THE ENGINEER

THE ENGINEER

VOLUME 4-5 NUMBER 4-1 WINTER-SPRING 1975

FEATURES

DEPARTMENTS

CHIEF'S BRIEFS

Colonel John James Abert was born in Frederick City, Maryland, September 17, 1788. He was graduated from the US Military Academy April 1, 1811 and resigned from the Army. From 1811 to 1814 Abert was employed in the War Office, Washington, D. C. In the defense of the Capital he volunteered as a private soldier and participated in the Battle of Blandsburg, Maryland, August 24, 1814.

On November 22, 1814 Abert was reappointed in the US Army with the rank of Brevet Major, Topographical Engineer. At that time there was no organized corps of topographical officers, but they formed a part of the General Staff and served with generals in the field.

In 1824 Abert was brevetted Lt Colonel for ten years faithful service in one grade; and after the death of Colonel Isaac Roberdean, January 15, 1824, he was ordered to take charge of the Topographical Bureau of the Engineer Department. By the Act of Congress, July 5, 1838, the Corps of Topographical Engineers was organized and Bvt Lt. Col. J. J. Abert was appointed to its command.

The accomplishments of the Topographical Engineers, under the thirty-seven year command of Abert, won the admiration of the scientific world, and the practical benefit of their early labors can be felt in nearly every State.

Colonel Abert retired from active service September 9, 1861 and died at Washington, D. C., January 27, 1863.

Edward B. Russell
Curator, US Army Engineer Museum

United States Army Engineer School Fort Belvoir, Virginia

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The Engineer is an authorized quarterly publication of the U.S. Army Engineer School. It is published to provide factual and in-depth information of interest to all Engineer units. Articles, photographs and art work of general interest may be submitted for consideration to: Editor, The Engineer, USA Engineer School, Fort Belvoir, Virginia 22060. Views and opinions expressed herein are not necessarily those of the Department of the Army. Use of funds for printing of this publication has been approved by Headquarters, Department of the Army, January 1, 1974.

ABOUT THE COVER

Older than the Nation itself, the Corps will celebrate its 200th Birthday on 16 June 1975. Realizing the impossibility of encompassing the overwhelming bulk of accomplishments on the small covers of a magazine, we have endeavored to portray only a few highlights in this time span. Whether in time of battle or time of civil disasters, the Corps Cares . . .

•PIPELINE•PIPE

ALASKA ENGINEER DISTRICT ANNOUNCES NEW PUBLICATION

The biennial publication of the Corps of Engineers, "Water Resources Development in Alaska," for 1975 has been published. A limited number are available without charge from the Public Affairs Office of the Corps' Alaska District Office.

This booklet summarizes projects and studies in Alaska that have been completed, as well as those that are under way, or are being studied or planned by the Corps of Engineers. It includes an index map to such projects throughout the state.

Distribution is being made to interested government agencies at Federal, State, and municipal levels; libraries; legislators; and organizations and individuals professionally concerned with water resources development.

USAES SEEKS ACCREDITATION:

The Southern Association of Colleges and Schools (SACS), through its Commission on Occupational Education Institutions (COEI), announced candidacy for accreditation both the US Army Engineer School and the Defense Mapping School, Fort Belvoir, Virginia during the 79th Annual Meeting of the 11-state organization being held in Dallas, December 8-11, 1974.

Candidacy for accreditation follows a formal visit by the office of the executive secretary to ascertain that the school meets the prerequisites of the association. Full accreditation follows upon the successful completion of a self-study that insures the candidate school meets the standards of accreditation.

The Occupational Commission accredits post-secondary, noncollegiate institutions preparing students in vocational-technical schools for immediate job entry. Schools range in program offerings from entry skill development to highly specialized, advanced technology education. State area vocational schools and technical institutions that are public and private nonprofit institutions are eligible for membership.

Accreditation symbolizes confidence in an institution's purposes, resources, and performance in meeting the Commission's standards of quality. The Occupational Commission is one of four components of the South's recognized regional independent accrediting organization, and was initially organized in 1968 as a new direction in educational training and retraining of a skilled labor force to man the South's growing industrial and commercial companies.

The Southern Association is one of six voluntary regional accrediting organizations in the United States and also is composed of public and private universities, colleges, secondary, and elementary schools. Total membership is approximately 10,000.

More than 100 institutions are now fully accredited from the six originally granted this standing in 1971. In addition, there are institutions in candidate standing, working toward accreditation.

COEI awards accreditation only after an extensive self-study has been completed, plus further evaluation by qualified professionals. Self-study, an intensive examination by staff and others interested in institutional improvement, covers 12 areas including purpose, organization-administration, educational program, financial resources, staff, physical facilities, equipment and supplies, student services, community relations, planning, multimedia instruction, and job placement/followup. The visiting team of experienced educators reviews the self-study and may make additional recommendations.

Once granted, SACS accreditation must be continually earned by annual review. Reaffirmation is required every five years.

AMERICAN COUNCIL ON EDUCATION RECOMMENDS SOLDIER COLLEGE CREDIT

Graduates of the Army Sergeant Majors Course are well on their way to an associate degree if colleges adopt a recommendation by the American Council on Education (ACE). ACE recommends that students completing this course at the Sergeants Major Academy at Fort Bliss, Texas, receive 2+ semester credit hours. Any college can accept the ACE's recommendation to give the soldier credit.

One school that has already agreed to award college credit is El Paso, Texas Community College. Once a student completes the associates degree

LINE. PIPELINE.

requirements, he can send his transcripts to the community college. The college awards associate degrees in applied science in industrial management and in applied arts.

A student graduating from the Sergeants Major Course and taking the electives offered by nearby El Paso Community College will have 24 of the 60 semester credit hours needed for an associate degree. Eighteen credits can be earned in the areas of general management, psychology or socialogy and international affairs. The other six hours may be earned by taking electives.

ENGINEER DINNER AND CASTLE BALL DATES SET:

This year's Annual Engineer Dinner should be a gala affair. It marks the 200th Anniversary of the founding of the Corps. The central theme of the dinner, "The Corps — 200 Years of Progress", speaks for itself. The annual dinners date back to 1867 when the Essayons Club was founded the year after the Corps turned over to the Army the responsibility for . . . "conducting the Military Academy at West Point". It is believed that the Essayons Club was the forerunner of the Army Engineer School. The club conducted seminars on engineer matters and was an extension of organizations founded by Colonel Jonathan Williams, the sixth Chief Engineer and the first Superintendent of the Military Academy.

Records show that the Engineer Dinner was not an annual affair. It was only in the 1920s that the Engineer Dinners were given numbers based on the first one or the 1867 date. Until the 1920s the dinners were not held regularly. They have been since. This year's is the 108th in our 200th year history.

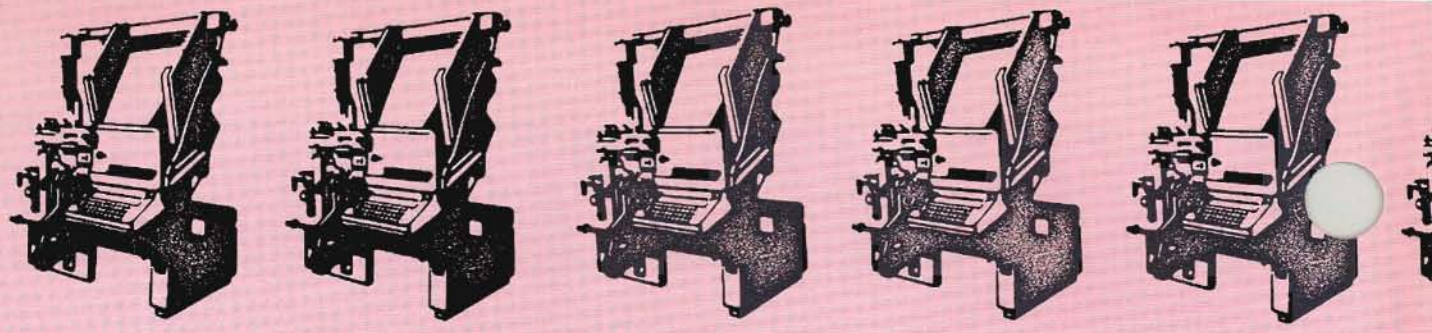
Themes for the dinners have been recent innovations. In 1966 the theme was Engineers in Action; 1967 — Army Engineers in War and Peace; 1973— Engineers-The Corps of Professionals; 1974 — The Corps-Supporting the Army and Serving the Nation.

The dinner is a time for engineer officers, active and retired, to come together and to be brought up to date on the state of the Corps. Over the past few years it has been held in conjunction with the Castle Ball — the Castle Ball being held with the ladies the evening following the Engineer Dinner. Both will be held at the Fort Belvoir Officers Club, the dinner on Friday, 2 May and the ball on Saturday, 3 May.

Additional information about the dinner can be obtained by writing to the 108th Annual Engineer Dinner Committee, USAES Brigade, Fort Belvoir, VA 22060 or calling Fort Belvoir 664-4300. Reservation information for the Castle Ball can be obtained by writing to Mrs. John Chandler, Qtrs 30, Mason Drive, Fort Belvoir, Va. 22060 or calling Fort Belvoir 781-7535.

EDITOR'S NOTE:

It has been brought to our attention that some information in the "Pipeline" section titled "Plans Available from OCE for a Training Environment" contained some inaccuracies. Here are some of the pertinent points to set the record straight: (1) the height of the structure is being revised from 20 feet to 16 feet, (2) the design will be added to the Army Facilities Components System, (3) it is being designed to be constructed by using troop units with limited support from engineer troops, such as construction equipment and technical advise, and (4) complete sets of plans, bill of materials, and labor and equipment estimates from construction of this facility will not be available until approximately July 1975. Further questions regarding the design, should be directed to Mr. Robert Elliston, (tel no OX3-6925), AFCS Branch, Field Engineering Division, Directorate of Facilities Engineering, OCE.



DEMOLITION SETS ARE (NOT) CTA ITEMS?

A great deal of confusion exists in the Army today about demolition sets in TOEs Chapter 8, SB 700-20, dated December 1974 and effective 1 March 1975 lists the demolition set as a CTA item.

DA message, DAMO-FDU, 212131Z Feb 75, Subject: Common Tables of Allowance Items in Chapter 8, SB 700-20, authorizes the retention of all items in Chapter 8, SB 700-20 in TOE/TDA units until the items appear in a published CTA. The USAES is working to clear up the status of the demolition sets, in the meantime hold on to what you have.

Other items to be removed from TOEs and placed in CTAs according to Chapter 8, SB 700-20, include typewriters, adding machines, water bags, filing cabinets, desks, food containers, safes, and trunk lockers.

ARTEP PRODUCTION AND EVALUATION

Army Training and Evaluation Program, ARTEP 5-35, Engineer Battalion, Corps, distributed as an Engineer School text in January, has now been printed and distributed by DA.

ARTEP 5-145, Engineer Battalion, Armored Division or Engineer Battalion, Infantry Division (Mechanized) in Support of Combined Arms Task Forces, in the new TRADOC Format has been printed as a Test document in limited numbers. It is scheduled for validation by the 4th Mech Inf Div in the Spring of 1975 prior to final publication and distribution.

TRAINING MINES

Electronic practice mines are in the prototype stage and are programed to form part of the Multiple Integrated Laser Engagement System (MILES) package. This means that new training (practice) mines will automatically score casualties and will turn off the training weapons within the casualty radius of the mine. MILES is a system of laser weapons that score hits. A hit on an individual, or tank, registers on the target and neutralizes the operation of his weapon.

NEW LOOK FOR ARMY VEHICLES

Soldiers throughout the Army will soon be busy painting their present solid color vehicles in newly developed four-color camouflage patterns. After extensive tests of its effectiveness against hostile observation, the new system of pattern painting was approved last spring for Army-wide use. Training Circular 5-200, Camouflage Pattern Painting, has been prepared by the US Army Engineer School to spread the word to the troops on the new patterns and how they are to be applied to both wheeled and tracked vehicles. The Engineer School in preparing this circular worked closely with scientists of the Army Materiel Command and the USA Mobility Equipment Research and Development Center, who developed both the new patterns and the new paints to be used for their application. The paint is a lusterless alkyd enamel that comes in eleven standard camouflage colors and has the property of reflecting near infrared radiation. The patterns basically consist of wavy, irregular patches of color painted on the vehicle. The unit commander will be able to choose the color combination that will most closely blend his vehicles into the basic background colors of the terrain in which they operate. The pattern designs, which will guide the troops in how to pattern paint each type of vehicles, will be available from local or regional Training Aids Support Offices. The circular has been distributed in limited numbers as a test edition pending printing by TAGO.

INDICATORS OF TRAINING PROFICIENCY

How do your units compare on results of their MOS tests? Why does one battalion score higher on their tests than others? Are results of MOS tests an indicator of our readiness posture?

There are many variables that can be used to answer these questions. However, a good

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reference point is the "MOS Evaluation Test Profile Summary Report," prepared quarterly by the Enlisted Evaluation Center (EEC) under EPD DCSPER. This report will indicate by MOS Code (MOSC) the percentage of personnel by unit who scored high, average, or low on a test major area. High indicates the soldiers' correctly answered 76% or more questions; average 46% - 75%, and low less than 45%. This report contains summary data ranging from major command (Part One) through separate company sized units grouped by battalion (Part Six).

Analysis of Data: EEC views an MOSC test Major Area that places between 20 to 25% in the high category, 50 to 60% in the average category, and 20 to 25% in the low category as a fairly normal distribution. Most commanders will generally be more concerned with using the report to compare units and to evaluate strengths and weaknesses. Many local conditions can affect performance (e.g., quality and quantity of training, availability of study material, availability of equipment, etc.,). Here are some bench marks.

- More than 20% low: Close review of training and other factors warranted.
- More than 45% low: A more urgent effort to correct conditions warranted.
- Less than 20% high: Some action in above.

We can all gain from this report. If you need help, contact the Department of Doctrine and Training Development, USA Engineer School, Ft. Belvoir, Autovon 354-1387 or commercial (703) 664-1387.

TRAINING EXTENSION COURSE (TEC) PROGRAM

The Training Extension Course (TEC) program is designed to provide training materials, prepared in audiovisual format by the combat arms schools, to soldiers at the unit level for individual or group study. The basic proposition behind the TEC program is that the Army service schools, as an important part of their mission, provide training assistance to units, both active and reserve, on a continuing basis.

Traditionally, the Army has provided military training to the soldier through resident instruction at the service schools or through correspondence courses prepared by the schools. TEC provides the soldier — at the unit — with programed multimedia lessons allowing him to study at whatever pace he is capable, or as part of a study group, during duty hours or on his own time.

