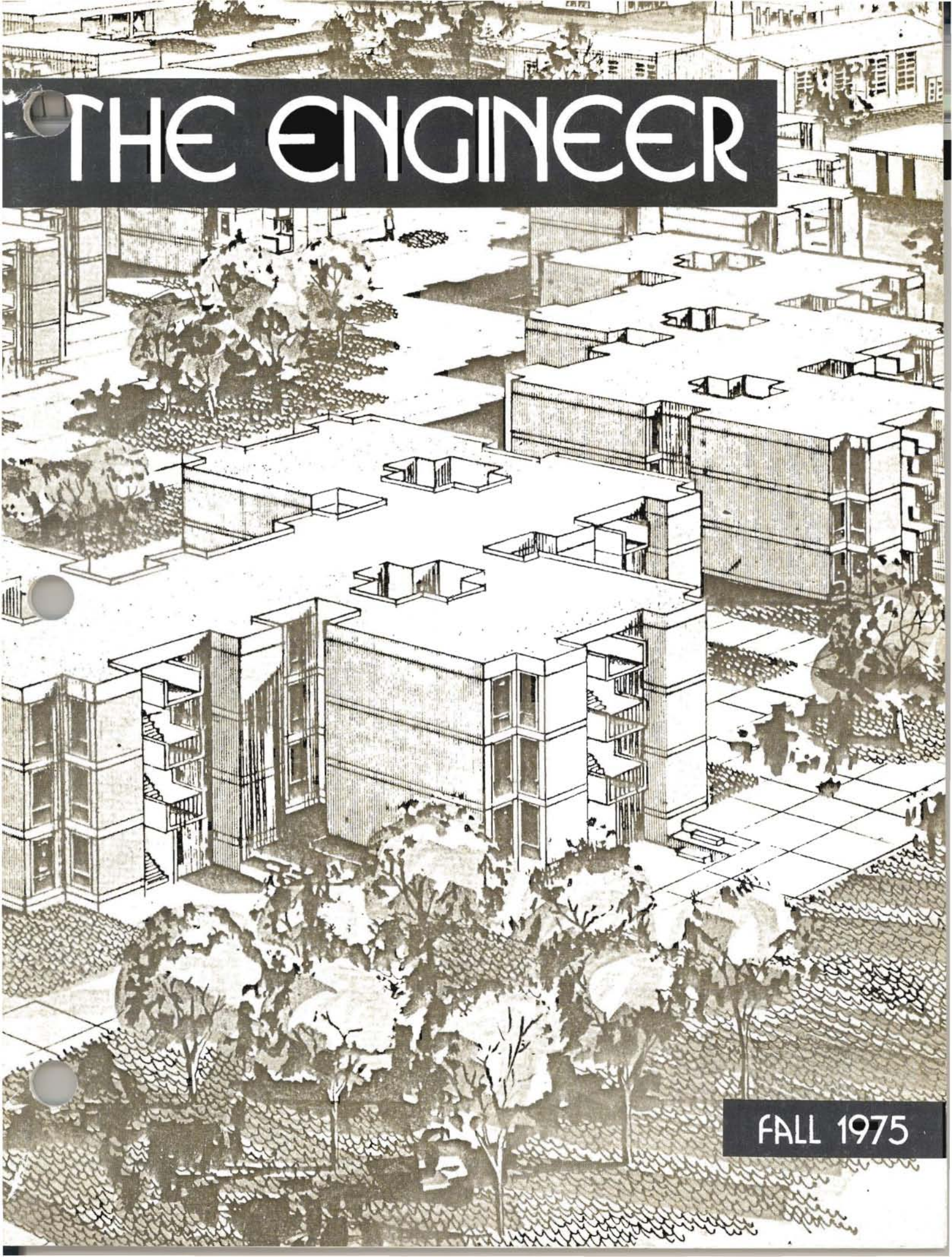
THE ENGINEER



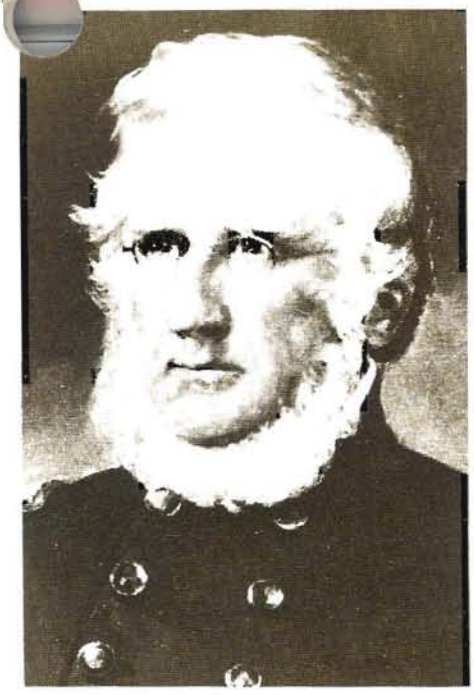
FALL 1975

THE ENGINEER

VOLUME 5 NUMBER 3 FALL 1975

FEATURES

DEPARTMENTS



CHIEF'S BRIEFS

Bvt. Major-General Richard Delafield served with distinction in the Corps of Engineers for 48 years. He was born in New York City on September 1, 1798 and became the first West Point graduate to receive a merit class standing, ranking first in 1818. As a second lieutenant he was selected topographical engineer with the American Commission, created under the Treaty of Ghent, to established the northern boundary of the United States.

Delafield had broad experience with seacoast fortifications work. In the construction of Forts Monroe and Calhoun at Hampton Roads, Va., he was assistant engineer from 1819 to 1824. For a decade (1845-55) he was a member of the Board of Engineers for the Atlantic Coast Defenses of the United States. During that period he supervised the defenses of New York Harbor and continued their improvement in the early years of the Civil War.

In two terms totaling twelve years as Superintendent of the US Military Academy, Delafield gained a reputation as an academic administrator. He added new structures and improved facilities. The new cadet uniform first bearing the "Turret Castle" insigne was authorized by him.

On April 22, 1864 Delafield was appointed Chief of Engineers with the rank of Brigadier-General. He retired on August 8, 1866.

Richard Delafield died in Washington, D.C., November 5, 1873.

John Dervan
Assistant Curator US Army Engineer Museum

United States Army Engineer School Fort Belvoir, Virginia

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ABOUT OUR COVER

Our cover shows a bird's eye-view of the dramatic and progressive changes undertaken at "the home of the complex, completed in September 1975, represents only one phase of the overall modernization plan. Story — page 25.

.PIPELINE.PIPE

ENGINEER SCHOOL OFFERS TRAINING MATERIALS UPDATE

The Engineer School's "Directorate of Educational Technology" desires to keep you abreast of the latest training materials, devices and "software" available to you through the Engineer School.

Beginning with this issue, The Engineer Magazine presents an "update" of such training support materials and solicits your questions and/or comments concerning training support needs. Address your query to: The United States Army Engineer School, ATTN: Educational Consultant Branch, Fort Belvoir, Virginia 22060. Autovon 354-4172

From time to time, new individualized, lesson packages; programmed texts, Sound/Slide, Sound/Page, TV Tapes etc., are being developed. Eventually, through periodical updating of catalogues and other training information devices, these may come to your attention. We hope, however, through use of The Engineer Magazine, to provide an informal vehicle for short-cutting the long time frame involved — and providing you with a quick overview of new items as they become available.

NOW AVAILABLE FROM THE ENGINEER SCHOOL

TV TAPES

NUMBER	TITLE
051-0205	Compressor Replacement for 38,000 BTU A/C Unit
051-0287	Concrete Construction Techniques
051-0324	Engineer Battalion Operations Briefing
051-0001	Electrical Repair Test Equipment, Part I: Digital Multimeter, LCR Bridge, Transistor Testor
051-0002	Electrical Repair Test Equipment, Part II: Variac and Oscilloscope
051-0329	Soil Density Determination
051-0180	Basic Priming Systems
051-0218	Paneling
051-0058	Analytical Photogrammetric Positioning System

The above tapes are FY 75 productions. All are available on ¾" cassette and ½" reel to reel versions. They may be requested through your local TASO or call Autovon 354-2177.

SUGGESTIONS FOR IWY OBSERVANCE

Lieutenant General W. C. Gribble, Jr., Chief of Engineers of the U. S. Army Corps of Engineers has issued a statement to Commanders of all Field Operating Agencies outlining suggestions for the Corps' observance of International Women's Year. Actions include presenting lobby displays, tying IWY to the worldwide mission of the Corps and featuring women in various Corps program areas; including the purposes of IWY as part of EEO training given to managers and supervisors; cooperating with state and local governments in their IWY activities; including women in all plans and in responsible positions for celebrating our 200th anniversary; and recognizing employees who have contributed to the goals of IWY: equality, development, and peace.

NEW MERDC FACILITY USES SCALE MODELS

A new facility being installed at the U.S. Army Mobility Equipment Research and Development Center (MERDC), Fort Belvoir, Va., will use scale models of military equipment to develop data on how best to camouflage actual items from radar detection.

Called the MACROSCOPE it is a compact indoor radar test range which uses 1/10 scale models of tanks, armored personnel carriers and the like to show how the life size counterpart looks and measures on radar. With this information, experts at the Center can design "Built-in" camouflage treatment to destroy the image and deceive enemy radar.

As a controlled test site, the MACROSCOPE provides a detailed target analysis with greater accuracy and less expense than time consuming measurements under varying field conditions.

Installation of the facility by Dare Technology of San Diego, Ca., under a $83,894 contract with the R&D Center will be complete by the end of 1975. The MACROSCOPE has been

LINE. PIPELINE.

in experimental operation since 1972 at the contractor's plant where it was designed and constructed under an earlier contract issued by MERDC.

MERDC is the Army's lead laboratory for camouflage technology and is also responsible for research, development, engineering and initial production buys in 14 other fields of endeavor to provide combat, mobility and logistic support equipment for the field soldier. Projects guided by the Army Materiel Command range from bridges to detection devices and from generators to mobile water purification equipment.

RREL CONSTRUCTION PROGRAM UNDER WAY

A $7.3 million construction program is under way at the U.S. Army Cold Regions Research and Engineering Laboratory.

Currently under construction is a logistics and supply facility which will include storage space to replace currently leased areas. Construction started this summer on an addition to the existing Laboratory building. A contract for $2,488,000 has been awarded to the ED Marden Corporation for construction of the Laboratory addition. Currently being designed is an Ice Engineering Research Facility.

The added facilities for the boratory has been required the growth in research and engineering program at CRREL. The Ice Engineering Facility will provide larger scale test facilities than are currently available.

NEW DESERT CAMOUFLAGE SCREEN RECEIVES CLASSIFICATION

A desert camouflage screen, the second of three different color blends in a lightweight, modular camouflage screening system developed by the U.S. Army Mobility Equipment Research and Development Center (MERDC), Fort Belvoir, Va., has been type classified as standard. A woodland version of the screen was type classified in 1972 and a snow version is undergoing final tests and modifications.

Standard classification means that the screen is considered the most advanced and satisfactory of its type available to meet current military needs. Bids will be sought for production and delivery as required.

The desert as well as the woodland screen provides concealment of equipment from visual, photographic and radar detection. Both come in radar transparent and radar scattering versions. The latter distorts a radar signal, thus preventing identification of a possible target. The former is used when the equipment being concealed includes radar of functions thru the use of radar.

Principal components of the desert and woodland versions of the screening system are a basic hexagonal screen shaped to approximate the symmetry of natural objects and a diamond shaped filler screen to maintain symmetry when two or more hexagonal nets are joined. The combined area of the hexagonal and diamond shaped screen is about 900 sq ft.

The support netting for the garnish is fabricated of polyester twine. The garnish consists of polyvinyl chloride coating on both sides of a spunbonded nylon base cloth. Each screen is equipped with quick-connect-disconnect fasteners to permit rapid assembly-disassembly of the camouflage. The screens are reversible to adjust to seasonal and color differences existing in nature.

A single camouflage screen can be erected in about five minutes. Additional screens can be connected at about the same rate to form multi-screen assemblies. A complete module with basic and filler net, repair kit and carrying case weighs about 65 pounds. The support system which also has been type classified consists of poles and batten spreaders to give the net a natural drape. The support system with case also weighs about 65 pounds. The new system permits easier and more rapid handling than the large assortment of sizes, shaped, color blends and engineered sets found in the old burlap garnished system. It also offers advantages in durability and resistance to water and oil absorption.

MERDC, recently designated as a Development Center reporting directly to the Army Material Command (AMC), Alexandria, Va., is the Army's lead laboratory for camouflage technology.

COLONELS:

Assignments. As of 31 August 1975, we will have 292 Engineer colonels on active duty. This figure is short of the projected worldwide Projected Requisition Authority (PRA) for Engineer colonels. As a result, assignment of Engineer colonels to branch immaterial positions will be more limited than usual during the coming year.

During Cy 76 about one-third of the Engineer colonels will be moving, most of them during the Jun-Aug timeframe. Every effort is being made by Colonels Division to project assignments six months in advance. Therefore, we will try to get the bulk of the moves programmed by the end of February 1976. No matter how hard we try to project requirements in a timely fashion, there will always be a few "quick" fills required, but we will try to minimize these.

Professional Registration. As you know, the certificate of Professional Registration is no longer maintained in your Official File; however, you should make sure that Colonels Division is aware of your Professional Registration.

LIEUTENANT COLONELS:

Assignments. Assignment emphasis continues on putting highly qualified officers into Army Readiness Regions (ARR s) and Recruiting Commands (USAREC). Most assignments require completion of both Bn Command and CGSC as a minimum. For most, such an assignment is a departure from what is traditionally regarded as the route to the top; but times have changed born out by the last 06 selection board.

A review of the files indicates that many LTCs do not have a current preference statement available. Try as we may to satisfy your career desires, we are shooting in the dark without your input to the system. If you are within 12 months of reassignment, please submit a preference statement showing your honest desires regarding duty and location. Include your current **duty** phone number and make use of the remarks space to add other data you wish to have considered in your next assignment. It's **your** career — help us manage it!

Professional Registration. Professional Engineers, check the comment in COL's notes regarding annotation of ORBs to reflect the State(s) and Year(s) in which you are registered. Appropriate data should appear in "Section X — Remarks" of your ORB.

MAJORS:

New Majors. Welcome to all the new majors on the latest list. You should set your professional goals for your "majority" of:

- Becoming qualified in your alternate specialty.
- Serving in an engineer troop unit.
- Completing CGSC by resident or non-resident attendance.

Assignments. There will be approximately 316 majors moving in 1976. Will you be one of those? If so, is your preference statement current? Regardless of whether you are a "new major" or an "old major", you can expect:

- To be vulnerable for a non-dependent tour if you have only one non-dependent tour (in rare cases, Engineer majors will be sent on a third involuntary NDT).
- To be vulnerable for an accompanied overseas tour if you have not had one or have overseas return date 1972 or earlier.
- To be stabilized for generally 36 months on station due to PCS constratints.

Predictions of possible assignment areas and commands are as follows:

Overseas: USAREUR, Alaska, Korea, Iran, Saudia Arabia, Liberia, Turkey, Panama, Australia (Topo), and SHAPE.

CONUS: Most CONUS posts, DCA, DNA, ROTC Regions, Readiness Regions, FORSCOM Hqs, TRADOC Hqs, Svc School Instructors at Benning, Knox, Sill, AMC, ASA, and some District and Facility Engineer assignments.

OPMS. DA is fully committed to OPMS. Each of us has an alternate specialty. It would be beneficial for each Engineer major to become qualified in his alternate specialty as soon as practicable, either by a duty assignment or a school. This may not be immediately possible due to PCS constraints and Army requirements. Each major should evaluate himself and ascertain where he stands in this area. It may be possible to pick up qualifications academically by correspondence course and/or TDY schooling from your current duty station or TDY enroute on a PCS. Review the Army School catalog, DA Pam 351-4, for the opportunities.

CGSC. Of all the professionally enhancing goals, attainment of CGSC level skills is the toughest. If a major is within his last 3 years of eligibility, and has not attended resident CGSC, he should seriously consider enrolling in NRI CGSC. The more senior an officer becomes, the heavier the emphasis on completion of CGSC, resident or N/R, as assignment prerequisites. We don't care how you acquire this level of military schooling, just so you have it. Its attainment is necessary prior to key management and command assignment as a LTC.

CAPTAINS:

Assignments. Most captains serving on CONUS assignments can expect to remain on station approximately three years or longer. For the forseeable future, overseas tours in long tour areas will continue to be 39 months in duration with non-dependent tours continuing at 13 months on stations.

Approximately 45% of all captains and promotable lieutenants request assignments to Forts Ord, Lewis, Carson, or Devens. Approximately 5% of the jobs available to captains are to be found in those locations. Officers desiring to go west or to the northeast continue to state those choices, however, alternatives at other posts or in other sections of the country should also be given.

Battalion size troop units are located, or will be located, at Forts Devense, Meade, Belvoir, Bragg, Benning, Stewart, Hood, Sill, Campbell, Riley, Leonard Wood, Carson, Ord, Lewis and Polk with smaller units located at Forts Dix, Jackson, McClellan, Presidio of San Francisco, Forts Bliss, and Knox.

OPMS. Officers who have received an alternate specialty designation should notify their assignments officer at least 15 months in advance of their DEROS if they desire their next assignment to be in their alternate specialty. Once they are within 12 months of DEROS their projected assignment specialty, whether primary or alternate, will be fixed and subject to change only in exceptional circumstances. Overseas equity will continue to be a master criterion in terms of overseas opportunities.

LIEUTENANTS:

Assignments. The current professional development of Engineer lieutenants is reflective of assignment stability, declining number of overseas tours and a stable promotion system. Officers can expect to remain on CONUS stations for approximately 36 months. The trend of sending lieutenants to EOAC after a long tour overseas or 36 months at a CONUS stations is expected to continue. This is compatible with the promotion rate to Captain, AUS, which is still 4 years of active

duty commissioned service. The criteria for EOAC remains the same: good performance with troops and availability. Selections are made on a competitive basis.

FOR ALL:

Professional Engineer Registration. Professional Engineer Registration is important to you as an officer in the Corps of Engineers; get it if you can. Although Professional Registration is not a prerequisite for any Engineer assignment, it is considered when assigning officers to positions in Facility Engineer and Engineer District organizations as well as to some research positions. Professional Registration is important in increasing the credibility of the Corps, especially in those areas where close association with civilian engineering organization is common. The Corps of Engineers offers assistance in several forms to those officers preparing for the Professional Engineer examinations. The Department of Army Wide Training Support, USAES, Fort Belvoir, offers the Professional Engineer Preparatory Correspondence Course. An excellent opportunity to take this course is as an elective while attending the resident Engineer Officer Advanced Course. In addition, for those officers assigned to the United States Military Academy, the Department of Engineering offers refresher courses to assist in review for the examination.

ORB Corrections. As a continuing effort to make the Officer Record Brief (ORB) a completely useful tool as an assignment aid, we encourage each officer be diligent and persistent in insuring that your ORB reflects necessary and correct information. You may audit your ORB during the annu audit cycle or when signing in at a new duty station. If errors are detected, they should be address to your servicing military personnel office, not OPD. The reason for asking you to contact you personnel officer is that they maintain the change submitted. This prevents a double loading of the data base and insures your DA Forms 2 and 2-1 are also corrected.

Your Correspondence Address. In most assignment actions, attempt is made to correspond with the officer at his home address. It is your "Official Military Address" which is used, as reported by you to your personnel office. The address should be your resident address, not your home of record (unless the two are the same). Please help us, and yourself, by performing this check.

Where Do You Want To Go? Although many officers have not yet realized the importance of the "dream sheet", here's a chance to explain the importance of the **preference statement.** Yes, it's a DA Form 483, **Officer Assignment Preference Statement.** It is our way of knowing what your desires are and serves as a vital planning tool in making assignments. Although, recognizing that assignments are made based on Army requirements, it's quite possible to satisfy both the needs of the Army and desires of the individual. Two important areas of the preference statement should be mentioned here:

- Make sure you put your complete present mailing address in item 8(a).
- The date assigned refers to the date you were assigned to a CONUS installation or a unit overseas.

If your last preference statement is more than a year old; you don't have one on file, at all; or, some major changes have occurred in your life — send us a new preference statement. You say the form doesn't fit your needs? Send us a letter!

Engineer Personnel Managers in OPD.

Colonels Division: (DAPC-OPC-AE)
Engineer Assignments, LTC Thomas Sands, 325-7871

LTC Division: (DAPC-OPL-AS)
Engineer Assignments, LTC Henry Covington, 325-0423

Majors Division: (DAPC-OPM-AS)
Engineer Assignments, MAJ Ted G. Stroup, 325-8109

POTPOURRI

Combat Support Arms Division: (DAPC-OPF)		
Division Chief	COL Carl P. Rodolph	325-0628
Engineer Branch Chief (DAPC-OPF-E)	LTC Charles E. Eastburn	525-7434
CPT Assignments	MAJ James E. Corbin	325-0650
Lt Assignments	CPT Milton Hunter	325-0651
Professional Development (DAPC-OPF-D)	MAJ Martin Suydam	325-7426
Warrant Officer Division: (DAPC-OPF-D)		
Engineer Assignments	CW4 Jean L. Derby	325-7837

(For Autovon dial 221 and the last four digits)
The mailing address remains the same: 200 Stovall Street, Alexandria, Virginia 22332

GOOD NEWS FOR AVIATORS!

