100, *Engineer Combat Operations,* and FM 5-34, *Engineer Field Data,* is essential. Finally, don't forget the Soldier's Manuals.

Professional Books: A particularly good place to begin is *The Army Officer's Guide* and DA Pam 600-2, *The Armed Forces Officer.* They are easy to read and though general in nature, both provide a great deal of basic information. They also serve as a quick reference for important data such as branch information and history and proper wear of the uniform.

Professional Journals: If you do not subscribe now, do so. The armed forces arena, especially for the engineer, is too vast and complex for you to keep current by reading general news.

Doctrine, tactics and equipment change. You should keep abreast of new weapons of the 1980s and the AirLand Battle concept. FM 5-100, *Engineer Combat Operations,* notes, "engineers at all levels must be aware of new material developments." Journals also describe the current professional climate in the Army and in the Corps of Engineers.

FM 5-34, *Engineer Field Data,* is yet another useful source, as is the *Engineer Platoon Leader's Handbook.*

It further states that engineer platoon leaders must "use the engineer systems to fight as required by the battalion task force commanders." Therefore, you should know how the maneuver commander is taught to use you and your assets.

The Division 86 manual for the Abrams tank battalion reads, "As a member of the combined arms team, the engineer promotes, develops, and implements actions to increase the mobility, countermobility and survivability of the task force." While that is certainly true, sometimes you must remind the task force commander of some of your limitations in mobility and resupply.

Knowledge of tank and mechanized infantry doctrine and tactics is essential. You cannot arbitrarily execute lanes through obstacles. Get detailed instructions, and in return, give your recommendations. Obstacle handoff and execution are seldom satisfactorily coordinated and detailed enough. Obstacle handoff remains one of the most difficult tasks to accomplish on the battlefield.

Familiarity Breeds Success

It is important to know the Table of Organization and Equipment (TOE) of the unit to which you are assigned; there are assets in the task force that can assist you in your mission. In general, you are familiar with the maneuver line companies. However, in most tank battalions, the Headquarters and Headquarters Company (HHC) and Combat Support Company (CSC) have the major cargo hauling capabilities and the AVLBs (armored vehicle launched bridge).

Make suggestions for using task force assets to help in your mission or training. All commanders will listen to recommendations that will help our men to win and to survive.

You must have intimate knowledge of the five-paragraph field order, also called the operations order (OPORD). The entire operations order must be understood in order to properly prepare yourself. The operations order is the commander's plan for battle which, in the absence of other guidance, should provide continuity for the task force in the event that command, control and com-

munications (C^3) is temporarily lost.

The operations order should also play an important role in preparing your men for the battle. You will have to write the engineer annex to the task force operations, so learn the format. Be detailed but concise.

You should maintain close contact with the individuals that will help you most. Ultimately, you work for the commander. Doctrinally, your guidance and missions will be coordinated by the S3. You may also be attached to one of the company teams in the task force. Get to know the commander or S3 as well as possible. If you know how they think, it will aid you in making correct decisions with minimum guidance.

It is to your advantage to get to know the task force personnel. It helps to be able to match faces and personalities with missions. Your platoon will operate with the same maneuver task force during all training exercises. This enables cohesion to develop and helps to solve some of the usual coordination problems.

Certainly each member of the task force influences your mission. The HHC commander and first sergeant are individuals with whom you will work often, and the battalion support platoon leader ensures that the battalion receives fuel, food and ammunition. Those three individuals (among others) have a direct bearing on your mission.

"You must have intimate knowledge of the five-paragraph field order."

Leaders must also continue to learn. Read everything applicable to engineers in the how-to-fight manuals FM 71-1, *Task and Mechanized Infantry Company Team;* FM 71-2, *Tank and Mechanized Infantry Task Force;* and TT 71-1/2, *The Abrams Battalion, Division 86.* You may be surprised to see very few paragraphs about the employing engineers.

Volunteer to give a class to the task force leadership, even if only for 10 minutes following a tactical operations order. Do not attempt to reach only the officers. Use your NCOs to teach their NCOs.

If the task force ever organizes your squads with each of their company teams, use the concept of normal association at squad level. Offer them an opportunity to visit your motor park or assembly area for cross-training and fun. Don't wait for them to offer; ask first. Virtually every commander is willing to show off his unit in front of other soldiers. The cross-training, especially in the engineer's secondary role as infantry will be practicable and fun.

The guidelines presented here are very general. If you get anything from this article, let it be an appreciation for discipline, teamwork, self-improvement, persistence and initiative. *The Army Officer's Guide* says that "engineers can look forward to professional opportunities which are limited only by their own abilities and ambitions."

Whether you plan to make a career in the armed forces or not, the next war (or certainly the next field training exercise) will be your war.

Be the expert!

CPT Willis Lee is an armor officer and ROTC instructor at Kentucky State University, Frankfort. He is a graduate of the Engineer Officer Advanced Course, the U.S. Military Academy, and the Airborne and Ranger schools.

He served in the 1st Armored Division as a tank platoon leader, scout platoon leader, S3(Air) and as a company commander.

Hotline Q & A

Q. I need information on Engineer desert operations.

A. See FM 90-3, *Desert Operations.* Also, your battalion S2 should routinely receive the National Training Center's newsletter, *Red Thrust Star,* which sometimes contains articles on developments in the area of desert operations.

Q. I need material that can be used to teach a class on the hasty protective minefield.

A. Use FM 20-32, *Mine/Countermine Operations at the Company Level;* FM5-102, *Mine Warfare,* and STANAG (Standard of Agreement) 2036, *Land Minefield Laying, Marking, Recording and Report Procedures,* as primary references.

Q. Are there any changes to a non-divisional unit as a result of Division 86 changes in TOEs?

A. Consult the CSEMW MAA (Combat Support, Engineering and Mine Warfare Mission Area Analysis), May 1983, and the Number 1, 1983, issue of ENGINEER which addresses Division 86.

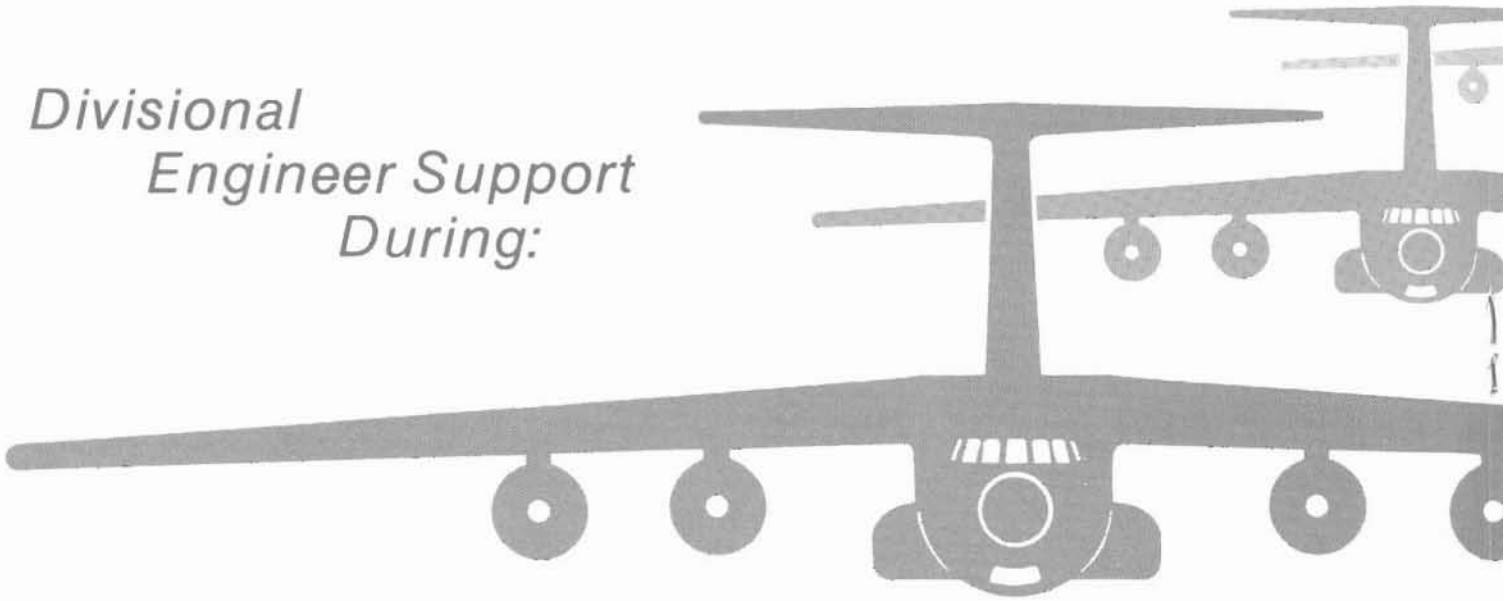
Q. I need a "canned" presentation about the Corps of Engineers. If a presentation is not available, a slide show would do.

A. The Engineer School has neither a briefing nor a slide show about the Corps of Engineers. However, a slide show is being developed and will be fielded sometime in 1984. Meanwhile, slides on the Corps of Engineers can be obtained from Ms. Stanley, Office of the Chief of Engineers (AV 270-0017). You might also want to check with the Corps of Engineers district in your area.

Q. Our engineer battalion is authorized 290M scrapers. Several of them are ready to be "washed out." We are not authorized replacements until the first quarter of FY85. What should we do until the replacements arrive?

A. Call your MACOM to request an exception to policy for extending the repair expenditure limit on 290M scrapers until replacement items are issued.

Divisional Engineer Support During:



OPERATION URGENT

by LTC Lawrence L. Izzo

Much of America was settling back for the kickoff of Monday Night Football.

But at 9 p.m. Eastern time on October 24, 1983, the 82nd Airborne Division's 307th Engineer Battalion was beginning to tee up for Operation Urgent Fury—the Grenada rescue mission.

Nineteen hours after the New York Giants and the St. Louis Cardinals began their gridiron combatives, members of the 307th and the infantry they supported were locked in real combat on a Caribbean island five hours flying time from Gifford, Cosell, and home at Fort Bragg.

The Mission

At 11 p.m., on October 24th, the 307th's commander was briefed by the division staff. Two battalions from the division's 2nd Brigade, accompanied by the brigade and division assault command posts (CPs), were deploying to Grenada. They would relieve two Ranger battalions sent to secure the island's important Point Salines airfield in a parachute assault at dawn the next day. The 82nd's two battalions would deploy with their habitual engineer attachments—one platoon each from B Company, with the company commander serving as brigade engineer.

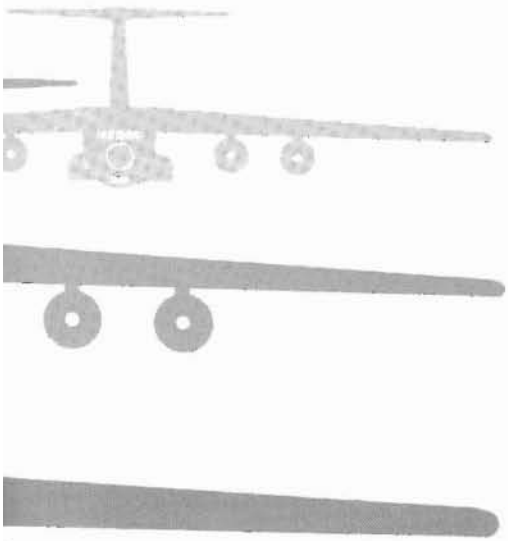
The division task force was to secure the airhead and prepare to rescue American students at the island's St. George's Medical School. Every precaution would be taken to keep the assault secret and to take the enemy by surprise.

Preparing for Combat

By 1 a.m., October 25, combat elements of both battalions were moving to a secure deployment area where they were isolated from the rest of Fort Bragg. Inside the holding area, there were no phones and there was no chance to go back and repack ALICE (all purpose, light weight, individual carrying equipment) packs, which, along with a weapon and load carrying equipment, were the only things the paratroopers would take with them into combat.

For the next five hours, the men made final preparations for combat, doing things they had practiced many times before. The troops were still unsure of their destination. There were briefings on actions at the objective airfield, and ammunition and contingency items (flak jackets, mosquito nets, iodine tablets, etc.) were issued.

It didn't matter that there was no time for sleep. Everyone was too excited to be tired. There was a gradual realization among the troops that this was no training exercise. Whether it was the tenseness of their leaders, the extra urgency or some other tip-off, slowly each paratrooper understood that this was an



FURY

actual deployment.

At dawn on the 25th, division units moved to nearby Pope Air Force Base (AFB), the departure airfield. By now the troops knew that on this parachute assault, there would be real bullets flying on the drop zone. At the airfield, jumpmasters gave their briefings. Soldiers rigged their packs for parachute assault and drew parachutes and reserves.

C141 aircraft would carry the assault echelon to Grenada. Both infantry battalions were going in very light, but with complete engineer platoons. All vehicles were left behind for deployment with follow-up echelons. In these vehicles were packed most of the engineer tools.