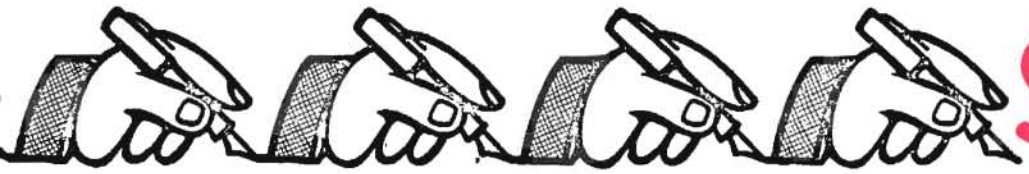
USAES entered into the TEC program in early 1973, and delivered Government Furnished Materials to a civilian contractor on 5 June 1974 for the preparation of 12 lessons which will be used for generator operation training. These lessons should reduce unit training time, increase individual proficiency and reduce generator downtime caused by faulty operation.

New Engineer Combat Support Equipment Company

The Engineer Combat Support Equipment Company replaces the Engineer Light Equipment Company and the Engineer Dump Truck Company in the combat zone. (The Dump Truck Company will continue to be found elsewhere).

The conversion of TOE 5-58G, Engineer Light Equipment Company to an H-series TOE has resulted in the formation of a new organization entitled Engineer Combat Support Equipment Company.

The Engineer Combat Support Equipment Company includes one platoon equipped with twenty commercial 20-ton dump trucks, three identical equipment platoons equipped with standard military construction equipment, and a maintenance platoon including the added direct support maintenance section.



Stop 16

Sir/During the past few years a myriad of exciting new concepts have been unveiled in the water transportation of break-bulk and containerized cargo. Generally dated by the concept of containerization, the newest concept of loadable lighters and barges aboard ocean-going vessels provides a challenge and zone of doctrinal activity to the Transportation and Corps of Engineers.

The SEABEE system of loadable shallow draft barges of approximately 850 net tons and 40,000 cubic feet of capacity is a LYKES Brothers Steamship Company development which expands that firm's service area to shallow draft waterways and inland ports. Of similar general design as the LASH, or lighter aboard ship array, both systems offer the shipper advantages heretofore unattainable with break-bulk, tanker, or containerships. Now, without rehandling, shippers can speed deliveries from wharf to wharf without regard to draft requirements.

Not coincidently, the SEABEE/LASH acronym has military applications in the same or similar zones where slower and less versatile LCU (landing craft, utility) and ship-to-beach discharge methods are currently used. But how can the military experience the SEABEE/LASH acronym without engaging in extensive capital investment, lengthy development processes, and obsolescence? The concept developed by the Military Airlift Command (MAC) suggests a solution wherein the best efforts of the military community tied to the practices of industry offer a capacity for understanding and development of doctrine on the one hand by the military in peacetime — coupled to the wartime utilization of commercial transport fleets to supplement military equipment for emergency airlift requirements. But can it work? An examination of the industry reveals many examples of cooperative ventures of benefit to the military community and the industry too!

Examining the need alone provides a "justification" for a military capability in this method of water transport. Examples during the Vietnam experience demonstrated the congestion growing from too much to unload — but not enough wharf length or at-wharf draft to meet ocean vessel requirements. Weather restrictions during large parts of the year, as experienced at DaNang, RVN, precluded in-stream discharge during crucial periods. How convenient the SEABEE/LASH acronym would have been in this instance? Besides eliminating the congestion and expanding the frontage capacity of seaports, the military use of the acronym can eliminate the transshipment from port to inland destination point by locating sub-depots inland adjacent to shallow draft discharge ports closer to the point of commodity consumption.

Training of military crews for on-board handling and stowing of SEABEE/LASH units and barge and lighter handling once discharged from the "mothership" can be accomplished through cooperative training aboard civilian vessels in an OJT program. Providing the military trainees did not displace civilian personnel labor units, the objections of the maritime unions would generally be limited to stringent safety and convenience conditions for its members.

Finally, in the same manner that MAC and the commercial air carriers have legitimized their cooperative operations during periods of airlift emergencies — a precedent for a water transportation covenant is readily available.

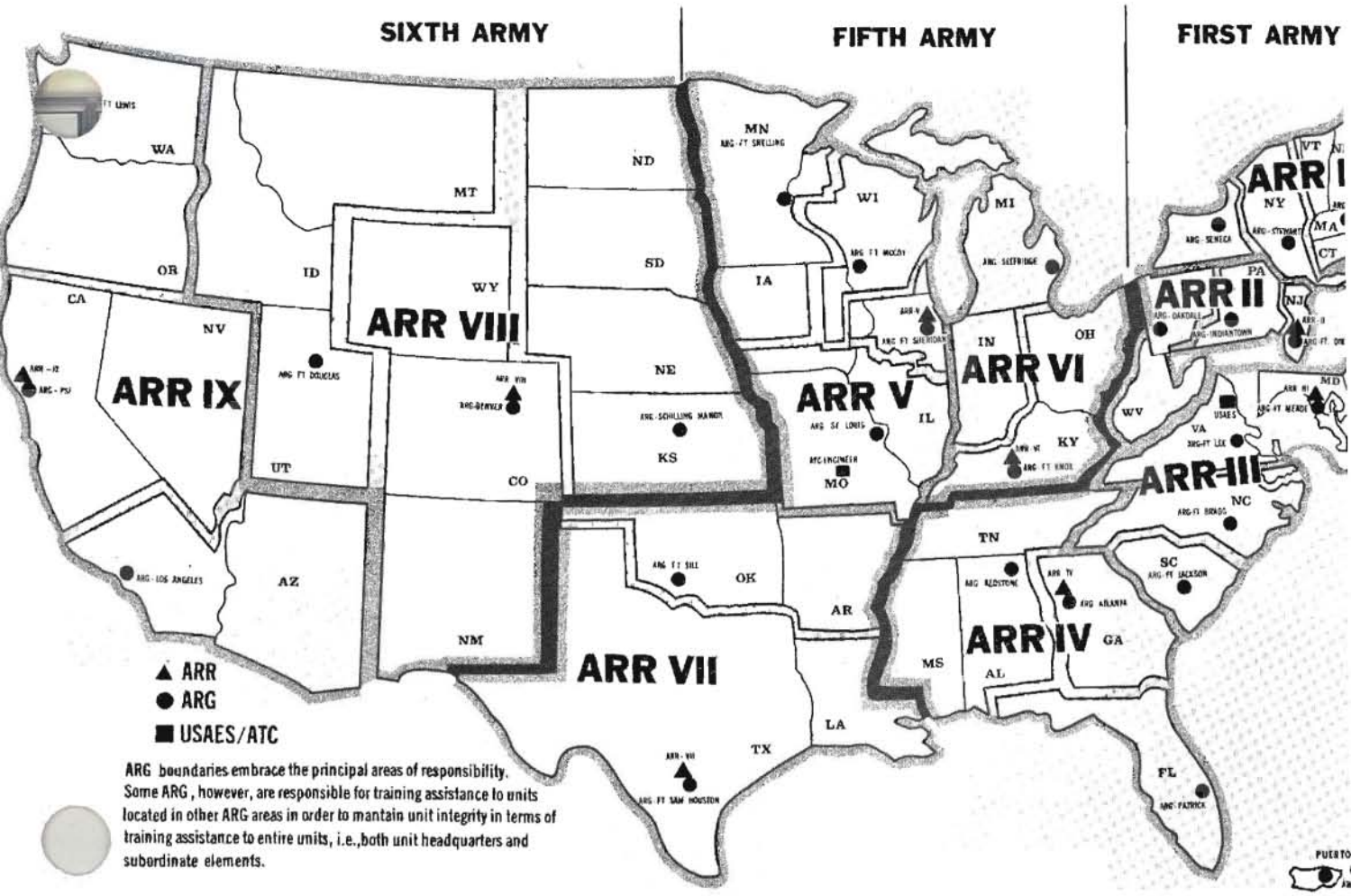
Details of the SEABEE system by LYKES Brothers Steamship Company suggest considerable feasibility to the military shipper (Transportation Corps) and a new environment for the military engineer to develop operating skills a techniques!

A system capable of beach delivery at 2500 tons per hour; a barge/lighter needing about 11 feet of water to deliver 850 tons; an expanding system for vessels delivered from a self-contained mothership, are all within arm's reach for exploitation to meet our military needs and extend our "total transportation systems" to yet another possibility! In its totality — the SEABEE/LASH acronym deserves our consideration and examination!

MAJ Paul J. Theuer
Office of The Engineer
HDQTRS, USAEUR

THE ENGINEER magazine is always interested in receiving letters such as the preceding from Major Theuer. H attention to various modes water transportation is laudable and may spark other reader reaction. Here is **your** forum. Use it!

CONUS ARMY, ARR AND ARG(EN) BOUNDARIES



ARG boundaries embrace the principal areas of responsibility. Some ARG, however, are responsible for training assistance to units located in other ARG areas in order to mantain unit integrity in terms of training assistance to entire units, i.e., both unit headquarters and subordinate elements.

ARMY READINESS REGION

Major Harvey T. Kaplan

The primary mission of the Army Readiness Region and its subordinate Readiness Groups is to improve Reserve Component Readiness. Within a Readiness Group, the Engineer Branch Assistance Team is one of over a dozen branch or functional groupings of personnel organized to contribute toward that primary mission within its area of expertise.

FORSCOM/TRADOC Regulation 10-1, recognizing that under STEADFAST very few engineer advisors remain with individual Reserve Component units, enumerated the general re-

sponsibilities of the engineer and other assistance personnel at the Readiness Groups and Regions. Several of the most significant Engineer Branch-Material responsibilities include the following:

- Providing engineer branch oriented training assistance to Reserve Component units. Such assistance includes, but is not limited to, training program development.
- Assisting units in obtaining training aids and material to improve training.
- Assisting units in obtaining desired technical assistance (to include published material) from appropriate TRADOC schools and other sources of assistance.
- Assisting in determining training benefits of community service/domestic action projects.
- Assisting Reserve Components in the scheduling of annual training.
- Providing engineer technical expertise in identifying facilities requirements. Providing assistance and guidance in identification of home station facility requirements, and expansion and repair projects for existing facilities.
- Providing engineer technical expertise in securing training facilities and areas.
- Providing assistance, guidance and coordination with host installations with respect to projects for annual training and projects for weekend training at home station.

In general, each Readiness Group's Engineer Branch Assistance Team is responsible for providing engineer branch-material assistance to all Reserve Component troop units (i.e., not only Corps of Engineers' units) and organizations within the Readiness Group's geographic area of responsibility. Members of engineer teams work with reserve component unit personnel during evening and weekend unit training assemblies throughout the year as well as at annual training sites primarily between May and September.

Although some changes in Group locations have been proposed, the following current stationing list will undoubtedly prove of interest to Corps of Engineers officers and senior noncommissioned officers already scheduled for or interested in Readiness Group assignment.

Over the past year, several hundred Corps of Engineers officers and senior NCOs have met the new and unique challenges of an equally new and unfamiliar type of organization, created under the STEADFAST reorganization of the Army to provide a wide variety of engineer branch material assistance to US Army Reserve and Army National Guard units. That organization is the Engineer Branch Assistance Team of the US Army Readiness Groups located within Army Readiness Region I - IX across the country. Although Corps of Engineers' USAR and ARNGUS units are already familiar with the new assistance concept, now after a full year of operations surely will be beneficial to report to the rest of Corps on the engineer assistance mission.

First, it should be noted that the organization and composition of Readiness Regions, Groups, and Engineer Branch Assistance Teams vary significantly from location to location. In general, a typical team consists of up to a dozen or more Corps of Engineers Lieutenant Colonels, Majors, Captains, Master Sergeants, and Sergeants First Class serving in combat engineering, construction, equipment and facilities-related staff positions. There is also one Engineer Colonel position at each Region Headquarters. The Readiness Region Tables of Distibution and Allowances (TDAs) are presently under review by US Army Forces Command; some adjustments in TDAs are anticipated.

Despite past intermittent emphasis on the "One Army Concept" and, more recently, full commitment to the "Total Army Force Concept," many active army personnel continue to regard duty with the Reserve Components as something undesirable, not in their best interests (except perhaps just prior to retirement), and contrary to their desires in regard to personal career development.

These stereotypes of Reserve Component d are no longer valid. Traditionally, something other than a representative cross-section of the active army has been assigned to duty with the Reserves and Guard. Such assignment policies are hardly in tune with the STEADFAST reorganization and today's system of priorities, where over two thirds of the engineer branch strength is in the reserve components. MILPERCEN can help by assigning outstanding officers and non-commissioned officers to the Readiness Groups and Regions. Similar to the case with recruiting duty, there is much to be said for assigning personnel to those areas of the country where they have lived before. Active duty personnel who "know the territory" definitely have the edge on the "outsiders," at least initially, in working with Guardsmen and US Army Reservists.

Active duty engineer personnel who are interested in accepting the combined challenges of duties related to the Engineering and Education career field specialties can assist MILPERCEN assignment officers and, in turn, Reserve Component units, by identifying themselves as parties seeking such assignment. The geographic possibilities are varied enough to suit just about engineer's personel preferences. The duties are equally varied, representing the substance of what will surely develop into a meaningful and rewarding tour of duty for every engineer assigned.

Major Harvey T. Kaplan is the Chief, Engineer Branch Assistance Team, Readiness Group Stewart, Army Readiness Region I. Since his commissioning in 1963, he has served with the 19th and 168th Engineer Combat Battalions; as a staff officer with the 159th Engineer Construction Group; as an Assistant Professor of Military Science; and as a member of the staff of the U.S. Army Engineer School. He holds a Bachelor of Arts Degree from The City College of New York and a Master's Degree in Education from Harvard University. He is currently a candidate for a Ph.D. Degree in Educational Administration at New York University.