During September 1975, the DCSPER, DA, approved Aviation as an alternate specialty under OPMS. This change is expected to be fully implemented in early 1976 and will be keyed to meeting field grade aviation requirements. The main features of this concept include the following:

- Aviation will become an Advanced Entry Specialty designated in the beginning of the eighth year of commissioned service.
- Aviators will be trained and assigned based upon their basic entry specialty. Only officers from IN, AR, FA, AD, EN, SC, TC and MI branches may receive flight training.
- Officers will be eligible to enter flight school between their 24th and 60th months of commissioned service (Engineer Officers should plan on four years of basic Engineer qualification prior to entering flight school.)

The Army Aviation program must have highly qualified officers who are well grounded in the Combat and Combat Support Arms. This specialty will be designed to employ aviators in aviation positions approximately 67% of the time as Majors, 50% as Lieutenant Colonels and 25% as Colonels. Captains with eight or more years service will be designated into the specialty to meet projected requirements at the O-4 level.

Further developments and implementation of the approved Aviation Specialty will take approximately six months. Additional details will be publicized as they become known.

CORPS OF ENGINEERS DESIGNATED COMBAT ARMS

On 12 September 1975, the Chief of Staff, Army approved an action which designated the Corps of Engineers as Combat Arms. The Combat Arms category now includes Armor, Infantry, Artillery, Air Defense Artillery and Corps of Engineers. This significant decision resulted in the Corps being the only branch in the Army to be classified as Combat, Combat Service, and Combat Service Support. From a personnel viewpoint, what is the impact of this designation? Actually, it is very little. The Corps of Engineers will continue to recruit female Engineers for service with Combat Support and Combat Service Support units. Designation of the Corps of Engineers as Combat Arms should, however, insure a more equitable share of C&GSC/AFSC military schooling opportunities.

There is no current OPD plan to realign the assignment and professional development of company grade Engineer officers from the Combat Support Arms Division to Combat Arms. Particularly since Engineers have the distinct opportunity to serve in all three Arms. Watch for additional information in The Engineer magazine.

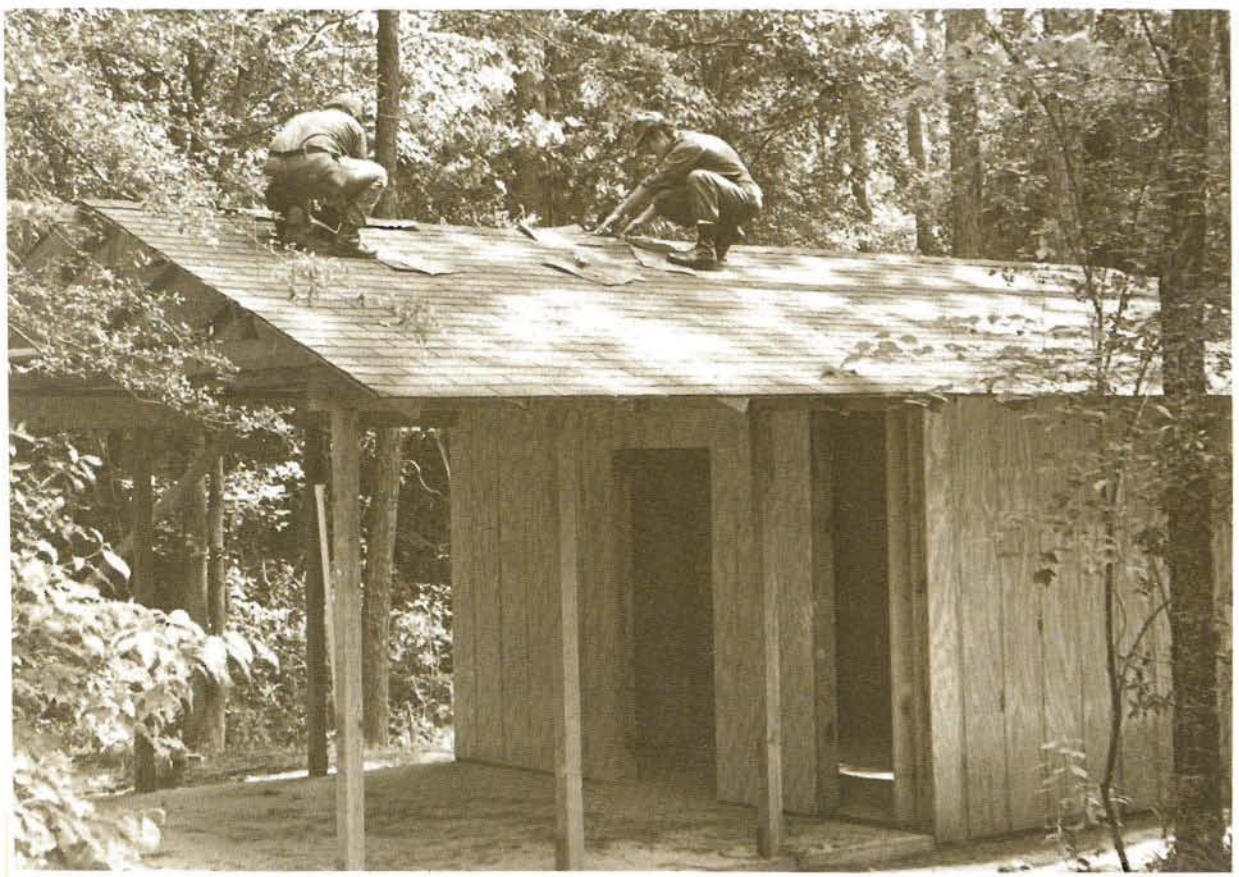
On The Job Traini

There are projects in every community which lend themselves to the limitations of National Guard and Reserve units. The primary limitation-ability to actually work on the project only one weekend a month, necessitates that the activities can be spread over many months or a year, and in some cases a longer time frame is required. Company B, Franklinton-Covington, of the 205th Engineer Battalion (Const), Louisiana Army National Guard, is presently involved in a major vertical construction project which is providing On-the-Job Training (OJT) for carpenters, electricians, plumbers, masons, concrete specialists, and even a few equipment operators.

When girl scouts of the Southeast Louisiana Girl Scout Council, New Orleans, La., were faced with major renovation of one of their camps, they turned to the 205th Engineer Battalion for assistance. Camp Covington, a nine-acre retreat hidden by towering pine trees and located seven miles north of Covington, needed a new kitchen facility, renovation of the adjoining dining hall, two new bath houses, general repair, and reroofing of the existing camper cabins. After returning from annual training in July 74, Company B, was assigned the camp project for work during weekend drills. Arrangements were made by the Girl Scout Council for the Company to purchase the needed building materials from area suppliers.

Work began with the demolishing of the deteriorated kitchen. A dozer was hauled in to push the foundation of an old fire place out of the way and level the site. Rough carpenters framed and completed the roof of the new kitchen. Then the finish carpenters moved in to complete the interior, including cabinet construction. After the majority of the kitchen construction was completed, renovation began on the adjoining dining hall, which was designed to accommodate 60 people. The old roofing material was stripped off, rotten lumber replaced, and a new shingle roof installed.

One of the new bath houses is presently under construction on the other side of the camp near t



A Helping

C J.

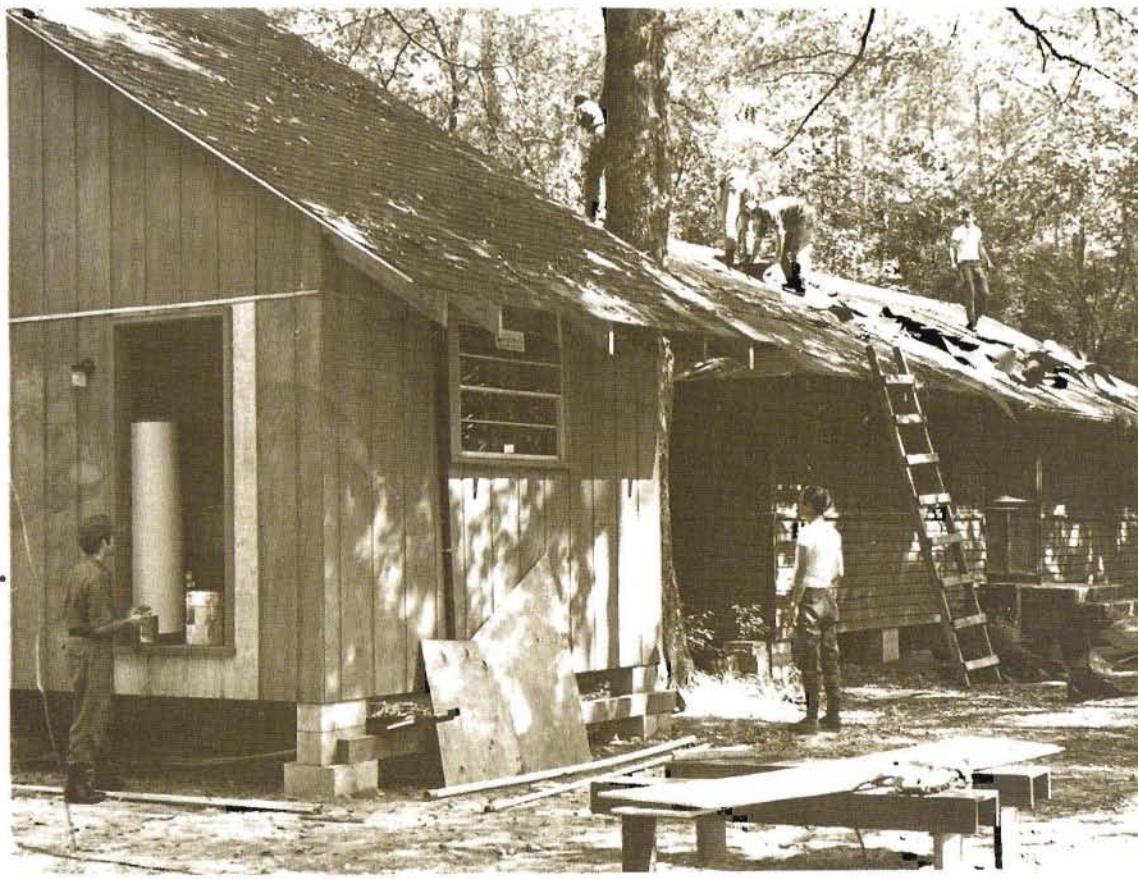
ng For The Guard

sleepy Bougue Falaya River. Because of the river, which is used as a swimming hole, care had to be taken in laying out the field lines for the septic tank. The Company has no TOE backhoe, so a member brought his personal one out to use in digging the field lines and installing the septic tank. Another member donated the gravel. This attitude has infected the entire Company because they are accomplishing something that will have a truely beneficial effect on their community. Classroom instruction or make work projects will never accomplish what one meaningful OJT project can do for training and unit *esprit*. The project will require several years to complete as there is a second bath house to start, the cabins to repair, and possibly a new caretaker house. There have been months when the Company could not work on the Camp because of other training requirements and a "call-up" for Hurricane Carmen, but every summer the happy sounds of more and more cheerful brownies attending day camp replaces the sounds of noisy buzzing of the carpenters saws.

Captain C. J. Schexnayder is Company Commander, Co B, 205th Engr Bn (Const), Louisiana Army National Guard. He has served as a Tactical Officer, Assistant Project Officer and Project Engineer both in the CONUS area and in Thailand. He is a graduate of Engineer Officer Advanced Course and is presently enrolled in the Command and General Staff Officer Course. He holds a BCE and MS degrees in Civil Engineering from the Georgia Institute of Technology, and is a registered professional engineer in Louisiana. He works as an Area Engineer with a Covington, La., firm of engineers.

Hands Story

Sch yder



FORGET THE STANDARD PATTERN

CPT John V. Kauffman

This article is an evaluation of the two different methods of installing landmines that are recognized to be presently part of US landmine warfare doctrine and policy. It must be understood that the comparisons made are based on hand emplacement of each method. There are new mechanical and scatterable methods of installation that are currently in the system or that are soon to be in the system that would require less time, manpower and logistical effort than either method using hand emplacement. There are, however, limitations to these systems that would preclude their use one hundred percent of the time. There are situations where the hand emplacement of mines will still be necessary and practical.

During recent years, the current procedures for hand emplacement of landmines and use of the standard pattern have been criticized by commanders at all levels. The main objections are it requires too much time, manpower and logistical support and is too complicated a system for most people who do not deal with it on a daily basis. Many commanders feel that a reversion to the row method of installation would be more advantageous than the standard pattern for the following reasons:

- It requires less time for installation.
- It requires less manpower to install.
- It requires less logistical effort, and the method of installation is less complicated.

Are these assumptions on the part of the commanders valid? To answer this question each reason will be examined individually. However, there are a few terms that need to be clarified.

1. Row Method of Installation — Using this method, the mines are laid in rows with regular spacing (not less than 6 paces/meters between antitank mines). Distances may vary between mines in different rows, but should remain constant within one mine row. See Figure A.

2. Standard Pattern Method of Installation — In this method, the mines are laid in the NATO cluster system, that is, a regularly spaced number of clusters on alternate sides of a strip centerline. A cluster consists of a base mine with zero to four mines surrounding it within a two meter/pace radius semicircle. See Figure B.

3. Front — The straight line distance between the right and left extremities of the minefields.

4. Desired Density (D.D.) — The average number of mines, by type, per meter of front of a minefield found from the front to the rear of the

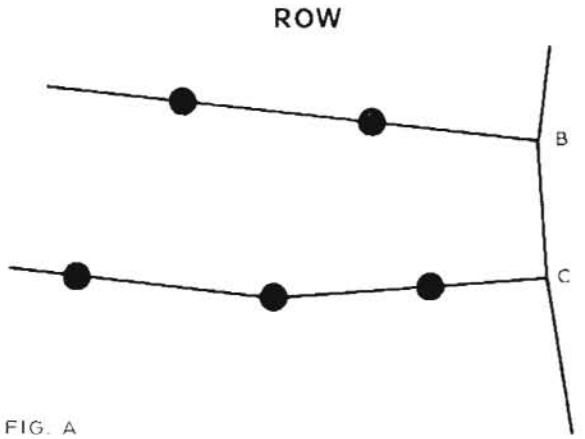


FIG. A

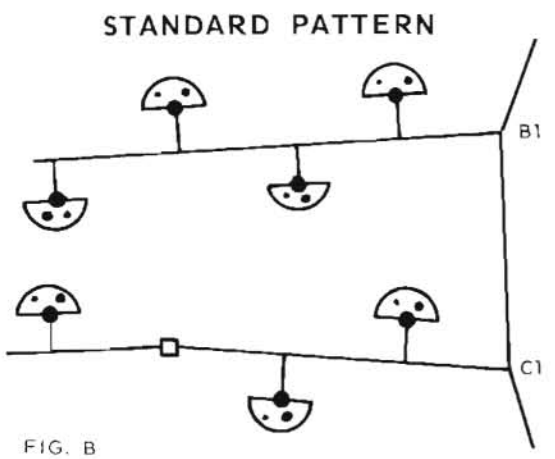


FIG. B

field. This is usually expressed in three numbers indicating type of mine, i.e., 1 antitank mine (AT), 1 antipersonnel fragmentation mine (APF), 1 antipersonnel blast mine (APB), or specifically a 1-1-1 desired density.

These two terms, front and desired density, are graphically portrayed by Figures C and D.

5. IOE — Irregular Outer Edge — The first strip of a minefield installed to the standard pattern. It consists of a base line with a number of short strips branching off toward the enemy. It consists of generally one-third as many live clusters (clusters that contain mines) as a regular lettered strip. Figure E shows graphically the IOE in relation to the regular strips in a minefield.

6. IOE Representative Cluster Composition (RCC) — The number of mines, by type, contained in each live cluster of the IOE. It is usually written in a three number format similar to desired density, viz, 1-2-2. However, desired density is average mines by type per meter of front and cluster composition is number of mines by type in a live cluster.

To compare standard pattern and row minefields, three assumptions have to be made:

- The desired density will be the same for each method of installation.
- The front will remain constant for each method, and
- Both methods will be manually installed using troops of equal experience.

The first statement to be examined is, "Row mining requires less time for installation than standard pattern." Envision a one-hundred meter front minefield installed to the standard pattern with a desired density of 1-2-2 (1 antitank mine, 2 antipersonnel fragmentation mines, and 2 antipersonnel blast mines per meter of minefield front). The IOE representative cluster composition will be 1-2-2 also. Using the current method of determining manhours, a calculation is made of the number of mines, by type, needed to achieve this density. Figure F explains the calculations. Having ascertained number of mines necessary, we can calculate the manhours using certain constants. For example, one man, on the average, can install four antitank mines in one hour, eight antipersonnel fragmentation mines in one hour, or sixteen antipersonnel blast mines in one hour. Using these as constants, divide each into the corresponding grand total of each type of mine. A twenty percent factor is then added to the total to account for the time spent in siting (includes

FIG. C

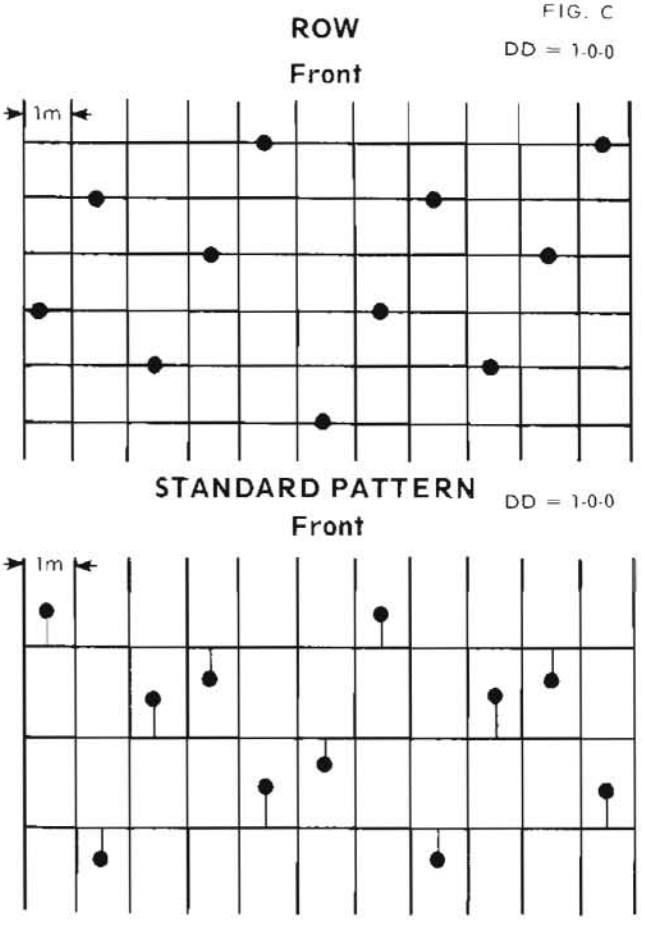


FIG. D

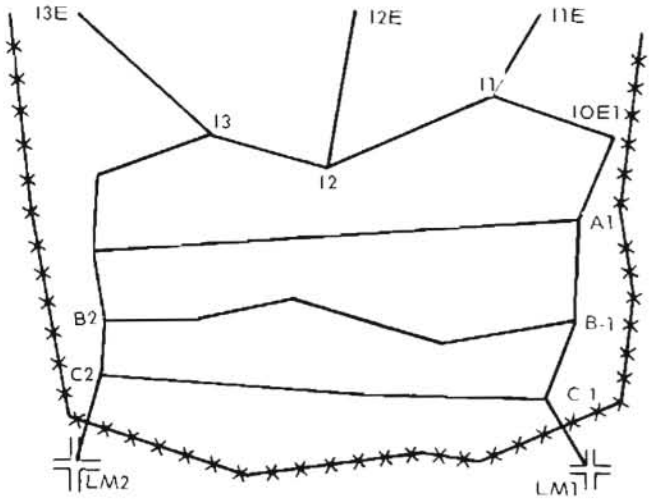


FIG. E

Desired Density (DD) 1-2-2

IOE 100 ÷ 9 = 12 live clusters in IOE RCC = 1-2-2

	AT	APF	APB	
IOE	12	24	24	
Regular Strips	100	200	200	D D X Front
SUBTOTAL	112	224	224	
10% Added for terrain & unserviceable mines	12	23	23	
GRAND TOTAL	124	247	247	

FIG. F

	AT		APF		APB	
GRAND TOTAL	124 ÷ 4		247 ÷ 8		247 ÷ 16	
MHRS	31	+	31	+	16	= 78

78 x 1.20 = 94 MHRS

FIG. G

physical layout), marking and recording. This is shown in Figure G.