The 307th Engineer Battalion commander would accompany the task force as the engineer representative in the division CP. His first task on the drop zone would be to assess the condition of the runway and to determine future engineer requirements.

By 9 a.m., troops were loading the C141s. Their parachutes were carried aboard for in-flight rigging during the five-hour trip. Morale was sky high, spurred on in anticipation of the first 82nd Airborne Division combat parachute jump in almost 30 years.

Cuban Counterattack

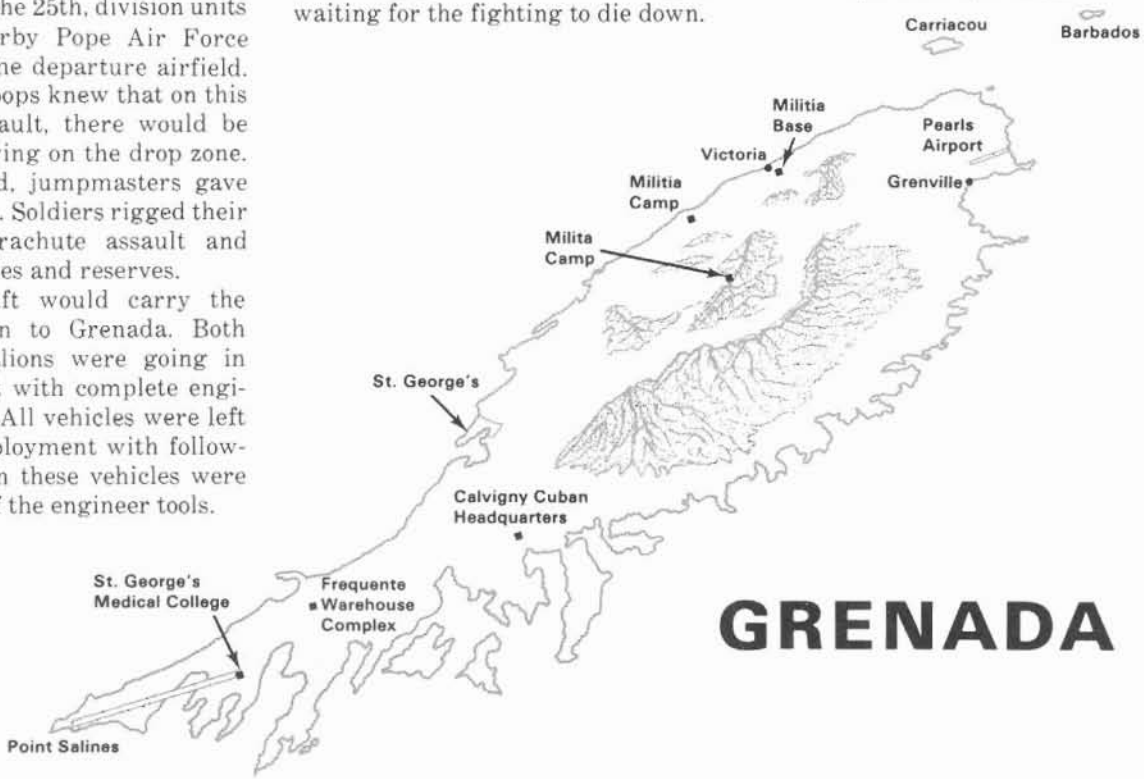
At 10 a.m., wheels were up and the task force was on its way. During the flight, the division commander received word that the Rangers successfully completed the airfield assault and that the C141s could land. The 82nd would not make a combat jump.

As the first aircraft landed, Cubans launched an abortive counterattack near the end of the Point Salines runway using three Soviet BTR-60 armored personnel carriers. Paratroopers, who had just gotten off of their aircraft, joined in with the Rangers and knocked out two BTR-60s. The third BTR was destroyed by a C130 Spectre gunship. Meanwhile, other C141s circled the airfield waiting for the fighting to die down.

By 4 p.m., the two infantry battalions were on the ground expanding the airhead. Two equipment operators from the 307th who had been attached to a Ranger battalion rejoined their engineer unit. The two men made the airfield parachute assault with the Rangers that morning. In spite of the fighting going on around them, they cleared the runway of construction equipment so the C141s from Fort Bragg could land. These engineers from the 307th were the only paratroopers from the 82nd who made the combat jump.

For the next several days, reinforcements arrived to round out elements of six infantry and two artillery battalions. The 9,000-foot Point Salines airfield runway was in excellent condition. The surface had several lifts of asphalt and could easily handle continuous C141 traffic.

Since the runway was surrounded by construction equipment, bringing in engineer equipment from Fort Bragg was unnecessary. Equipment operators with the first-deployed engineer platoons quickly began using the captured equipment, which included Russian dump trucks and Komatzu bulldozers. As more operators, mechanics and combat engineers arrived, more captured equipment was put into operation.



Escorting Cubans to the new detention center.

Security and Water

Their first night in Grenada, the dozer operators began ditching around the division CP to restrict access and to improve security. Later that night, the dozers served as barricades. Precast concrete blocks surrounding the Point Salines terminal later were stacked to form a truck-proof CP barricade. The 82nd would not chance repeating the Marine's Beirut tragedy which was so fresh in everyone's mind.

Another early engineer requirement was to clear rubble from the concrete apron outside the airport so supplies could be unloaded from C130s flying in from a staging base on Barbados, about 60 miles from Grenada. Completing this task expanded the capacity of the main runway, which was being used for unloading ammunition, food and priority supplies arriving on C141s from Pope AFB. Engineers also dug-in the main refueling point, the ammunition supply point, and cut a road to the field hospital.

On D+1, the first 400 gallon per hour (g.p.h.) erdalator arrived and the 307th established the first of four water points. Later, a corps-level 600 g.p.h. reverse osmosis water purification unit (ROWPU) was brought in. Because of its desalinization capability, the ROWPU was located right next to the ocean near the airfield.

Reinforcements by D+4 brought engineer strength at the airfield to a company (minus) in general support of the division.

They Did It All

A challenge during any airborne operation is reinforcing the task force while simultaneously keeping it supplied. During Urgent Fury, everything had to come by air over thousands of miles. Every aircraft sortie was important. No wasted space on any aircraft was allowed; only the most essential personnel and equipment were deployed.

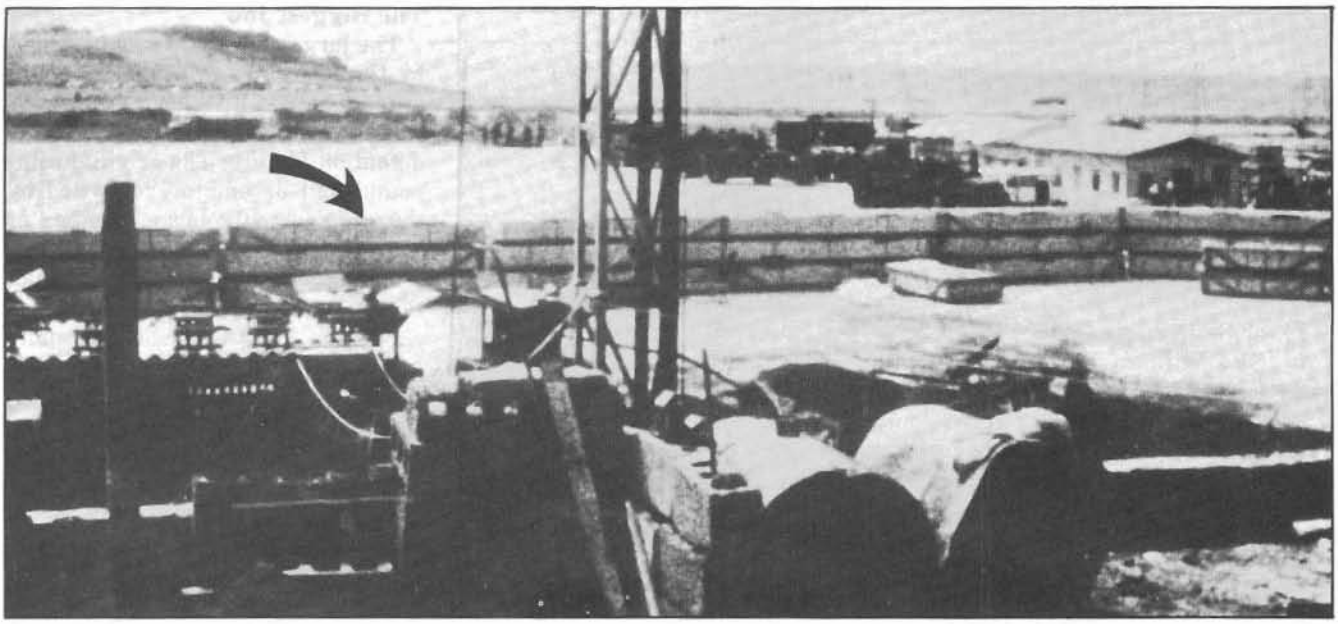
Hence, the handful of engineers at the airfield in general support found themselves performing many missions. They put Russian generators into operation and provided electricity and lighting to the division CP. Their water-point trucks were used to transport infantry. Engineers helped move beds, blankets and supplies for the field hospital.

They also carried wounded soldiers to evacuation aircraft, dug graves for enemy dead, built latrines, dug garbage pits, repaired plumbing and electricity for the detention compound, distributed water, and erected concertina. They improvised dust suppression equipment for the airfield, cleared landing zones for helicopters, provided local security and gerry-rigged shower points. They accomplished everything asked of them using captured equipment and the barest minimum of hand tools.

Meanwhile, the engineer support for the infantry battalions had grown to six platoons, or the nucleus of two companies. These platoons cleared landing zones, provided demolition support, conducted mine sweeping operations to search for buried weapons, and erected roadblocks.

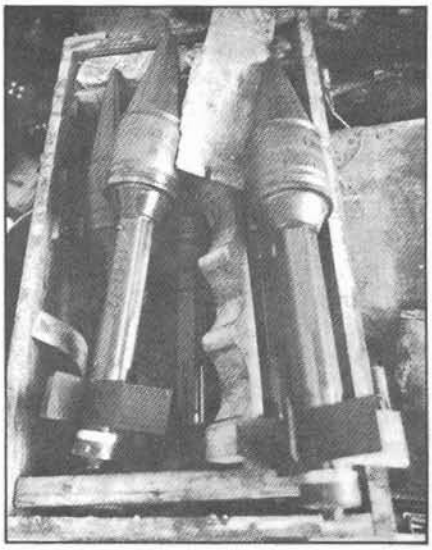
Engineers also fought alongside their infantry comrades, assisting in airmobile and ground operations. Bravo Company received the mission to secure the largest cache of captured weapons and ammunition on the island, the Frequente warehouse complex. The company repeatedly received sniper fire from the surrounding hills until using ground surveillance radar and key outposts ended the danger. The company inventoried the captured materiel and began moving it to the airfield.

Engineers in Grenada using a captured front loader.



One of the engineers' first tasks was to construct a truck-proof barricade (see arrow) around the division CP.

Captured: Soviet 7.62mm ammo labeled "Cuban Economic Office," above. Below, North Korean rocket-propelled grenades.



Urgent Fury

TIME CAPSULE

October 24	
9 p.m.	307th Engineer Bn, 82nd Airborne Div. alerted.
1 a.m.	82nd Airborne Div. task force of two battalions (each with one engineer platoon) moves to predeployment area.
October 25	
Dawn	Rangers (with two heavy equipment operators from the 307th) make a parachute assault onto the Point Salines airfield.
10 a.m.	Wheels up. 82nd Airborne Div. task force on the way.
4 p.m.	Task force lands; abortive Cuban counterattack.
October 26	First of four water points is established.
October 29	Division engineer strength increases to a company (minus).
November 1	307th is tasked to build 1,000-person detention facility.
November 3	Detention facility completed.
November 4	B Co., 307th returns to Fort Bragg.
November 15	C Co., 307th begins returning to Fort Bragg
December 24	Last elements of C Co., 307th return to Fort Bragg.

COMBAT JUMPERS

Spain, Richardson and the Rangers

For SP4 Charles E. Spain and SP4 William R. Richardson on October 23rd, one hour they were enjoying an off-duty Sunday, the next hour they were on their way to join in the Ranger parachute assault against the Point Salinas airfield in Grenada.

Both men are equipment operators in the 618th Engineer Company (LE), 307th Engineer Battalion, 82nd Airborne Division. They were the only troopers from the 82nd to make the jump in Grenada.

Spain (L) and Richardson now wear wings with a combat star.

For Richardson, it was literally baptism by fire. The parachute assault was his first jump since completing airborne training. It was a jump made under fire, at 500 feet, and with no reserve parachute.