FIRST U.S. ARMY

ARMY READINESS REGION REGION I — Fort Devens, MA 01433
- Readiness Group Devens (Fort Devens, MA 01433)
- Readiness Group Stewart (USMA — Stewart Annex; Newburgh, NY 12550)
- Readiness Group Seneca (Seneca Army Depot; Romulus, NY 14541)

ARMY READINESS REGION II — Fort Dix, NY 08640
- Readiness Group Dix (Fort Dix, NJ 08640)
- Readiness Group Indiantown (Indiantown Gap Military Reservation; Annville, PA 17003)
- Readiness Group Oakdale (Oakdale, PA 15071)

ARMY READINESS REGION III — Fort Meade, MD 20755
- Readiness Group Meade (Fort Meade, MD 20755)
- Readiness Group Bragg (Fort Bragg, NC 28307)
- Readiness Group Jackson (Fort Jackson, SC 29207)
- Readiness Group Lee (Fort Lee, VA 23801)

ARMY READINESS REGION IV — Fort Gillem; Forest Park, GA 30050
- Readiness Group Redstone (PO Box 1500A; Huntsville, AL 35809)
- Readiness Group Atlanta (Fort Gillem; Forest Park, GA 30050)
- Readiness Group Patrick (Patrick Air Force Base, FL 32925)
- Readiness Group Buchanan (Fort Buchanan, PR 00934)

FIFTH U. S. ARMY

ARMY READINESS REGION V — Fort Sheridan, IL 60037
- Readiness Group Sheridan (Bldg 703, PO Box 34, Fort Sheridan, IL 60037)
- Readiness Group Snelling (Bldg 54, Fort Snelling, St Paul, MN 55111)
- Readiness Group St. Louis (4300 Goodfellow Blvd., St. Louis, MO 63120)
- Readiness Group McCoy (Fort McCoy; Sparta, WI 54656)

ARMY READINESS REGION VI — Fort Knox, KY 40121
- Readiness Group Knox (Fort Knox, KY 40120)
- Readiness Group Selfridge (Selfridge ANGB, Mount Clemens, MI 48045)

ARMY READINESS REGION VII — Fort Sam Houston, TX 78234
- Readiness Group Sill (Fort Sill, OK 73504)
- Readiness Group Sam Houston (Fort Sam Houston, TX 78234)

SIXTH U.S. ARMY

ARMY READINESS REGION VIII — Fitzsimons Army Medical Center; Denver, CO 80240
- Readiness Group Denver (Fitzsimons Army Medical Center; Denver, CO 80240)
- Readiness Group Shilling Manor (Bldg 310, Salina Airport Industrial Center; Salina, KS 67401)
- Readiness Group Douglas (Bldg 100, Soldiers' Circle, Fort Douglas, UT 84113)

ARMY READINESS REGION IX — Presidio of San Francisco, CA 94129
- Readiness Group Los Angeles (San Pedro, CA 90731)
- Readiness Group PSF (Presidio of San Francisco, CA 94129)
- Readiness Group Lewis (Fort Lewis, WA 98433)

BATON YOUR

Winston R. Hayward

Napoleon, a master of the art of war, is credited with having said that evey soldier in his army carried a baton in his knapsack. The baton was a symbol of authority, similar to the swagger stick, carried by high ranking officers of the French army of that day. Obviously, Napoleon was saying that any soldier could rise in rank in the French army, depending only upon the soldier's ability.

In today's Army, with its need for training and expertise, one way to increase your potential is through enrollment in one of the wide range of correspondence courses offered by the Department of Army Wide Training Support (DAWTS), the United States Army Engineer School. The only limitation is individual initiative coupled with a willingness on the part of the student to voluntarily discipline or condition himself to regular study habits. Students set the pace of study commensurate with their ability to learn. Certificates are awarded upon completion of each subcourse and some special courses. Diplomas are awarded upon completion of career courses. Currently, over 16,000 personnel in all grades are enrolled in over 200 different subcourses ranging from Explosives and Demolitions, Roads and Airfields, and River Crossing Operations to administrative, management and maintenance subjects. The subcourses cover the gamut of the technical, tactical, managerial, and professional concerns of military engineers. Through these courses developed at USAES, military and civilian personnel around the globe, wherever mail is delivered, have the opportunity to increase their knowledge and improve their skills in military engineering. The courses will help mold well trained, mentally alert soldiers for today's requirements. A continuing cycle of review and revision is intended to keep the subcourses current with changes in doctrine, new equipment and procedures in the different subject areas. USAES correspondence courses are open to members of all the Armed Services — Navy, Maine Corps, Air Force, Coast Guard and Army. Civilian employees of the federal government are also eligible if the instruction is job-related.

Enrollment Voluntary and Free. Correspondence course enrollment is voluntary. All necessary instructional material and postage paid envelopes are provided at no cost to the student. Successful completion of appropriate correspondence course instruction enables Active Duty, National Guard, and US Army Reserve Officers to satisfy the military educational requirements for promotio Successful completion of correspondence subcourses also earns enlisted personnel promotion points under the new standard Army promotion

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system. Each credit hour is worth ½ a promotion point up to a maximum allowable 125 promotion points. Correspondence course study, when supplemented by practical training, can be of valuable assistance to personnel seeking MOS qualification or proficiency.

Counseling Service and Self-Paced Instruction. A counseling service is provided by the Administration and Processing Branch, of the Department, to assist students and prospective students in planning a course of study and to provide information and guidance.

Once enrolled, all subcourses are completed under the concept of self-paced instruction. The student grades his own lessons using the solutions inclosed in the subcourse packet. The final examination is also furnished in the original subcourse packet.

Administration. During the past year, correspondence course administration has moved into the data processing age under the TRADOC Educational Data System. Enrollments, grading, student notices, shipping data, and many other administrative details have gone from the manual system which was necessarily slow and tedious to the computer which has earned the reputation for speed and accuracy, limited only by programming techniques. This system is working and satisfying a long felt need to provide better service to the student which is the only reason we are in business.

Career Courses. Career courses are offered for enlisted and officer personnel to improve their proficiency and prepare themselves for greater responsibility. In all courses, the subcourse is the actual study package the student receives. It consists of an introduction, a series of lessons with attached memorandum or textbook, lesson and examination exercises, together with the lesson solutions for self-paced instruction and other necessary training or suppementary materials. A correspondence course consists of related subcourses; each subcourse teaches a particular topic or phase of a subject.

NCOES. The Noncommissioned Officer Education System is an Army-wide program for educational and professional career development to provide each branch of the Army with professionally qualified noncommissioned officers. In order to accommodate the Engineer Career Management Fields and MOSs, the USAES has developed a flexible course concept that applies to both the Basic and Advanced Noncommissioned Officer Courses.

Each course is divided into three phases. Phase I is that portion consisting of Army subjects that apply to all Career Management Fields at a specific skill level. Phase II is that portion of each course related to a specific career field. Phase III is that portion related to MOS specialization. The instruction is aimed at increasing the skill level within the target MOS. The length of Phase II

and Phase III is established according to the needs of the Career Management Field and MOSs.

New programs of instruction have been developed for the Combat Engineering and Construction and Utilities Career Management Fields for both the basic and advanced noncommissioned officer courses. Within each field, the instruction in Phases II and III is designed for specific MOSs.

Four noncommissioned officer courses, two basic and two advanced, are offered under the NCOES. The two basic NCO courses are:

• Combat Engineering (CE-CMF) Noncommissioned Officer Basic Correspondence Course, E40, which is designed to provide selected personnel with a working knowledge of those duties required to perform in the grades of E5, E6, and E7. Enrollees must be qualified in MOS 12B, 12C, 12D, 12E or 12F and complete a minimum of 60 credit hours of work each enrollment year.

• The Construction and Engineering (CU-CMF) Noncommissioned Officer Basic Correspondence Course, E40, is designed for personnel in MOSs, 51B, C, D, E, F, G, J, K, L, M, 81B, or 82B.

The two NCO advanced courses have titles identical to the basic courses but there the similarity ends. They are designed to provide enlisted personnel with a working knowledge of those duties required to perform as noncommissioned officers in grades E8 and E9 and to prepare senior noncommissioned officers for enrollment in the Army Command and General Staff College Special Correspondence Course for Sergeants Major and Operations Sergeants. For the CE-CMF course, qualification in MOS 12B, C, D, E, or F is required. For the CU-CMF course qualification in MOS 51E, F, H, M, N, P, R, 52E, 53B, C, 57D, 62D, G, H, N, J, 81B or 82B is a prerequisite.

Four officer career courses (2 basic and 2 advanced) are also available. The two officer basic courses are:

• The Engineer Officer Basic Correspondence Course is designed to increase the proficiency of engineer lieutenants in company level duties, in both construction and combat units. It also provides reserve component officers the means for meeting branch qualifications.

• The Nonresident Engineer Officer Course provides the option of completing the course by correspondence from USAES or completing it by a combination of correspondence subcourses and USAR school instruction. Common subjects are offered in some USAR schools as well as by correspondence and the remainder of the course is completed by correspondence.

The two officer advanced courses are:

• The Nonresident/Resident Engineer Officer Advanced Course provides several options in that it can be completed entirely by correspondence or partially by correspondence and the remainder residence at USAES or at a USAR scho Completion of a writing requirement (staff study) is now required for successful completion of this course. Completion of any of the options will satisfy the military educational requirements for promotion and attendance at the Command and General Staff College and satisfies the prerequisite for an assignment requiring completion of the Engineer Officer Advanced Course.

• The Engineer Officer Advanced Correspondence Course is completed entirely by correspondence and in other respects corresponds to the above courses. All of the career correspondence courses offered by USAES parallel the corresponding resident courses as far as possible.

Special Courses and Programs. In addition to the career courses, special courses are available to provide opportunity for the student to further his knowledge in a specialized or functional area. Included in these courses are:

• The Facilities Engineer Management Course which parallels the corresponding resident course and is designed to provide a working knowledge of facilities engineering including administration, organization and functions, real property maintenance activities and other facilities engineeri support activities. The course consists of subcourses totaling 70 credit hours that must be completed in one enrollment year.

• The Company Commander's Preparatory Course is designed to provide potential and active engineer company commanders with instruction pertaining to unit administration and management including the effective utilization of personnel and materiel resources for which they are responsible. There are 11 subcourses totaling 38 credit hours for completion in one enrollment year.

• The Professional Engineer Preparatory Course which is intended to assist qualified applicants for Professional Engineer Registration to review in preparation for state registration examination or engineer-in-training certification. In this course, no attempt is made to teach the subjects that an engineer must know. The emphasis is on helping the student review what he has already learned on the assumption that the examinations have a common core of engineering subject matter and engineers differ in skill, background, and knowledge. Eighteen subcourses are available for the student's selection of those that he requires.

• Engineering courses including the Engine Construction Correspondence Course and the Engineer Combat Support Correspondence Course are available to provide instruction in these areas.

• The Technical Orientation Course is avail-

able to students who require instruction in subjects fundamental to engineering practice including Mathematics, Slide Rule, Fundamentals of Physics and Construction Print Reading.

• MOS courses are available that are designed primarily to teach the principles and practices of specialized engineer skills. They have been developed along MOS lines so that they serve a variety of purposes dependent upon the student's needs and desires. They can be used to help prepare for promotion or for MOS Evaluation Tests.

Individuals who do not want to enroll for an entire course may design their own study program from over 200 subcourses currently offered in the Engineer Correspondence Course Program.

• The purpose of the Engineer Skill Training Program is to produce qualified engineer soldier craftsmen in the four basic vertical construction skills through the combined application of correspondence course study and technical and practical training. Enlisted personnel, active or reserve, in all grades, having a GT score of 90 or above are eligible for the program.

The program is a combination of three accepted mediums of instruction: Engineer Correspondence Courses, OJT, and classroom instruction conducted at the Directorate of Facilities Engineering of any Army installation by master craftsmen (foremen) or similarly qualified personnel. The selected students attend classes and complete correspondence course study assignments in accordance with a schedule based on a Program of Instuction (POI) designed specifically to serve the purposes of this program. An introductory packet is available on request.

Enrollment Information. Information on elibibility and prerequisites for all courses may be obtained from the USAES Pam 600-20, Announcement of Correspondence Courses, which is available in many units or by writing;

Commandant
U. S. Army Engineer School
ATTN: Department of Army Wide Training Support
For Belvoir, Virginia 22060

Prospective students should fill out and submit DA Form 145, Army Correspondence Course Enrollment Application. For military personnel, the proper channel is their Commanding Officer; civilian personnel should apply through their immediate supervisor.

Winston R. Hayward is chief of the Training Materials Division in the Department of Army Wide Training Support, USAES. He retired from the Army (COL, CE) in 1960 and has been employed at the Engineer School since that time.

ALL FOR ONE, ONE FOR ALL

By Major Lonnie Williams

At one time or another, many of us have been asked or have asked ourselves, "Why don't the Services all train their pilots or equipment operators or doctors at the same place?" Think of all the tax dollars that would be saved! Did you know that beginning in September 1972, representatives from the four Services (US Army, US Air Force, US Navy, and US Marine Corps) have periodically met in an attempt to consolidate common training in *all* duty areas? In Engineer related areas, Construction Equipment Operator (CEO) training was selected for the pilot consolidation analysis since it appeared to have the most potential for early implementation. Representatives of the four Services met at Ft Belvoir, Virginia and jointly designed and developed a training program based on the missions and needs of each. Consolidation of CEO training has now been accomplished at Ft Leonard Wood, Missouri. Army students changed over to the new CEO Interservice Curriculum on 25 November 1974. Students from the other services started in the program 6 January 1975.