Using the row method, if the effectiveness of the IOE is to be maintained in line with comparable desired density, a comparable number of mines must be installed, by type, in the IOE rows. Also, an equivalent number of mines must be present in the remainder of the field to maintain the same density. The installation rate constants 4, 8 and 16 are not dependent on the installation method; therefore, the manhours are determined in exactly the same way for row mining as they are for the standard pattern method. It therefore follows that the row method does *not* require less time for installation than does the standard pattern.

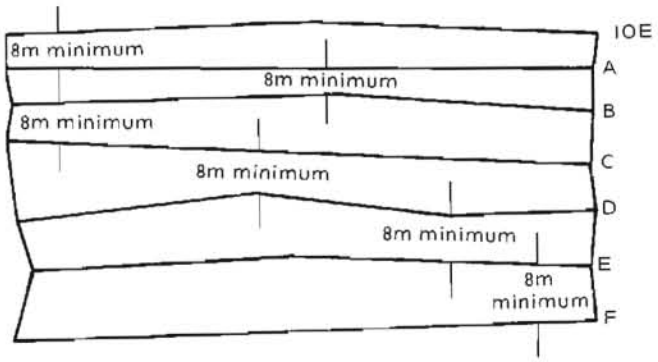
The second and third statements, "Row mining requires less manpower to install than does the standard pattern" and "Row mining requires less logistical effort than standard pattern" are directly related to the manhours required to install either type, if the manhours required to install application of the standard pattern are commonly recognized as being more complicated than those that

EDITORS NOTE: The author reaches his conclusion on an analysis of hand emplacement of mines against a 1953 threat force. The development of the M-57 mine planter for use with the M-15 mine significantly increases laying rates of Anti-Tank (AT) mines. This is particularly true using the row pattern, with one pass per strip as opposed to the standard pattern requiring 2 passes per strip. The concept of protecting the AT mine from dismounted troops is not as critical as previously perceived, in light of Soviet mechanized, doctrine to remain mounted during the assault. The Family of Scatterable Mines (FASCAM) Study recommends a ratio of 1 Anti-Personnel (AP) (fragmentation) mine per 2 AT when confronting a mechanized threat. The combination of mechanical emplacement and reduction of AP requirements have increased the desirability of row mining.

govern the row method. However, the actual physical installation process for either method does not vary significantly. Even though the standard pattern does have more complex rules for employment, it does not require any added time, manpower or logistical effort.

ROW

FIG. H-1



STANDARD PATTERN

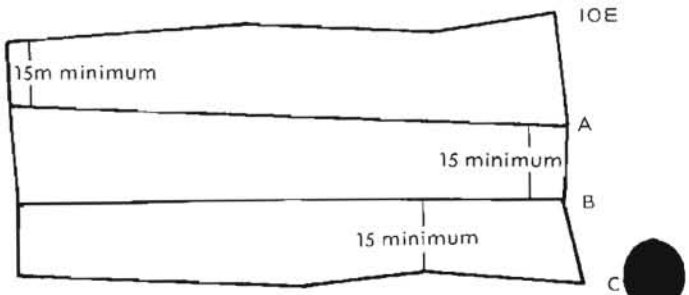


FIG. H-2

Furthermore, there is one concept that the critics of the standard pattern have either forgotten about or have just disregarded — effectiveness. In discussing the effectiveness of the standard pattern, the "how" and "why" of the cluster pattern's development needs to be briefly explored. Emphasis on mine warfare, with regard to doctrinal concepts, arose during and immediately following the Korean War. The Second Mine Warfare Panel which met at Fort Belvoir, Va., in 1953, developed the cluster pattern. Some procedures in doctrine have changed, but the basic cluster pattern is essentially the same today as when it was first introduced. The cluster pattern was developed to make antitank minefields a formidable obstacle for combined arms forces to breach, specifically armor coupled with foot troops. It is acknowledged that neither method (row or standard pattern) presents a more effective obstacle than the other to an enemy force equipped with mechanical or explosive breaching equipment. Also, since both minefields have the same density, the probability of encounter by an armored vehicle moving through either field will be essentially the same. However, the cluster pattern has been recognized as much more effective against manual detection and breaching by foot infantry. The whole concept of the cluster pattern was designed to protect the antitank base mine with the antipersonnel fragmentation and antipersonnel blast mines. This can be seen graphically in Fig. I.

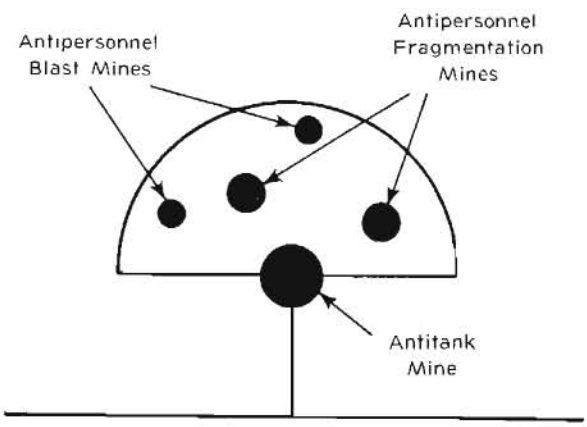


FIG. I

It becomes obvious that it is much more difficult to manually breach this type of pattern than a purely row pattern as seen in Figure J.

With the antipersonnel fragmentation and antipersonnel blast mines surrounding the base mine, the actual detection of any consistent pattern becomes more difficult. Even after detection has been accomplished, this configuration, standard pattern, becomes a more formidable obstacle for manual breaching than does the row configuration. With this understanding, then, there seems to be a

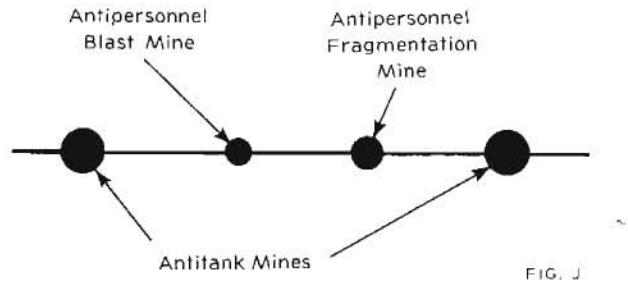


FIG. J

trade-off point in the selection of one method of installation over the other. This trade-off is that the commander must sacrifice some effectiveness of the obstacle for the simplification of rules governing installation and vice versa.

It can be argued that criticisms of the standard pattern have arisen due to a lack of understanding of its principles and also due to fallacies of judgment in selection of row over the standard pattern. To eliminate the standard pattern and revert to the row method would effectively deprive the commander of a basic tool of defense. It has been shown that it does not require more time, manpower or logistics to install the standard pattern. It has also been shown that the standard pattern offers a level of effectiveness that the row pattern cannot. Complicated? Somewhat. However, is it not the commander's responsibility to see that his subordinates are familiar with and proficient in mine warfare principles? A closer examination of the principles that make up the standard pattern reveals that it really isn't the huge dark ogre that everyone thinks it is. A complete understanding can be achieved with limited study. Also, once a decision has been made with respect to where a minefield that is hand emplaced is to be sited and its intended mission, it makes more sense to put in the more effective standard pattern. It seems that a total reversion to the row method will occur if the critics of the standard pattern continue to adhere to the current misconceptions.

CPT John V. Kauffman graduated from the Engineer Officer Basic Course in January 1970. He attended the Construction Planning and Operations Course prior to being assigned to the 23rd Engineer Battalion, 3rd Armored Division in Hanau, Germany. He returned from Europe in June of 1973 and became the Adjutant of the 3rd Battalion, US Army Engineer School Brigade. CPT Kauffman was an instructor in the Mine Warfare Branch of the Department of Applied Engineering at the US Army Engineer School. He holds a BS degree in education from Indiana University of Pennsylvania.

VIRGINIA BEACH SAND STORAGE

Curtis W. Baskette, Jr.

Virginia Beach is the major public beach in Virginia on the Atlantic Ocean. It is valuable from both a recreational and economic standpoint. But, as is typical of most shorelines along the eastern seaboard, beach erosion is a persistent problem. In an effort to combat this problem, local, state and federal interests have been working together in an attempt to maintain an adequate recreational beach through periodic replenishment of sand. The Norfolk District, U. S. Army Corps of Engineers, which administers the federal interests in the project, also has the responsibility for keeping navigation channels open into the harbor of Hampton Roads, including the Thimble Shoal Channel at the mouth of the Chesapeake Bay. Material obtained from maintenance dredging of the channel, normally dumped at sea, was tested and found to be high quality, coarse sand, suitable for beach nourishment. Armed with these test results, the Corps developed a plan to recover this sand for use on the beach.

Both the beach nourishment and channel dredging are Congressionally-authorized federal projects and combining them had the advantage of providing an environmentally desirable solution to the perennial problem of where to deposit dredge spoil. The first phase of the project included pumping the excavated sand ashore to a storage area on Cape Henry for later transfer to the eroding beaches of the resort city. A significant contribution on this civil works project was provided by the U. S. Army's Transportation Center at Fort Eustis, Virginia. The Army supplied both manpower and equipment necessary to discharge the sand onto the shore. Concurrently, the operation provided a valuable training opportunity in a wide range of logistics, port construction, and operating techniques.

Pumpout Operation

Dredging of the 11-mile long Thimble Shoal Navigation Channel was accomplished by the Corps' owned-and-operated hopper dredge GOETHALS, which has the required pumpout capability. After obtaining a full load of sand in her hopper bins, the dredge connected to an intricate mooring system offshore from Cape Henry, reversed the engines and pumped the material ashore to a beach storage area on Fort Story Military Reservation. The mooring system, located in 30 feet of water to accommodate the dredge's draft requirements, included a floating mooring barge which provided the connection between the dredge and the submerged pipeline leading to shore. Suitable anchorage of the mooring barge in the exposed ocean environment of Chesapeake Bay was a critical factor in the operation. The aid provided by the 497th Engineer Company (port construction), Fort Eustis, in furnishing and operating a self-elevating DeLong Pier was essential to success. The pier was raised above the water by pneumatic jacks on each of its ten caissons. Each caisson or spud is 78 feet long and 6 feet in diameter with 1½-inch thick steel walls. Once out of the influence of the sea, the pier provided a stable platform to which the mooring barge was secured. The principal dimensions of the two barges are:

	Mooring Barge	DeLong Pier
Length	250 feet	300 feet
Width	60 feet	80 feet
Draft	3 feet, 4 inches	3 feet
Deck height	10 feet	13 feet
Weight	1500 tons	2300 tons

More than 1100 feet of 28-inch diameter submerged pipeline was placed on the bay bottom between the mooring system and the shore. Another 2700 feet of shore pipe was required along the shoreline to the stockpile area.

The sand pumpout and storage operation took place between 6 October and 25 November 1974, a period of about 50 days. During that time, over 450,000 cubic yards of high quality sand was pumped ashore. The stockpile extended over a

28-acre area with a top elevation approaching 30 feet above mean sea level. Transfer of the material to the project shoreline at Virginia Beach, some 8 miles away, began during January 1975. In all, a 3- to 4-year supply of beach nourishment material has been made available.

The 497th Engineer Company

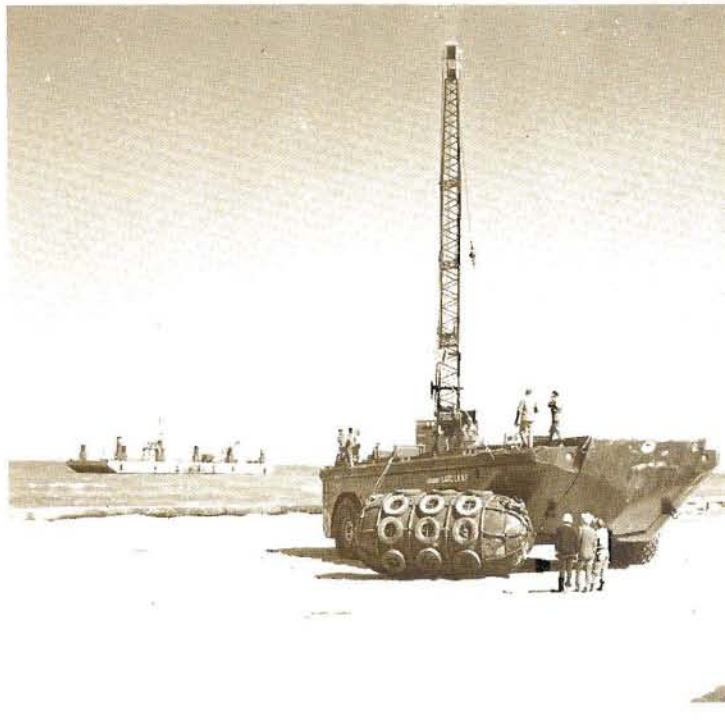
Formed in 1942, the 497th Engineer Company is the only active port construction unit in the United States Army. It participated in numerous campaigns and construction efforts during World War II and in Viet Nam. As an element of the 7th Transportation Group at Fort Eustis, its primary mission is to construct, improve and rehabilitate waterfront facilities, including piers, wharves, and offshore anchorage systems; the installation of submarine and floating pipelines; marine salvage; and vessel repair. In addition to the normal marine construction equipment which the unit has under its command, the 497th also has charge of a self-elevating DeLong Pier. Used successfully in Vietnam as an "instant" pier or wharf for off-loading marine cargo, the DeLong Pier provided a ready means of stabilizing the mooring facilities for the sand pumpout.

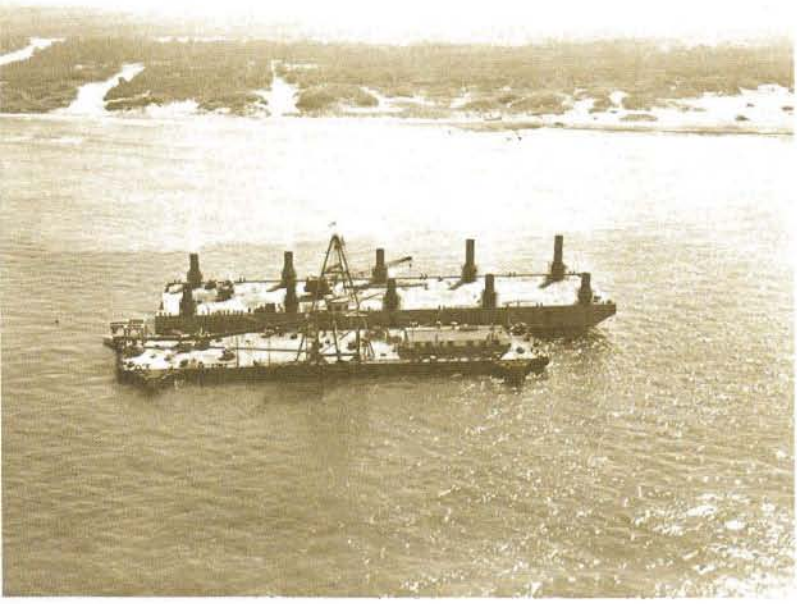
Success of the pumpout-sand storage project was dependent on being able to locate and elevate the pier in about 30 feet of water, and within a reasonable pumping distance to the stockpile area. Test installations of the pier were begun in early August 1974. Sufficient soil bearing capacity to raise the pier was not found within the upper bay bottom immediately offshore of the site. After conducting a geophysical survey of the nearshore zone using a seismic profiler, another series of test installations was conducted by the port construction unit. A suitable area was located and the DeLong Pier was raised approximately 1100 feet offshore and 2700 feet east of the stockpile site, well within the efficient pumping capabilities of the GOETHALS.

A specialized fendering system was installed between the floating mooring barge and elevated DeLong Pier to absorb wave and ship-induced energy. Two separate fender units were constructed, each consisting of 15-inch diameter rubber fenders hung horizontally from the deck of the DeLong Pier; a series of ten vertical timber piles; and cylindrical foam-filled fenders, measuring 4.0 feet by 7.4 feet, shackled together and floating between the mooring barge and timber piles. The fendering system was installed by the 497th Engineer Company. The untreated oak piles were driven about 15 feet into the bay bottom by a 40-ton crawler crane from the deck of the DeLong Pier.

10-Ton Fork Lift Installing Section of Shore Pipe

Yokohama Fender Being Airlifted Aboard LARC LX Amphibious Vehicle for Transport to Mooring Facilities





Mooring Barge Secured to DeLong Pier Offshore of Fort Story, Virginia

Dredge GOETHALS docking to Mooring Facilities

After four days of operation, significant winds and waves developed out of the northeast. The foam-filled fenders were damaged considerably with separation resulting around their ends. Although additional foam fenders were available for replacement, a more substantial fender was necessary in view of possible major storm damage. Two Yokohoma rubber pneumatic fenders, measuring 8 feet by 18 feet were borrowed from the U. S. Coast Guard at Elizabeth City, North Carolina. Even though winds exceeding 40 knots and waves exceeding 7 feet were experienced, no further damage to the fenders or barges resulted.

The 1100 feet of 28-inch pipeline was floated in a single section to the site from a Corps of Engineers facility inside Norfolk Harbor. The pipeline was positioned between the mooring facilities and shore and lowered to the bay bottom by gradually filling it with water. A large LARC LX amphibious vehicle towed the pipe through the surf zone onto the beach. Corps-owned shore pipe was carried to the site in 16-foot sections by flatbed trucks. Two weeks were required by the engineer unit to assemble the 2700 feet of pipe paralleling the shoreline to the storage site. The assembly was accomplished through the combined use of two D-7 bulldozers, a 20-ton mobile crane, and a 10-ton forklift. The forklift simplified and expedited the installation process considerably as a result of its mobility in the sandy terrain and effectiveness in handling and positioning the pipe. These same pieces of equipment were used throughout the pumpout operation for adding pipe and shaping the dikes around the sand storage area to retain the discharged material.

Another major role played by the port construction unit pertained to the docking of the dredge GOETHALS to the mooring barge and the mating of the discharge pipeline to the dredge's pumpout system. Under the supervision of personnel from the Corps' Philadelphia District, the soldiers were responsible for the operation of the four automatic tensioning winches which secured the dredge to the mooring barge. Two additional winches controlled the discharge pipeline for its mating with the dredge. The dredging-pumpout activities were conducted around-the-clock, seven days a week throughout the two months of operation with an average of four hopper loads a day being pumped ashore.

Roles of Other Military Units

Several other units of the Transportation Center were instrumental in providing support to the preparation and accomplishment of the sand storage operation. Tug assistance was provided by the 73rd Floating Craft Company in the

movement of barges, floating pipelines, and other materials required for the project. Divers of the 70th Transportation Battalion made reconnaissance investigations of the bay floor during the process of locating a suitable position for erection of the DeLong Pier and alignment of the submerged pipelines. They also accomplished the underwater maintenance of the submerged pipeline and its connections.

Besides furnishing the land upon which the sand was stored, the 79th Transportation Battalion at Fort Story also contributed both logistics and transportation. Fort Story is the only Army installation in the United States suitable for amphibious training, for the conduct of logistics-over-the-shore (LOTS) exercises, and for the test of amphibious and LOTS operational concepts and equipment. The primary amphibious vehicles utilized at the installation are of the LARC class. These vehicles afforded an efficient means of transferring men, equipment and materials from the shore to the mooring facilities and dredge. At least one manned vehicle was stationed on the beach twenty-four hours a day for the possible emergency evacuation of men from the offshore facilities. Fortunately, no severe emergency arose during the operation.

By the effective combination of two separate civil works projects, thousands of cubic yards of sand, normally lost by dumping at sea, were recovered for the replenishment of eroding shorelines. The physical and economic success of the operation was made possible by the significant support of troops and equipment of the United States Army, who gained valuable training and experience from the various technical aspects of their efforts. Through the joint civilian and military endeavors, not only were the citizens of Virginia Beach, Virginia, supplied with much-needed beach nourishment sand, but optimum conservation and use of a natural resource was achieved with minimum impact on the environment.

Curtis W. Baskette, Jr. is a project engineer in the Water Resources Planning Branch, Engineering Division, for the U.S. Army Engineer District in Norfolk, Virginia. His responsibilities include the formulation of reports and administration of projects relative to coastal engineering and beach erosion, navigation, flood control and related water resources projects. He obtained his bachelor of science degree in civil engineering at Virginia Polytechnic Institute and State University and his master's degree in coastal and oceanographic engineering at the University of Florida. He has been with the Norfolk District office since 1967.

Aerial View of the Sand Stockpile on the Fort Story Military Reservation on Cape Henry

D-7 Bulldozers Removing Shore End of Submerged Pipeline

ARE ENGINEERS REALLY DIFFERENT?

MAJ Joseph P. Kish

EDITOR's NOTE: This article is published in the interest of provoking discussion. The USAES is in the process of rewriting the current family of field manuals. These manuals will include discussions of command and support relationships, which are being modified to reflect changing doctrine on "How to Fight."

Have you ever tried to explain to a combat arms officer the "best" way to employ your engineer unit? Even if your recommendation was technically and tactically sound, have you ever tried to justify your decision based on official US Army doctrine? If the answer to both these questions is "yes", you have already experienced the problem area I will discuss.

If you are a member of a divisional engineer battalion, your doctrinal organization for combat is quite clear. An engineer combat company is normally placed in support of each committed brigade, while the remainder of the battalion supports the division as a whole.