The drop zone was the Point Salinas airfield runway, and it was littered with construction equipment. Spain and Richardson were with the Rangers to move the construction equipment off the runway so the follow-on assault force from Fort Bragg could land.

According to an *Army Times* report, the two engineers worked under sniper fire while the Rangers secured a perimeter around the airfield.

Spain, Richardson and the Rangers jumped at dawn on the 25th. By 1 p.m., they had cleared the runway of equipment. Three hours later the assault force from the 82nd Airborne Division was landing.

Military posters in a Cuban barracks at Pearls Airport.

The Biggest Job

The largest single mission tackled by the division engineers began on D+7 when the division commander told the engineers to construct a new detention facility. The original compound had become overcrowded by the unexpectedly large number of detainees.

With the help of Cuban construction worker volunteers, and with captured equipment, locally purchased materials, tents and other important items rushed in from Fort Bragg, the 307th constructed a 1,000-man camp in 34 hours.

The camp had exterior and interior lighting, 45 GP-medium tents, guard towers, a shower point, plywood latrines, triple standard concertina and segregated interior compounds for the different categories of detainees. On D+9, engineers helped move the prisoners into the new compound.

There were many lessons learned during Urgent Fury. Some key ones for airborne divisional engineers include: the importance of planning for general support of the division rear as well as for supporting forward combat units; understanding and using procedures for purchasing key material locally; planning and coordinating the use of local hires; and most importantly, planning for and making the best use of captured engineer equipment.

With the accomplishment of their mission—rescuing and evacuating all American students, relieving two Ranger battalions and then the Marine ground forces, and capturing or destroying all Cuban forces on the island—the paratroopers of the "All American" 82nd Airborne Division added another chapter to the division's illustrious history.

LTC Lawrence L. Izzo commands the 307th Engineer Battalion, 82nd Airborne Division and was the division engineer for Operation Urgent Fury. Previously he was S3 of the 18th Engineer Brigade, USAREUR. LTC Izzo has an M.S. degree from the Massachusetts Institute of Technology, an M.B.A. degree from Long Island University, and is a licensed professional engineer in Virginia.

The Sauteures police station during renovation by C Company, 307th Engineers. *(Nancy Ann Zamorski photo.)*

Water to the Ankles & No Repair Parts

by SP5 Nancy Ann Zamorski

"Hey, come over here and take a look at this. I went to turn on the water and the faucet broke off in my hand."

That was one of the problems C Company from the 82nd Airborne Division's 307th Engineer Battalion faced while rehabilitating seven police stations in Grenada.

Renovating the stations included painting, electrical rewiring, repairing cell doors, and upgrading the flush toilets and plumbing systems.

"The stations were not damaged from the fighting," said SSG Russel G. Smith Jr., of C Company's 2nd Platoon, 3rd Squad. Smith worked at the abandoned Sauteures police station on the northern tip of the island. "The place was real old. I'd say it dated back to 1900—or at least before the 1930s," he said.

The plumbing in most of the stations was early 1950s vintage, according to one of the engineers.

"We had to put in a new drainage system at the Grenville police station," said Smith. "When we first got there, the water was ankle deep."

Because the plumbing was so old, the engineers had a difficult time finding repair parts. Everything needed for repairs was purchased from stores on the island.

Another problem the engineers had in repairing one of the stations was with electricity.

Inspector Roy Raymond of the Sauteures station is from Grenada. He said that the electricity is shut off in his area, "due to the condition of the generators here." He explained that electricity is shared at different times of the day in the community.

"Because of that," Smith said, "we couldn't work on most of the electrical problems until the evening when the electricity came back on. Once it came back on, I could run a hot wire in.

"We worked with electrical supplies bought on the island that were imported from England," Smith said. "It was difficult for us since the electricity was not the same as back in the states."

The renovated police stations are being used by Grenadian authorities as base areas for security operations now that U.S. troops have left the island.

SP5 Nancy Ann Zamorski is a photojournalist in the XVIII Airborne Corps public affairs office.

Everything Engineers Can Be

by SFC Bob Lentner

The commander of the XVIII Airborne Corps troops in Grenada put them in for a Meritorious Unit Citation, even though they weren't part of the island assault force. They didn't have a chance to fire a shot, but their brigade commander thinks they're some of the best soldiers in the Army.

They're the combat engineers of C Company, 548th Engineer Battalion (Combat). They were soldiers who worked tirelessly as builders and fixers. They improvised detention cells out of packing crates, covered landing strip holes, repaired roofs, kept the dust out of the air on convoy roads, and covered a motor park area with gravel.

And they did a lot more. Shortly after their arrival in Grenada on November 6, 1983, the engineers from Charlie Company, reinforced by two platoons from the 27th Engineer Battalion (Airborne) and six soldiers from the 20th Engineer Brigade's composite engineer battalion, began work on a list of projects that kept them busy around-the clock for almost a month.

The first major project was moving, putting on pallets, and loading all of the weapons and ammunition captured on the island. The Soviet and Cuban arms and munitions were prepared and packaged by the engineers for shipment to stateside receiving points. The task force was also responsible for recovering and destroying explosives found on the island during the invasion.

First sergeant of the engineer task force, SFC Andy Koji, said his men did everything for everybody. "We built a security fence around the radio station, two field PXs, put in lighting at the American embassy, put plumbing and electricity back into the local police stations, and even fed 300 extra people a Thanksgiving meal. We did it all," Koji said.

The commander of C Company and the entire Grenadian engineer task force, CPT Roderick Chisholm, said he couldn't think of a function that his soldiers didn't perform. "They did carpentry, plumbing and electrical work at the island's hospital, built helipads, upgraded prisons, worked on roads and the airstrip, strung a lot of concertina, and even provided security for the airstrip for a while. They did a lot of good work that will last, and they did it together."

The main body of the engineer task force returned to Fort Bragg late on the night of December 7th and were met by families and fellow soldiers at the Green Ramp at Pope Air Force Base. About 20 of the engineers remained in Grenada to complete projects and to prepare equipment for redeployment.

"The soldiers in the task force were great," said COL Daniel R. Schroeder, commander of the 20th Engineer Brigade (Combat) (Airborne Corps). "They did everything we expected of them and more. I'm proud of them. They're everything engineers can be."

SFC Bob Lentener is the public affairs officer of the 20th Engineer Brigade (Combat) (Airborne Corps).

548th Engineers wait for their baggage after returning to Ft. Bragg from Grenada. *(Bob Lentner photo)*

A warehouse full of Soviet-made small arms ammunition. Six arms warehouses were found in Grenada.

A Caribbean Arms Cache

On October 25, 1983, the U.S. military, at the request of the Organization of Eastern Caribbean States, conducted joint operations, code named "Urgent Fury," to protect U.S. and foreign citizens in Grenada and to assist in restoring order and stability in the country.

During the first few days of the operation, more than 600 Cubans were detained in Grenada. Resistance from these well armed military and paramilitary forces belied claims that they were simply "construction crews."

Large amounts of Soviet weapons and equipment, supplied by the Soviets through Cuba to Grenada, were found by the multinational force. Following is a complete list of these weapons and equipment. This weaponry has been estimated to be sufficient to equip two Cuban infantry battalions for 30-45 days of combat.

Rifles and Machine Guns

1,626- Soviet AK-47 assault rifles
1,120- Model 52 (Czech)
58- Enfields
4,074- KS rifles (SKS)
3- MK-3
2- Bren rifles
6- M16s
2,432- Mosin Nagent (7.62mm Soviet rifles
32- M3A1 submachine guns
7- Sterling machine guns
55- M23 submachine guns
17- Sten Mark 2
180- Soviet M1945 Submachine guns
300- Miscellaneous sidearms
31- .22 Caliber rifles
300- Shotguns

Crew Served Weapons

9- Soviet 7.62mm PKM machine guns
8- 73mm SPG-9 recoil-less guns
12- ZU-23mm antiaircraft guns
1- DSHQ 12.7mm Machine gun
10- 82mm mortars

Ammunition

5,516,600 RDS- 7.62mm
162 RDS- 73mm
8,962 RDS- 82mm mortar
2,320 RDS- 14.5mm
29,120 RDS- 23mm anti-aircraft gun ammunition
366 RDS- 57mm rocket propelled grenades
940 RDS- 75mm
1200 sticks- Dynamite
24,768- Flares

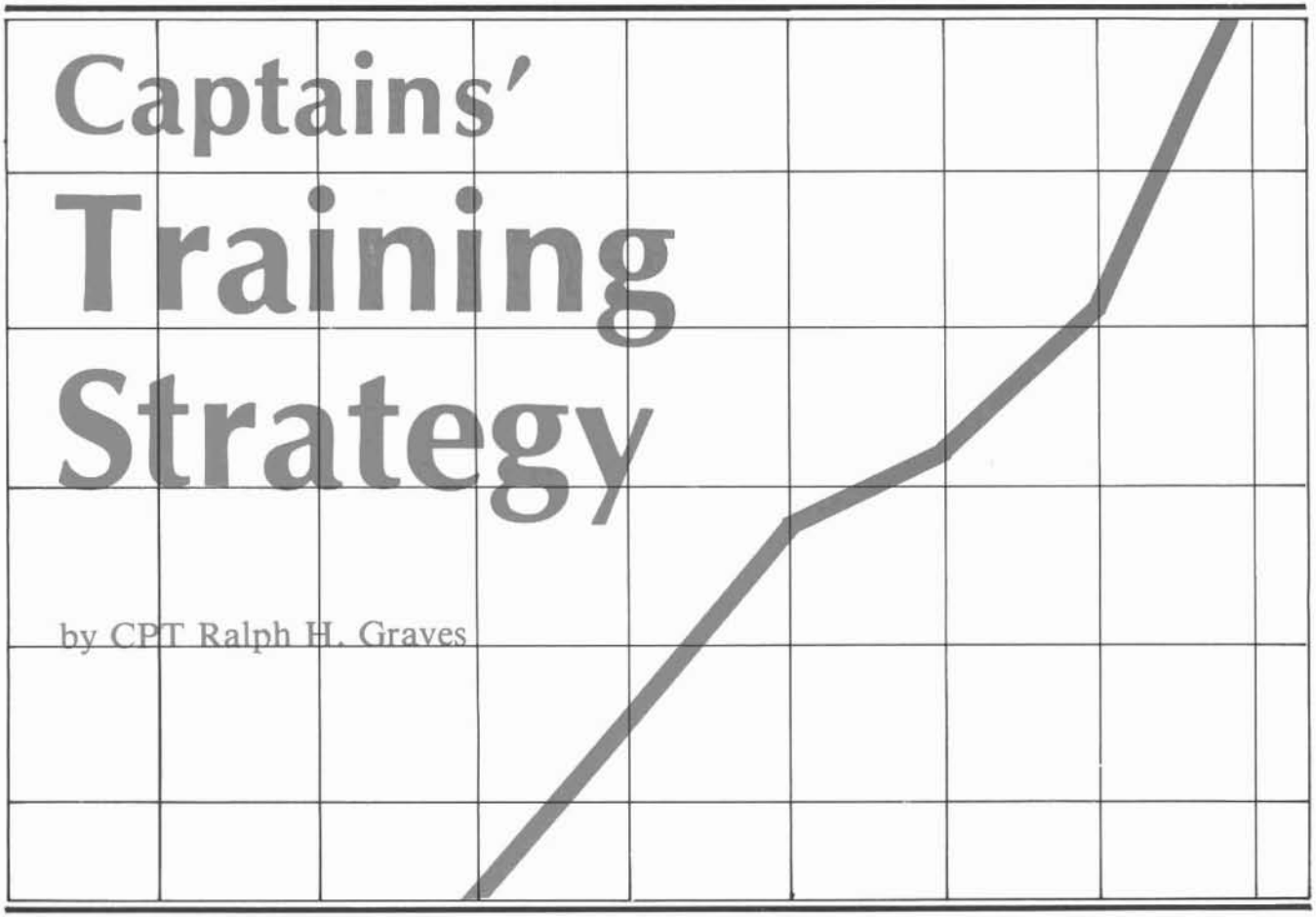
Miscellaneous Weapons

1,824- Grenades
6- RPG 7 (rocket propelled grenade)
46- RPG 2 (rocket propelled grenade)
8- Tear gas riot guns
8- Flare guns

Vehicles

2- Armored fighting vehicles

Captains' Training Strategy



by CPT Ralph H. Graves

The Engineer School is launching a new Engineer Officer Advanced Course (EOAC) with a combination of features unlike anything the Army has seen before.

Highlights of the 20-week course include grouping lessons into two-week modules, emphasizing experiential training and arranging students into small groups, helping students to incorporate the concept of "wellness" into their professional and personal lives, and using computer based instruction.

The first increment of the new course begins in October 1984. The new course is the result of analyzing field experience, reviewing other courses, and studying the latest educational techniques. The new advanced course's concepts for the near and long terms are called, respectively, Vision 84 and Vision 86.