In development of this new training program, a major change was made in the concept and organization of training, particularly for the Army. Class lengths and, to some extent, skills taught were changed. In most cases, the CEO courses have been shortened owing to a change in training concept. Chart 1 shows the existing and the new course lengths. Charts 2 and 3 reflect the new Interservice Training Modules. In designing the Interservice courses, no attempt was made to duplicate existing courses either in form, content or duration. Two thoughts pervaded the design process: one, round out the individual by provid-

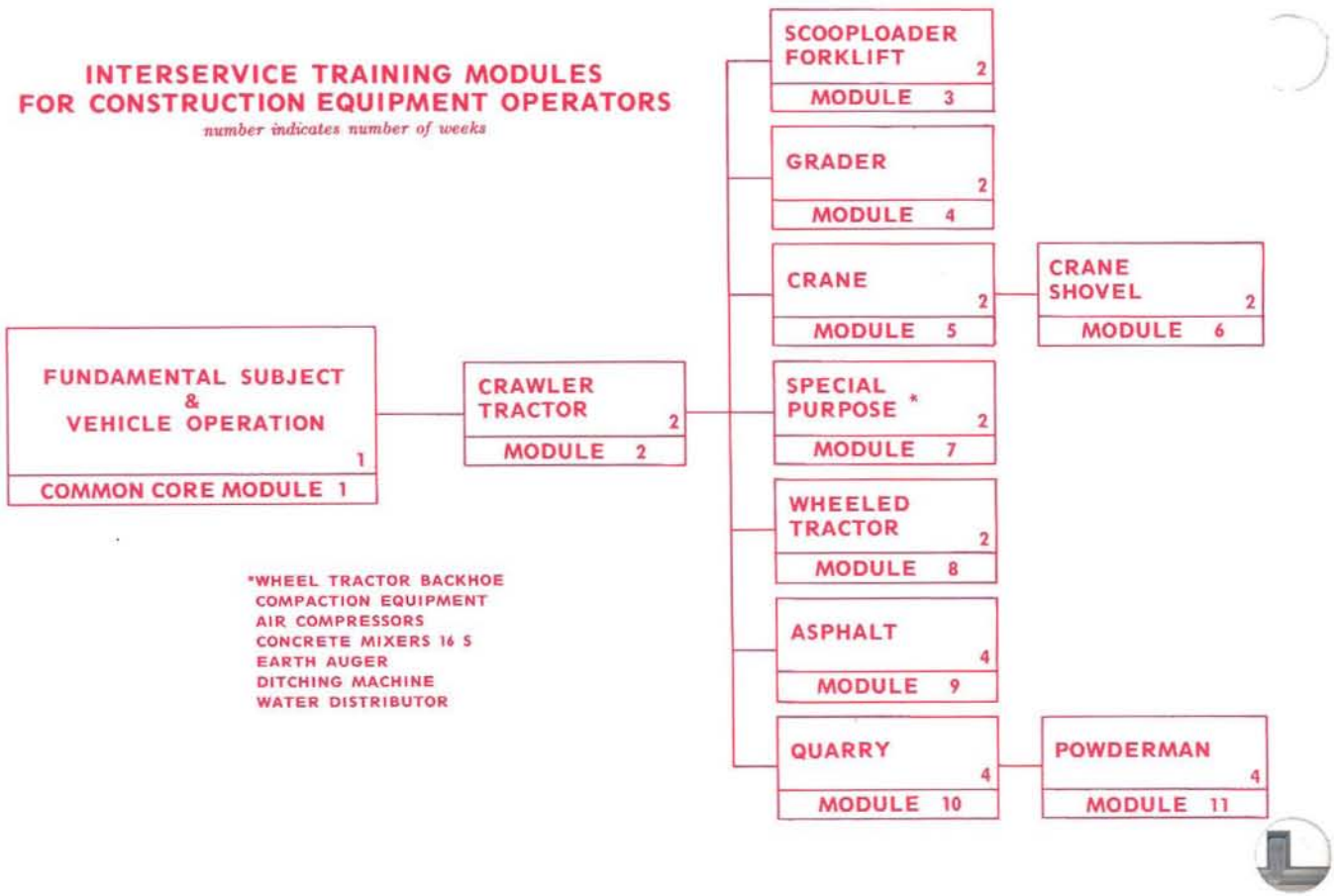


CHART 1

COMPARISON OF TRAINING TIMES FOR CONSTRUCTION EQUIPMENT OPERATOR

(Weeks)

MOS Code	Old Length	Current Length
62D20	7	7
62E20	8	5
62F20	7	5
62F30	8	7
62G20	7	7
62G30	4	4
62H20	Course discontinued	
62J20	7	5
62J30	5	3
62K20	7	5
62L20	7	5
62M20	7	5

ing multi-skill training; and two, provide only that training which will be beneficial during the first enlistment term. These thoughts tend to reduce the overall length of training, particularly when coupled with the current DA shift in emphasis towards performance training and criterion referenced tests. Right away you will notice that now a graduate of Advanced Individual Training (AIT) will be qualified to operate several items of equipment (not just one as was previously the case), all in a shorter time frame. The big reasons this difference are performance oriented train- and a "teach the test" concept which zeroes in on training, locking out that which is unnecessary to perform the required task.

Although the training time will be reduced, it is important to note that there is no reduced standard, either imposed or implied. There is a tendency to believe that substitution of a shorter, multi-skill course will produce a lesser product than the existing 7 week, single skill courses. But, when you consider that the amount of hands-on-time on equipment in the 5 week course is at least double that which was provided during the 7 week course, it becomes apparent that the revised courses will be at least *as* effective as the original courses. The organization of the training and training strategy make this possible. Through the use of training modules, each concentrating on a particular type of equipment, equipment operators can progress at a faster rate when compared to the lock-step method of instruction because of the transfer to knowledge that occurs between modules. All students attend a common core module 1 week in length, then go on to two or three additional modules, depending on their MOS (See Chart 2). All equipment operators will be qualified on the rugged crawler tractor before going on to other equipment, more specialized and sometimes more sensitive.

This new training program will produce an apprentice, capable of operating several items of equipment. The Construction Equipment Operators Course will provide the basic skills and competencies which must be built on with experience and practical work, best accomplished in the unit.

Several other areas of Engineer training are presently being investigated for their interservice training potential. Among them are Construction Surveying, Construction Drafting, Soils Analyst, Utilities, Industrial Gas Production, and Vertical Construction skills. Before this analysis has been completed, all functional duty areas (all MOS) will have been compared with those of other services. If consolidation is possible, this will be brought out. If the courses are incompatible, we will at least have the assurance that we're not wasting our good tax dollars. But don't close the books yet! In our continuing efforts to improve career development and progression opportunities, you'll see a change in the MOS structure soon (probably within a year or so). The result will be a shuffle of some equipment among MOS and a new MOS code assignment. More on this subject will appear when our career field proposals have been staffed through DA. In the interim, and afterwards, the USAES will continue in its efforts to provide challenging and interesting training for every Engineer.

Chart 2

CURRENT MOS CODE	TITLE	INTERSERVICE TRAINING MODULES REQUIRED
62D20	Asphalt Equipment Operator	1, 2 and 9
62E20	Crawler Tractor Operator	1, 2 (4, 7 or 8)*
62F20	Crane Operator	1, 2 and 5
62F30	Crane-Shovel Operator	1, 2, 5 and 6
62G20	Quarry Machine Operator	1, 2, and 10
62G30	Powderman	1, 2, 10 and 11
62H20	Concrete Paving Equipment Operator	**
62J20	General Construction Machine Operator	1, 2 and 7
62J30	Well Driller	***
62K20	Grader Operator	1, 2 and 4
62L20	Wheeled Tractor Operator	1, 2 and 8
62M20	Rough Terrain Forklift and Loader Operator	1, 2 and 3

*Determined at Fort Leonard Wood based on availability of spaces.
**MOS to be discontinued; send to 51J20.
***Go to Fort Hunname, Course Number A-730-0014.

MAJ Lonnie B. Williams, Jr. is currently Chief, Individual Training Branch, Training Programs Division, Doctrine and Training Development Department, DC/CTD, USAES, Fort Belvoir, VA. He has a BS in Architecture and is a graduate of the Engineer Officer Basic and Advanced Courses. MAJ Williams has served with the 17th Engineer Bn, Fort Hood, TX; the 921st Engr Group, Fort Leonard Wood, MO; HQ US Army Materiel Command, Wash, D. C.; overseas assignment with 2d Engr Bn, Korea; the 547th Engr Bn in Europe; and two assignments in RVN.

A SPARK OF LIGHT

CW2 Donald P. Jensen

Electricity does impact on your job! Power production is an everyday requirement within Combat and Support Units. As Engineer Commanders/Staff Officers or NCO's you have probably been in a situation similar to one of these:

- Increased production is required at your crusher site; a double shift is the answer, but is lighting available for night operations?
- A power blackout has occurred. The Post Cold Storage Facility has a half million dollars of frozen food that is about to thaw. You must provide emergency power!! What's the condition of 100 KW generator set?
- Building a timber trestle bridge in a remote area. Power hand tools are the answer!
- Operating a mobile bath/laundry unit? Not without electricity!

Numerous situations like these occur continuously and all require mobile electric power. The fact is, power production equipment is essential to virtually all Army units.

The Engineer School at Fort Belvoir, Virginia, is responsible for training your Power Generation Equipment Operator/Repairman, MOS 52B20. An insight of this training program should provide you with an increased capability of assessing the performance and capabilities of your Power Generation assets.

The present 52B20 program of instruction is designed to train students in the operation and organizational maintenance of Army generators. Instruction is presented in three forms; formal classroom, indoor practical exercises on actual equipment, and an out-of-doors field exercise designed to test an individual's ability to function in the field environment.

Seventy hours of the fundamentals of electricity form a foundation of basic electrical knowl[edge] and serves as the first subject area presente[d] the potential powerman. Sixty-five hours of

theory of operation and diagnostic repair procedures for gasoline and diesel engines provides the next building block in the students' development. Now, utilizing this newly acquired knowledge of electricity and engines, the student advances to actual generator sets where he masters the operation and maintenance procedures of representative models of the DOD Family of Generators in the 1.5 through 60 KW range. Diagnostic procedures are then presented which enables the student to locate and correct equipment malfunctions in each specific type of generator.

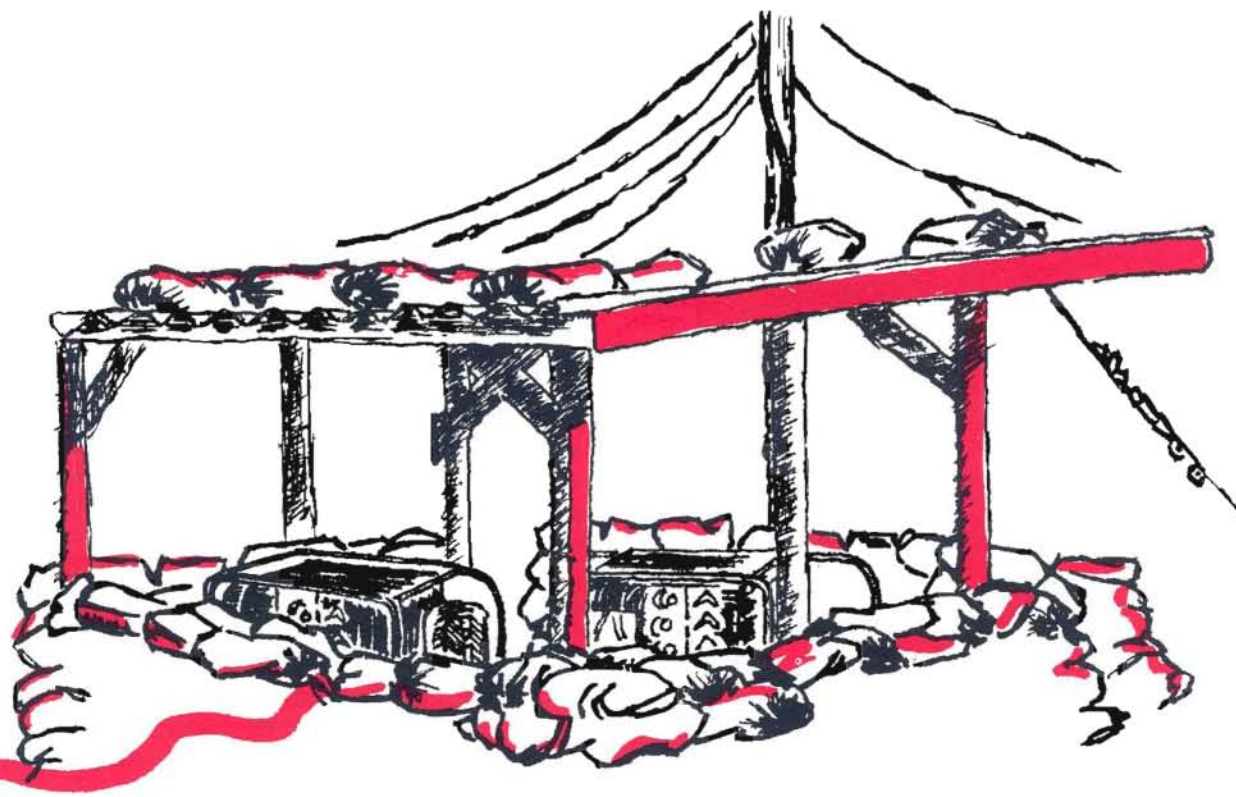
The course is culminated with a three day field training exercise developed in 1971, as a result of field feedback which indicated the need for further training in equipment utilization. The skills and knowledges obtained through all previous instruction are now tested to determine if the student is able to: select the proper generator and cables for a given situation, install and connect equipment, provide distribution systems and balance electrical loads. During the field exercise, the students are required to provide power to a variety of electrical loads found in the field such as lighting, electric motors and buildings with installed electrical equipment.

The training provides *realism!* Instruction is equipment oriented and conducted largely by hands-on techniques. Power for heating, lighting and air conditioning of offices and break areas is provided by student operated organic generators, demonstrating the advantages and importance of maintaining a dependable power source.

The instructors teaching the course collectively possess several hundred years field experience, thereby providing a key ingredient to the development of students with tricks of the trade and field expedients on how to successfully get the job done. The proper use of technical manuals is highly emphasized, as many times the 52B20 man must work independently without the benefit of technical assistance.

The overview presented is but one of the courses conducted at the Engineer School. The course typifies improvements continually being made in training based on field feedback, and supports the need for "communication" between the *Training Base* and the *Field Units*. If at anytime you encounter a situation that may point out a training need, or if you need training material — take a few minutes and drop us a line. The results will be mutually beneficial.

CW2 Donald P. Jensen is an instructor in the Power Generator Branch, Department of Mechanical & Technical Equipment, United States Army Engineer School, Ft. Belvoir, Virginia.



HELPING HA

CPT Frank R. Finch

If there is one trait common to all Army Engineers, it is the ability to accomplish impossible tasks routinely. Recently Camp Parks, California, a small training area for the reserves and federal agencies, had a serious problem with the water supply for the installation, and Company D, 864th Engineer Battalion (Construction), was called to the rescue.

The water was quickly becoming contaminated from old-age roofing material which had rotted and fallen into the reservoir. In fact, not only had the roofing material deteriorated, but the entire timber superstructure as well. After an urgent request for assistance was received by the Engineers, planning began for the project. A wc estimate from Camp Parks called for four plt-wk. A study of the site showed a huge job ahead: all stringers (2"x8"x16'), all bracing (2"x4"18"), all decking (2"x4"x16'), and all corrugated asbestos sheeting had to be replaced as well as selected girders (3 laminations of 2"x 12"x16').

Before any work began, the old roofing had to be removed — at best, a risky job. A detailed man-hours estimate was compiled, and it came very close to the original estimate of four plt-wks. Although nothing more than a normal project, added constraints made this to appear an impossible mission.

Logistical support, prior training commitments, and ongoing projects made four weeks an unacceptable loss for one platoon. Plus, Camp Parks needed its only water source made safe as soon as possible, before the long, dry season ahead. Two weeks for two platoons? This seemed unworkable because of the working space available. One platoon size unit was the ideal force.

The solution to the problems was one familiar to engineer troops: work around the clock! Two 12 hour shifts were designated, a work sequence was carefully organized, equipment and materia were prepositioned; platoon light sets and gene tors were loaded and D Company was ready to move out. Twelve men from the 51st Engineer

NDS

Detachment were attached to augment the work force. The first platoon started on Monday at 1200 hours and worked until midnight. The second platoon worked from midnight until noon. The operation was planned to continue through the following Sunday.