But what happens when nondivisional engineers are supporting your division? Doctrine is quite consistent in recommending that the nondivisional engineers be placed in support of, or attached to, the division. That's all right as far as establishing a command relationship. But what about the combat support tasks and the coordination to be accomplished by the supporting unit? As an example, FM 5-142, paragraph 3-8a, states:

"*. . . Corps engineer combat brigade elements operating forward into divisional areas on a task or area assignment coordinate major activities with the division engineer through their engineer combat group headquarters. When attached to or in direct support of a division, they coordinate with the division engineer.*"

Here, however, we encounter the common doctrinal confusion of discussing command relationships intermixed with mission assignments. A task assignment and an area assignment are tactical missions; whereas attachment and direct support are command relationships. This confusion also exists in other engineer doctrinal references (FM 5-1 and FM 5-162) where terms are defined in the first few chapters, but are confusingly intermixed.

I propose the adoption of a system which specifically designates the various command relationships separate from the mission assignments. This system is similar to the technique used by the field artillery. A summary of some combinations is furnished at the end of this article (Tables 3 and 4). No handy matrix of all inherent responsibilities has been developed, due to the myriad employment combinations possible. Such a system is compatible with the format of the five paragraph operation order. In fact, it is based on the operation order format specified in FM 101-5. O combat arms brethren think and organize the activities in accordance with the operation order format, so why should we insist that engineer

employment doctrine be different?

Many of you may question the advisability of "tinkering" with a system that has served us faithfully throughout the years. True, the engineers have always been able to resolve disputes. However, many times these resolutions have bewildered maneuver commanders who could not fully understand the intricacies of the system. The following proposal should clarify future working relationships. By clearly specifying the differences between a command relationship and a mission assignment, the supported unit as well as the supporting engineer unit would clearly understand their mutual responsibilities, prerogatives, and command channels. Hopefully, it would also clarify relationships with tenant units not receiving support. How many times in Vietnam did that nondivisional engineer company commander have to deny requests from senior officers wanting to use a grader for "just an hour"?

In order to clarify the following proposal, as well as to save the reader research time, the discussion includes certain definitions found in current doctrine and AR 310-25, *Dictionary of United States Army Terms*. The command relationships are those to be specified in the Task Organization of the appropriate operation order; while the mission assignments are those to be specified in an appropriate subparagraph of paragraph 3, EXECUTION, of the same operation order.

Command Relationships

Engineer units will have a command relationship established with higher headquarters. The command relationships of *organic* and *assignment* are relatively permanent and are specified by TOE or in appropriate general orders. Since these two command relationships are not subject to change by an operation order, they will not be discussed in detail. The command relationships of *attachment*, *operational control*, and *direct support* are subject to frequent change and are specified in the Task Organization of the appropriate operation order/plan. A brief discussion of these last three terms follows.

Attachment is the temporary placement of a unit under a command other than its assigned command. Unless otherwise specified in the attachment order, the commander of the unit receiving the attachment exercises the same degree of command and control as he does over units and persons organic to his command. However, the responsibility for transfer and promotion of personnel, as well as the administration of military justice, will normally be retained by the parent unit.

Operational Control is the placement of a unit under a commander or staff officer for the accomplishment of specific missions, or tasks, which are usually limited by function, time, or location. It does not include authority to assign separate employment of components of the units concerned. In addition, it does not, of itself, include responsibility or authority for combat service support, administration, internal organization, or unit training.

Direct Support is a temporary command relationship requiring priority support to be provided by a unit, not attached or under operational control of the supported unit. The parent organization of the supporting engineer element retains command of, and responsibility for administrative and logistic support of the supporting element. Direct support is not clearly specified as a command relationship in current engineer doctrine. However FM 101-5, Appendix F, clearly specifies it as such and requires that "DS" be indicated when appropriate in the operation order Task Organization.

The five possible command relationships are stated in Table 1.

Command Relationships

Organic
Assignment
Attachment*
Operational Control*
Direct Support*

*These command relationships are specified in the Task Organization of an operation order/plan.

TABLE 1

Mission Assignments

Within the framework of the command relationship, the combat support responsibilities to be executed by engineer units are designated by the assignment of support missions and/or work assignments. These should be discussed together in doctrinal references as "mission assignments"; since they are the missions specified in an appropriate subparagraph of paragraph 3, EXECUTION, of the operation order. In addition to the mission assignments, engineer employment is often further clarified by designating work priorities for the various missions assigned. A brief explanation of the mission assignments follows.

Direct Support is a mission characterized by close liaison and coordination between the supporting and the supported unit. It assures that the priority of engineer effort is applied as needed

to the requirements of the supported command, without fragmenting or diluting control of the engineer support unit by its parent organization. The support of a DS unit cannot be withdrawn or diverted without approval by the commander over both the supported unit and the parent engineer unit. The parent engineer headquarters maintains technical supervision of the direct support unit.

General Support is that support which is provided to the supported force as a whole and not to any particular subdivision. This mission assignment is applicable to engineer elements not providing priority support to a particular subdivision of the major headquarters concerned. General support takes advantage of the centralized planning and technical supervision capability of the parent engineer headquarters.

Coordination of engineer combat support frequently requires the specification of work assignments in addition to specifying a direct support or a general support mission. The work assignments which may be assigned are task, area, or a combination assignment.

Area Assignment is the designation of responsibility to an engineer unit for general engineer work within a specific geographic area. The limits of responsibility may or may not coincide with tactical boundaries; they are primarily based on the estimated engineer requirements. If an informal boundary is required to establish area responsibility, an engineer forward work limit (FWL) is established by common agreement between engineer commanders. (The use of the term "FWL" typifies the problem that I would like to eliminate. It is commonly used in engineer doctrinal references as well as USAES literature. However, a non-engineer could be extremely confused since this term is not recognized in AR 310-25 or AR 310-50.)

Task Assignment is the assignment of specific project or projects to be accomplished by an engineer unit within the area of operations of the supported unit. Task assignment has the advantage of clearly defining the job to be accomplished and permits a degree of centralized control.

Combination Assignment includes both the missions of task and area assignment for a particular engineer unit. Tasks can also be assigned within the geographical area of responsibility of another engineer unit.

As indicated previously, *work priorities* may also be specified for dilineated tasks. However, the overall priorities can only be specified by the headquarters directing the supporting engineer effort. Thus, the command relationship established also has implications regarding the specification of priorities.

Within the framework of the command relationship, the five possible mission assignments are stated in Table 2.

Mission Assignments

Direct Support
General Support
Task Assignment
Area Assignment
Combination Assignment

TABLE 2

Divisional Engineer Employment Responsibilities

Command Relation	Type Missions (Tasks) Supported Unit May Assign	Who May Change Mission	Establish Liaison w/	Work Priorities Established by	Who Provides Admin/Log Support	Requests for Assistance through	Technical Supervision by
Organic, Assignment or Attached	DS GS Task Area Combination	Supported Unit	Supported Unit	Supported Unit	Supported Unit	Supported Unit Channels	Div Engr
Operational Control	DS GS Task Area Combination	Common Cdr of engr & Supported Unit	Supported Unit	Supported Unit	Parent Engr HQ	Supported Unit Channels	Div Engr
Direct Support	DS Task Area Combination	Common Cdr of engr & Supported Unit*	Supported Unit	Supported Unit	Parent Engr HQ	Engr Channels to Parent HQ	Div Engr

*Unused capabilities may be employed by parent engr HQ after coordination with the supported unit.

Nondivisional Engineer Employment Responsibilities when supporting a Division or Separate Brigade

Command Relation	Type Missions (Tasks) Supported Unit May Assign	Who May Change Mission	Establish Liaison w/	Priorities Established by	Who Provides Admin/Log Support	Requests for Assistance through	Technical Supervision by
Attached	DS GS Task Area Combination	Supported Unit	Div Engr & Supported Unit	Supported Unit	Supported Unit	Div to Corps (Command channels)	Div Engr
Operational Control	DS GS Task Area Combination	Corps	Div Engr & Supported Unit	Supported Unit	Parent Engr HQ	Div to Corps (Command channels)	Div Engr
Direct Support	DS Task Area Combination	Corps*	Div Engr & Supported Unit	Supported Unit	Parent Engr HQ	non-div-engr channels	Div Engr
Assigned or Attached to Engr Bde or Gp	GS Task Area Combination	Parent Engr HQ	Div Engr	Corps	Parent Engr HQ	non-div-engr channels	Parent Engr HQ & Div Engr
Combat Service Support Tasks (Construction & Installation Support)							
Assigned or Attached to Engr Bde or Gp	GS Task Area Combination	Parent Engr HQ	Div Engr	Corps	Parent Engr HQ	non-div-engr channels	Parent Engr HQ

*Unused capabilities may be employed by parent engr HQ after coordination with the supported unit.

mmary

An outline of some of the inherent responsibilities for various combinations of command relationships and mission assignments is contained in Tables 3 and 4. Table 3 applies to divisional engineer units. Table 4 applies to nondivisional engineer units operating in a divisional area of operations. Since some of the responsibilities change for combat service support tasks (construction and installation support), these tasks are listed separately.

Conclusion

The previous discussion was intended to summarize what every experienced Army engineer has found to exist in an actual theater of operations. Nothing contrary to current doctrine has been introduced. However, by rigorously separating the command relationship from the mission assignment in doctrinal references, we can assist the newer Army engneers in visualizing their essential combat support contributions in any future theater of operations. The current employment flexibility is maintained, yet this proposal s the additional advantage of explaining engi- r supporting procedures in terms familiar to e combat arms. Hopefully, it will assist in preventing future misunderstandings with supported units, as well as tenant units not receiving support.

Once an engineer project is underway in an area of operations, many interested commanders, both engineer and non-engineer, will be keeping abreast of the progress. It is essential that the engineer commander on the site clearly understands the headquarters that can adjust his priorities, as well as the channels he uses to request additional assistance. If these considerations are evaluated prior to the engineer troops arriving on the site, and if the command relationship and mission assignment is disseminated to all interested units, the engineer tasks can be accomplished rapidly and with a minimum of confusion.

Engineer employment doctrine is not radically different from other combat support, let's just ensure that we state it as such.

Major Joseph P. Kish holds a BS degree from Purdue University and a MA from Michigan State University. He is also a graduate of the Engineer Officer Basic and Advanced Courses, and the Command and General Staff College. His military assignments include being a Company Commander (both at Ft Belvoir and overseas); Administrative Officer; IAGS Paraguay Project; ROTC Instructor, Michigan State University; District Senior Advisor, MR IV, RVN; and Senior Engineer Tactics Instructor, US Army Air Defense School.

CPT Hugh C. MacDonald

ANTI—TANK DITCH CONSTRUCTION

It is 0430 hrs. The steady roar of heavy engineer earthmoving equipment ushers in the first chilly light of dawn. The last 40 hours have not heard this roar cease. Less than two days ago, a fast approaching enemy tank division had an unimpeded avenue of approach over the very spot across the plain upon which this equipment works. But now, after the movement of over 50,000 tons of earth, a two kilometer anti-tank ditch nears completion. It's presence alone adds valuable hours of reaction time for the friendly forces.

The above situation could have been a reality in a Soviet block invasion across the plains of Europe or an Arab tank assualt over the deserts of the Sinai Peninsula. It occurred, however, in a recent field training exercise conducted by the 79th Engr Bn (Const) in May 1975 at the Lampertheim Training Area near Mannheim, Germany. The training throughout the exercise was geared to the engineer role in countering enemy armor operations. One of the goals of the training was to determine the feasibility of constructing an anti-tank ditch of realistic proportions, within a limited period of time, in unfamiliar terrain.

The need for anti-tank obstacle construction training arises due to the heavy enemy armor threat faced in Western Europe today. Lessons learned during the 1973 "Yom Kippur" war in the Mideast further emphasize the need for this training. To quote the recent Combat Battalion (Heavy) ARTEP, *The long range high velocity tank cannon and longer range anti-tank armor missile systems dominate the modern battlefield. Their range capabilities are such that virtually anything that can be seen can be taken under fire and hit. They are so lethal that virtually anything that can be hit can be killed.* Thus, a primary engineer role against armor attack is to slow or stop the enemy tank force long enough to permit engagement by friendly forces.

Previously conducted tests have proven the effectiveness of the anti-tank ditch. The principles are simple. A ditch 5 meters wide, 1.5-2 meters in depth, is cut across the direction of the enemy's advance. The spoil from the cut is spread along the friendly side of the ditch, as close to the bank as soil conditions permit. Though a tank can get into the ditch, an entry perpendicular to the line of the ditch will stop all forward movement once the tank is inside. The sheer face of the friendly bank precludes the enemy tank from directly climbing to the friendly side. The narrow width of the ditch impedes turning the tank. The tank is therefore virtually frozen long enough to be engaged by friendly fire. An entry parallel to the line of the ditch allows the tank freedom of movement inside the ditch. However, its weapons systems are practically ineffective. Its restricted freedom of movement allows it to be more easily targeted by friendly fire. Finally, any attempt to bridge the gap by AVLB or earthen ramp results in two discouraging factors: 1) Lanes across the ditch

become well defined allowing concentration of the friendly fire; 2) The climbing of the earth wall on the friendly side exposes the vulnerable underbelly of the armored vehicle to friendly fire.

The 79th Engr Bn set out to determine the feasibility of constructing an anti-tank ditch during a simulated wartime situation. A two kilometer long open plain in the Lampertheim Training Area was chosen to be the site of the test. The test area was approximately 100 kilometers from the unit's home station.

At 0330 hours, 2 May, the operation order for the construction of the anti-tank ditch was issued to the construction units in garrison. Their mission was to convoy to the Lampertheim site and provide general engineer support to defensive operations. Specific tasks included a 2000 meter anti-tank ditch, to be completed NLT 1200 hours, 4 May, as well as other engineer defensive operations.

The ditch was divided into two areas of responsibility — the northern half to be constructed by C company and the southern half to be the responsibility of B company. Ditch dimensions were five meters wide with a minimum depth of 1.5 meters. The spoil was to be stockpiled on the friendly bank of the ditch. The units were ready to convoy by 0530 hours. A survey party departed home station prior to the convoy. It located and staked the ditch line by 0830 hours. The construction units began arriving near the site at 0930 hours. Site recons, unloading of equipment, and personnel briefings took less than two hours. Construction began in earnest by 1130 hours. The operation proceeded on an around-the-clock basis. An average of seven 290Ms with scrapers, eight D7E dozers, and 2 graders were in operation at any one time. Each company worked two operator crews, each crew working 12 hour shifts.

The logistical support for the exercise was operational by 1600 hours. It was centrally located 100 meters to the rear of the ditch and consisted of second and third echelon maintenance teams, fuel point, aid station and Bn S-3 Forward.

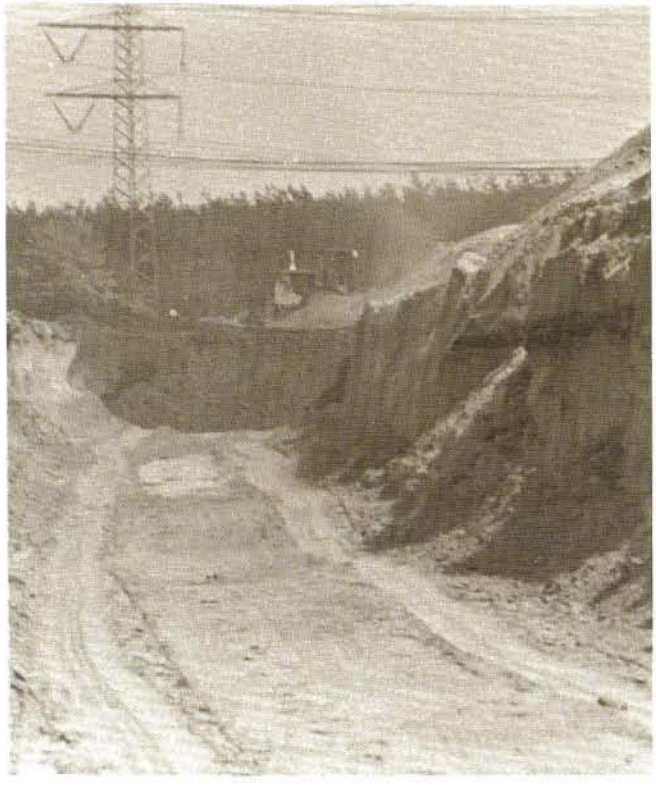
By 1900 hours, 2 May, B company was 32% complete with their sector of the ditch. They cut a path about 30 cm deep along the entire length of the ditch, and then started working from the far southern part of their sector working toward the ditch center, using two crews of two 290Ms pushloaded by dozers. C company was 35% complete. They started at the far northern end of their sector, using a system of progressive cuts working to the center of the ditch. The scrapers were loaded in series pushing each other with a dozer at the rear pushing the last pan.

By 0200, 3 May, B company was 40% complete and C company was 45%. Each unit continued to

use the same method of cutting the ditch that they started with. Light sets which had been set up to illuminate the ditch during darkness proved to be more of a safety hazard than an aid. The glare from the lights occasionally blinded the operators, causing production to slow to a crawl. They were subsequently shut off, and vehicle lights only were used.

By nightfall 3 May, both of the sectors were 85% complete. During the day, C company continued to use progressive cutting. B company, however, experimented with cutting the ditch one pan width (approximately 4 meters) wide and deeper than the required 1.5 meters, then had dozers periodically cut the friendly bank to widen the ditch to the specified width. This method increased their production and enabled them to draw equal with C company by nightfall.

The remaining 15% of the ditch in both sectors was completed by 0300 hours, 4 May. Shaping of the spoil on the friendly bank and additional cutting in those portions of the ditch that did not quite meet the 1.5 meter depth specifications required some additional time. Constant vibrations caused by the heavy equipment in the ditch and the dozing of the spoil as close as possible to the ditch bank caused occasional time-consuming cave-ins. This problem was more acute at Lampertheim than would normally be expected because



Left: Anti-Tank Ditch perspective; Above: View looking into extreme north end of ditch — 100%; and, Bottom: Cross-section of finished Anti-Tank Ditch

the soil was a uniformly graded sand. By 0730, 4 May, the mission was officially completed. A total of 22,750 yards of earth had been moved in 4 hours. A 2000 meter anti-tank ditch now lay in the path of the advancing enemy force. Completed 4½ hours ahead of the desired schedule, the operation was an unqualified success.

The primary conclusion drawn from this exercise is that construction of an effective anti-tank ditch obstacle can be accomplished in a very short time span. The effectiveness of the obstacle could be further increased through mining and/or filling it with barbed wire. While it is realized that the ditch in itself is not by any means an impenetrable obstacle, it does serve to impede and/or channelize the enemy's advance, drawing them into a killing zone of lethal fire. Considering the present advanced state of tank and anti-tank weaponry, it could very well provide the edge that could turn the tide of a battle.

CPT Hugh C. MacDonald is a graduate of USMA Class of 1971. After graduation he attended the Engineer Officer Basic Course and Airborne School before joining the 79th Engineer Battalion (Const). CPT MacDonald has served as platoon leader of Earth Moving Platoon, C Co, 79th Engineer Battalion, and as the Construction Officer and Pipeline Engineer in the S-3 Section, HHC, 79th Engineer Battalion (Construction).

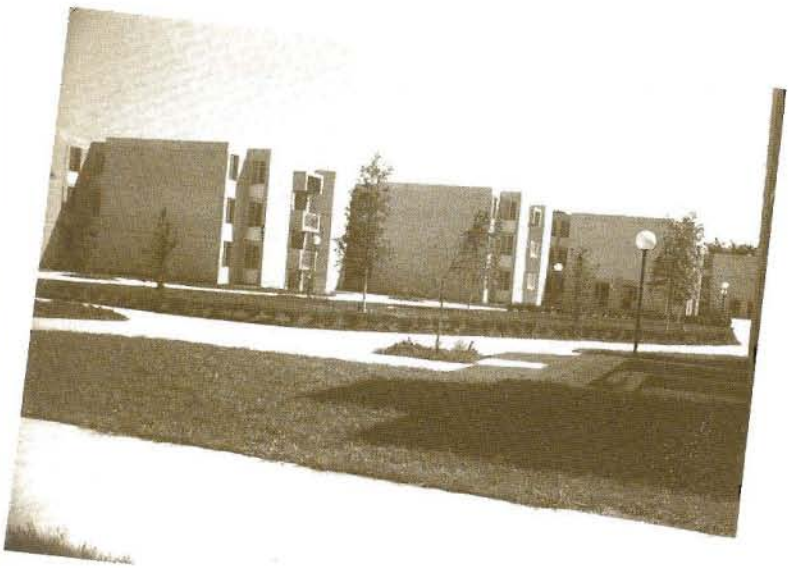
Construction on Belvoir

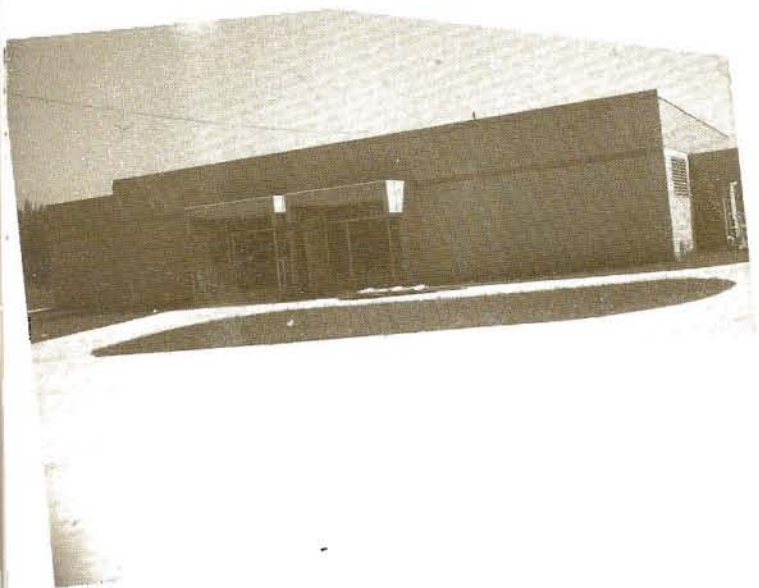
The wide variety of assignments available within today's Army not withstanding, it has been said that an Engineer's first look at Fort Belvoir will not be his last. Naturally, a few members of the Corps have never visited the "home" of the U.S. Army Engineer School, and probably never will. The average soldier, though, should he choose to remain an Army Engineer, either has seen, or soon will see, the "Fort on the Potomac."