The Basic Concepts

The fundamental concepts of the new advanced course are:

Scenario/modules: Related lessons will be grouped into two-week modules. Lessons are couched in a scenario format—a setting formulated by the Combined Arms Center at Fort Leavenworth in which notional units perform missions that appear to be taking place in various parts of the world. The scenario format will add realism to instruction and exercises. It also will encourage students to practice solving problems using doctrine as a guide.

Experiential training/small groups: Captains' skills such as planning, managing, and leading are integration skills best taught by doing. The new advanced course will emphasize hands-on training in groups of 10 to 12 students. In addition to small-group practical exercises, each module will include at least one capstone exercise in which the groups perform a number of tasks to accomplish a broad mission.

Wellness: The new course will incorporate the concept of wellness, defined as developing mind, body, and spirit to increase individual potential and satisfaction. Wellness instruction will cover topics such as time management, personal assessment and goal setting, stress management, physical conditioning, control of substance abuse, and diet and nutrition.

Team leaders: Each small group will have a team leader to act as mentor, coach, and facilitator. The team leader will supervise all small-group exercises, evaluate and counsel students, conduct wellness training, and act as role models. Additionally,

team leaders will write doctrine, keep the course current, and act as subject matter experts.

Challenge and reward. Rather than emphasize a median or passing standard for test scores, the new course will focus on developing skills for success in the field. The idea is to motivate officers by presenting the challenges of introspective, engineering, and people-related problem solving. An evaluation of group exercise participation and performance counseling by team leaders will supplement traditional evaluation methods.

Computer based instruction (CBI): This concept encourages the student to use the computer terminal to accelerate and personalize instruction. It is particularly applicable to Engineer captains' training because students enter the advanced course with a variety of academic backgrounds. Ultimately, CBI can provide an interactive, worldwide educational network linking all engineer units to the Engineer School.

Core and Functional Courses

The new EOAC will include a 14-week core course followed by functional courses keyed to the student's next assignment. The combined length will be at least 20 weeks, preserving the advanced course as a permanent change-of-station assignment. Reserve Component officers can attend the two-week modules during their Active Duty for Training periods.

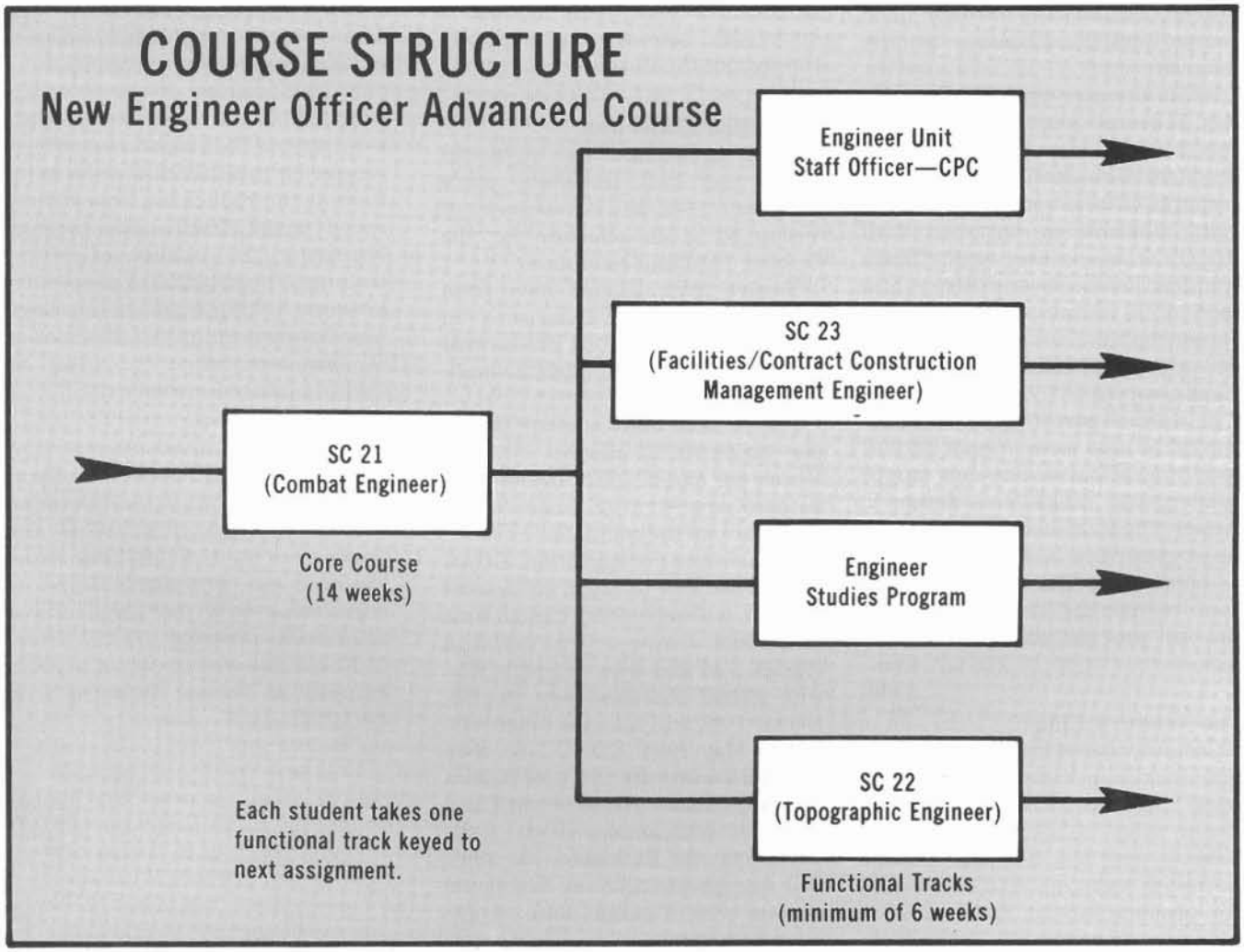
Offering the 14-week core course also allows the Engineer School to delete the current 12-week Reserve Component EOAC and to train Reserve and Active Component officers together.

Core Course Requirements

Before attending the core course, each prospective student will take a diagnostic exam. The exam is expected to last four hours, and will be given at education centers or USAR schools. The exam will test military skills covered in the Engineer Officer Basic Course and in initial assignments. Students who do not show an adequate base proficiency will receive special instruction by correspondence or in residence before starting the core course. The diagnostic exam and pre-course will eliminate redundant instruction from the new advanced course.

Course Content

Over 1,000 tasks were reviewed in a scan of Specialty Code (SC) 21 duty positions to determine the course content. Some 600 tasks were identified to be taught in the core course



and grouped into lessons within the modules.

The core course scenario will follow a sequence through peacetime, mobilization, deployment, offensive and defensive combat, lines-of-communication and base camp construction, and rapid deployment and counterinsurgency contingencies. The principles of AirLand Battle doctrine and of combined arms employment will be integrated throughout.

Lecture instruction will be reduced greatly in favor of practical exercises. A typical classroom day will run from 7 a.m. to 1 p.m., with the afternoons allocated to out-of-class study and to other activities. Approximately one-third of the instruction will be conducted in small groups.

Functional Courses

The functional courses planned include ADM Mission Officer, SC 23, SC 22, Engineer Unit Staff Officer, the Company Pre-Command Course, and the Engineer Studies Program.

While the core course trains officers in overall planning and execution of combat engineer missions, the Engineer Unit Staff Officer Course prepares officers returning to troop units to serve as battalion staff officers or as engineer staff officers at higher levels. These skills are also applicable to company command. Those who have not yet commanded will attend a Company Pre-Command Course.

At least 10 percent of the instruction in the near term (Vision 84) will be computer based. Subjects taught by computer range from design to tactics. The terminals will be used to assist classroom instruction as well as homework. The system will be used to monitor student progress and to provide course statistical data.

The Network Link

Computer based instruction figures prominently in Vision 86. An educational network is envisioned that would allow students to interact directly with the Engineer School for initial learning, refresher training, problem solving, and communicating by electronic mail, even from remote locations. The bulk of learning could take place through the computer in a non-resident mode. The student would then attend a brief TDY assignment to a core course consisting entirely of experiential training, and to functional courses, either in residence or on the computer, which would prepare the officer for specific duty assignments.

The computer network also could contribute to unit training programs unrelated to the new advanced course. It would be an ideal tool for unit professional development programs and could be used to prepare for upcoming exercises or projects.

Further, the network would enable the Engineer School to publish doctrinal updates rapidly. School and subject matter experts could stay in touch through the network and collaborate on projects. Units facing problems could query the network and benefit from the collective experience of the engineer community. With this network, the Engineer School would become a knowledge base serving engineers throughout the world.

Transition Underway

Work to update the advanced course has been underway since February, 1983, and development of Vision 84 is on schedule for the October 1984 implementation.

Twelve team leaders have been selected, and two classrooms in Humphreys Hall at Fort Belvoir will be modified to accommodate small-group instruction.

Funds have been allotted to buy the hardware to support CBI for Vision 84, and a cell of courseware authors are writing instructional material into the computer.

To facilitate the transition, EOAC 7-84, scheduled to begin on August 20, 1984, will not be held. Components of the new course will be tested in classes 5-84 and 6-84. Students who will attend the first new course, EOAC 1-85, will take the diagnostic test in May 1984. EOAC 1-85, 2-85 and 3-85 will take the course in a format without CBI, to be used as a basis for comparison. EOAC 4-85, beginning on February 18, 1985, will incorporate core and functional courses with a target total of 133 hours of CBI.

Other TRADOC Initiatives

Captains' training is being improved at the Engineer School against a background of other initiatives in the U.S. Army Training and Doctrine Command (TRADOC).

The task analysis performed for Engineer captains' training provided information for development of Military Qualification Standard Level III (MQS III) Common Tasks by the Combined Arms Center at Fort Leavenworth, Kansas. The instructional materials developed for the EOAC core course will be the basis for the MQS III Engineer Specialty Manual.

The 1978 Department of the Army Review of Education and Training for Officers (RETO) study recommended that the time in the advanced courses be reduced. Schools throughout TRADOC soon will be implementing advanced courses with 20-week core courses followed by up to six weeks of functional courses. The new EOAC will reduce student residence time by at least four weeks. Long-term concepts could lead to further reduction.

Implementation of the new captains' training strategy significantly will improve the preparation officers receive for meeting challenges in the field. It can reduce the time officers spend away from units without impairing the quality of officer training. The potential of a computer network linking together the Engineer family is unlimited. Realization of this new vision promises an exciting future for the Corps.

CPT Ralph H. Graves is a member of the Captains' Training Team, Directorate of Training and Doctrine, U.S. Army Engineer School. He is a graduate of the U.S. Military Academy and has a master's degree in engineering from the University of California, Berkeley. He has served in Korea and was assistant division engineer of the 8th Infantry Div., USAREUR.

Restructuring SC 21—

by CPT Bruce H. Reminger

Benefits to the Corps and to The Army

In May 1983, the Army chief of staff approved restructuring officer Specialty Code 21 (Engineer) into SC 21 (Combat Engineer) and SC 23 (Facilities/Contract Construction Management Engineer). With this change, Engineer branch officers can become more proficient in combat engineering and in facilities/contract construction management, without being required to become fully qualified in another additional specialty.

Problems with Old SC 21

In accordance with the Officer Personnel Management System (OPMS), commissioned officers must have two specialties, an "accession" or initial specialty (INSPEC) and an additional specialty (ADSPEC). The INSPEC is assigned upon commissioning, and the ADSPEC is designated at about the fifth through eighth years of service.

The Corps of Engineers is a unique branch, one with both military and civil missions. Under the old SC 21, Engineer officers performed a diversity of assignments—a diversity which sometimes did not promote meaningful career progression in either combat engineering or in facilities/contract construction management. There was simply not enought time available to become fully qualified in all aspects of the branch and in an ADSPEC.

A second problem with the former SC 21 regarded the projected field grade officer shortage. Four to nine years from now, approximately one-third of all Corps of Engineers field grade requirements would have to have been filled by ADSPEC 21 officers. The shortage would be due to the number of SC 1 officers required to work in their ADSPEC and thus be unavailable for duty in SC 21 positions.

The restructure creates a new SC 21 (Combat Engineer) which is an INSPEC only, designated upon commissioning. Typical duty positions are company commander, battalion/group/brigade staff officer, military engineering instructor, Reserve Component advisor, and recruiting commander.

Since new SC 21 is an INSPEC only, all positions will be held by Corps of Engineers officers. All Corps of Engineers officers are being automatically reclassified as (new) INSPEC 21s. Those officers from other branches currently holding ADSPEC 21 will be awarded new ADSPECs during FY 84.

SC 23 (Facilities/Construction Management Engineer) is an ADPSEC only. Typical positions are facilities engineer, director of engineering and housing, district engineer, and project engineer.