Steadily, the project took shape. Men from the 51st Engineer Detachment lead the way clearing the old debris from the work area, while the first platoon followed right behind them with new lumber. A safety man in a rowboat below found that more of his time was spent retriving lost tools. As each man became more proficient in his individual job, the pace of the work picked up. A crane was used to remove large beams and debris from the water. A break area was established to get men out of the hot sun during the day; here the mess hall served cold drinks, snacks, and coffee at night.

As the week wore on, the noise level during time off dropped noticeably. (No cases of insomnia were reported!). Each shift was glad when their relief came, but competition was keen to see which platoon was getting more work accomplished. The Operations Section kept a close watch to insure high quality work.

The big moment came at 0330 hours, Friday morning with both platoons working side-by-side. Morale seemed higher than ever as the job rapidly neared completion. Clean-up and packing of equipment had already begun as the last sheet of roofing material was drilled and bolted into place. After a breather and a moment to admire their work, D Company was looking forward to going back home.

Approximately 2700 square yards of area had been upgraded to provide a safe water source for Camp Parks. Over 5100 man-hours were logged in a week's period and a challenging project had been finished ahead of schedule, primarily due to the "can-do" spirit of D Company's soldiers. Once again, Army Engineers had accomplished a "mission impossible."

EDITOR'S NOTE:

THE ENGINEER is a magazine committed to change, just as the Corps is in a constant state of evolution. One of these changes is represented in the introduction of a new department devoted to "spreading the word" about the experiences of various engineer units, both active and reserve component, throughout the world. In the marketplace of ideas, THE ENGINEER wants to seize the lead in telling the story of **your** particular unit. There is only one way to accomplish this and that is for **you** to tell it to us first. Drop us a line!

By Colonel R. L. Pendleton

MOB DES

The US Army Engineer School at Fort Belvoir, Virginia, is well known as the "Home of the Engineers." A relatively unknown, but very significant, segment of the Engineer School family are the Mobilization Designees (MOB DES), who are assigned to the Engineer School's Mobilization TDA. The officer and enlisted men assigned to this TDA are members of the US Army Ready Reserve. They are career reservists who have full-time civilian occupations and who possess special qualifications, expertise and skills which can be fully utilized by the US Army Engineer School (USAES).

Their prior military service, civilian and military education, and civilian occupations provide a valuable resource to compliment the staff and faculty of the Engineer School, primarily, in the event of national emergency, but also during peace time when available assets can be efficiently and economically utilized. The MOB DES program has been active at the USAES for some 20 years. During this time, several hundreds of reservists have participated in the program and have contributed to the mission of the Engineer School.

Department of Army policies for establishing and operating the MOB DES program during peacetime are contained in AR 140-145, Army Reserve: Mobilization Designations, dated 15 February 1974.

The objective of the MOB DES program is to provide key, early augmentation support for valid mobilization requirements identified in a mobilization TDA and to have the designees available to report between M-day and M+90 days. These key, early augmentation requirements are filled by members of the Ready Reserve, who are preselected and trained by OJT and/or other methods. The program prescribes that designees will be selected by name and that they will be given extensive premobilization orientation and qualification training in the positions for which they have been selected, including OJT in the designated position. With this training, they will be expected to perform assigned tasks immediately upon arrival at their mobilization station.

Proponency for the USAES MOB DES program rests with the Office of the Secretary of the Engineer School; however, close coordination is required with the USAES, Department of Army Wide Training Support (D/AWTS), the proponent for the Expanded Reserve Component Support Program and the central coordinating USAES agency for all matters dealing with the Reserve Components.

MOB DES are at USAES for 12 days annual training each year. They are assigned, however, on a 52 week basis and are available on a

voluntary basis to assist the departments to which they are assigned. This assistance consists of their acceptance of non-time dependent training projects from the School. Each USAES department is encouraged to review its requirements to determine those tasks which are appropriate for training projects.

How does all of this affect the role and mission of the US Army Engineer School? Any emergency which requires the rapid expansion of the Army will bring about a corresponding requirement for the US Army Engineer School to augment itself to produce a greater number of graduates of all existing classes. We foresee that many new classes will also be re-created, such as the Engineer Officer Candidate School (EOCS). To accomplish increased graduations, with no loss of quality in instruction, is a formidable task. The contingency plan which supports a mobilization in the USAES, identifies personnel augmentation requirements in three general categories, namely: (1) additional civilian space requirements, (2) additional military spaces, and (3) the subject of this paper; additional pre-selected and pre-trained military personnel, "Mobilization Designees."

Unlike "pipeline" requirements for augmentation, where military and civilian requirements are expected to be available from gross assets on a general basis following an emergency, the MOB DES position is a discrete requirement against which an individual member of the Ready Reserve is selected and assigned with a view toward immediate availability following declaration of war or other national emergency requiring a rapid expansion of the active Army. Positions so identified represent requirements which require extensive pre-mobilization orientation and on-the-job training (OJT).

Under Advance Emergency Orders, which are part of the initial assignment package of each MOB DES, the individual is given the authority to travel and ordered to report to his mobilization station upon notification by the Secretary of the Army. Under emergency conditions, such notification might be delivered by the public news media or by more usual form of communication, such as registered mail or telegram. Some MOB DES are identified with reporting dates of 31, 60 or 90 days following M-Day, depending upon the augmentation phasing requirements of the organization.

As members of the Individual Ready Reserve (IRR) not assigned to troop program units, MOB DES officers are subject to the promotion provision of the Reserve Officer Personnel Act (DOPMA), under which promotion eligibility is essentially a function of total years of commissioned service and time in grade. Promotion flow requires three years to 1st LT; 4 years — with 6 years service to CPT; 7 and 12 years for Major: and 7 and 17 years to LTC. For promotion to Colonel, zones of consideration are established each year by DA and announced in DA Circulars in the 135 series. Designees receive permanent promotions as reserves of the Army and upon mobilization enter the active service with a date of rank calculated on the basis of promotion date plus credit for subsequent service in that grade in the ready reserve. Enlisted Designees are promoted according to the provisions of AR 135-205.

An Officer Evaluation Report (OER) is rendered by the proponent agency for both officer and enlisted MOB DES, for each annual training tour of duty. These OERs are most important when DA selection boards are considering officer and EM for retention, promotion, selection to senior service schools and selection for new reserve assignment.

The selection and assignment of MOB DES for vacancies in the USAES MOB DES TDA is the responsibility of the US Army Reserve Components Personnel and Administration Center (RCPAC) in St. Louis, Missouri. RCPAC exercises administrative jurisdiction over all members of the Ready Reserve not assigned to troop program units of the USAR. Within the pool of Individual Ready Reserves (IRR), Mobilization Designees are assigned to an accounting element called the USAR Control Group (MOB DES). The entire world-wide US Army MOB DES program authorizes approximately 8500 positions, of which some 6000 spaces are currently filled. The MOB DES positions are located in approximately 50 different Department of the Army agencies. Included in the total authorization are 300 EM positions. To-date approximately 30 EM have been assigned to MOB DES, Army-wide. It is significant to note that of the 300 EM positions authorized, 55 are authorized in the USAES TDA.

There are currently 102 officers and one warrant officer assigned to the Engineer School's TDA, as compared to 115 authorized. The assigned officers range in rank from Colonel (O-6) to 2d LT (O-1). The TDA also provides for assignment of 55 enlisted men in the grades of E6, E7, and E8 and at the present two EM are assigned. Current enlisted men vacancies exist in the following MOS: 11B, 11C, 12B, 12C, 12E, 51P, 52D, 52E, 52O, 62B, 62C, 62H, 62N, 76P, 76Y, and 81C. Officer MOS vacancies for majors and below include: 0663, 1331, 2025, 4200, 4201, 7010, and 7110.

What does a Designee do during his annual training at the Engineer School? Following are representative examples taken from a preview USAES MOB DES After Action Report:

"LTC served as an instructor in the Soils and Geology Branch, Heavy Construction Division, Department of Engineering Science (D/ES). During his AT he converted a lesson in "Compaction" from synchronized slides and sound using Nurelco equipment to picture and sound on Kodak slide 3M equipment. He also prepared and taught a three (3) hour class to the Soils Analyst Course."

"Major served as Acting Chief of the Supply Branch, General Support Division, Department of Military Science (D/MS), for two weeks while the branch chief was on TDY."

"Major as a special staff officer in Department of Mechanical and Technical Equipment (D/M&TE), assisted in preparation of a department Safety SOP. His civilian position as a staff safety engineer for the Port Authority in New York provided expertise for him to accomplish his special assignment."

"Major served as an instructor in the Civil Works and Military Construction Section, Engineering Management Division, D/ES. The absence of instructor personnel in his branch had left a complete void in the preparation of instructional material. During his AT he was able to prepare a POI."

"CPT served as an instructor in the Structures Branch, Engineering Design Division, D/ES. During AT he taught 26 hours of classroom instruction. He provided continuity during a period when the branch was short of qualified instructors."

"CPT served as an instructor in the Roads and Airfields Branch, Heavy Construction Division, D/ES. During AT he taught 21 hours of instruction."

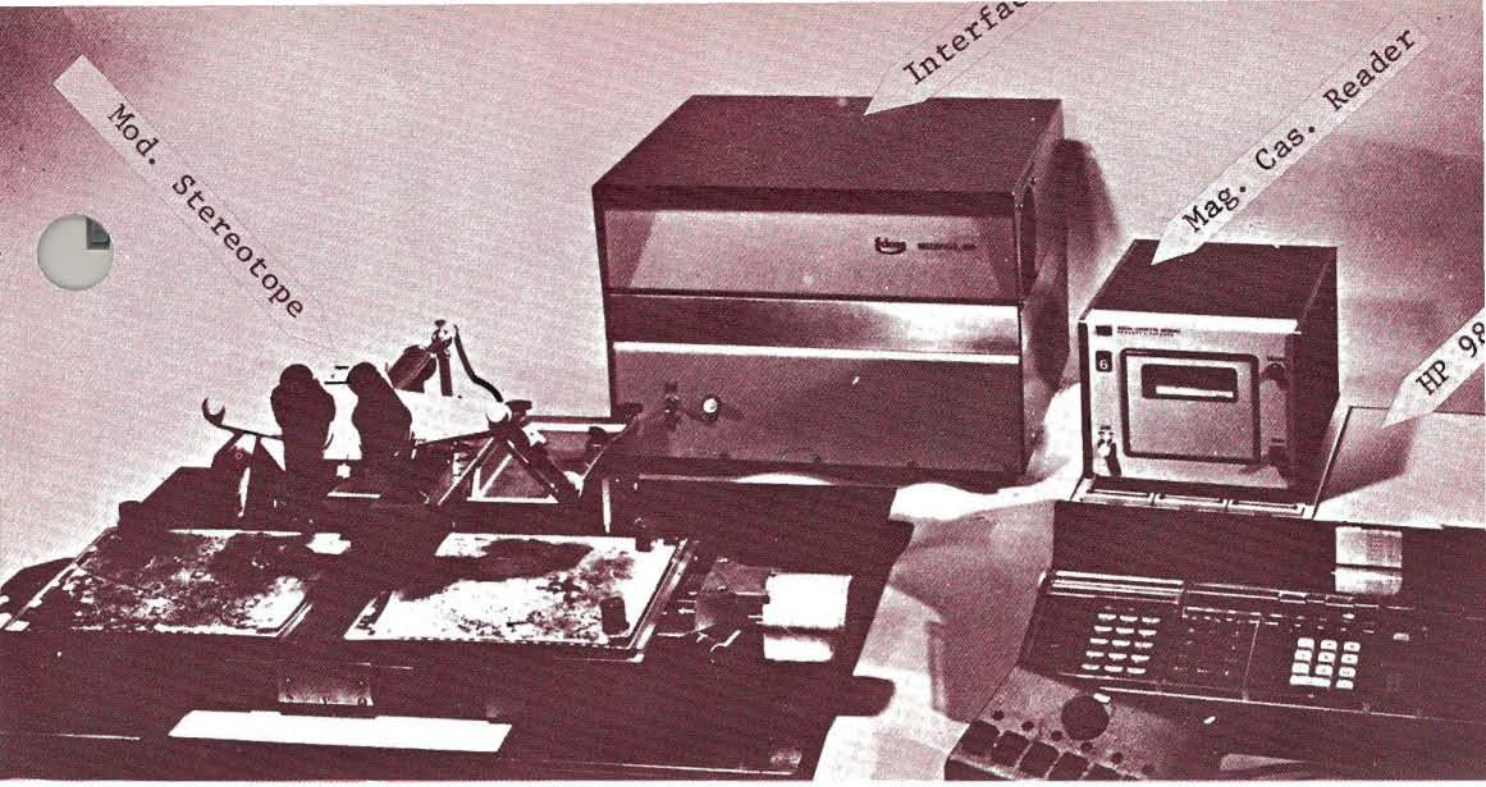
"LT served in the Automatic Data Processing Section, Engineering Management Division, D/ES. During AT he worked on a computer program project which will serve as an excellent teaching tool for the Engineering Management Contract Course."

"LT served as a special project officer in the Engineering Management Division, D/ES. During AT he rewrote two (2) practical exercises, testing the understanding of construction management techniques of EOAC officers."

The Congress has directed that reservists will play a very significant role in today's All Volunteer Army. The pressure on the defense budget, recent Army reorganizations, and the increased cost of the Volunteer Army has resulted in a reduced Active Army establishment. In order to maintain the force structure necessary to counter threats to our national security, a more efficient use was to be made of the resources available. A greater use of the Reserve Components in our force planning is therefore one method of stretching our manpower resources.

One of the biggest problems facing the MOB DES program today is that of establishing maintaining effective communications. Many servists do not really understand the MOB DES program and do not fully appreciate the vital role that it plays in support of an active Army activity. Likewise, a great many members of the active Army do not know what MOB DES means and therefore are not able to associate with the important role to which we have been assigned. One of the main purposes of this article is to acquaint both active and reserve members of the Corps of Engineers of the MOB DES program. The MOB Designee has been working quietly behind the scenes for may years, doing his part for national defense, and really receiving very little acknowledgement for his efforts, other than personal satisfaction that he was making a worthwhile contribution. However, those familiar with the MOB DES frequently characterize him as a highly motivated, self-enlightened individual who is enthusiastic and anxious to make a significant contribution to not only his ultimate mobilization responsibilities, but to the interim mission of the USAES element to which he is assigned. It is hoped that this article will be of special interest to those seeking a new reserve assignment. For information relative to vacancies outlined here it is requested that inquiries be addressed to Commander, US Army Reserve Component Personnel and Administration Center, ATTN: AGUZ-CMD-M, 9700 Page Blvd., St. Louis, MO 63132, or write to the Engineer School, Fort Belvoir, VA 22060, ATTN: ATSE-SE-AA. We want to fill all of our vacant positions and we need your help.