For those who have been away for several years or longer, a return to Belvoir will undoubtedly include a surprise or two. New, improved facilities, which have replaced many of the familiar World War II vintage structures, have provided a most welcome facelift. In addition to the obvious need to maintain that which is of military significance, the impact of a volunteer force upon housing and recreational facilities has been substantial.

Perhaps the most noteworthy of the billeting improvements is the enlisted barracks complex on North Post. Completed in late 1975, these billets represents only a portion of the $10 million construction package. Included also are consolidated company administration and supply buildings, branch dispensary and PX facilities, and a central energy plant. A second phase of the project, still awaiting funding, includes an identical 1200 man barracks, a gymnasium, a chapel, a new mess hall, and a battalion and regimental headquarters. The new barracks will have private baths and common living room areas. Enlisted grades of E7 and above will have private quarters, while in no case will more than three soldiers share a room.

In an attempt to upgrade living conditions for bachelor and unaccompanied officers, a 227 room BOQ has recently been completed across from the Humphreys Hall parking lot. This five story concrete and brick building is complete with central heating and air conditioning, carpets, elevators, private kitchens, lounges, laundries, storage space, and additional parking.





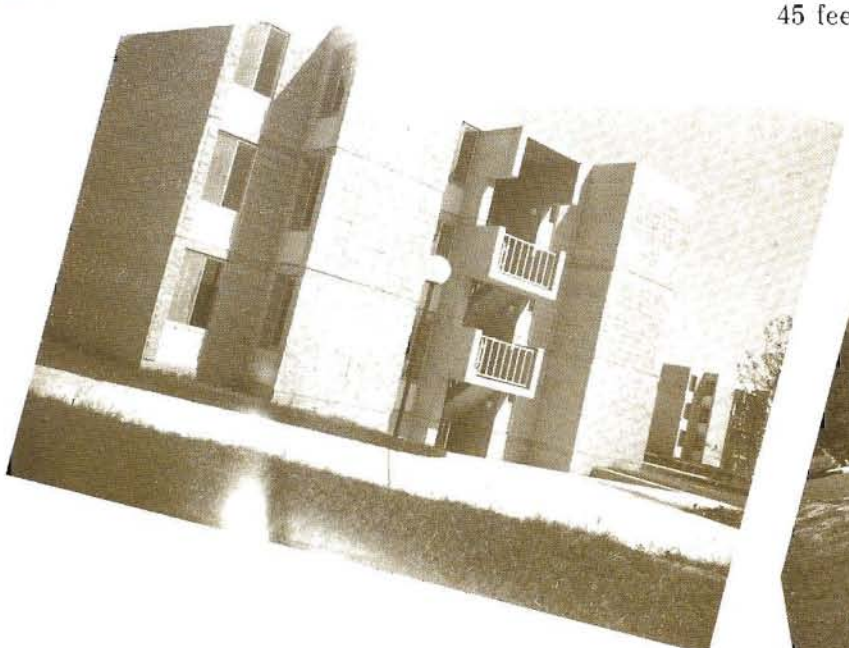
If you have a family, a project to improve existing housing for more than 400 units at Fairfax Village and Dogue Creek is scheduled for completion by the fall of 1976. The contract calls for air conditioning and complete kitchen improvements, to include such items as new sinks and cabinets, built-in dishwashers and garbage disposals, and relocation of washer-dryer units. The Directorate of Facilities Engineering has confirmed that plans are underway to provide similar improvements for the remainder of Belvoir's family housing units.

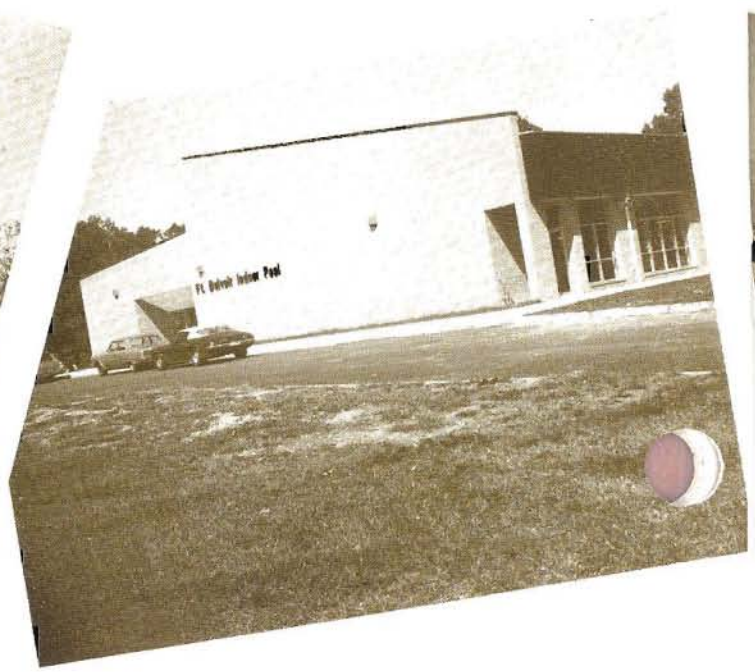
Housing improvements will not stop there, however. Another project, authorized and funded by Congress and scheduled to start late 1975, will provide some 1445 new units. Of these, 850 are earmarked for Army personnel. They will include 628 three, four and five bedroom townhouses and duplexes, and 222 two bedroom garden apartments. Ninety will be for officers and their families, sixty for senior enlisted personnel, and the remaining 700 for E4s and E5s.

The Navy and the Coast Guard will receive 595 duplexes and townhouses similar to those being built for the Army. Twenty-five of these will be for officers with the remainder being provided for enlisted personnel.

One other billeting project scheduled for the near future is the construction of a medical barracks for EM/EW assigned to DeWitt Army Hospital. The three story brick building should be completed by the summer of 1976 and will house two people per room, as well as provide private baths, a dayroom, a lounge, and a laundry room.

Recreational facilities have not gone unnoticed at Fort Belvoir. An indoor swimming pool was completed in mid 1975. The pool measures some 45 feet by 75 feet and also includes locker rooms,





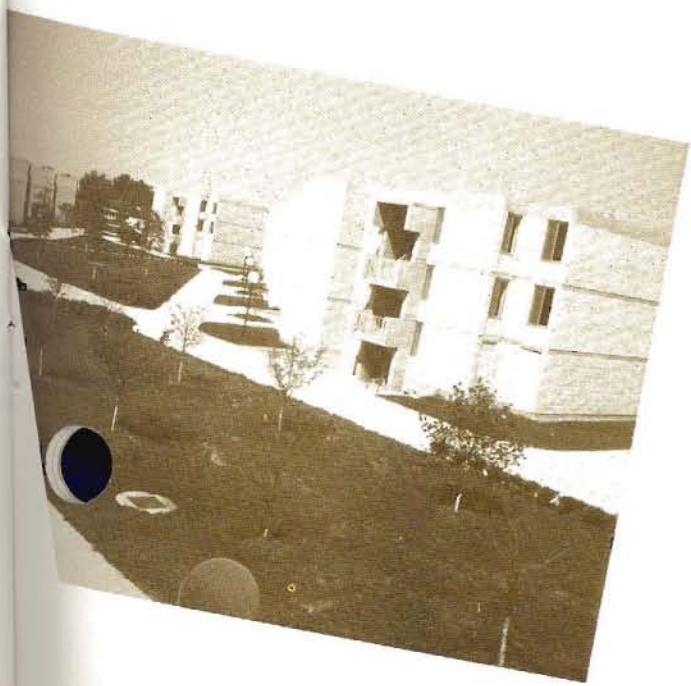
showers, toilets, an office area, and a parking lot. Also under construction is a 500 seat theater. The air conditioned theater is located on North Post, thereby providing a much needed source of entertainment for the troops who reside in that area.

Other recreational facilities recently completed include a recreation center and a crafts shop. The recreation center, located next to the main post theater, is a brick faced, steel framed, CMU block, air conditioned building with 23,150 square feet of floor space. In addition to the normal lounge and dayroom activities, the club offers a beer and pizza shop, several acoustically controlled music rooms, and a small multi-purpose room with a stage.

Recent contract work at Fort Belvoir has also resulted in the construction of a number of important military facilities. Included among these is a 1200 man US Army Reserve Center, scheduled for completion in 1975. Located on North Post, the two story, 48,600 square foot center and a one story, 7,550 square foot motor repair shop will provide a much needed training complex for reserve units in the northern Virginia area.

One of the more costly projects has been the Communications/Electronics Evaluation and Testing Agency, completed this past winter. This DOD facility cost some $12 million to construct and will be used for training personnel, and testing and evaluating communications and electronics equipment.

Some other significant military facilities completed within the last year include a Coastal Engineering Research Center costing six million dollars, and a Topographic Research and Development Laboratory at $5.5 million. The Research Center provides extensive testing and storage capabilities, while the R&D Laboratory offers some 91,000 square feet for the Engineer Topographic Laboratories to continue their studies in the field of topography.



In addition to what has already been mentioned, a number of other projects have been authorized and funded through fiscal year 1977. One of these is the central air conditioning of the Defense Mapping School's Wheeler Hall, scheduled to be completed by the summer of 1976. Another is the electrical and mechanical upgrade of DeWitt Army Hospital, which, because of the operation of the hospital, will be phased over a period of two years.

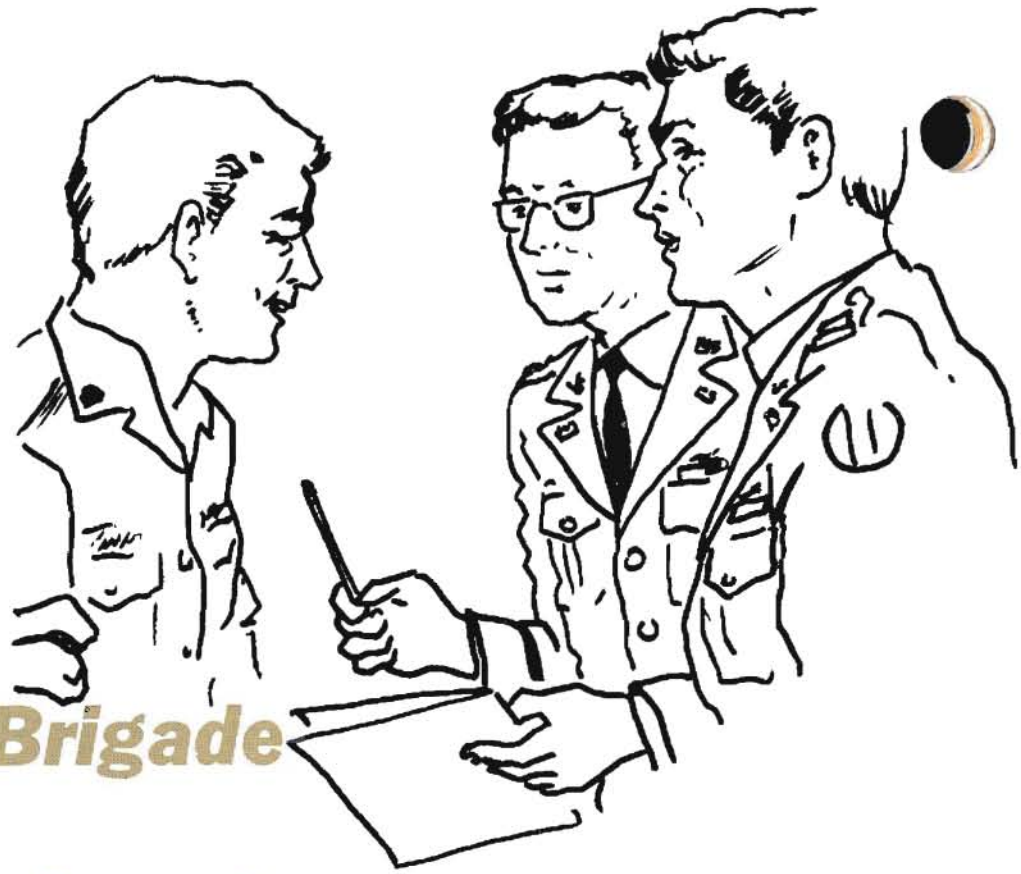
Two water purification control projects will be completed by this winter. One will eliminate waste water disposal, and the other will provide for sanitary sewer improvements. A new Night Vision Systems Laboratory will be built at MERDC. Construction of the 104,000 square foot, 4 story building, with a 38 foot high bay machine shop will start this summer and should be finished by mid 1977. Also due to commence this year is an Aircraft Supply Building at Davison Army Airfield. The 15,300 square foot, one story, CMU combination warehouse and administration area is schedudle for completion by the Spring of 1976.

Remaining tasks which will be performed with FY 76 and FY 77 funds include two energy conservation projects for a total of 261 buildings, a 32,800 square foot Camouflage Laboratory at MERDC, and an 8,040 square foot Flight Simulator Building at Davison Army Airfield.

In order to help create the spaces for many of the new facilities, DFAE personnel at Fort Belvoir have been busy overseeing the removal of many temporary wooden structures. Nearly all of the work is being done by troop labor utilizing demolitions, once the buildings have been stripped by Facilities Engineering personnel.

It becomes obvious, then, that not only do the people and programs change, but also that the physical setup of the post is subject to alteration through the years. Much of what is being accomplished now is the result of careful planning processes begun many years ago. The next time you are at Belvoir, remember that the new office where you work, or the new quarters where you live, evolved as part of an ongoing program to constantly improve the status quo of the facilities on post.

Captain Richard B. Polin is presently enrolled in a graduate program at George Washington University. He earned a BSCE degree from Lafayette College and is a graduate of the Engineer Officer Advanced Course, 1-75. He has served previously with 12th Engr Bn, Germany and US Army Engineer District, Far East, Korea.



Universal Brigade and Group Headquarters

John M. Frank

In April 1971, the OCE Study, "New Concepts in Organization and Employment of Nondivisional Combat Engineer Units," examined the problem "To determine the requirement for a 'Universal' Engineer Brigade Headquarters capable of assignment to a Corps, Army or ENCOM to command engineer groups which may be made up of a mix of combat and construction battalions." Also, "To determine the requirement for an Engineer Group Headquarters which has the capabiltiy to manage a varying mix of combat and construction battalions." In both study efforts, it was concluded that the concept of a "universal" brigade/group headquarters be adopted.

The study was vague as to the method of accomplishing the change other than to suggest that a construction augmentation be added when the unit was operating in the communications zone. Much study and effort went into developing tables with augmentations, but it developed that these were not as satisfactory or efficient as the separate tables. Then in January 1974, the Engineer Strategic Studies Group published a study, "The Construction Battalion in the Combat Engineering Role." The analysis showed that on some combat zone tasks the construction battalion is more effective than the combat battalion. With some equipment augmentation, dual training of select personnel, and additional unit training, the construction battalion can be more effective on most combat engineering tasks. This report led the Chief of Engineers, in March 1974, to recommend to the Army Chief of Staff that the present construction battalion be renamed the Combat Battalion (Heavy), and that it be given the additional mission to perform defensive operations as infantry when required. The Chief of Staff approved the recommendations and the construction battalion has now been renamed the Combat Battalion (Heavy), a Category I unit with a mission to fight as infantry.

The change in the role of the construction battalion to a Combat Battalion (Heavy) with possible assignment from the FEBA to the waters edge caused a reexamination of the mission for construction brigade and construction group headquarters. Now there is a need to also supervise combat activities. Similarly, the combat brigade and group headquarters also may have to supervise the construction capabilities inherent in the Combat Battalion (Heavy). The basis for a truly "universal" brigade and group headquarters

became quite apparent.

On 18 November 1974, a seminar group from Class 1-75 Engineer Officer Advanced Course was convened to attempt to design a universal brigade and group headquarters. On 27 February 1975, the group presented its findings to the Engineer Center Team at Fort Belvoir. The consensus of opinion was that a universal headquarters which combines all the combat and construction functions of the existing headquarters should be developed for the brigade (with a variation for Corps, Airborne Corps and Theater Army) and for the group (but without variations).

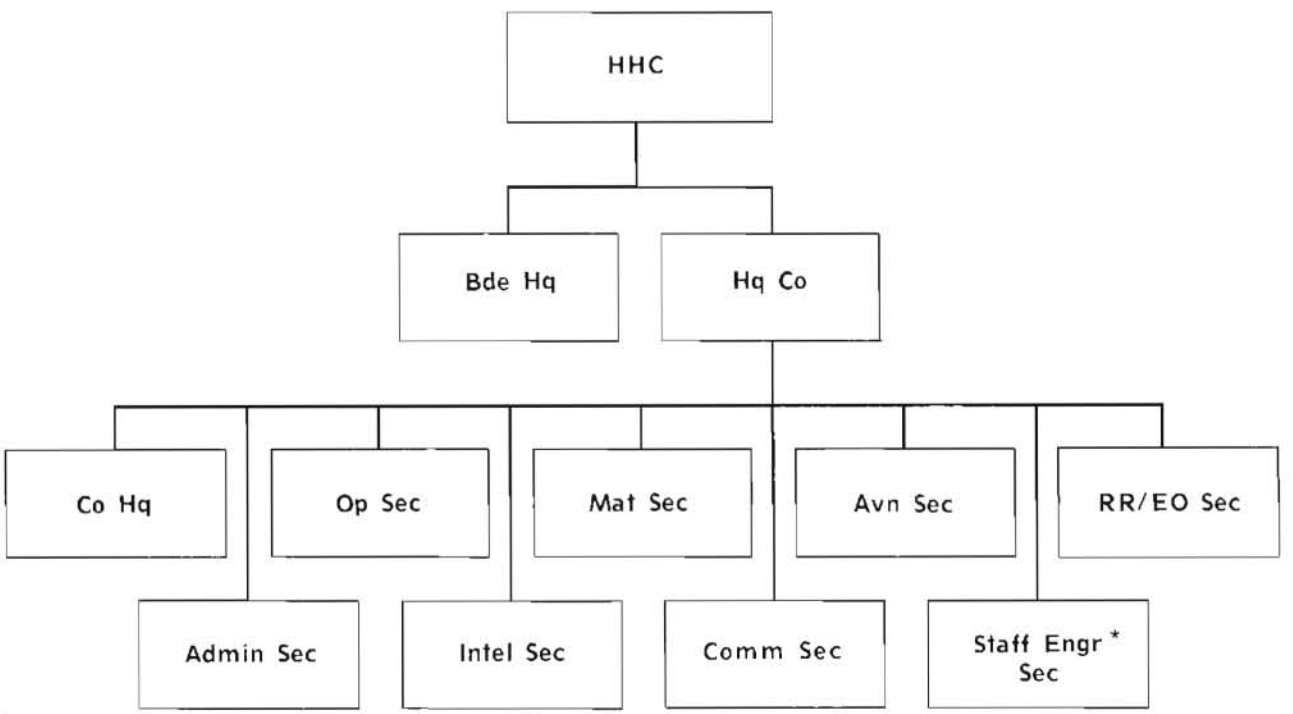
At the present time, the US Army Engineer School is developing TOEs for the universal brigade and group headquarters. These TOEs will combine the functions of both the combat and construction brigade and group headquarters, eliminate overlapping functions, and add those functions which do not appear in either unit, such as the intelligence function.

The TOE for the engineer brigade headquarters is being developed on the basis that the engineer headquarters are the first engineer command and control headquarters introduced into a theater of operations, followed by a engineer group headquarters as the span of control increases. A single TOE with three variations is proposed since it is necessary to provide for a corps engineer staff when the brigade headquarters is employed in the corps, but not in the communications zone and the current airborne variation must be preserved.

The brigade headquarters company is organized as shown in Figure 1. The operations section is a combination of the operations and intelligence and engineer and plans section in the old HHC engineer construction brigade. As was mentioned before, the universal brigade has a separate intelligence section. The aviation section has 2 OH-58 and 1 UH-1 helicopters with 2 OH-58 in augmentation.