Currently, members of Year Group (YG) 77 are receiving their ADSPEC designation. In the designation process (or reclassification process for SC 21 officers senior to YG 77), MILPERCEN is considering the following criteria, in order of priority:

- Prior experience in a position now coded as SC 23
- Engineering degree
- Individual officer preferences

The ADSPEC designation process for YG 77 should be complete by the end of FY 84.

Benefits of the Restructure

The restructure helps to solve the Corps' officer force structure problems by converting a large number of SC 21 positions to SC 23. This allows Engineer officers to satisfy the OPMS requirement to become proficient in their ADSPEC while fulfilling an Engineer branch position requirement. Since more Engineer officers will be available to work within the branch, fewer ADSPEC engineers from branches will be required.

Officers are eligible for command selection, advanced schooling, and promotion by specialty, not by branch. With more time available for both combat engineering and facilities/contract construction management assignments, chances are that Engineer officers will be better qualified in either specialty—or both. This is much better than attempting to qualify everyone in all aspects of the Corps of Engineers, and then having them compete against those who are well qualified in more narrowly defined specialties. Those Engineer officers who do not desire SC 23 as their ADSPEC may choose a different ADSPEC. This will provide good career options for Engineer officers without engineering degrees, or for those who do not desire assignments in the facilities or contract management arenas.

The restructure is also good news for the officer corps as a whole because it diminishes the need to force individuals from other branches to serve as ADSPEC engineers. Since new SC 21 is an INSPEC only, all SC 21 positions will be held by Corps of Engineers officers. About 70 percent of the SC 23 population will be made up of SC 21/23 officers.

The change also benefits women in the Corps. Because all positions in SC 23 are open, women can participate fully in the specialty and have the same variety of opportunities men have.

SC 22, Topographic Engineer, is not affected by the restructure of SC 21.

CPT Bruce H. Reminger is a personnel management officer in the Engineer School's Proponency Office. He is a graduate of the U.S. Military Academy and served in various positions with the 20th Engineer Brigade (Combat) (Airborne Corps).

by MAJ Lee A. Peters &
MAJ Kenneth Davidson

TEWTs for Engineer Troops

The 972nd Engineers get serious about "training the trainers."

"A TOOT?" you may ask. "What in the world is a TOOT?"

Well, it's actually spelled TEWT, and it means tactical exercise without troops. It's the concept of training trainers to be more proficient at training the troops they lead. TEWTs are performance-oriented and follow the Battalion Training Management System (BTMS) principles of holding classroom instruction to a minimum while emphasizing hands-on instruction. If conducted properly, the program will result in better training throughout the unit and increase readiness.

The 972nd Engineer Battalion (Combat) (Corps), USAR, Fort Benjamin Harrison, Indiana, conducted an ambitious and successful TEWT that taught or updated combat engineer and leadership skills to more than 70 NCOs.

The TEWT program was the 972nd's method of correcting training deficiencies observed during the training year, including Annual Training where several units performed marginally.

Some soldiers did not seem to comprehend basic combat engineer tasks.

This was especially evident among the squad and section leaders. They frequently asked for help with basic engineering subjects, or conducted training poorly. Also, returning Basic and Advanced Individual Training students were often more proficient in accomplishing engineer tasks than were their supervisors.

TEWTs were frequently used within the 972nd in the past, usually for training FTX instructors on how to direct specific missions. However, the battalion felt that upgrading combat engineer and leadership skills across the board would benefit all squad and section leaders in the battalion, and the TEWT method was to accomplish this.

The TEWTs required assembling virtually every squad and section leader in the battalion at a training facility; providing the necessary logistical support, including training materials, rations, and transportation; and also providing the key element of competent instruction.

The 972nd's commander contacted the Engineer Team from Army Readiness and Mobilization Region VI at Fort Knox, Kentucky, and discussed the TEWT idea with them. The team felt it could provide the necessary instruction for the project. However, team members emphasized that support from the unit commanders, the battalion staff, and participants would be required for the program to be successful.

Planning the course was the responsibility of the battalion assistant operations officer, who established a list of required actions and responsible parties. Meanwhile, units identified personnel to take part in the instruction. Camp Atterbury, an Indiana National Guard facility south of Indianapolis, was selected as the main training site. Readiness group personnel coordinated subjects and training schedules with the S3.

The classes were taught twice—once Saturday and again on Sunday—for a six-month period. Because of this, a unit or squad lost only one-half of its leaders each drill day.

The subjects taught during the TEWTs included demolitions, mine warfare, route reconnaissance, bridging, NBC and other combat engineer tasks based on ARTEP 5-35 and soldier's manuals (see next page).

The training was conducted in full battle dress under tactical conditions. Leadership was rotated and radiotelephone procedures, safety, NBC, MOPP levels, troop-leading procedures, and basic soldiering skills were integrated throughout.

To measure the relative effectiveness of the training, students received a "Go/No Go" rating for each task performed. These ratings were recorded in each individual's job book. The soldiers finishing the program received a course completion certificate signed by the battalion commander.

Not everything went smoothly. Once a group from one of the companies became lost on the way to Camp Atterbury and missed half of the day's instruction. During another month, the winter weather was so inclement with blowing snow and wind chill in the minus 40-degree (Fahrenheit) range that the training was cancelled and rescheduled for the following month. However, each problem was overcome and used as a lesson learned.

The effectiveness of the program was apparent at the next Annual Training when squads and sections performed at a much-improved level. Their overall performance was reflected in the annual training evaluation. The evaluator said that the 972nd was the finest engineer battalion he had evaluated.

ARTEP 5-35 TASKS

6-17 Crater Roads

7-3 Breach Obstacles with Explosives

7-14 Conduct Route Clearance Operations

6-16 Disable Bridges

5-15 Conduct Reconnaissance for Obstacle Location

5-15 Conduct Hasty Route Reconnaissance

5-16 Conduct Deliberate Route Reconnaissance

5-19 Conduct Bridge Reconnaissance

The acquired job knowledge that squad and section leaders gained helped them regain confidence and self-esteem. They became enthusiastic leaders who could impart their experience and knowledge to others. Predictably, individual squad members showed increased confidence in their squad leaders.

The TEWT instruction required a trade-off: The first line supervisors were absent from half of their unit's training during the TEWT period. Also, the program was costly in terms of training material, rations, fuel, and reimbursement to the Indiana National Guard for use of their personnel and facility.

To maintain the proficiency now present in NCO squad and section leaders, the battalion has incorporated an active NCO development program for refresher training in basic engineering tasks. Hopefully, this will prevent the need for a large-scale TEWT in the future.

TEWTs can be very effective for improving training in any unit. Careful planning, thorough preparation, and a willingness to overcome problems are necessary. Commanders should consider using this instruction method in planning their unit's training. TEWTs can pay big rewards in improving unit readiness.

"The program's effectiveness was apparent at the next Annual Training. The AT evaluator said the 972nd was the finest engineer battalion he had evaluated."

MAJ Lee A. Peters, USAR, heads Construction Support Services, Inc., in Indianapolis. He has master's degrees in civil engineering and management from Purdue University and serves as maintenance officer for the 123rd ARCOM. During the TEWT training, he was executive officer of the 972nd Engineers. He served in Vietnam with the 92nd and 169th Engineer Bns. Peters is a registered professional engineer in Indiana.

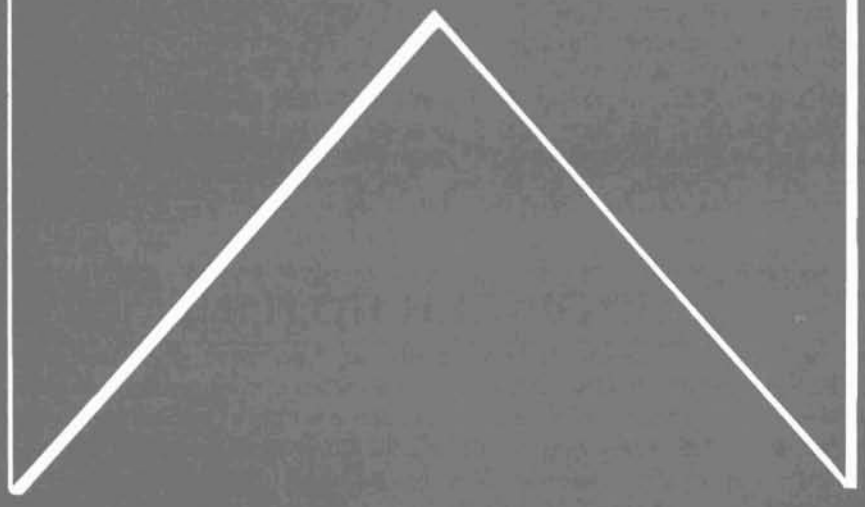
MAJ Kenneth Davidson, USAR, is an ROTC instructor at the University of Nevada, Las Vegas. He was supervising staff administrative assistant of the 972nd during the TEWTs. He has a master's degree in business administration from Georgia State University and is a graduate of the Administration Officer's Advanced Course.

ENGINEER HOTLINE

Problems, questions, and comments relating to engineer doctrine, training, organization, and equipment can be addressed telephonically to the U.S. Army Engineer School's "Engineer Hotline". The Hotline's auto-answer recorder operates 24 hours a day, seven days a week. Callers should state their name, address and telephone number, followed by a concise question or comment. You'll receive a reply within three to 15 days. **The Hotline is not a receiving agency for formal requests.**

pass guidons not paychecks

CPT W.C. Harrington Jr.



"Sir, Captain Smith reporting as ordered."

"Captain Smith, I just finished reviewing the report of survey from your company change-of-command inventory. I don't think I have to tell you that I'm not pleased with the results."

"No sir."

"Based on what the surveying officer has stated, it looks as if you will be held liable for the entire amount of the shortages. Of course, your liability in this case will be limited to one month's base pay; but that is serious enough in its own right. Also, this will be reflected in your change-of-command officer efficiency report (OER). You have done an excellent job in every other aspect of your company command; it's a shame that an otherwise outstanding OER should be marred by a comment on failure to maintain property accountability. Do you have anything to say?"

"No sir. I started off poorly when I took over the company, and I never could get it squared away. It's something I brought on myself, and there is no one else to blame."

Unfortunately, such a scene occurs far too often. The amount of the liability may not always be so high, but engineers of all ranks will agree that any amount is too much. A change-of-command is for passing guidons, not paychecks; but the too frequent occurrence of such incidents has created a growing awareness that government property is the responsibility of everyone, from the lowest soldier in a squad to the engineer commander at every level. Shortages identified during inventories are being examined very closely for evidence of negligence, and negligent personnel are being held pecuniarily liable in ever-increasing numbers.

Unfortunately, the amount of formal resident training an engineer officer receives in supply matters prior to his or her company command is limited. For example, a lieutenant in EOBC receives only about 30 hours of supply-related instruction; and students in EOAC receive only one hour of instruction on conducting change-of-command inventories. Some engineer officers are selected before company command before attending the advanced course and thus have only the basic course instruction to draw on. Therefore, most of an engineer officer's knowledge about supply procedures is acquired in the field, either through personal experiences or the experiences of others.

All too often, an incoming company commander has only a vague idea of how to start an inventory process. A good incoming change-of-command inventory does not necessarily ensure that property accountability will be maintained, but it will go a long way toward setting the stage for a shortage-free outgoing inventory. Here are some facts and suggestions which might prove useful.

Most Army units are organized under either a table of organization and equipment (TOE) or a table of distribution and allowances (TDA). Most TOEs have been further organized under a modified table of organization and equipment (MTOE) to account for variations in unit missions.

An MTOE lists all of the personnel and equipment that a unit is authorized to accomplish its mission; so the first thing an incoming commander should do prior to conducting an inventory is to obtain and closely examine the authorization document for his unit. Every major end item which is authorized to a company is listed on this document, and it is *the company commander's* responsibility to ensure that every item is accounted for at all times.

Additionally, the unit has other items of equipment (e.g., desks, fans, buffers, linen, and beds) which are classified as installation (station) property and are authorized by one of the common tables of allowances (CTAs), the most often cited being CTA 50-909. Both organizational (authorized by MTOE) and station property records are managed and controlled by the property book section of the division materiel management center (DMMC). At some installations, the linen and furnishings for the barracks are managed by the furnishings management office at the installation level, which will maintain the property records for those items. Again, as with organizational property, it is the company commander's responsibility to maintain proper supply accountability for the installation property issued to the unit.

Before beginning the inventory, the new company commander should arrange for a briefing by the engineer property book officer (PBO) and someone from the battalion S4 section to bring himself up-to-date on the latest supply procedures and to clear up any questions he may have on supply records and accountability. This briefing will prove especially useful in the possible problem areas early and take steps to resolve them before the inventory starts.

"The first step is to collect all the references for the components of each end item."

Once all of the major end items have been accounted for, it is time to do the nuts and bolts portion of the change-of-command inventory—the actual inventory of the end items and their components.