Colonel Roger L. Pendleton is Commander of the 1649th MOB DES Detachment, US Army Engineer School and has been with the USAES MOB DES for 10 years. He served in World War II with the 104th Inf Division and with Engineer units in Japan and Okinawa during the Korean War. He has a BS Degree in Civil Engineering from the University of Maine and has taken graduate work at George Washington University and Virginia Polytechnic Institute. He is a registered Professional Engineer and served as President of the Virginia Society of Professional Engineers in 1969-1970. He is a graduate of both the Engineer Officer Advanced Course and the Command and General Staff College. He is presently a second year student in the Army War College — non-resident program. His civil position is that of a civil engineer with the Defense Communications Engineering Center (DCA) in Reston, Virginia.



APPS: *A new measuring system*

MAJ Leon Thompson

The Analytical Photogrammetric Positioning System (APPS) offers great promise as an Engineer measuring instrument.

In response to requirements to locate the position of points more accurately and quickly than can be done with maps, Mapping, Charting and Geodesy researchers developed the APPS. The APPS is a new and innovative application of well established photogrammetric principles which have been incorporated into hardware that is simple and rugged enough to be moved to the field. The purpose of this article is to briefly explain how the APPS's system operates, to discuss some possible engineer uses of the APPS and finally to challenge all Army Engineers to consider other innovative, time and money saving applications of this potentially valuable tool.

Basically the APPS is a measuring system which may be used to determine the UTM grid coordinates of any point appearing on a previously prepared point positioning data base. The important point is that the accuracy of the APPS is far superior to that obtainable from a map. The APPS will produce positional information in minutes and is extremely simple to operate. The Defense Mapping School (a component of the Defense Mapping Agency) offers a 34 hour course which produces an extremely proficient operator. In isolated cases, operators may be trained even quicker.

Operational Technique

The APPS is only useful in an area where a point positioning data base (PPDB) has been prepared. This means that the area must have been metrically photographed and photogrammetrically triangulated (determination of camera position and attitude) with all computed data placed on a magnetic tape cassette. These photos and this magnetic tape comprise what is commonly called the APPS "data base." Photo 2 depicts the operational system concept for the APPS. In essence when a target or a point to be measured is brought to the attention of the APPS operator (recon photo, map, visually, etc) he first determines from the photo index (mosaic) which two overlapping photographs contain the image of the target. He then withdraws from the data file (manila folder) the proper two photos and the appropriate magnetic tape cassette. Placing these photos on the modified Stereotope, the APPS operator derives measurements which are used by the programmable calculator, in conjunction with the information from the magnetic tape, to determine the location of a previously unknown point. The entire operation only requires approximately four and one-half minutes. Subsequent points

appearing on the same two photographs require even less time, perhaps twenty seconds.

APPS Accuracy Exceeds that of a Map

The obtainable accuracy of the system depends on the ability of the operator to identify that which he wishes to measure (correlation error), the measuring ability of the apparatus (instrument error) and the triangulation errors that exist in the previously prepared data base. For Engineer use, the "target" or point to be measured will always be readily identifiable so correlation errors by the operator are not significant. The instrumental or measuring error of the APPS hardware is a constant of approximately 25 to 30 micrometers. (Later versions yet to be produced will undoubtedly be more precise.) Therefore, the only errors which need concern the Engineer are triangulation errors which vary with each data base. The extent of the triangulation errors depends on the scale of the photography. As with a map, the smaller the scale the greater will be the error.

For standard small scale data bases (1:100,000) the APPS can determine positions to within $\pm$ 10 meters in N (Northing), E (Easting), and H (Height). When compared to the possible errors in a 1:100,000 scale map (51 meters horizontal (N and E), 15 meters vertical (H)) it is apparent that the APPS represents a sizeable improvement, particulary in N and E.

Similarly, the photography taken for the purpose of producing a 1:250,000 scale map probably will have a scale of 1:100,000. If these photographs are used in the preparation of a PPDB, the APPS may be employed to determine the N, E and H coordinates of any point to $\pm$ 10 meters or better. If these same photos are used to make a 1:250,000 scale map the errors will be considerably larger (see Table 1).

TABLE 1
Possible Positional Error based on National Map Accuracy Standards

Map Scale	Possible Error	
	Horizontal (Meters)	Vertical* (Meters)
1:20,000 (or larger)	17	3
1:50,000	25	3
1:100,000	51	15
1:250,000	127	30

Based on representative contour intervals

More importantly, for non-standard, large scale point positioning data bases (approx. 1:20,000 or larger) the APPS will produce positional data to better than one meter. Referring to the well established National Map Accuracy Standards it can be determined that any point on a map **may** have an absolute positional error as great as those depicted in Table 1.

The APPS will **always** give better positi data than maps simply because two steps (Steps & 7 in Table 2) in the mapping process, both of which contribute heavily to errors, have been eliminated.

TABLE 2
Mapping Sequence

1. Mission Planning	
2. Acquire Mapping Photography	Data Base (approx 50% of total cost)
3. Photographic Processing	
4. Photo Triangulation	
5. Triangulation Adjustments	
6. Compilation & other Mapping Processes	
7. Reproduction & Distribution	

Table 2 lists, in general terms, the steps required in producing a map. If one stops after step 5, the product will be a data base (photos & triangulation data) which is useable in an apparatus like the APPS. The compilation and reproduction steps have been eliminated. This eliminates two large sources of error and, as a bonus, cuts approximately 50% of the cost. The accuracy of the APPS for small scale photography is astounding. However, for Engineers, APPS results from large scale data bases (when av able) are even more important. When usin large scale data base (1:20,000 or larger), t APPS will produce positional data to **better than one meter** in N, E and H! Furthermore, these results are possible with a system that is simple, fast and rugged enough to operate under field conditions.

Although large scale data bases are presently considered non-standard and are somewhat expensive to produce, they could probably be made available under the following circumstances:

a. a high priority requirement exists,
b. large scale photography already is available,
c. a sufficient time/cost savings could be documented,
d. a high frequency of use is expected.

Engineer uses of the APPS

Assuming that a large scale data base exists, how might an Engineer use an apparatus which is accurate to better than one meter and is quick and simple to use? This question may be answered by listing the circumstances when an Engineer needs positional data.

• **Cut and fill** — A prime example is cut and fill determinations. Using an APPS and its programmable calculator, the Engineer could quickly and inexpensively determine the most advantageous route for a new road by measuring along the proposed routes to better than one meter and then computing the amount of material to be hauled in or hauled out. Route recommendations could be made without ever dispatching field parties.

• **Trafficability** — Trafficability studies would be greatly facilitated. Without dispatching Engineer recon teams the APPS operator could:

a. determine slopes by measuring spot elevations,
b. measure tree heights which may be related to tree size,
c. measure road widths,
d. determine widths of rivers, ravines, gullies, etc.

• **Tactical Operations** — Tactically the APPS would be useful in determining the size of probable landing zones, the height-to-distance clearances on the end of expedient runways, and the size and condition of beaches. The amount of bridging necessary to overcome a natural obstacle could be quickly determined by measuring the width of the river, gully, etc. Tactical movement would be failitated by providing data to determine the intervisibility between battlefield areas. Engineer intelligence teams are expected to maintain records of probable Engineer targets whose coordinates could be very precisely determined with the APPS.

• **Drainage Studies** — By measuring spot elevations the Engineer could quickly and accurately compute drainage patterns. The height of dams could be measured or the extent of the area to be flooded computed in the event a dam of a specific height were constructed.

• **Line of Sight** — Line of sight determinations for special communications equipment or for sophisticated distant measuring equipment becomes easy and extremely fast by using the APPS.

Other Engineer uses of the APPS certainly exist; it is a solution looking for a problem.

As Engineers we should be cognizant that a simple and rugged device exists, which, when used with a non-standard large scale data base, will allow us to measure to better than one meter without ever leaving the office. Furthermore, the system requires very little operator training, is nearly free from maintenance requirements, and is extremely fast to use. It would seem that Engineers could produce better products/information, more quickly and accurately and with less manpower by using the APPS. The Analytical Photogrammetric Positioning System (APPS) is presently being selectively deployed in all the Services with several being destined for each Topogaphic Battalion. Shouldn't all Engineers be using it?

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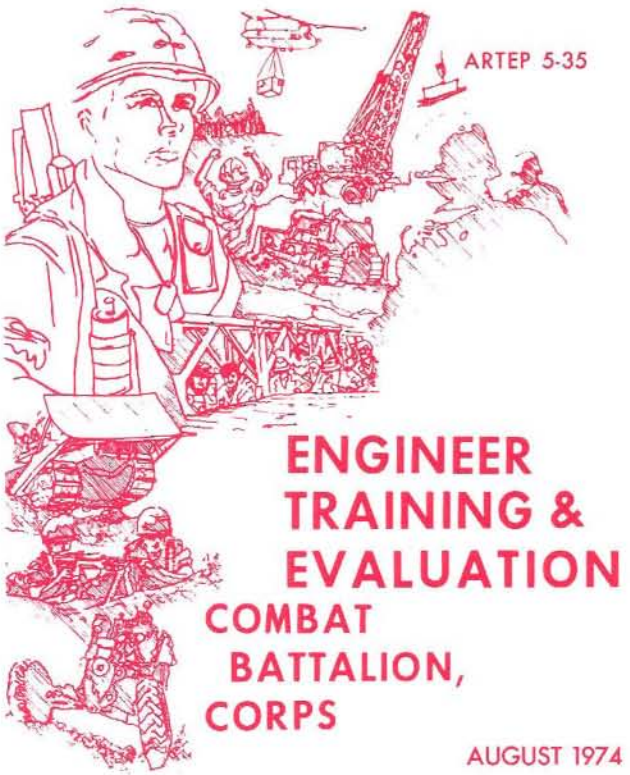
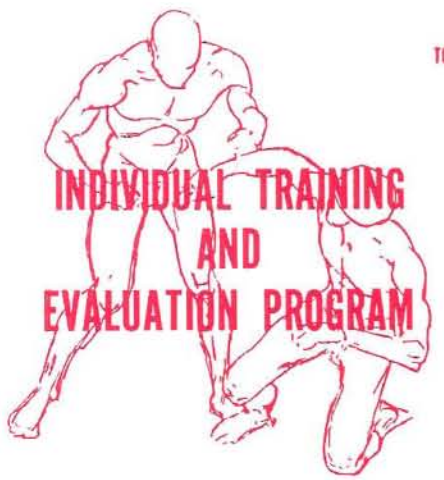
ARTEPS





Captain Ronald C. Clement

In his book, *Guidelines for the Leader and the Commander*, General Bruce C. Clarke, USA, stated that the paramount concern of the Army is the ground combat soldier and that, among other things, he must be well trained to perform effectively in combat. Few will argue that the combat engineer company, comprised of individual engineer soldiers, plays an indispensable role in combat operations whether they be offensive or defensive in nature. Just how well that company performs in accomplishing the myriad of assigned tasks is directly related to the effectiveness of the unit commander's training program. The *Army Training and Evaluation Program (ARTEP) 5-35*, published in August 1974, provides the combat engineer company commander with a tool to develop an effective training program and the readily evaluate the state of training and rea ness of his unit.

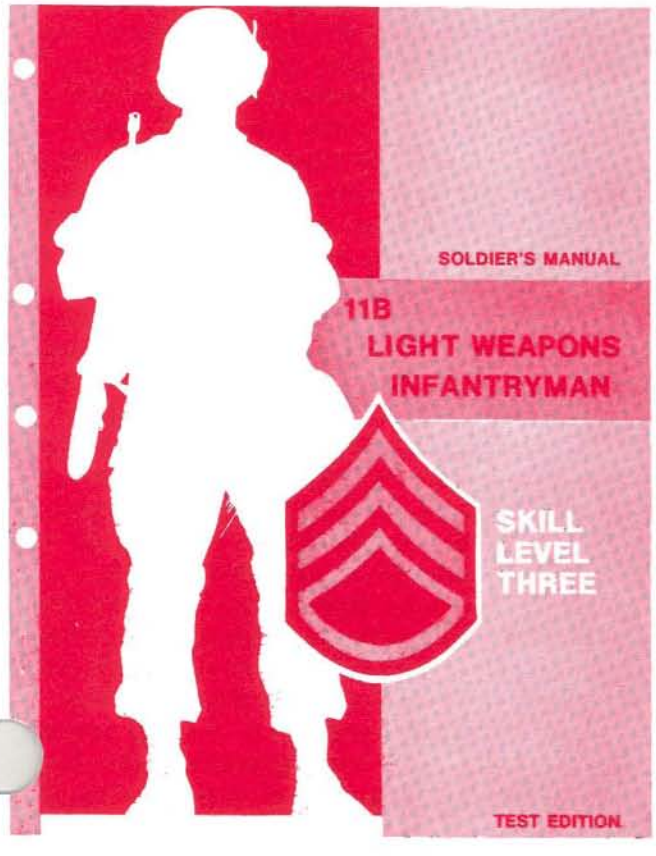
The ARTEP 5-35 is a document which provides guidance to the commander in regard to scheduling, conducting, supervising, and evaluating training in his unit. It supersedes portions of ATP 5-25 and ATT 5-25 which apply to TO&E 5-35 units. The overall objective of the document is to outline the "collective" training and evaluation tasks. The trainer can devise the individual soldier's tasks by use of techniques in FM 2-6, *"How To Prepare and Conduct Military Training,"* which, when combined with ARTEP 5-35 will lead to successful accomplishment of the unit mission. Additionally, it provides flexibility for the commander in developing his own training program.

Based upon the systems engineering concept, the ARTEP 5-35 establishes minimum training objectives, keyed to acceptable degrees of proficiency and levels of performance, and then provides flexible guidance for attaining those objectives. Whether or not the objectives are successfully attained is measured by demonstrated performance, rather than simply being exposed to training for a specified number of hours. The minimum objectives are presented in the form of task inventories at the battalion, company, platoon, and squad levels. These task inventories consist of a major mission, each with several

ubordinate tasks which must first be accomplished in order to complete the major mission. An example of a squad-level major mission with corresponding subordinate tasks is shown below:

(Major Mission)	3.	PROVIDE ENGINEER SUPPORT IN ASSAULT RIVER CROSSING OPERATIONS.
(Sub Task)	3.4	Support assault phase of river crossing. Assemble assault boats. Operate assault boats.
(Sub Task)	3.5	Clear far shore obstacles. Remove underwater obstacles. Clear far shore minefields.
(Sub Task)	3.12	Construct anchor tower. Anchor tower base. Rig guylines. Connect tower sections to pivot unit. Raise the tower.