Recognizing that the corps is now an administrative and logistical headquarters as well as a

HEADQUARTERS AND HEADQUARTERS COMPANY
ENGINEER BRIGADE
CORPS OR AIRBORNE CORPS
OR
THEATER ARMY



*Staff Engineer Section authorized only for Engineer Brigade, Corps or Airborne Corps.

FIGURE 1

tactical headquarters and that the corps has topographic and real property maintenance responsibilities, the corps engineer staff section was increased from 16 people to 29, but this is less than the 39 in the Army engineer section of the Army brigade. The total strength of the new brigade headquarters with a corps engineer staff section is 167. As a COMZ brigade, it runs 134.

The organization of the group headquarters is as shown in Figure 2. Again, plans and operations are combined in one section and a seperate intelligence section is included. The groups aviation section is authorized 2 OH-58A helicopters and 2 are in augmentation.

The group is organized as a command and control headquarters. It has very little planning and design capability, only enough to allow it to supervise engineer battalions assigned. Total strength of the group headquarters will be around 100.

The draft plan TOE for the bridgade and group headquarters are under field review. Early comments indicate a desire for more mobility and more communications. The DA puts a clear limitation on the mobility of the units as does the DA for communications. Be assured that every vehicle and every radio allowed by both these studies will be provided for the units. It is estimated that the entire review and publication process will take about 6 months with implementation of the new tables to take place early in FY-77. Also, it should be understood that the RR/EO Section is mandated from Department of Army.

This action eliminates one brigade and one group headquarters from the force structure and provides the engineers and the Army with greater flexibility, in that, it provides headquarters capable of assuming command of any mix of engineer units.

Mr John M. Frank, a 21-year active duty veteran, is the Chief of the Organization Division, Deputy Commandant for Combat and Training Development, USAES.

HEADQUARTERS AND HEADQUARTERS COMPANY ENGINEER GROUP

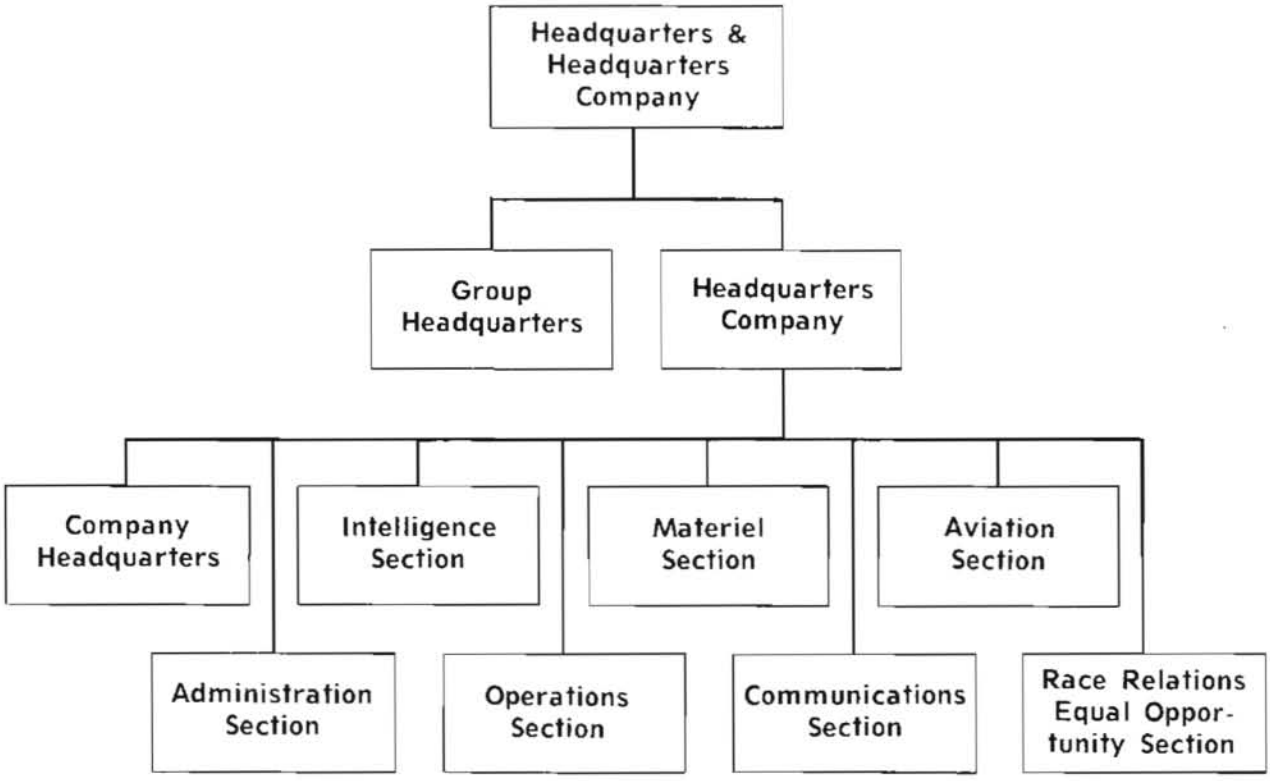


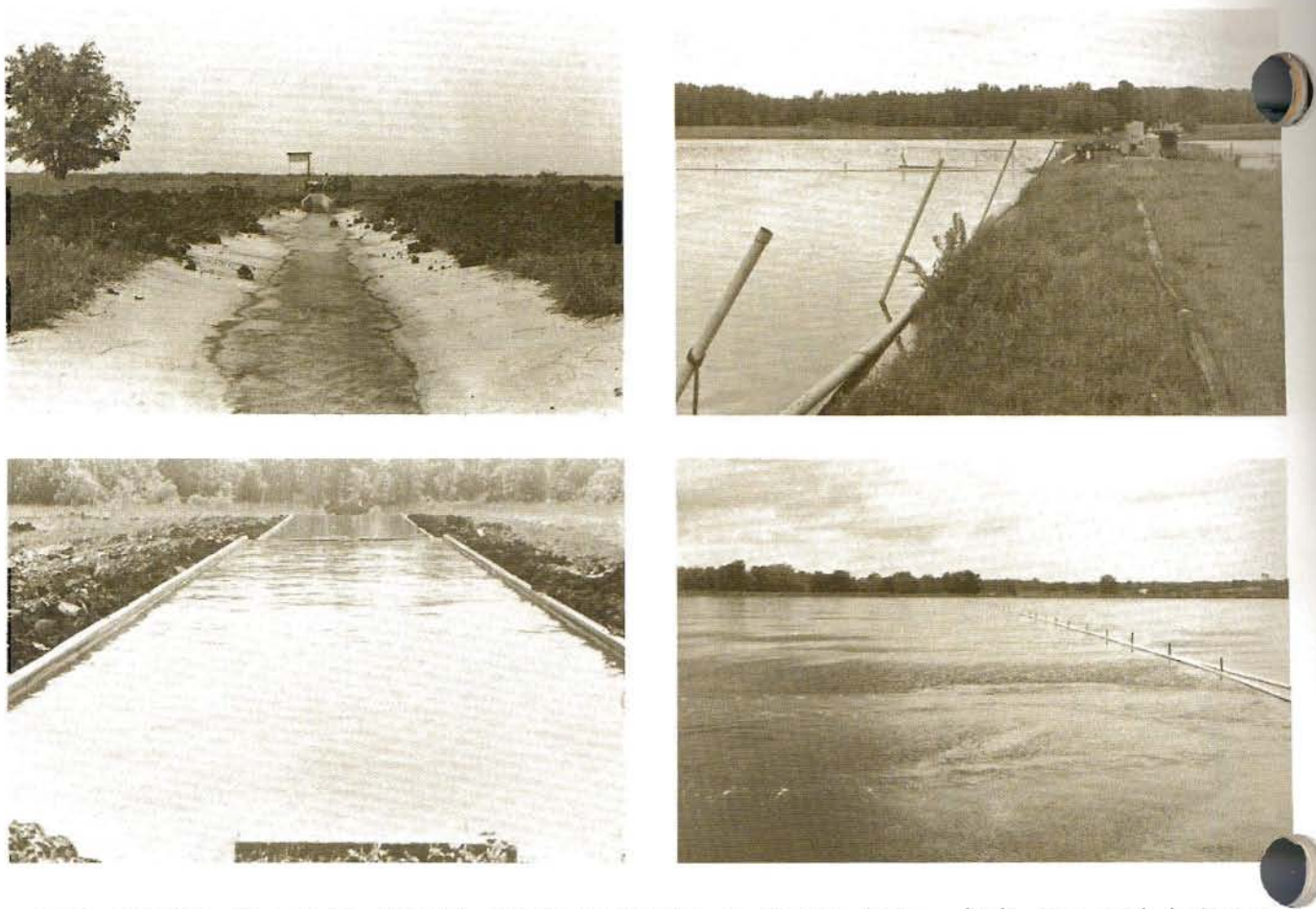
FIGURE 2

NEW ARRIVALS

CPT John B. Grecian

April 28, 1975 started out as a fairly routine day for the 5th Engineer Battalion (C)(A) at Fort Leonard Wood, Missouri. During afternoon parade practice the situation changed, the battalion was placed on alert for a possible unit move, loading and movement plans were activated, rumors as to where the move would take the battalion were being conjured up all over the post with Southeast Asia in the front, running just ahead of the Middle East. The Battalion Commander and two selected members of his staff went to the airfield, boarded a U8 and flew south.

When the unit movement plan was activated, it was as though a giant sponge had soaked up all of the normal red tape at Fort Leonard Wood. Members of the Post Finance section, Staff Judge Advocate office, Adjutant General Records section, and Provost Marshal office came to the battalion area and began out-processing personnel for shipment. At the end of the processing line, MEDAC personnel checked individual shot records and brought them up-to-date, if needed. Post Supply personnel expedited the fill of requisitions for C-rations, POL, and other needed supplies. Requisitions for ammunition were processed, and ammunition was placed in the ammo holding area in the event the movement order specified ammunition would be carried with the unit. Eight hours after notification, two companies of the 5th were completely loaded, processed for movement, standing by for instructions, and ready to roll.



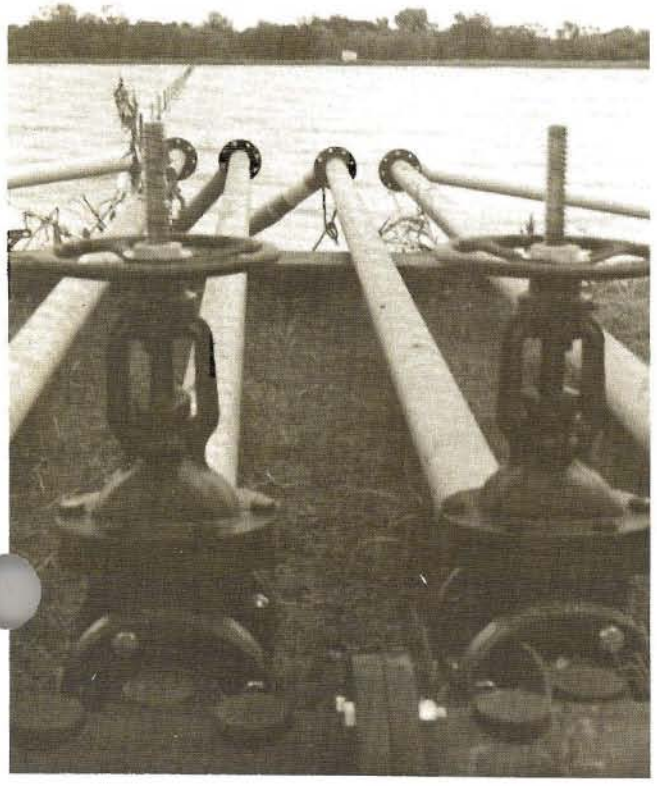
THE SCOPE OF THE WORK UNDERTAKEN is shown here. Left top and bottom: Chlorination Holding Pond Site, before and after. Right top and bottom: Views of the installed aeration system.

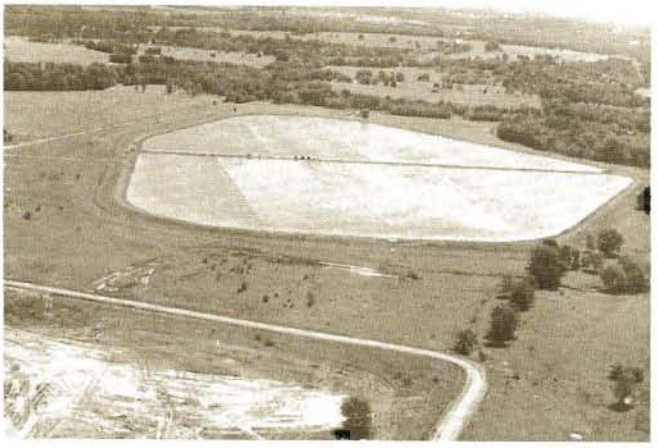
The mission assigned to Company D, 5th Engineer Battalion (C)(A) and 515th Engineer Company (PL)(CS) (attached) was to move to Fort Chaffee, Arkansas, and support Task Force "New Arrivals" for preparation of the post to receive, process, house, and care for twenty-four thousand Vietnamese refugees who were part of the group evacuated from the Republic of Viet Nam during the communist take-over. The Battalion Commander returned the evening of 28 April with as much information as could be gained from initial liasion with Task Force personnel and the Caretaker Detachment at Fort Chaffee. He elected to accompany the two units with a battalion command element and remain with them at Fort Chaffee until the crisis-oriented part of the post preparation was completed.

The Battalion Advance Party departed from Fort Leonard Wood at 0200 hours, 29 April 1975 and arrived at Fort Chaffee by 0700 hours on the 29th. The main body, which consisted of the Battalion Command element, Co D, and 515th Engr Co, arrived shortly thereafter. Within three hours of arrival at Fort Chaffee, the engineers were working on assigned projects.

Preparation of Fort Chaffee for refugees was a momentous task. Units came from all over the country to form the Task Force. The engineer missions consisted of renovation and dewinterization of 188 barracks buildings, constructing partitions in the open bay barracks to form family units, renovating and restoring the utilities service to the post hospital complex which had been in storage for eleven years, installing beds in the Vietnamese living quarters, constructing two concrete chlorination holding ponds and an aeration system in the post sewage lagoon for compliance with Environmental Protection Agency standards, and the construction of a new fifty eight acre sewage lagoon with aeration systems to accommodate the increased population. The initial priority for completion was, of course, the bil[illegible] preparation and the hospital. Barracks partitio[illegible] were prefabricate and stock piled while other crews hauled them to billets where beds had been erected and installed them. The Battalion Combat

front view of the installed Air Control & stribution Manifold: Sewer Lagoon Aeration ystem.





A BIRD'S EYEVIEW of the existing sewer lagoon with the aeraton system installed is shown on the top. Bottom: The completed installation of the constant pressure blowers which charge 4" PCV pipe with air which, in turn, is released into the lagoon water.

Construction section and elements of the 515th renovated the hospital and re-established the steam heating and hot water utilities. Company D constructed the chlorination ponds and the aeration system at the existing sewage lagoon. By working two twelve hour shifts daily on a twenty four hour, seven day operational basis, the missions were accomplished. The Vietnamese "New Arrivals" were received, housed, and well cared for with such efficiency that the refugees were unaware of the frantic preparation effort and the monumental logistics support required behind the scenes.

The new sewage lagoon presented special problems for the 5th, since heavy earth moving equipment is not organic to the battalion. This was alleviated by attaching the earth moving latoon from the 593d Engineer Company at Fort , Oklahoma, to the 5th Engineers. The site for e lagoon was adjacent to the existing one. The area was marshy and construction was complicated by unseasonally heavy rains during the months of April, May, and June.

The reaction time and responsiveness of the battalion, coupled with the varied and in some cases technical aspects of the projects, particularly the sewer lagoon aeration projects and the renovation and restoration of the hospital boiler plant and steam system, are testimonials to the versatility of the combat engineer soldier. The mission at Fort Chaffee is continuing for the 5th Engineer Battalion, and the 593d is continuing with construction of the new sewer lagoon, however, the first two weeks at Fort Chaffee have once again proven that Combat Engineers can get the job done, anywhere, anytime, under any circumstance.

Captain John B. Grecian is presently Commander, Company B, 5th Engr Bn (C)(A), Fort Leonard Wood. He is a graduate of Auburn University, Alabama, the Officer Rotary Wing Aviator Course, and the Engineer Officer Advanced Course. He has served as Company Commander and Battalion Executive Officer in Germany, Vietnam and the CONUS area.

FAESHED Countermine System

SP5 John Degel

In a continuing study of the combat role of mine-countermine measures, researchers at MASSTER (Modern Army Selected Systems Test, Evaluation and Review) are examining two helicopter-delivered systems which can be utilized to quickly and efficiently clear enemy minefields and emplace "friendly" minefields.

The two systems — FAESHED (Fuel Air Explosive System, Helicopter Delivered) and the M56 Mine Dispersing Subsystem — are similar in methods of preparation and delivery. Since the two systems are so similar in methods of preparation and delivery, the tests are being run concurrently in an effort to reduce manpower requirements and costs. An estimated 40% reduction in manhours and equipment usage will be saved, as well as an approximate $10,000 to $16,000 in costs.

FAESHED is a newly developed countermine measure designed to breach a minefield without causing the craters usually resulting from an explosive-type demolition charge. The FAESHED is a modified Navy bomb containing three bomblets. Each bomblet contains 72 pounds of ethylene oxide an explosive gas.

The bomblet has a four-foot electronic probe, which causes the bomblets to explode at the desired level once the probe comes in contact with the ground.

The resultant ethylene oxide cloud is detonated by means of two delayed-time detonators which are thrown to each side of the cloud, creating a surface overpressure of 300 pounds per square inch. The cloud of one bomblet can effectively cover an area of 1,960 square feet.

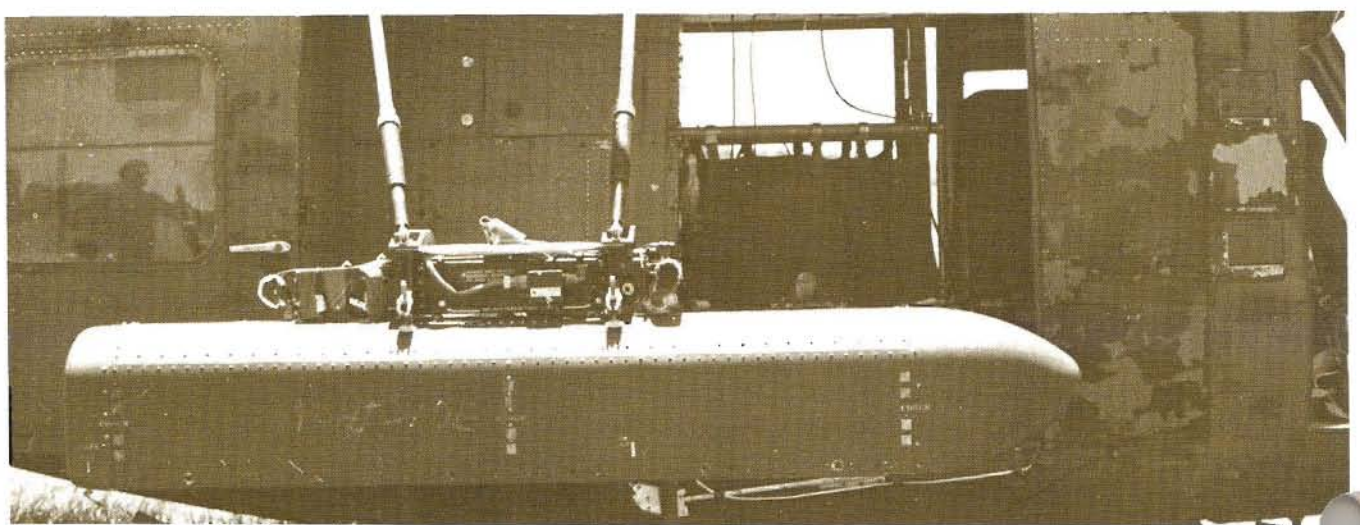
The FAESHED, due to its overpressure, is also effective in dealing with the enemy's minefields. The 300 pounds psi easily demolishes most anti-tank, anti-vehicular or anti-personnel devices used in the field. Also, because of its composition, the FAESHED can penetrate tunnels, collapsing them once the cloud is detonated. The only after-effect is the depression left by the collapsed defensive position.

Another potential use of FAESHED is as an offensive weapon against enemy air defense artillery positions, radar installations, aircraft and airfields, and enemy defensive constructions.

"In short, FAESHED can be used effectively against any blast sensitive target. Dropped within 100 feet of a helicopter or aircraft, the FAESHED can effectively destroy that aircraft's combat usefulness without damaging the airfield or landing pad," said one of the Test Officers for the MASSTER test.

For test purposes at Ft. Hood, a MK-1 practice bomb, which has a smoke charge in the nose, and the same aerodynamic features as one of the bomblets, is being used in the MASSTER study. The MK-106 weighs only 12 pounds, making handling and testing much easier.