The first step in accomplishing this task is to collect the appropriate technical manuals (TMs), supply catalogs (SCs), and other references which prescribe the type and

company commander is newly assigned to the post and is unfamiliar with local regulations and procedures. Also, the new company commander should familiarize himself with AR 710-2, *Supply Policy Below The Wholesale Level;* AR 735-11, *Accounting for Lost, Damaged, or Destroyed Property;* and DA Pam 710-2-1, *Using Unit Supply System, Manual Procedures.*

An examination of the unit organizational and station property printouts, obtained from the property book section, will provide the latest data on which items of equipment have been issued to the unit. By comparing the organizational printout with the MTOE, the new company commander can determine which authorized items have not been issued to the unit. He can then coordinate with the PBO to ensure that all shortages are, in fact, on request. The PBO will issue DMMC requisition numbers which will allow the company commander to account even for shortage items.

The incoming company commander checks all of the sub-hand receipts to ensure that all the end items for which he is signing are properly sub-hand receipted. Through this type of check *before* the change-of-command inventory, he can identify

amount of components for each end item. (For example, for the inventory of a Bailey bridge, a copy of TM 5-277 will be needed; the general mechanic's tool kit is covered in SC 5180-90-CL-N26, *Tool Set, General Mechanic's: Automotive.)*

These manuals normally include an illustration and a description of each component. Using such publications is especially critical with the large numbers of new equipment now being introduced into the inventory. GSA catalogs can be especially useful in providing more accurate descriptions and pictures of hand tools than are often provided in TMs and SCs. It is also important that the new company commander use the most recent references so that he is aware of the latest additions or deletions to the component list. DA Pam 310-4 provides the date of the latest published manual and any changes.

To reduce confusion and standardize property records, the Department of the Army now publishes hand receipt manuals for each end item. For example, the hand receipt manual for an M548 cargo carrier is TM 9-2350-247-10-HR, *Hand Receipt Manual Covering Basic Issue Items (BII) and Additional Authorized List (AAL) for Carrier, Cargo, Tracked, 6-Ton: M548;* for the common No. 1 automotive shop set is SC 4910-95-CL-A74-HR. *Hand Receipt Manual Covering Contents of Shop Equipment, Automotive Maintenance and Repair, Organizational Maintenance, Common No. 1 (Less Power).*

These hand receipt manuals identify all the components of an end item as they should appear on the DA Form 2062 hand receipt. Those items not yet covered in DA-level hand receipt manuals may be covered in corps or division manuals which can be obtained locally.

The schedule to perform the actual inventory should be coordinated by the new and old company commanders. (See sample schedule on page 41.) While there are many methods which will work, a suggested method is to schedule inventories by sub-hand receipt for the first half of each day. The other half of the day is dedicated to required paperwork, such as updating component hand receipts, verifying shortages on hand receipt annexes, and preparing relief-from-accountability paperwork. Handling the paperwork in this timely manner prevents an overload of paperwork at the end of the inventory schedule. In most cases, the company will not be able to totally stand-down for the inventory; so such a schedule will provide time for other requirements.

The time needed for the inventory depends on factors such as the unit's size, equipment and external requirements. AR 710-2 prescribes that 30 days be allowed for the inventory; in most cases this will be sufficient, although extensions may be granted in unusual cases. After preparing the schedule, the new and old battery commanders should brief the battalion commander and ensure that the battalion executive officer and the battalion operations officer are aware of how the inventory will affect their areas of responsibility.

When the inventory of each sub-hand receipt is finished, the shortages must be cross-referenced to the hand receipt annex (formerly called the shortage annex) for each end item. The majority of components for the end items will have an expendability code of durable (D); however, some items are classified as non-expendable (N) and expendable (X). The non-expendable hand receipt annex is maintained by the PBO at DMMC.

The company commander must ensure that recent additions/deletions to the component list have been posted to this annex and that the PBO has initialed the annex to validate its accuracy after all changes have been made. The durable hand receipt annex is maintained by the battalion S4 section, and similar actions must take place there.

Hand receipt annexes for expendable items are not required; but, if needed items are not on hand, they should be requisitioned. Also, the departing company commander must see that the latest relief from accountability documents (e.g., reports of survey, statements of charges, etc.) have been posted to the annexes and that copies of both annexes are retained by the unit after they have been validated by the responsible officer. By comparing the shortage list from the inventory with the hand receipt annexes, the company commander can determine a "short, not previously accounted for" list.

"Allow enough time to do a thorough inventory and to prepare paperwork."

End items which have been turned in for repair to outside agencies must also be inventoried. The sub-hand receipt holder should have a work order (normally a receipt copy of DA Form 2402, *Exchange Tag*, or a DA Form 2407, *Maintenance Request*). These receipts should be validated by checking with the agency which signed for the end item. For example, the direct support maintenance company armaments section would be contacted to check on a damaged rifle that had been turned in.

Once the "short, not previously accounted for" lists have been prepared, follow-up actions must be taken so that proper accountability is maintained. Overages, if any, may be cross-leveled to fill valid shortages within the unit; however, the company commander must take care to ensure that each sub-hand receipt holder is held accountable for his assigned property.

Shortages which were not previously accounted for must be handled under the provisions of AR 735-11. If a hand receipt holder admits negligence, it is probably best to use cash sales whenever

INVENTORY SCHEDULE

DAY 1
Review authorization document.
Receive briefing from battalion S4 representative.
Obtain unit organizational and installation property printouts.
Compare authorization document with printout; note shortages.
Obtain copies of hand-receipts annexes.
DAY 2
Compare unit sub-hand receipts with printout, ensure that all end items are sub-hand receipted.
Schedule inventory with departing commander; brief battalion commander, executive officer, and operations officer.
DAY 3
Assemble references for inventory.
DAY 4
Inventory heavy equipment.
DAY 5
Inventory heavy equipment.
DAY 6
Inventory tool boxes.
DAY 7
Inventory communications equipment.
DAY 8
Inventory mess.
DAY 9
Inventory maintenance.
DAY 10
Inventory maintenance.
DAY 11
Inventory arms room.
DAY 12
Inventory NBC equipment.
DAY 13
Inventory orderly room, company commander's jeep, and special weapons (as applicable).
DAY 14
Inventory supply.
DAY 15
Inventory supply.
DAY 16
Inventory camouflage equipment set.
DAY 17
Determine shortages and prepare relief-from-accountability paperwork.
DAY 18
Determine shortages and prepare relief-from-accountability paperwork.
DAY 19
Brief battalion commander and sign printout.
DAY 20 Assume command.

possible (for hand tools, for example) since this procedure normally gets the missing item back into the hands of the user more quickly and with less paperwork than other methods. If liability is not admitted, it will be necessary to initiate a report of survey.

The battalion commander should be kept informed during the inventory. He definitely does not want to be surprised by the results of the completed inventory.

The sub-hand receipts should be updated and signed to reflect the results of the inventory as soon as possible. By following the half-day inventory plan previously discussed and with detailed planning, the company commander should be able to update each sub-hand receipt on the same day it was inventoried; then he should double-check all actions for accuracy and completeness. After all necessary relief from accountability actions have been initiated, the new and old company commanders go to the property book section at DMMC and sign the hand receipts which transfer responsibility for all the company's property.

The key to a change-of-command inventory is preparation. Assembling the necessary references before the inventory reduces confusion and saves time. Establishing a realistic schedule allows sufficient time for a thorough inventory and for timely preparation of any necessary paperwork.

A good inventory provides the new company commander with an accurate status of company property and guarantees that there is accountability for all of it, thus setting the stage for continued accurate property accountability throughout the tenure of his or her command.

Every engineer company commander wants to miss the initial scene entirely and be the star actor in this one!

Adapted from an article appearing in the November-December 1983 Field Artillery Journal.

"Sir, Captain Smith reporting as ordered."

"Captain Smith, I have just finished reviewing your report on the results of your change-of-command inventory. I see that you have accounted for every end item with no component shortages—that is a superb achievement! Congratulations on an outstanding job of property accountability."

"Thank you, sir. I was fortunate in that I was able to conduct a very thorough inventory prior to assuming command, and that made the whole job a lot easier."

Dry application of lime underway during a 62nd Engineers' airfield construction project at Camp Bullis.

Military Application of Lime Stabilization

by CPT Joseph M. Seerley &
CPT John D. Norwood

The 62nd Engineers turn a confrontation with 800 feet of unacceptable subgrade into a unique training opportunity.

The 62nd Engineer Battalion (Combat) (Heavy), stationed at Fort Hood, Texas, was tasked by the U.S. Armed Forces Command Headquarters to construct a C130 assault airfield at Camp Bullis, Texas. Camp Bullis is an Army training area north of San Antonio under the direction of Fort Sam Houston.

The project called for the construction of a medium lift airfield capable of handling, during its five-year design life, 100 cycles of a 100,000-pound Air Force C130 Hercules aircraft. A cycle is the landing and takeoff of one aircraft.

To construct the airfield efficiently in minimum time, the battalion consolidated its earthmoving units into a single engineer company (C Team). C Team provided on-site control and consisted of three earthmoving platoons, elements of a direct support maintenance shop, and the headquarters company technical section.

Unacceptable Subgrade

During construction, the unit discovered that an 800-foot section of the proposed runway consisted of highly compressible black clay four to eight feet deep. The soil was unacceptable as a subgrade because its California Bearing Ratio (CBR) was three or less, as determined by inplace CBR. (The design procedures in Army Technical Manual 5-330, *Roads and Airfields*, does not provide for the use of its design chart with an Airfield Index (AI) of less than five, which loosely equates to a CBR of four).

To solve the problem of an unacceptable subgrade, lacking the flexibility of relocating the airfield site and as a learning experience for the unit, the battalion commander formed a special team of eight of the battalion's most technically proficient officers. Their educational backgrounds included engineering, civil engineering, and mathematics. The team relocated to Camp Bullis and conducted a detailed study of various stabilization options. Team members then proposed to the deputy commander of Fort Sam Houston that the area be stabilized with lime.

Lime stabilization is seldom used by military construction units and the procedure required study and research by the battalion's design team.

The procedure finally established is discussed below. Initially, all available data on the soil was gathered. This data is as follows:

Atterburg
Liquid Limit = 73
Plastic Limit = 26
Plasticity Index = 47

Sieve Analysis
Gravel = 0%
Sand = 2.9%
Fines = 97.1%

CBR = 3

Inplace Density/Moisture
= 81 LB/CF
Wc = 29.4%

Penetrometer Readings (every half station)

Depth	*Airfield Index*
6″	4.2
12″	6.3
18″	8.5

The soil was classified by the Unified Soils Classification System as a Highly Plastic, Inorganic Clay (CH) common to the San Antonio area. The above data showed that this soil was an ideal candidate for lime stabilization. During the preliminary soils exploration, local engineering firms were consulted to determine the average lime/soil mix for this type of soil. The average mix was an 8 percent lime solution. This percentage mix was taken as a starting point to calculate design mix. Army technical manuals could have been used for this initial mix design; however, it was felt that in this situation it would be best to contact those with local experience.

Areas For Concern

Two major concerns were identified during the analysis. First, the effect of adding lime on the pH of the soil needed to be determined. It was felt that natural consumption of the lime into the soil might occur if the pH change was too drastic.

Lab studies were conducted to determine the effect of lime on the soil pH. The percentage of lime varied from zero percent to 12 percent. The data is consolidated below.

Percent of Lime	*pH @ 5 Minutes*	*pH @ 24 Hours*
0	6.8	0 to 8.1
6	11.8	12.1
8	11.9	12.0
10	11.8	12.1
12	11.8	12.1

As the data reflects, the pH varied insignificantly at percent mixes of greater than 6 percent. The concern that a natural consumption of lime by the soil would occur was unfounded. Unconfined compression tests conducted on the lime soil mix produced no extraordinary results.

A second concern was to reduce the Plasticity Index (PI) of the soil. The inplace clay had a PI of 47, which indicated a significant water retention property of the soil. If lime stablization was to be effective, the PI had to be greatly lowered, thus reducing the porosity of the soil and its propensity to swell. Lab data

A leased Rototiller is used to reduce soil particle size before lime application. Several days of tilling were required because of the soil's high in-place water content.

"The lime stabilization effort was an overwhelming success. The subbase was altered to yield a soil with outstanding construction properties (CBR=27)."

showed that the PI could be lowered to 15 at mixes of 8 percent and above. Since an 8 percent mix was the most economical mix that satisfied the criteria, it was chosen for design specifications. A CE (Compactible Effort) 55 test was done on the 8 percent lime/soil mix and the following data resulted:

Maximum Compacted Density
= 95.8 LB/CF
Optimum Moisture Content = 21.5%

How To Apply?

Once design specifications were determined, a method of application had to be chosen. A dry application of lime was chosen based primarily on the limited availability of slurry dispensing equipment but also because of the poor reactive qualities of a slurry mix with CH soil.