It can be readily seen from the above example that in order to successfully accomplish the squad mission each subordinate task must be successfully completed. Poor performance in any of the ubordinate task areas may severely hamper or ossibly cause the squad to fail in accomplishing its primary mission. If weaknesses are noted during the evaluation of the squad's ability to accomplish these subtasks, then the platoon leader or company commander may require additional training in those specific areas until the squad is proficient. The beauty of the whole program is that the objectives, major mission, and tasks are readily definable and serve not only as a measure of a squad's ability to accomplish its assigned mission, but also the individual squad member's ability to function as a contributing member to the total team effort.



A change is on the way to classify tasks by levels of proficiency. It must be understood that system engineering is a dynamic process possessing an element called quality control. Information obtained from draft reviews and interaction with other service schools all point to a need to relate to training readiness. Change 1 to ARTEP 5-35, along with the new ARTEPS, provides this guidance.

The other unit ARTEPS soon to be available are:

ARTEP 7-15	LIGHT INF BN
ARTEP 7-45	MECH INF BN
ARTEP 11-35	SIG BN (ARMD/MECH BN)
ARTEP 17-35	ARMORED BN
ARTEP 29-17	FORWARD SUPT MAINT CO

In addition, a new performance oriented training film for engineers is to be released soon. Its title is *"Dynamic Training — The Way to Go."*

Finally, there are the various individual training devices such as Training Extension Courses (TEC), Individual Training and Evaluation Programs (ITEPS), and Soldier's Manuals.

ARTEP 5-35 serves as a valuable training guide to the combat engineer company commander. When properly implemented, it will insure that this will not fail its assigned mission due to a lack of technical proficiency.

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CPT Robert J. Melchoir

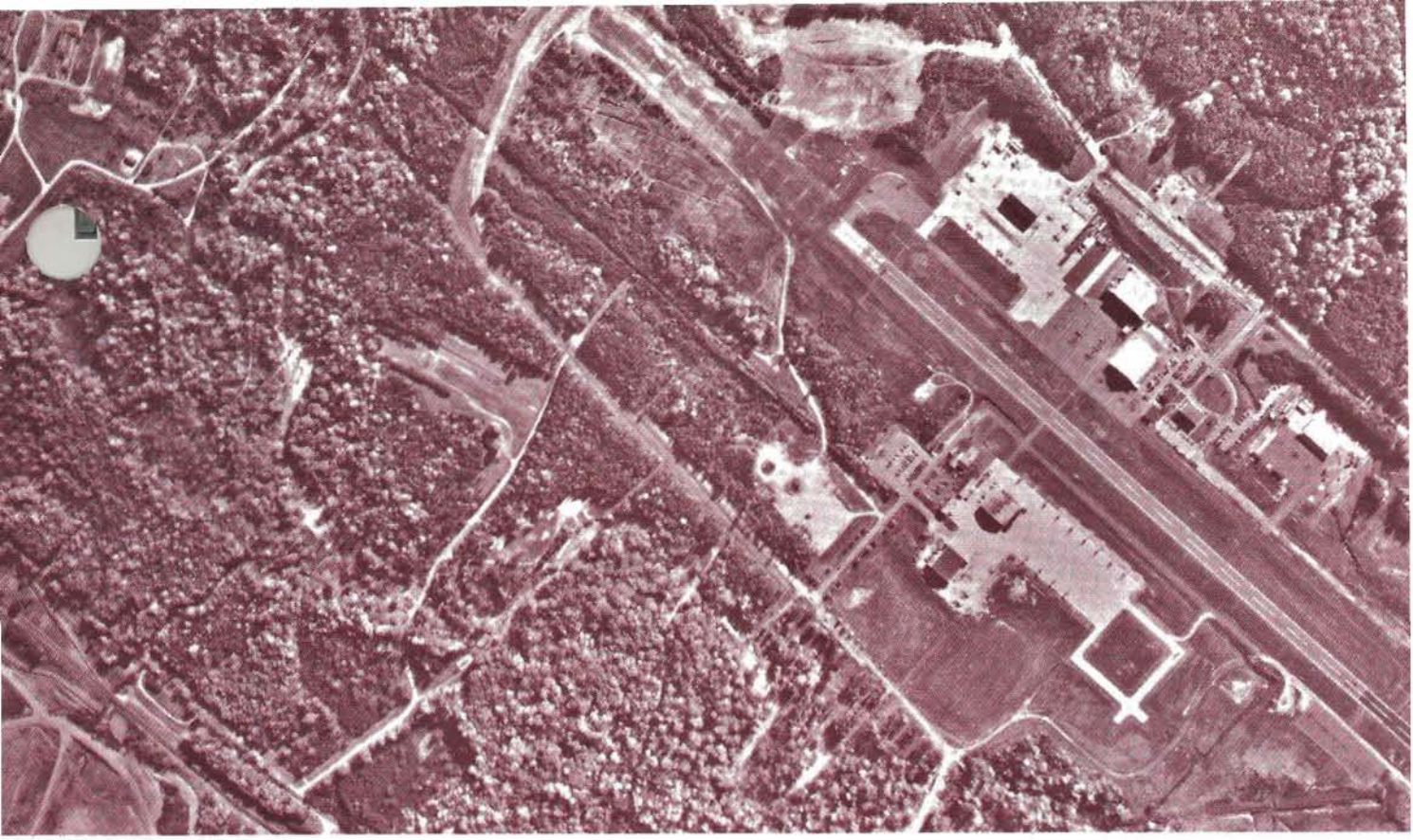
Mapping, charting & geodesy information documents play a vital role in an organization's planning and execution of its training and mission requirements. These topographic products are of paramount importance to an individual responsible for the effective employment of any size unit in the Army today. Yet, there are many products available which are not being utilized properly because of the lack of knowledge by planners and commanders as to the availability of these products and the proper procedures for their acquisition.

Mapping, charting & geodesy product distribution centers are located throughout the United States and Europe. They are frequently found with an Army Topographic Battalion, which has joint responsibility with the Defense Mapping Agency for MC&G product distribution and production in the Army. The control of the topographic field for the U.S. military today is vested in the Department of Defense under the auspices of the Defense Mapping Agency, located at Washington, D. C. All MC&G product distribution and production is monitored by this Agency and centralized control is exercised over the topographic facilities of all the Services from its headquarters.

All U.S. military units located in the Continental United States, Alaska and the Canal Zone will submit requests for MC&G products to the Defense Mapping Agency Topographic Center, Attn: 55300, Washington, D.C. 20315. This agency is responsible for all inventory control of topographic materials in the CONUS system, and after processing all requisitions will forward them for supply action to one of two major depots. For units located east of the Mississippi River, all topographic products will be supplied from the depot at Philadelphia, Pennsylvania, and for units west of the Mississippi River all materials will come from a similar depot at Clearfield, Utah. The European distribution center is located at the 649th Engineer Battalion (Topo), APO New York 09081, near Heidelberg, Germany. All units assigned to the European Theater, Italy, and the Middle East should request their topographic products from this center. Finally, for units stationed in the Pacific Theater, the distribution center is located at the 652d Engineer Battalion (Topo), APO San Francisco 96558, on Ford Island, Hawaii. Units not covered by the listed distribution centers should write the Defense Mapping Agency Topographic Center, Attn: 55300, Washington, D. C. 20315, concerning topographic distribution and product availability.

An extensive line of mapping, charting & geodesy products is available at these distribution centers. Large, medium, and small scale topographic maps are available for the geographic area of the world covered by that center. In addition to standard topographic maps, other special classified and nonclassified geographic information documents are available. Road and bridge classifica' and military supply route maps are available assist the commander in planning his route movements and convoys. Lines of communication, urban area studies, port studies, terrain analysis studies and strategic terrain studies are stocked to assist the planners with specialized details concerning the area of their operations. Special engineer and intelligence studies are also frequently available, and many centers stock locally produced charts and overlays covering a specific area of military interest. The European distribution center also operates a geographic information library where rare, very old, or highly classified MC&G products may be used by a unit on a loan basis. Finally, the distribution centers will normally have an exchange account with foreign and allied nations and can provide U.S. units with allied MC&G products, provided that adequate justification is submitted and validated by each higher command of the originating unit.

All policies and procedures for Army topography are outlined in AR 115-11, dated February 1974, and should be available in all unit regulation files. This regulation describes in detail the functions and responsibilities of each comma echelon within the U.S. force structure for collection, interpretation and dissemination of topographic data. It also states in brief detail the



products that are available, the policy guide for their release and the prescribed channels for procuring these products and data.

The procedures for obtaining mapping, charting and geodesy information documents are quite simple. The MC&G distribution system has adopted the MILSTRIP requisition system as the primary means for supplying topographic products. All requests should be coordinated through the appropriate S-2/G-2 prior to submission to the map depot system. The DOD map supply catalog is available from all centers and will describe details necessary for submitting requisitions into the system. In addition, the local depots publish requisitioning procedures for their system and also produce a local catalog showing all special products and classified items available at their location for issue to units. Requisitions are processed at the map depot in accordance with the standard supply priority system and shipped by the fastest means possible to the customer. For units located near the distribution facility, a unit pickup service is offered.

Many additional mapping, charting & geodesy (and geographic) products are available through other federal and state government agencies. The U.S. Geological Survey has large scale mapping and special products for most areas of the United States. These products are available to units of all services; and the procedure for their acquisition, with the location of distribution centers, is contained in AR 115-11. The Central Intelligence Agency (CIA) has numerous special intelligence reports and studies available upon request. The Department of Agriculture is an excellent source for aerial photography and has available almost complete coverage of the United States. Requests for all aerial photography should be addressed to the USGS Information Office, location identified in AR 115-11, and accompanied by adequate justification validated by all higher commands of the originating unit. In the absence of adequate justification, photographs may be purchased from the Department at an approximate cost of $2.50 per photo. Many city and state government offices will normally have maps and charts available for their area, and a visit to these offices will oftentimes prove rewarding to a planner in search of topographic material.

This has been a cursory review of the mapping, charting & geodesy product distribution system. MC&G distribution centers are located throughout the world to serve and supply the military commander and planner with topographic products. Commanders at all echelons must be aware of what is available through this supply system, and the distribution centers must be utilized to their maximum if effective leadership, training, and mission accomplishment are to be realized.

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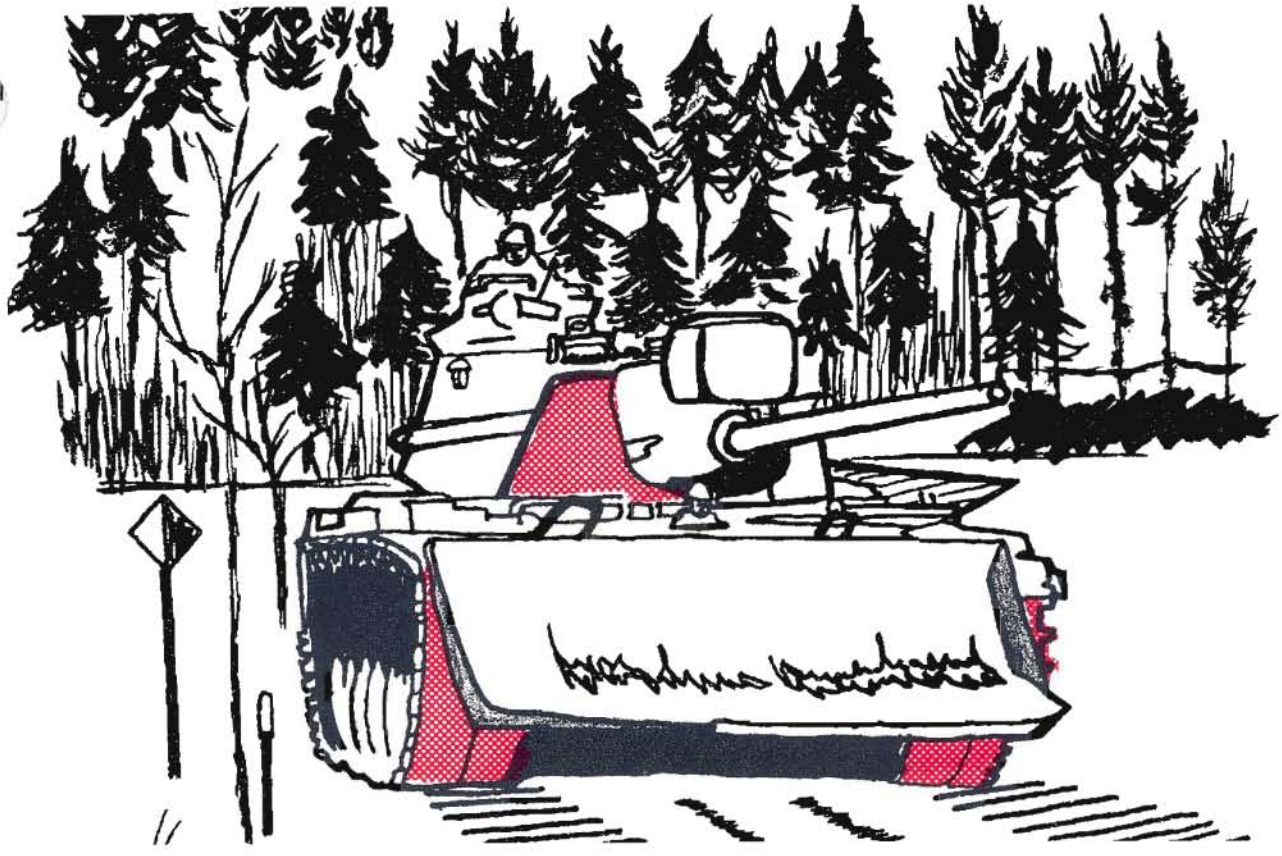
Forging friendships through REFORGER VI

Captain Samuel C. Raines

Reforger comes but once a year, and upon its completion comes many varied reflections as to what it actually was. Reforger is perhaps the largest annual combat training operation involving US and Allied Forces. For some soldiers, Reforger meant a trip to Europe, or a scenic view of the German countryside. To commanders, Reforger was an excellent time for training and testing their unit capabilities. To the high level staff and politicians, Reforger provided the opportunity to evaluate the overall potential of countering a threat to world peace. To some Europe-based units, it may have been another field problem taking them away from their families and the comforts of barracks living. To the G. I., it was spent in cold, wet weather, of going without sleep, and living in the mud and/or snow. But to the Combat Engineers, who were responsible for controlling and repairing the maneuver damage to the Germany countryside, Reforger meant something quite different.