When the MK-106 hits the ground, the smoke charge detonates, allowing the researchers to determine the accuracy of the missile by judging



A mine dispenser is shown attached to an Army helicopter during testing of the M56 Mine Dispers Subsystem. The helicopter — delivered minelaying system is currently being evaluated by MASSTER (Modern Army Selected System Test, Evaluation and Review) as a possible means of quickly and efficiently implanting a minefield in a combat situation.

An Army helicopter is shown with a MK 106 practice bomb mounted to its side for testing the FAESHED mine clearing system. This system will help soldiers rapidly eliminate enemy minefields.

the distance of the smoke from the intended target.

However, a full size mockup of the FAESHED is ed by ammunition supply point personnel to aluate the labor and time that would be expended in arming and loading the actual device in a combat situation. But once the FAESHED mockup has been loaded and the data accumulated, the device is removed and replaced with the practice bomb.

The other system being tested at MASSTER — the M56 Mine Dispersing Subsystem — is similar to FAESHED in the sense that both are helicopter-delivered, but differs entirely in purpose. The M56 system is designed to rapidly distribute mines in a specific area to restrict the movement of enemy troops and equipment.

The subsystem consists of two dispensers on the helicopter, each containing 40 cannisters. Two 6-pound mines are in each cannister, giving a total delivery capability of 160 mines.

The two basic types of mine are anti-tank and anti-vehicular. The system also contains a few surprises for the opponent who might attempt to neutralize them — several roll-resistant and anti-disturbance mines are distributed among the mines.

An anti-disturbance mine is designed to deto- le if someone attempts to pick it up or move it m its resting place. The roll-resistant mine has an even more complex purpose . . . the roll-resistant mine is designed as a counter-measure against the roller type mine detector and detonator favored by some military forces in the field.

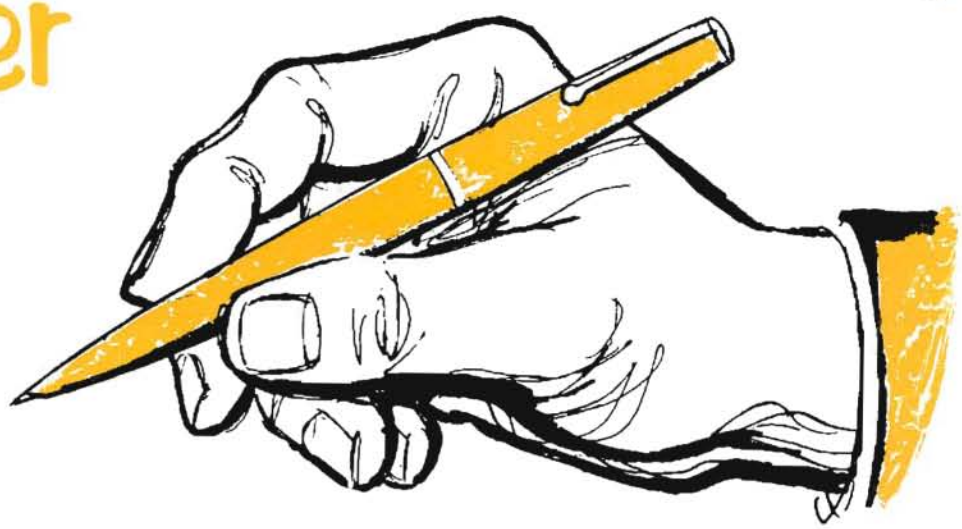
When the tank or armored vehicle — equipped with a heavy roller bar (attached to the front) rolls over the mine, it does not explode in the short time it is under the weight of the roller bar. Instead, after a short fusing sequence, the roll-resistant mine is designed to detonate under the sustained pressure of the tank.

"In the minefield, the arming sequence works in this manner: one to two minutes after the mines are seeded, they arm themselves," explained the MASSTER test officer for the M-56 portion of the test. "After a certain period of time — if they haven't been detonated by a target — the mines will self-destruct. The battery powered mines, equipped with a sencing circuit, self-destruct when the batteries run down. The mines will also self-destruct if any attempt is made to disarm them or to remove the batteries."

As in the FAESHED system, the M56 is helicopter-delivered. In fact, except for minor changes, the loading and dispensing racks are the same for both devices. Once again, the ammunition supply point personnel are called upon to perform technical preparation activities necessary for the loading and arming of the M56 devices.

Test personnel involved in the MASSTER research come from MASSTER's Combat Support Directorate, the 4th Battalion, 9th Cavalry of the 6th Cavalry Regiment; the 1st and 2d Battalions of the 67th Armor, both from the 2d Armored Division; and the 664th Ammunition Company, from the 13th Corps Support Command.

Register as a PRO!



Howard S. Giberson

Professional registration is an important step in the career development of officers of the U. S. Army Corps of Engineers. In assignments such as Engineer Districts or research and development activities, officers associate with engineers in private industry and other government agencies in performing their professional duties. Registration as a professional engineer lends stature to the military engineer and enhances his image among his civilian contemporaries.

Registration and licensing of professional engineers is a function of the State governments and the rules and regulations pertaining to registration vary somewhat from state to state. However, the requirements for registration are basically uniform and generally provide for three alternative qualifying standards:

- Graduation from an approved engineering curriculum plus four years or more of satisfactory engineering practice, and a 16-hour written examination.
- Eight years or more of satisfactory engineering practice plus a written examination, if not a graduate of an engineering college.
- Twelve years or more of lawful engineering practice, for candidates who are at least 35 years old. Most states require at least an 8-hour written examination for applicants in this category.

Although registration is a state function, the trend is toward uniform examinations prepared by the Uniform Examining Committee of the National Council of Engineer Examiners. Even those states which prescribe their own test generally follow the format of the uniform examinations. The uniform examinations are written tests and are given on successive days twice each year, usually in April and November.

The first examination, generally called the Engineer-in-Training or EIT examination, is prepared for machine scoring, requiring a selection from a group of predetermined answers. The morning session consists of 150 unrelated questions which cover a broad area of engineering fundamentals. All questions are to be answered and the score is based on the number of correct answers. The afternoon portion consists of a number of problem sets in each of the following areas of engineering fundamentals: Economic Analysis, Dynamics, Mechanics of Materials, Thermodynamics, Electrical Theory, Statics, and Fluid Mechanics. The problem sets consist of an introductory statement and have ten independent machine scorable questions which relate to the introductory information allowing partial credit. Each examinee is expected to answer five problem sets in at least four of the major areas with not more than one problem set in Economics.

The second examination, generally called the Professional Engineer or PE examination, includes the following twelve disciplines of engineering:

Chemical	Industrial
Civil	Petroleum
Electrical	Sanitary
Mechanical	Nuclear
Manufacturing	Structural
Ceramic	Agricultural

All twelve disciplines are combined into a single examination booklet for the four-hour morning session and another booklet for the four-hour afternoon period. Each examination booklet contains one problem in the area of Economics and

about nine problems in each engineering discipline. Each examinee is required to solve any combination of four problems in the morning and four problems during the afternoon.

A candidate for professional registration should begin by obtaining from his State Registration Board the rules and regulations pertaining to registration in his particular state. A listing of the State Boards, with addresses, is included in the U. S. Army Engineer School pamphlet on the Professional Engineer Preparatory Correspondence Course. This pamphlet may be obtained by writing to the Commandant, U. S. Army Engineer School, Fort Belvoir, Virginia 22060, Attention: Department of Army Wide Training Support.

After determining the State requirements for registration, the PE candidate should formulate a plan of preparation for the examinations. The younger less experienced officer will undoubtedly find that he is required to take both the EIT and PE examinations, while the older officer with more experience may only be required to pass the latter. The preparation plan might well include enrollment in the correspondence course described in the aforementioned U. S. Army Engineer School pamphlet. The course includes a group of subcourses to help prepare for the EIT examination and another group to assist in preparing for the PE examination. The purpose of these subcourses is not to teach the subjects that an engineer must know; rather, the subcourses are designed to help him review what he has already learned. Officers who have recently taken the examinations in Virginia have found the correspondence course a valuable aid for preparation for the tests.

The officer seeking registration should begin to prepare his application for certification about 90 days before the scheduled examinations. Application forms are provided by the State Board and require the completion of a form including personal data, education, and experience record. Most states require that the candidate send a form to his college to be completed and returned to the Board. Up to five endorsers who are licensed Professional Engineers may be required. The application and all other necessary forms have to reach the Board approximately 60 days prior to the examination date. The State Board evaluates the candidate's record and notifies him of the time and place of the examination and what examination he is required to pass.

Both the EIT and PE examinations are open book tests. Generally, any bound reference is permitted. Time is an important factor, however, and the examinee should be able to locate information rapidly in his references. Slide rules or battery-powered calculators may be used on both examinations.

Although there is no law or other authority for federal or national professional engineer registration, the Army Organization Act of 1950 requires that officers engaged in the performance of professional work have professional competence equivalent to that of persons performing similar work in private or civil practice. It is becoming more evident that professional competency is not enough to fulfill this requirement. Registration is an important step to professional development. To quote the National Society of Professional Engineers: "By going through the registration process, an engineer gains two important benefits: (1) he receives authority to practice engineering before the public and (2) he establishes his professional standing on the basis of legal requirements."

On the day of the examination, the candidate should arrive at the designated place about fifteen minutes before the specified time in order to organize his references and work area. After the instructions are given by the examination monitor, the test will begin. On recent EIT examinations in Virginia, officers have found it advisable to work through the 150 problems in the morning session, skipping any problems which they could not solve immediately. After going through the test in this manner, they then returned to those which had been passed and, using references as necessary, attempted to solve these problems. Finally, since grade is based on number correct, they recommend a guess at the answer to all problems not solved within the time limit. In the afternoon session the first step is to select the five problem sets to be solved. Naturally, one should select those sets that are easiest for him, consistent with the rules. Again, it is better to simply guess at an answer than to leave a blank since no penalty is assessed for wrong answers.

At the PE examination, the recommended procedure is to look through the problem booklet and select the four problems to be worked. It is advisable to look at all problems because some require much more time for solution than others and time is important. All work must be shown and, in some cases, it is advisable to cite the reference used, if any.

If you are interested in being a registered Professional Engineer start TODAY! Remember, the Engineer School stands ready to assist you in any way possible.

Howard S. Giberson is a correspondence course editor in the Department of Army Wide Training Support, USAES. He retired from the Army Reserve (LTC, USAR-Ret) and holds a Master of Arts Degree in Education from George Washington University.

Thomas J. Riggs

AN ENGINEER'S SEVEN DAY WAR

Editor's Note:

Mr. Rigg's article is a true story which, until now, has never been told. Although it portrays only a small segment of the actions of WWII, it exemplifies the versatility and importance of engineers as part of the combined arms team.

It is a particularly timely article, in that, DA has recently redesignated engineers as combat arms.

Training, youth, and discipline are key factors in most pursuits in life; they are crucial in a military career.

My military career began in February 1941 when I graduated from the University of Illinois and received a ROTC commission, as a second lieutenant, in the Corps of Engineers. After attending a refresher course at the US Army Engineer School, I was assigned to the Engineer Replacement Training Center, Fort Belvoir, as a platoon leader in a training battalion. The following two years moved by rapidly and during this time I received a Regular Army commission, completed the Engineer Officer Advanced Course, and became a battalion commander with the rank of Major.

By 1943, I was becoming impatient with my role in training, and I began investigating the possibilities of a transfer to the Paratroopers, or the Rangers, or some combat division. My opportunity came in the spring of 1943, when I was ordered to the 81st Engineer Combat Battalion as the Executive Officer. The Battalion Commander was Lieutenant Colonel William J. Himes, who had recently returned from duty on the Alaskan Highway.

The 81st was part of the 106th Infantry Division being activated at Camp (now Fort) Jackson, S.C. Most of the enlisted men were 18 year old draftees, so the average age of the Division was under 22. With an excellent cadre of officers and noncoms, the Division was enthusiastic and receptive to tough training standards. I remember being impressed with the fact that the Chief of Staff of the Division was Colonel William C. Baker, Jr., formerly of the Corps of Engineers.

By late summer of 1943, I had been ordered to establish an Engineer Combat Battalion in Camp Gordon, GA. LTC Himes insisted that I hand select the best officers from the 81st to make up my cadre. Sixty days after we had started to train the new battalion, I was ordered back to the 81st to replace LTC Himes who was moving on to command an Engineer Corps.

We continued our training at Camp Jackson in preparation for maneuvers in Tennessee during January-March of 1944. We had inserted some Ranger training in guerilla warfare which helped sharpen the individual instincts of our young group.

From Tennessee, the Division was ordered to Camp Atterbury, IN, to continue training and await deployment. Shortly after our arrival at Camp Atterbury, I was ordered to the Command and General Staff College at Fort Leavenworth, KS. I returned to the Division shortly before we were ordered to the embarkation port. In my absence, the Division had supplied over 7,000 enlisted infantrymen, or 60% of its trained men, to an overseas replacement center. Fortunately, the Engineers lost only four officers and no enlisted men in this transfer. There was to be no time to adequately train the enlisted infantry replacements for the Division.

Prior to the embarkation, I was met by a fellow staff officer who informed me that I was to turn my battalion over to my Executive Officer, MAJ Marshall, and that I, as the Division Engineer Officer, was to be sent to England with the Division Commander, his staff, and three infantry regiments. In theory, we were to continue training in England and to be used as an infantry combat group. Without the service units, and particularly their artillery, neither mission was that practical. The support units followed 30 days later.

By late November, the 106th was assembled in England as a Division and by 1 December embarked for the channel crossing. A few days later, they debarked in Rouen in mud and rain and moved by unit convoys into a combat sector

around St Vith, Belgium. We relieved the 2d Infantry Division which was being deployed to launch an attack through the 99th Infantry Division.

The relief of the 2d was accomplished in three days, man-for-man, and position-by-position. The two sectors occupied by the 422d and 423d Infantry Regiments, of the 106th, were astride the old Siegfried Line in the Schnee Eifel mountain range.

As the 81st relieved the 2d Engineer Combat Battalion, there was a lot of banter from these combat veterans about the "country club" atmosphere of the position due to the daily exchange of fire but no real action. From an engineer support point of view, there was the difficult task of maintaining the roads which were critical for resupply. We inherited the fortifications, mine fields, and barbed wire which had been originally established by the 4th Infantry Division and reinforced by the 2d.

By 12 December, the 106th had taken over the sector and began to review their mission and means. The mission of the Division was to defend a salient that was over 20 miles wide and extended 8 miles into the German lines. To accomplish this, the 422d, 423d, and 424th Infantry Regiments were in line from north to south.

The 424th adjoined the 28th Infantry Division to the south. The 14th Cavalry Group, reinforced, occupied the northern five miles of the front and were tied into the 99th Infantry Division to the north. In addition, the Division had the following attached units: 275th Armored Field Artillery Battalion, 820th Tank Destroyer Battalion, 634 AAA Battalion, and the 168th Engineer Combat Battalion. The last unit was assigned to maintain the road net in the rear of the sector.

The 81st Engineer Combat Battalion attached a company to each of the Infantry Regiments. The Battalion CP was in Heuem, about four miles east of St Vith, on the Schonberg road.

We were still reconnoitering and improving our positions, when a heavy artillery barrage hit the sector at about 0530 hours. After putting the staff on alert, I went to the Division CP in St Vith to check other reports. St Vith was being hit from what was described as railroad mounted artillery capable of firing up to 14 inch rounds.

From the G-2 section, I learned the whole front was under heavy attack by enemy infantry supported by tanks and artillery. The Division G-2's attempt to convey this information to the VIII Corps was misunderstood. VIII Corps obviously thought that as "green troops," the Division was exaggerating the intensity and scope of the action. Even an attack plan, taken from a captured German officer, confirming the scope and nature of the attack was either not recognized or never arrived at Corps.

Since the 106th had no infantry in reserve, I was asked by the G-3 to assemble and prepare the 81st Engineers for their secondary mission as an infantry reserve. I returned to the Bn CP about 0800 hours and found that one platoon of Company A and all of Companies B and C had already been committed as infantry reserves by their regiments. This left only the Headquarters and Service Company plus the headquarters and two platoons of Company A.

CPT Harmon, Company A, was the only line company commander on hand at the Bn CP to attend a meeting, and he was called back by the 422d Regimental Combat Team to defend his Company CP in Auw. Auw was already under attack by enemy infantry in white uniforms and supported by tanks. By 1500 hours, Auw was lost to Germans, and remanents of Company A were working their way back to St Vith.

Company B, which had its headquarters in Schonberg, was ordered by the CO of the 423d Regimental Combat Team to clear the village of Bleialf. Our last contact with Company B was through Chief Warrant Officer Carmichael, Bn S-4, who was expediting delivery of ammunition to the Company. He also located a few selfpropelled tank destroyer guns which eliminated some enemy strong points in the village. Carmichael returned to the Bn CP by early evening before Company B was cut off by the German advance.

Meanwhile, at the Bn CP in Heuem, phone communications were out and radio channels were jammed. Schonberg and Heuem were being shelled. Auw had fallen, and CPT Harmon had escaped with only a dozen men. Co C, in the meantime, had been committed as infantry to defend the east side of Heckhalenfeld and later to fill in a gap in the line between Heckhalenfeld and Winterspelt.

All reports continued to show a deteriorating situation for the 106th Division. The 14th Calvary Group had fallen back in some areas west and north of St Vith so that the northern flank was wide open. It had also become clear that the Division was being hit by at least four to six divisions, including two Ranger Divisions — not the two Volkszrenadres Divisions originally identified.

Around midnight, Corps and Army were finally convinced of the true situation and were committing Combat Command B (CCB), 9th Armored Division, and CCB, 7th Armored Division. The 7th Armored would arrive at 0700 on the 17th of December and be assigned to attack through the St Vith-Schonberg road to the entrapped 422d and 423d regiments.

17 December 1944:

I returned to the Bn CP to instruct Headquarters and Service Company to clear the St Vith-Schonberg road and to evacuate the engineer heavy equipment from Schronberg to Rodt, just west of St Vith. The remanents of Company A and Headquarters and Service Company were to hold in Heuem.

The previous day of heavy combat action left a very confused impression on me. We had lost many men in Company A. Communications, both internal and external, were confused and growing more difficult by the hour. Rumors were growing and difficult to dispute without facts. Unit commanders were jittery. Some service units, such as Corps Artillery, were starting to move to the rear without their artillery. At the Division CP, I could sense the desperation of the Commanding General for his two regiments that were being cut-off and his relief when given the two armored CCBs. Meanwhile, the commanding officer of the 14th Calvary Group was desperate and unable to marshall any organized resistance in his critical sector on the north flank.

I felt frustrated because most of the 81st Engineers were under other commands, and the sole function of the Headquarters and Service Company was one of resupply where the roads were still open. Although the men of the 81st were fighting as infantry, we were not doing it as a unit.

Later, in the early morning, I returned to [redacted] Division CP in St Vith. The situation in front of St Vith was becoming more fluid. By 0830 hours, my headquarters had lost contact with Company B beyond Schonberg and were preparing to evacuate the CP at Heuem in the face of approaching enemy infantry and tanks. At 1000 hours, I was ordered by the Commanding General, Alan Jones, of the 106th, to organize a task force to defend St Vith. The 168th Engineer Combat Battalion was attached to the 81st with orders to assemble all available men from both units as well as division headquarters personnel. We were to hold St Vith for the counter attack of CCB, 7th Armored, through, our positions. After relaying these orders to the 81st and the 168th, I left for Heuem and met my staff and part of the 168th command group on a natural rise about a mile east of St Vith. They were being followed by an enemy task force of infantry and tanks which had cleared Heuem. That particular location, in addition to having a line of woods at the top of the rise to the north, had a good field of fire back down the Schonberg road for 1000 yards. To the south side of the road was a 20 feet wide fire break running parallel to the wood line on the north and lead[redacted] to an opening and a farm house about 200 yards the south.

As units arrived from the 91st and 168th Engineer Combat Battalions, they were placed astride the road and a skirmish line of engineers, converted to infantry, gradually dug in with some automatic weapons. Knowing that the counter attack by CCB, 7th Armored, would be through us, I elected to place several daisy chains of mines across the road and placed 2 bazooka teams in the woods for cover. A 37mm anti-tank gun was placed with an engineer squad to cover them. This gun was lost in the first exchange of fire.

We were fortunate to have a platoon of six tank destroyer guns which were set up in the edge of the woods to the north of the road. Before the position was consolidated, we had an exchange of fire with the enemy. By about 1600 hours, the position had been consolidated and four tanks plus an estimated battalion of infantry began to advance on us from the woods about 1000 yards away. The tank destroyer platoon engaged the tanks by bore-sighting the guns which had been received in the morning. While they did not disable the enemy tanks, they did force them [redacted] retreat to the woods with their infantry. The t[redacted] destroyer platoon was then ordered to shift th[redacted] position north on the leading edge of the woods for future action. They moved north and out of our sector without reporting. This was the first of

several units that left our sector to join a movement to the rear. It was this kind of attitude that increased my determination to hold our position.