Before the dry lime could be applied, the particle size of the soil had to be reduced. This would ensure proper mixing and the highest degree of uniformity between the soil and lime additive. To accomplish this, a leased commercial roto tiller was used. Because of the high in-place water content of the soil, several days of tilling were required to get the correct particle size. Initial passes were made at a depth of 8 inches and the soil left to dry. After drying, successive passes were made to reduce the size of the clay particles.

Lime was then added dry and mixed by the roto tiller into the soil until a uniform mix was obtained. Water was added using 6,000-gallon water distributors.

The speedy moisture test set should not be used with stabilized soils since the mixture can clog the tester. As a result, a field expedient method was used to determine the initial water content. Denatured alcohol was added to the soil/lime mixture then ignited. This allowed moisture to be burned out of the soil. By weighing samples before and after burning, moisture content was determined.

Once the soil reached optimum moisture content at 21.5 percent water, compaction began. A high-speed, motorized sheepsfoot roller was used to obtain 95 percent of the CE 55 maximum compacted density. Since the lime produced a hydration reaction, the treated area kept moist during a seven-day period.

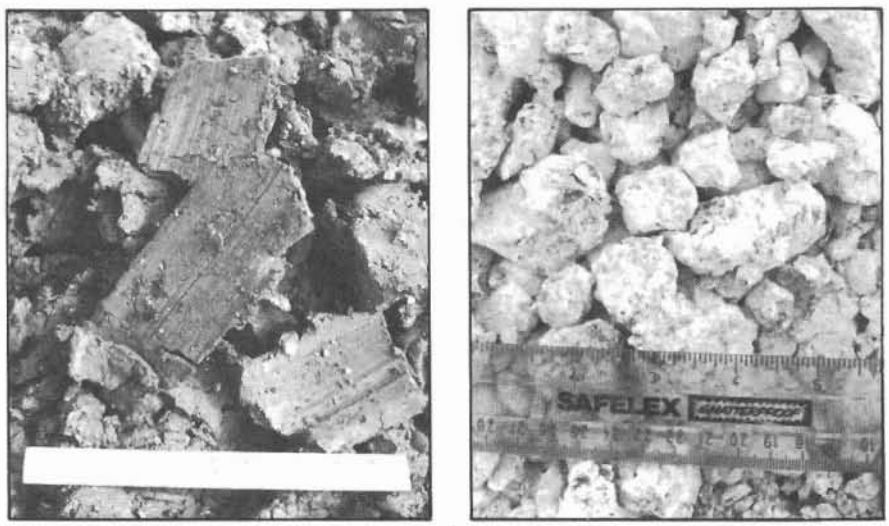
On the seventh day, Field Moisture/Density (Nuclear Method), In-place CBR, and Penetrometer tests were conducted. The results were:

Average Compaction = 93.5 LB/CF
Average Moisture Content = 28.3%
Inplace CBR = 27
Airfield Index = 15

Based on these results, the lime stabilization effort was an overwhelming success. The very nature of the subbase was altered, yielding a soil with outstanding construction properties (CBR = 27).

The exercise benefitted the 62nd Engineer Battalion and proved that military units can successfully implement stabilization construction techniques.

The successful stabilization project enabled the rest of the construction to proceed on schedule, and the strip was certified for C130 landings by the U.S. Air Force.



Particle size before (left) and after (right) tilling.

CPT Joseph M. Seerley commanded C Company, 62nd Engineer Battalion (Combat) (Heavy) and was the commander of C Team. He is now attending the Engineer Officer Advanced Course. He is a graduate of the University of California at Santa Barbara. He has served as vertical platoon leader, company construction officer, and civil engineer for the 44th Engineer Battalion (Combat) (Heavy), Korea, and as platoon leader and diving officer for the 801st Engineer Company (Port Construction) (Reserve).

CPT John D. Norwood was the civil engineer, S3, 62nd Engineer Battalion (Combat) (Heavy). He is a graduate of the United States Military Academy and of the Engineer Officer Advance Course. He has served as a vertical and a horizontal platoon leader, company construction officer, and battalion adjutant.

Publications From CERL

A listing of the latest research results from the Construction Engineering Research Laboratory

Each Winter Issue of ENGINEER, beginning with this one, will carry a list of publications produced by the U.S. Army Construction Engineering Research Laboratory (CERL) of interest to combat engineers and to facilities engineers.

The list is divided into two sections: material related to combat engineering, and material related to facilities engineering. These sections are sub-divided into a list of fact sheets and a list of technical reports/publications.

Fact sheets are typically short (one or two-page) summaries of CERL's research effort on a given subject. Technical papers/publications are lengthier documents presenting the results of CERL's research on a specific topic.

Fact sheets are available from the Public Affairs Office, U.S. Army Construction Engineering Research Laboratory, P.O. Box 4005, Champaign, IL 61820.

Technical reports/publications are available at a nominal cost from the National Technical Information Center, 5285 Port Royal Road, Springfield, VA 22161, or by contacting the Publications Branch at CERL.

COMBAT ENGINEERING ACTIVITIES

Fact Sheets are available on the following CERL studies in progess on combat engineering activities:

CERL's Work in Support of Army Facilities Component System (AFCS)—presents CERL's research role in improving the AFCS.

Engineer Unit Microcomputer Applications—Discusses the use of microcomputer software applications for managing construction activities for the 18th Engineer Brigade in Germany.

Engineer Modeling Study—A computer program design to determine the effects of combat engineer activities on the outcome of a battle.

Foam Applications in Heavy Bridging/Rafting—Use of foam composite materials to float vehicles across streams and to repair existing floating bridging systems.

Flotation Bridging/Rafting System for Airborne/Airmobile Operations—Evaluation of methods available for floating vehicles across unfordable streams.

Foam Overhead Cover Support Systems (FOCOS)—A rapidly constructed, foam-filled fabric arch used with a top soil covering to protect infantry operators of antitank weapons.

Foam Protective Shelters—Evaluation of theater-of-operations structures to determine which can be best adapted to foam material support systems.

Foam Domes as Expedient Facilities—Use of foam domes in providing housing and storage for mobilization efforts.

Programmable Pocket Calculators for Engineer Troop Units—Use of programmable pocket calculators to support combat engineering activities.

FACILITY ENGINEERING ACTIVITIES

Fact sheets are available on the following CERL research efforts on facility engineering activities:

CERL Publications

Analysis of Industrialized Building Systems Pilot Projects

Appropriate Technologies for Upgrading Army Sewage Treatment Facilities and for New Construction

Building Loads Analysis and System Thermodynamics (BLAST)

Ceramic Anodes for Corrosion Protection

CERL Provides Help for the Director of Engineering and Housing

Characteristics, Control, and Treatment of Leachate and Gas Formation at Military Landfills

Corrosion Mitigation

Composting Toilet

DD Form 1391 Processor

Electrical Consumption Reduction at Army Installations

Energy Monitoring and Control Systems (IEMCS)

Environmental Quality Technology

Habitability Program

Hazardous/Toxic Waste

Improved Roofing Materials and Systems

Improvements to the Integrated Facilities Systems (IFS) Component Inspection System

Industrialized Building Systems in Military Construction

Life Cycle Cost Database for Maintenance and Repair Data

Low-Cost Meters for Solar Energy Systems

Materials Technology

Middle East Base Development

Paint Laboratory

Photovoltaic Power System

Automated Corps of Engineers Concrete Quality Monitor (CE-CQM)

Pipe Corrosion Management System (PIPER)

PAVER—Pavement Management System

Real-Time Weld Quality Monitor

Environmental Technical Information System (ETIS)

ETIS Enhancements

Training Area Maintenance

Solar System Performance Monitoring

Remote Site Waste Treatment

Railroad Maintenance Management System (RAILER)

Quality Control/Quality Assurance (QC/QA)

PORTAWASHER Refuse Container Cleaner/Hazardous Waste Spill Cleanup—Listing of Recent CERL Technical Reports/Publications on Combat Engineering Activities.

Technical Report P-146, "Microcomputer Selection Guide for Construction Field Offices," by F. Grobler, M. O'Connor, and Glen E. Colwell, Jun. 1983, ADA130245.

Technical Report M-323, "Troop Construction in the Mideast," by USACERL and USAWES, Oct. 1982, BO76455.

Technical Report P-131, "Engineer Modeling Study, Volume I: Executive Summary," by John Evans, Sep. 1982, ADA121166.

Technical Report P-131, "Engineer Modeling Study, Volume II: Users Manual," by Gerald Brown and Hugh Henry, Sep. 1982, ADA121167.

Technical Report P-131, "Engineer Modeling Study, Volume III: CORDIVEN Engineer Module Interface Manual," by Carlton Mills, Sep. 1982, ADA121168.

Technical Report P-136, "User's Manual for MILENG1/UTIL Read-Only-Memory Module of the Combat Engineer Programmable Hand-Held Calculator," by John M. Deponai III, Sep. 1982, ADA120338.

Technical Report P-134, "Software Documentation for MILENG1/UTIL Read-Only-Memory Module," by Laure A. Thomas and John M. Deponai III, Sep. 1982, ADA20317.

Technical Report M-314, "Relocatable Structures for Use in Theaters of Opeations," by A. Kso, M. Frisch, J. Lambert, M. Ptak, May 1982, ADA117038.

Special Report M-291, "Concept Paper: The Use of Polyurethane Foam Plastics for Tactical Bridging and Rafting Operations," by A. Smith, Apr. 1981, ADA099033.

Technical Report M-287, "Theater of Operations Construction in the Desert: A Handbook of Lessons Learned in the Middle East," by A. Koa and P. Hadala, Jan. 1981, ADA104389.

Technical Report M-281, "Investigation of the Minimum Deployment Time of a Foam/Fabric Composite Material," by A. Smith, B. R. Culbertson, and R. E. Muncy, Sep. 1980, ADA091658.

Technical Report P-112, "Type II Forward Storage Site Facilities: POMCUS System," by Robert L. Porter, Sep. 1980.
Vol I: ADA092310 Vol II: ADA093672

Technical Report M-272, "Investigation of Rapidly Deployable Plastic Foam Systems," Oct. 1979.
Vol I: System Development, by Alvin Smith, ADA076332.
Vol II: Nonliner Deformation and Local Buckling of Kevlar Fabric/Polyurethane Foam Composites, by Alvin Smith, S. S. Wang, and A. Y. Kuo, ADA076310.

Technical Report M-269, "Foam Overhead Cover Support (FOCOS) System for Dismounted and Mounted TOW Positions," by Alvin Smith, Aug. 1979, ADA075746.

Special Report M-262, "Inflation/Foam/Shotcrete System for Rapid Construction of Circular Arches," by M. Woratzeck, May 1979, ADA069878.

Sepcial Report M-255, "A Family of Components for the Wood Panelized Prefabricated Building System," by A. M. Kao and T. M. Whiteside, Jan. 1979, DA065659.

Listing of Recent CERL Technical Reports/Publications on Facility Engineering Activities:

Technical Report M-334, "Evaluation of Contractor Quality Control of Built-Up Roofing," by Myer J. Rosenfield, Oct. 1983.

Technical Report E-190, "Use of the Building Loads Analysis & Systems Thermodynamics (BLAST) Computer Program to Review New Army Building Designs for Energy Use," by Donald J. Leverenz, Dale L. Herron, JoAnn Amber Eidsmore, and Robert E. O'Brien, Oct. 1983.

Technical Report N-151, "Oxidation Ditch Technology for Upgrading Army Sewage Treatment Facilities," by J. T. Brandy, C. P. C. Poon, and E. D. Smith, Aug. 1983.

Technical Report E-186, "Analysis of Facilities' Energy Use Patterns," by Ben J. Sliwinski, and Elizabeth Elischer, Aug. 1983, ADA131527.

Technical Report M-333, "Preliminary Investigation of Ceramic-Coated Anodes for Cathodic Protection," by E. G. Segan, and A. Kumar, Jul. 1983.

Technical Report M-332, "Electromagnetic Shielding of Full-Sized Structures by Metal-Arc Spraying," by P. Nielson, Jun. 1983, ADA132883.

Technical Report N-159, "Portawasher: A Self-Contained Dumpster Cleaning System," by G. Gerdes, and B. Donahue, Jun. 1983, ADA131799.

Technical Report N-157, "Distribution of Water Use at Representative Fixed Army Installations," by John T. Bandy, and Richard J. Scholze, Jun. 1983.

Technical Report N-152, "Users Guide: Simulation Model for Ammunition Plants; Prediction of Wastewater Characteristics and Impact of Reuse/Recycle," by S. Railsback, M. Messenger, R. Webster, and J. Bandy, Jun. 1983, ADA130694.

Technical Report N-155, "Treatment of Landfill Leachate at Army Facilities," by R. A. Shafer, E. D. Smith, J. T. Bandy, P. G. Malone, D. A. Moore, and L. W. Jones, May 1983, ADA132483.

Technical Report E-185, "Use of Simplified Input for BLAST Energy Analysis," by D. Herron, J. Eidsmore, R. O'Brien, and D. Leverenz, May 1983, ADA131261.

Technical Report E-181, "Modification of Cabinet Fans with Inlet Air Guide Fairings to Improve Performance," by William H. Dolan, Apr. 1983, ADA130253.

Technical N-149, "Tracking Hazardous Materials Through Army Installations: A Feasibility Study," by Manette Messenger, Ron Webster, Steve Railsback, and John Bandy, Mar. 1983, ADA129103.

Technical Report N-140, "Particulate Air Pollution Control for Army Coal-Fired Boiler Plants," Mikucki, Mar. 1983, ADA127636.

Special Report P-143, "A Case Study of Industrialized Building Products and Innovative Building Delivery Techniques used for TACOM Facilities in Warren, MI," by Michael G. Carroll, and Thomas R. Napier, Mar. 1983, ADA128539.

Technical Report E-184, "Electronic Time Switch Evaluation Study," by Lee Thurber, Mar. 1983, ADA127870.

Technical Report E-183, "Analysis of Energy Conservation Alternatives for Standard Army Buildings," by Douglas C. Hittle, Robert E. O'Brien, and George S. Percival, Mar. 1983, ADA129963.

Technical Report M-320, "Military Installation Painting Problems: Survey Analysis and Recommended Solutions," by S. Johnston and A. Beitelman, Jul. 1982, ADA119267.

Technical Report M-310, "Overview of the PAVER Pavement Management System and Economic Analysis of Field Implementing the PAVER Pavement Management System," by M. Y. Shahin, and S. D. Kohn, Mar. 1982, ADA16311.

Technical Report M-312, 'Investigation of Materials of Waterproofing Leaky Corrugated Galvanized Steel-Arch Magazines From the Inside," by Stanley M. Kanarowski, Mar. 1982, ADA115645.

Technical Report M-308, "Insulation Retrofit Under Low-Slope Roofs," by Myer J. Rosenfield and Donald E. Brotherson, Feb. 1982, ADA113802.

Technical Report M-294, "Pavement Maintenance Management for Roads and Parking Lots," by M. Y. Shahin and S. D. Kohn, Oct. 1981, ADA110296.

Technical Report M-283, "Pavement Evaluation and Repair Recommendation Sierra Army, Depot, Amedee Air Strip," by M. Y. Shahin, Nov. 1980, ADA093761.

Technical Report M-280, "Selection of Cooling Water Treatment at Military Installations to Prevent Scaling and Corrosion," by R. Lane and A. Kumar, Jun. 1980, ADA087266.

Technical Report P-107, "Housing Maintenance Contract Guide," by Joyce L. Nay, David W. Brown, et al., May 1980, ADA084539.

Technical Report M-279, "Roofing Repair Materials for Korean Relocatable Buildings—Test and Evaluation," by Robert E. Muncy, May 1980, ADA085188.

Technical Report M-268, "Development of a Pavement Condition Rating Procedure for Roads, Streets, and Parking Lots," by Mohamed Y. Shanin and Starr D. Kohn, Jul. 1979.
Vol I: Condition Rating Procedure, ADA074170.
Vol II: Distress Identification Manual, ADA074171.

Interim Report M-263, "Evaluation of Alternative Reroofing Systems," by E. Marvin, G. Middleton, L. Eubanks, M. Rosenfield, J. Blair, and E. Lindow, Jun. 1979, ADA071578.

Special Report M-256, "Investigation of Materials for Waterproofing Leaky Concrete Ammunition-Storage Bunkers From the Inside," by Stanley M. Kanarowski, Jan. 1979, ADA064731.

Special Report M-257, "Investigation of Techniques for the Rapid Preparation of Painted Wood Surfaces," by P. A. Howdyshell and T. Olsson, Jan. 1979, ADA064813.

Career Notes

Commissioned Officers' Branch

What Shape Are You In?

With increasing frequency, selection boards are asking questions about the physical fitness of the officer corps. Board members often ask for direct verification of height, weight and body fat percentage for officers at or above the screen weight specified in Appendix A, AR 600-9, *The Army Weight Control Program*, dated Feb. 15, 1983. In addition, board members are correlating the information contained in Items 3 and 12, Part IVa of DA Form 67-8, *U.S. Army Officer Evaluation Report*, with the height and weight data in Section IV of the Officer Record Brief (ORB). Individuals reporting sudden height increases or weight drops are likely to be viewed with suspicion by board members.

If you are close to screen weight, it may be in your best interest to get a "pinch test." Also ensure that any deviation from published height and weight standards is adequately explained in Section IVb of the DA Form 67-8. In addition, if you are in a zone of consideration and there is any significant improvement in your shape, report the information to your assignment officer at MILPERCEN so that a change can be made on your ORB.

The selection boards are dead serious about the physical fitness of the officer corps.

SC18—Special Operations:

This new additional specialty is concerned with the unconventional employment of individuals and units in a variety of tactical missions. Special operations officers are trained to participate in foreign internal defense, unconventional warfare, strike missions and numerous other activites, both overt and covert, in war or in peacetime.

The prerequisites for SC18 ADSPEC designation:

- Male officer
- Branch qualification (completion of advanced course)
- Airborne qualified

Officers currently holding ASE 5G or SSI 48E have been invited to seek redesignation to the new specialty.

Ranger or Special Forces qualification is preferred, but not required. About 83 officers will be assigned to the new specialty each year.

Warrant Officers' Branch

Warrant Officer Training:

In April 1983, a comprehensive study was begun to determine how the professional development of an engineer warrant officer should be accomplished. The approach used in the study was a systematic analysis of engineer warrant officer education and career management by conducting a needs assessment, compiling current data, and conducting an analysis by boards.

The analysis phase was conducted by two boards: specialty task boards and common warrant officer analysis boards. The objectives of the specialty task boards were to produce task lists and job descriptions by career level for the following MOSs: Utilities Operations and Maintenance Technician (811A); Engineer Equipment Repair Technician (621A); Photomapping Technician (811A);

Survey Technician (821); Reproduction Technician (833A); and Terrain Analysis Technician (841A).

The objectives of the common warrant officer analysis boards were to perform (1) problem analysis—to determine discrepancies in training (actual vs. projected) and possible solutions; (2) evaluation—to determine the feasibility of those solutions; and (3) action planning—to determine ways to implement solutions into existing training systems for warrant officers.

The types of problems addressed in the study were the current warrant officer education system, prerequisites for appointment, boarding actions for appointment, assignments, ASI management, grading by school qualifications, feeder MOS analysis, civilian education and the role of the engineer warrant officer.

The study was completed on Sep. 30, 1983. The proposals are currently being reviewed and will be published on a later date.

NCO & Enlisted Soldiers' Branch

FY84 Promotion Boards:

E7 Promotions & ANCOC Selections
Oct. 2 - Nov. 7, '84

E8 Promotions
Jul. 11 - Aug. 3, '84

E9 Promotions
May 1 - May 23, '84

SGM Academy Selections
Mar. 6 - Mar. 23, '84

How *should* you prepare for a promotion board? To start with, send for a copy of your Official Military Personnel File (OMPF) and review it from top to bottom to ensure that all data on the fiche is yours and is up to date. Check your photo and make sure your uniform and appearance meet Army standards. Check to see if all your awards and letters are included on your fiche. Anything which has not been entered or needs updating should be taken care of immediately through your PAC.

Physical fitness is heavily emphasized. Make sure you passed your last PT test and make sure the score is on your last SEER.

Training and education also play a major role in the promotion process. Seek leadership positions and leadership schools whenever possible. The NCO who has attended leadership schools is a step ahead.

Foreign Language Training:

The Army wants volunteers for language training. Engineer soldiers who are interested must meet the prerequsites of Army Regulation 611-6, *Army Linguist Program.*

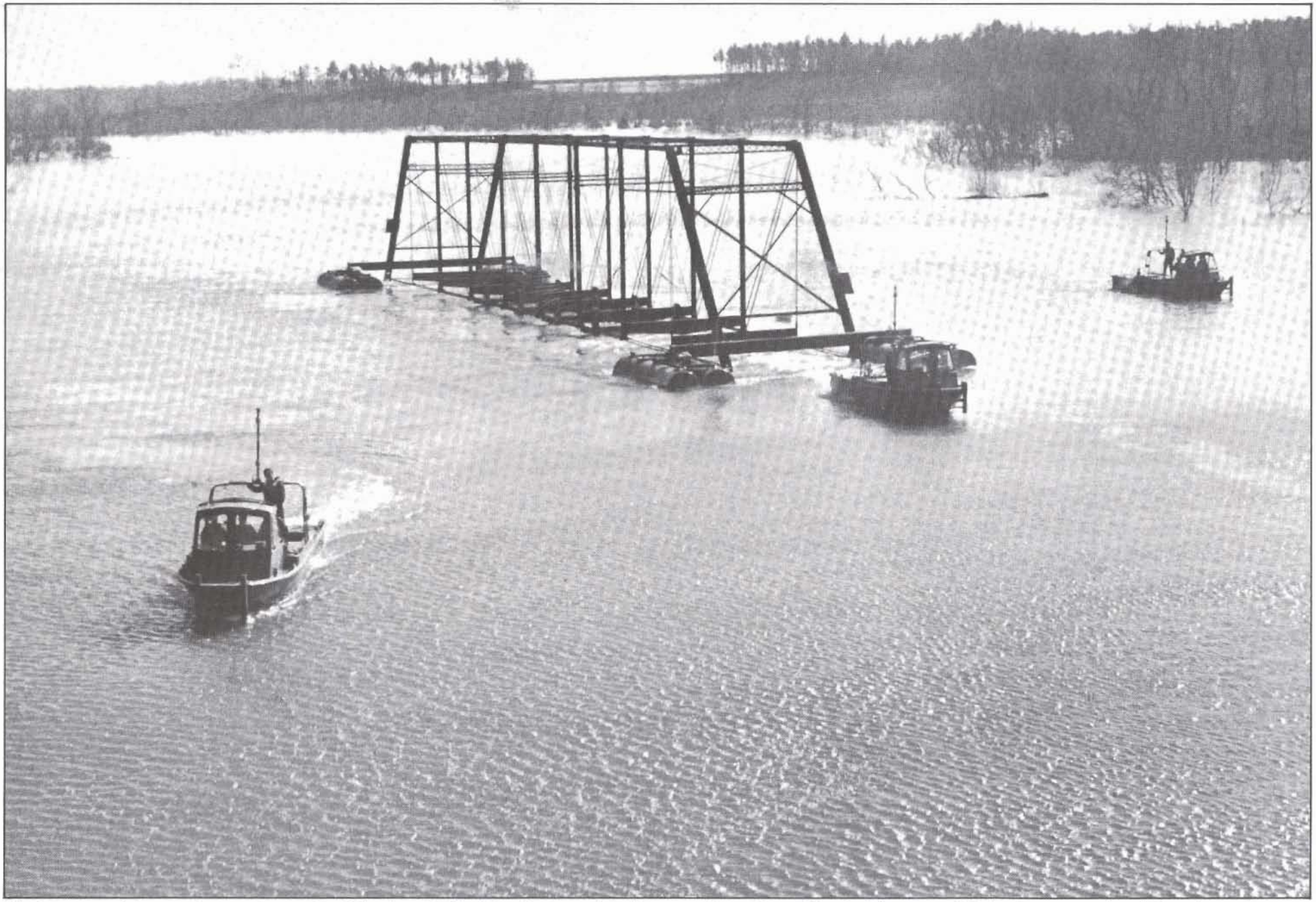
Formal foreign language training for the Army is conducted at the Defense Language Institute Foreign Language Center (DLIFLC), Presidio of Monterey, Calif.; at the DLIFLC, Presidio of San Francisco, Calif.; and at the Foreign Service Institute, U.S. Department of State, Arlington, Va.

Personnel who meet the eligibility criteria in AR 611-6 are encouraged to volunteer for language training. Submit DA Form 4187l to MILPERCEN, ATTN: DAPC-EPT-L, 2461 Eisenhower Ave., Alexandria, VA 22331. Each request (DA Form 4187) must include a current DA Form 2, DA Form 2-1, and verification of DLAB score.

For more information on language training, call Ms. Brewers at MILPERCEN, AV 221-8415/0640.

New Branch Chief:

LTC John Kidd is the new branch chief of the enlisted Engineer branch at MILPERCEN.



Endangered by rising waters, the Blackwell Bridge is towed to its new location. The bridge is a historic example of the American bridge pin connection system. Bridge-movement operations were conducted by the 3rd Engineer Bn., Ft. Stewart, while the new bridge site was prepared by Ft. Stewart's 92nd Engineer Bn. The operation was directed by the Corps' Savannah District.

(Photo by Jonas Jordan)