Later in the afternoon, the Division Air-Ground Liaison Officer made contact with the only American aircraft that we were to see. We assumed that the enemy tanks and infantry were hidden in the woods to our front and had requested a mission to be fired by the Division Artillery, but they were not able to respond. I got on the radio with the Air-Ground Liaison Officer to guide the P-47 over the woods. According to CPT Ward, CO of Headquarters and Service Company, the plane made 4 passes before sighting the tanks. He then made several straffing passes over the area and hit one tank.

At about 1700 hours, a Major Boyer arrived with the first elements of B Troop, 87th Reconnaissance Squadron, CCB, 7th Armored Division, to support our position. I did not like the idea of putting this fine mobile unit in a fixed defense position, but their heavy automatic weapons were ideal for the ample fields of fire in front of the wooded position to the north of the road. As they moved in, Headquarters and Service Company, 81st Engineers, plus part of A Company were moved to the south of the 168th Engineer Combat Battalion to extend that flank. Some medium tanks had arrived and were ordered to hold in the defilade back of the hill crest.

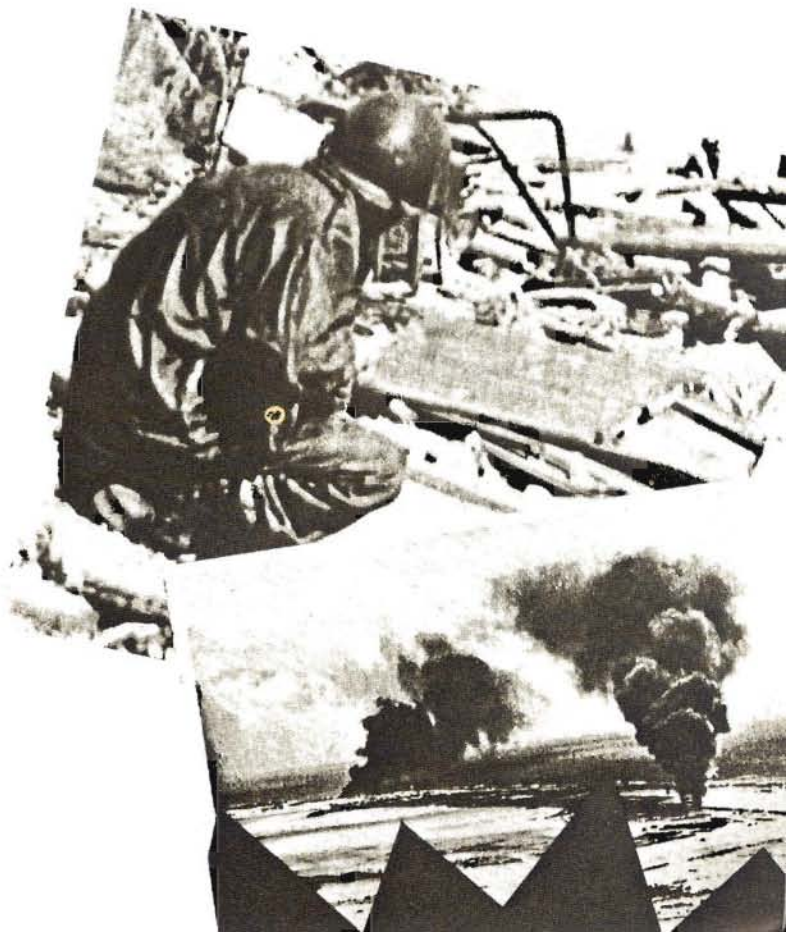
Boyer reported the roads to the rear were full of retreating vehicles and the remainder of CCB, 7th Armored, would be delayed until the 18th at the earliest.

As the Headquarters and Service Co, 81st, were deploying into their new position, they were engaged at close range by an enemy tank and infantry. A daisy chain of mines disabled the tank and the infantry was driven off by small arms fire. CPT Ward requested the fire support of some American medium tanks in his area; however, they refused because of the deadly 88mm gun on the enemy tank. I suggested that he and his officers "ride" the tops of the tanks to steer them into position. He "rode" the lead tank into position and was knocked off by the first 88mm round, but he scrambled to safety. The American tanks then knocked out the enemy tank and withdrew to defilade again.

At about 1900 hours, an enemy combat patrol penetrated our lines and got within thirty yards of the CP. I gathered about four people in the CP and ran up the hill to the point of penetration, closed the gap and ordered a clean-up of the infiltrators. I found that the gap in the skirmish line had been made by men fading to the rear. From that point on, I visited our front line every hour or so, particularly at night, to let the men know that their commander was there.

Later in the evening, the Forward Observer from the Armored Field Artillery Battalion reported that his unit was in the area and wanted to provide artillery support. The unit could provide close support fire, but tree bursts would create casualties for us as well as the enemy. To combat this problem, we covered the foxholes with logs and earth with a space to roll under when an incoming mission was signaled. It worked many times for us.

As units of the 38th Armored Infantry began to arrive, a staff meeting was held at about midnight. The meeting included officers of the two engineer battalions, B Troop, 87th Reconnaissance Squadron, 38th Armored Infantry, the attached platoon of medium tanks, and the Armored Artillery Battalion. It was decided to move Company B, 38th Armored Infantry, into the positions occupied by the 168th Engineers. The 168th Engineers, which by now was reduced to two companies, would move into a gap on the right flank of the position in order to connect the line with a company of the 23d Armored Infantry, CCB, 9th Armored Division, to the south. This action was carefully organized and executed by digging a parallel line of foxholes behind the 168th Engineers position. The engineer platoon leaders then led the infantry forward to individually relieve the engineers so as to prevent an internal fire fight.



18 December 1944:

By 0300 hours, the position was fairly well consolidated. This finished the second day of battle testing for me. In the previous 24 hours, I had seen blood, bravery, fear, and death. It was also confirmed that the two infantry regiments, the 422d and 423d, were now completely surrounded, and we were their closest possible contact. We were still expecting a counter-attack by the 7th Armored, but they seemed to be gradually absorbed in our defense.

19 December 1944:

Early in the morning, the enemy began a series of probing attacks. About 0930 hours, they launched a company size attack and supported by a Tiger tank. The attack was directed at the clearing south of the fire break which was defended by the remaining men of Co A, 81st Engineers. The attack was repulsed and the Tiger tank was knocked out by three American medium tanks which had been placed in position behind the engineers. Lieutenant Rutledge, acting company commander of Co A, 81st Engineers, directed this attack. He was wounded in front of his o[illegible] position, refused first aid, and was killed trying [illegible] pursue the enemy himself. The loss hit hard, and his actions were a great inspiration to us all.

At about 1500 hours, another company size attack penetrated this same area and reached our task force CP. I heard the small arms fire and saw soldiers crouching along the roadside. I gathered the officers and men in the CP and got the soldiers crouching at roadside to launch a charge back up the hill into the break in the line. We killed 4 of the enemy and closed the gap.

At about 1600 hours, A Company, 38th Armored, arrived and was ordered to relive B Troop, 87th Reconnaissance Squadron, which then moved to reinforce the position occupied by Co A, 81st Engineers. B Troop had lost 40 officers and men in their position.

At 1700 hours, I received verbal information that the 106th Division Headquarters had moved to Vielsam and that the 81st Engineer Task Force was being attached to the 7th Armored Division. This shift of CPs and command did not sound like the aggressive attack that we were expecting.

By 1900 hours, Lieutenant Colonel Fuller, commander of the 38th Armored Infantry, arrived with instructions from General Clarke, Comma[illegible] ing General of CCB, 7th Armored. Since most the units in the position were now infantry, it had been decided that LTC Fuller should take command, and I was to be his Executive Officer. I felt a personal let-down in the change of responsibility, but I did get the first sleep that I had had since the early morning of the 16th.

20 December 1944:

During the day the 81st Engineers laid mine fields in the area in front of Co A. While we had prepared the bridges in St Vith for demolition, we did not mine the St Vith-Schonberg road in order to keep it open for the expected counter-attack through our position.

21 December 1944:

During the morning, enemy patrol activity increased. By 1500 hours, a concentrated barrage began and continued until about 1730. During the barrage, I was hailed by the Forward Observer of the 275th Armored Artillery Battalion to report that his CO wanted to talk to me. I got on the radio to hear LTC Clay reporting that he was down to his last round. I instructed him to fire his last round and to get out. The enemy barrage [illegible] taking a heavy toll. One tree burst killed company commander from the 38th Armored Division, his supporting tank unit commander, and two other casualties. Being on the scene, I

adjusted the command of the unit and committed a visional platoon from the 423d to this unit's tor.

At about 1800 hours, LTC Fuller announced he was placing me in charge of the position while he reported back to Headquarters, CCB, 7th Armored, to plan alternate defensive positions. He never returned and our orders stood to defend St Vith.

About 2200 hours, an enemy attack was launched up the Schonberg-St Vith road straight into our position. The enemy force consisted of six Tiger tanks and supported by about a battalion of infantry. Our temporary daisy chains of mines and bazookas were ineffective against their massive attack. We committed four and then a total of six American medium tanks to this point blank contest. It was really no contest. The German tanks lobbed parachute flares to the rear of the American tanks and fired their 88s directly at the silhouetted American tanks. In three successive shots, they disabled three of the American tanks, and the other three vanished in the direction of St Vith.

Our position was now split, and I ordered my staff to fall back to St Vith. I picked my way to ur front positions and learned that, subsequent to frontal assault, we had lost contacts with units he north and the south of the original skirmish line of 17 December. Through the forward artillery observer radio, I reported to the 7th Armored Division that our position had been penetrated, and we had lost contact with our flanks. I was ordered to organize an attack on St Vith and to work our way back to Vielsam.

22 December 1944:

It was now close to daybreak. I issued instructions to assemble in a nearby park that overlooked St Vith. By dawn, every incoming road to St Vith was filled with enemy traffic. We scouted a line of vehicles abandoned by the 9th Armored at the base of the hill below our position and recovered some "grease guns" (45 caliber sub-machine guns) and ammo. With only two officers and thirty or forty men completely fatigued, an attack appeared hopeless, so we made terrain maps and split into 5 or 6 man patrols. All of this group were subsequently captured.

As a prisoner-of-war, I was marched with a 20-man group for 140 miles in 10 days to a rail head in Germany. I lost about 50 pounds and nessed the death by starvation by at least e of the group. In Poland, I escaped after 28 ys of imprisonment and was picked up by the Polish Underground. A rendezvous was arranged with the Russian Army who evacuated me from Warsaw through Odessa on the Black Sea, through

Istanbul to US Army Control in Port Said, Egypt. I was then moved to Naples for shipment home.

I was terribly disturbed and distressed over the terrible losses taken by the 106th and the 81st Combat Engineers and our failure to hold our defensive sector. It was difficult to believe that the units on our flank had fallen back on the night of 21 December without notifying us. I had been so localized in that position in front of St Vith that I did not preceive the magnitude of the total action and the strategic importance of denying the road net at St Vith to the enemy.

I began this report with a view on the importance of training, youth and discipline. I feel that the infantry training of the 81st Combat Engineer Battalion enabled it to be committed effectively as a ready reserve. We took pride in weapons training and special training such as the Ranger program. Most of the officers in the 81st Engineers were qualified as experts in every weapon authorized the unit. The high degree of discipline was the result of programs involving weapons, explosives, and physical fitness.

In our totally professional and volunteer army, combat proficiency should continue to be encouraged for engineer units. I know from experience that engineer soldiers will have to fight for survival in many engineer support circumstances.

Mr. Thomas J. Riggs completed his tour of active duty in November 1947 and retired from the Army Reserve as a colonel. For 13 years, Mr. Riggs was Group Vice President for Textron, Inc., based in Providence, R.I. In October 1972 he became Executive Vice President of Operations and a Director of Katy Industries, Inc. of Elgin, IL and Boston, MA. Mr. Riggs is currently President and Chief Executive Officer of Lawson-Hemphill, Inc. of Central Falls, R.I.

BRIDGING

NEW OER TEST PLAN BEING DEVELOPED BY MILPERCEN

Developmental efforts toward an Officer Evaluation Report (OER) to replace the current DA Form 67-7 are continuing at MILPERCEN.

Because of the innovative techniques incorporated in the proposed DA Form 76, it has been decided that extensive field testing will be necessary. The test — which will require several months to conduct — has made it necessary to delay indefinitely the DA Form 76's originally announced 1 January 1976 implementation date. The test could result in further refinements of the proposed form which were explained earlier in various publications.

Field testing, DA planners agree, not only will provide the basis for sound decisions by Army leadership but it also will assist DA in introducing a new OER that enjoys greater confidence within the officer corps. Plans call for a multi-phased test as a basis for further evaluation of innovations such as rated officer input, the separation of information provided by the rater and indorser, the expanded role of the reviewer, and the focus on description versus quantification.

The first phase of the test plan will begin with comprehensive briefings presented to selected major commanders (TRADOC, FORSCOM, AMC, Eighth Army, USAREUR & 7th Army, Health Services Command) outlining the concept and form of the proposed evaluation system, and soliciting the designation of a limited number of command representative to become members of joint (DA-major command) test teams. The intent of this participating is to get the field involved from the onset in the conduct of the test, and, subsequently, to allow the major commanders to play a major role in the assessment of test results.

Next, the test will be administered in selected sample rating chains. Organizational slices (approximately 45) from various commands and staff agencies representing a cross section of the many rating situations that involve Army officers of all grades (including warrant and general officers) will be tested by either a joint team or a DA team (MILPERCEN). These organizational slices will include combat, combat support, joint agencies, combat service support elements, staff elements, field operating activities, MAAG s, MILGROUP s, and other unique rating situations. The slices will be selected to achieve geographical diversity (worldwide) as well as environmental diversity.

The actual test will include the completion of the test form, selected on-site interviews, and the completion of a questionnaire. The testing time for any specific organization will take approximately two weeks. Results of the tests will be used as a basis for further evaluation of innovations that are being proposed.

Career managers and other key OER users at HQDA will also participate in the test to insure the proposed form fills their needs. In addition, a worldwide random survey of approximately 2,000 officers will be conducted to obtain additional information concerning the officer corps' attitudes toward the evaluation techniques being proposed. Special measures will be taken to assure personal privacy and proper control of the test forms and to avoid any inadvertent mix-up with personnel files.

Upon completion of the test, a detailed analysis will be conducted leading to specific proposals for the follow-on to the current OER, DA Form 67-7. Major commands will then be advised of the analysis and asked for their recommendations.

Phase I of the test plan — detailed briefings at major command sites — will begin in October. Actual testing will occur during October-December, and the test analysis will begin in early 1976. No definite target date for implementing the new OER form has been set: DA planners intend to take whatever time may be necessary to come up with the optimum form to assess performance and potential. Current projections envision fielding the new form in late calendar year 1976 or early 1977.

THE GAP

FORWARDING PERSONNEL QUALIFICATION RECORDS

Some Personnel Qualification Records, DA Forms 2 and 2-1, for individuals entering active duty as commissioned or warrant officers are still being forwarded to MILPERCEN addressed to the Personnel Actions and Records Directorate.

Personnel officers and specialists should insure the forms are addressed to the attention of DAPC-PSS-D. Otherwise, it is possible the forms could be inadvertently placed in the officer's Official Military Personnel File (OMPF) and not be used to add personnel information to the Officer Master File (OMF) as intended. This would result in the OMF not having a complete and accurate record of the officer.

SCHOOLING FOR CLUB MANAGEMENT MOS AVAILABLE

Due to a world-wide shortage of Club Management personnel, MILPERCEN is soliciting applications from soldiers in grades E-6 and E-7 for attendance at the Club Management course given at Ft. Lee, VA.

Selected individuals will attend the seven-week course TDY and will be awarded a new primary MOS of 00J50 upon completion. Course graduates will be assigned within their new PMOS according to their personal preferences and the needs of the Army.

Soldiers in grade E-5 may also be selected to attend the course but must be highly recommended by their commanders. All applicants will be subject to a background investigation prior to receiving the new PMOS.

Applications should be submitted on a DA Form 2496, "Disposition Form," and forwarded to the individual's commander for recommendation. The commander should, in turn, forward the application to the Commander, US Army Military Personnel Center, ATTN: DAPC-EPM-M for final disposition.

VIETNAM AWARD DEADLINE NEARING

Soldiers whose acts of heroism or meritorious service in Southeast Asia may have gone unrecognized can still be recommended for appropriate awards — but not for long — according to MILPERCEN's Awards Branch.

A 24 October 1975 deadline for recommendations for awards to be received in formal military channels has been established by public law and is contained in DA Circular 627-1. To date, only 37 recommendations citing the law have been received for consideration by MILPERCEN.

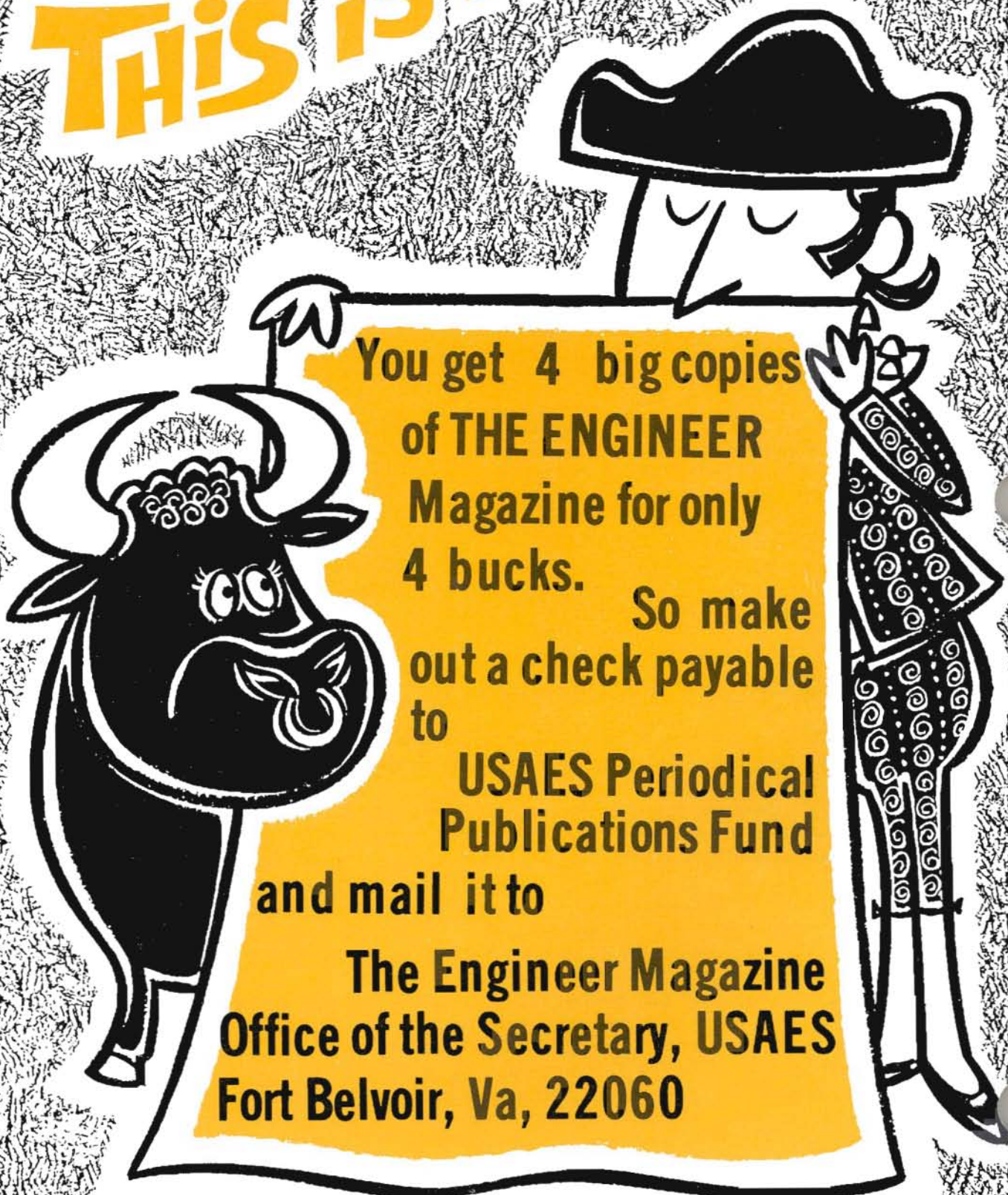
The law was signed into effect 24 October 1974 to allow an additional year for outstanding or heroic acts to be recognized. Any service member witnessing an outstanding act may recommend another service member for an award. Also, all recommendations will be reviewed under the criteria in effect at the time of the action.

Recommendations for awards may be made for any action in Vietnam, Cambodia, Laos, or for personnel based out of those countries who directly supported combat activities, such as Hawaii-based couriers on long-term TDY missions in Vietnam.

Ex-service members may also be recommended for actions performed while serving on active duty. If the award is approved, every effort will be made to contact the individual and present the award. If the individual cannot be found, the award and any additional documentation will be forwarded to his permanent record maintained, for Army personnel, at St. Louis.

All recommendations for awards should be made on the DA Form 638, "Recommendation for Award." Details of the program and additional criteria may be found in DA Circular 627-1.

THIS IS NO BULL!



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