For the second consecutive year, the 82d Engineer Battalion, stationed in Bamberg, Germany, was selected as the "Maneuver Damage Control" element for Reforger VI, 1974. To accomplish its mission, the Battalion divided the maneuver area into sections, each to be controlled by a combat engineer company. Maneuver damage control involved recording all damage prior to Reforger, and during the exercise constantly patrolling the area, recording each particular damage regardless of how small. These repo were forwarded daily to VII Corps Headquarte and provided information needed to assist in control of the exercise. In addition, these reports were recorded by the claims office in order to aid the government in settling any claims resulting from damage caused during the exercise. Additionally, the Engineers were required to repair any major damage causing possible safety hazards. This task involved repairing bridges, scraping mud off the roadways, and traffic control. The Engineers also monitored rainfall and soil conditions and forwarded the statistics to VII Corps Headquarters. From other Engineer data and these reports, the Commander was able to decide whether maneuver elements should stay primarily on the roads or be allowed to maneuver in the fields and forests. In essence, the Engineers were required to be "on the go" around the clock.

One of the most important aspects of the Engineer's mission was that of maintaining good will and public relations with the German people. Often times after a mechanized or armored unit had maneuvered through a small village, the Engineer maneuver damage control teams were the only ones left behind to repair damages, assi the local villagers with claims, or to try to le the German people with a good feeling towa Americans and the U. S. Army. On occasion, a



farmer's entire crop had been smashed by a tank, street torn up by an APC, or minor damage to uildings resulting from trucks. It was not always easy to maintain good diplomatic relations! But, overall the Engineers were able to accomplish this task very successfully.

Bravo Company of the 82d Combat Engineers decided to accomplish its mission differently this past year. The company began initial reconnaissance of its area of responsibility three months prior to the Reforger exercise. The area measured about 60 miles long and 30 miles wide. First, a village had to be selected as a command post; secondly, every road within the area had to be reconnoitered and all existing damage reported. (This would later be compared with exercise damage for claims purposes.) The city of Nuresheim was selected as a command post and meetings were held with the local Burgermeister (Mayor) to determine where the company could bivouac and what city facilities could be used. Coordination was made with the German Highway Authority, as they would work very closely with American Engineers in keeping the roads repaired, clear of mud, and safe.

It was at this point that Bravo Company decided to do things a bit differently. Along with maneuver damage control and repairing areas the Americans had damaged, the company decided to use its engineer equipment to do construction projects for the city. The local German people were very excited about this.

There was much paperwork and coordination required before a German-American Project would be approved, but in time this was accomplished. In exchange for American Engineer assistance, the city of Nuresheim provided a bivouac area near the center of town, an old Bahnfof (train station) to use as offices, free water, and use of the local school's hot showers and heated swimming pool. After a long cold day in the snow and mud, the hot shower felt good!

Bravo Company maintained close contact with all maneuver units in its area and through this effort and the training of state side elements in controlling damage, overall maneuver damage was reduced to a minimum.

During the month's stay in Nuresheim, many soldiers of Bravo Company were treated to free food and drinks by local townspeople. On two occasions the city sponsored a dance and invited all of B Company. There were towns in the local area which gave American Engineers a chance to observe the people, customs, and traditions not normally available to the G. I. Daily the bivouac area was overrun with small children who seemed to be fascinated with the Engineers' operation. It did not take long for the Engineers to begin sharing their "C" rations and candy with the children and some close friendships were made.

Often in the evening a German family would come to the bivouac area requesting a soldier to come to their home for dinner. One particular Sunday, 120 families arrived for this purpose — there were only 100 Engineers. Some G. I.'s had more than one lunch that day!

The projects consisted of constructing a road, building a sportsplatz, and leveling a site for construction. The company worked closely with the city engineers to insure proper construction of the projects. Daily, while working on the projects, the dozer and bucket loader operators were greeted by local townspeople who brought them hot coffee, cakes, and cheese.

The city mayor and his staff visited the bivouac area and were delighted with a lunch of "C" rations — the "C" rations were their request. One Engineer impressed the local priest with his ability to play the church organ, and another gave a class to the local school on trapping in Minnesota.

Reforger ended and with it the end to Bravo Company's official duties In Nuresheim. On the night prior to the company's return to Bamberg, the town hosted the entire company to a big banquet consisting of food, drink, music, entertainment, and lots of good friendship. During the course of the evening, the city expressed its thanks in the form of many gifts. The Engineers in turn made presentations to the city for its most gracious hospitality.

The following morning, amid a snowstorm, Bravo Company left Nuresheim and began its long convoy back to Bamberg. It seemed the entire city was there to say good-bye. As the trucks pulled out, there were many cries of "I'll be back!" Although Reforger was over, the warm memories of German-American relationships and the wonderful little town who literally adopted an Engineer Company, would never be forgotten. Bravo Company continued its snowy journey northward home, and each man had a warmness in his heart knowing Reforger had provided them with a closer bond between American soldiers and German civilians.

As Commander of B Company, 82d Engineer Battalion (Combat), I was naturally concerned with the idea of bivouacing a company literally in the center of a small German town. However, when my soldiers saw and felt the hospitality of the local citizens, they in-turn conducted themselves at all times in a manner highly befitting a soldier of the United States Army. They were proud to be able to assist this small city. In the weeks following Reforger, I have noticed a large number of my men returning to Nuresheim on pass or leave. I consider this evidence of the superb German-American relationship established by a group of men who wanted to help. We were proud to help the German community who went "all out" to provide a home for Americans who were away from their own home. To B Company, the outcome on Reforger was a valuable lesson on the merits of a little extra effort, thorough planning and coordination, and a desire to help.

CPT Samuel C. Raines was the Company Commander, Co B, 82d Engineer Battalion (Cbt), Bamberg, Germany. He completed Engineer OCS in 1966 and graduated from the Engineer Officer Advanced Course in 1970. Military assignments have included CONUS, Vietnam, Europe an Ethiopia. He holds a BS degree from Aubu University.

SCORES

by LTC Adrian G. Traas

The Scenario Oriented Recurring Evaluation System (SCORES) is a combat development technique for identifying shortfalls and addressing potential improvements in Army organization, doctrine, and materiel. General DePuy, the Commanding General of TRADOC, initiated this technique in early 1973 by directing the U.S. Army Combined Arms Combat Developments Activity (CACDA) at Fort Leavenworth, Kansas, to develop a process which could test, evaluate, and actively measure the effectiveness of the current force structure of the Army.

SCORES is being accomplished through the preparation of a family of standard scenarios against which any combination of forces can be evaluated and their relative capabilities and limitations determined. The development and evaluation of these scenarios is being carried out through the combined efforts of TRADOC centers and schools, each adding its expertise to any conclusion in the same scenario. The U.S. Army Engineer School (USAES) plays the Engineer role throughout there scenarios.

TRADOC selects the geographic areas in which Army forces will be evaluated. The areas are selected to evaluate forces operating in certain environments (desert, tropics, temperate, arctic) and tactical situations (airmobile, armor, antiarmor, counterinsurgency). The forces and situations chosen for the scenarios are selected to be typical of when, where, and how the US Army might realistically expect to be committed in the real world. For each area, Headquarters, TRADOC, provides a general scenario which includes a description of the area, enemy forces, friendly forces, the events leading to the introduction of US forces, and the mission of the Army component. CACDA then expands this general scenario into an operational scenario by further defining missions and tasks to include Corps, COSCOM, Division, and DOSCOM level plans and orders. Designated schools, such as the Engineer School, develop supporting plans at the brigade and battalion level. At this point, the baseline force structure is firmly established and represents the existing force of today. The major units are located on the ground and as realistic a threat as possible is clearly defined. Further refining and fleshing out of details continues by the schools. At the Engineer School this is accomplished by a Scenario Development Team, which is made up of representatives from the combat developments activities of the USAES. The team insures that the scenario developed provides the testbed to support combat development activities and provides data for required decisions.

Scenario development entails preparation of annexes, orders, overlays, and command guidance for the subordinate units down to battalion and company level. In some cases, such as airmobile raids, plans include individual platoons and teams in order to gain sufficient resolution in critical areas of interest. Situations are developed to test unit capabilities and limitations. An example would be the tasking of an engineer airborne combat battalion and airborne light equipment company to construct two C-130 forward medium duty airfields in a limited period of time. Water production, support of airmobile operations, employing minefields and barriers, fire fighting requirements, and operational base support are other examples of the varied engineer roles that are selected during the scenario development for subsequent evaluation. The detailed operational scenario is then ready to be assembled. Inputs from all the schools and centers are consolidated at CACDA. Differences are resolved, editing and rewrite performed, and the details provided by each school are made an integral part of the total scenario package. This completes the development cycle for a standard scenario and the evaluation is ready to begin.

The Engineer School Evalation Team conducts preliminary (Phase I) and detailed (Phase II) evaluations of engineer elements within the structure of approved operational scenarios. This team is independent of the Scenario Development Team, by organization as well as outlook, to insu a separate and balanced review of the engine force structure capabilities. It is constituted from the assets (principally instructors and EOBC students) of the Deputy Commandant for Training and Education (DC/T&E) and the Defense Mapping School. The Director of the Department of Military Science, USAES, heads the team.

Drawing on the expertise in the teaching elements, the Evaluation Team assesses capabilities and limitations, identifies means of improving effectiveness, changes in organization, equipment, doctrine and training. Evaluation reports are prepared by the team and forwarded for use by the Deputy Commandant for Combat and Training Developments (DC/CTD) at the Engineer School and other TRADOC schools and centers, as appropriate, for further evaluation and coordination.

The efforts of the SCORES Scenario Development and Evaluation Teams are guided by a Steering Committee comprised of the most senior and experienced Engineer officers available at the Engineer School and Defense Mapping School. All major findings and conclusions of the SCORES Engineer Task Force are reviewed by this committee prior to approval by the Commandant, USAES, as the official engineer contribution.

The SCORES process is accomplishing its purpose. In one scenario, preliminary Phase I evaluation revealed that a group headquarters, several fire fighting teams, and float bridge units could be eliminated from a theater force structure without reduction in the total force capability. The geography, climate, and total force ceilings prompted these findings. This preliminary evaluation also identified other items for subsequent Phase II detailed evaluations. These items included a close look at barrier operations; dust palliation; development of minimal essential operational bases during a limited period of operation; terrain interlligence; and water production, storage, and distribution. The Phase II detailed evaluations are handled either as an iteration or a side excursion of the Phase I evaluations. As an example, water was identified as a problem area for operations in the Middle East. Even after several production sources were found to be adequate, distribution of the water proved to be a problem. Considerable discussion then took place with the Logistics Center, Quartermaster School and Transportation School. The refined evaluation should come up with a solution. If it does not then items in development are analyzed for comparison and "what if" situations are evaluated. If these efforts still do not solve the problem, a new

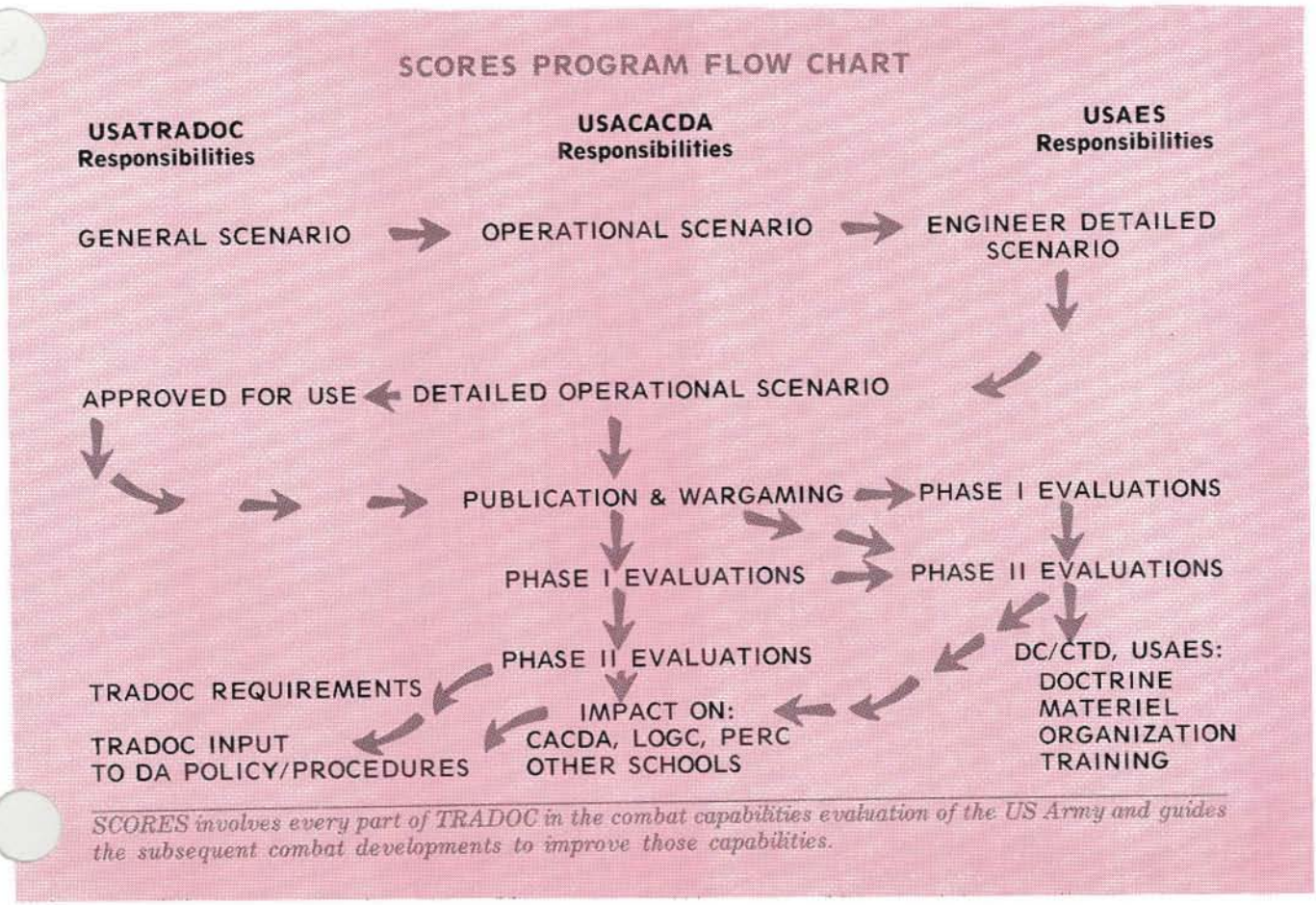
study in materiel development action may be required. Thus, in one instance SCORES has accomplished part of its objectives in identifying shortfalls.

SCORES evaluations must also interface with existing study and development programs. The requirement to minimize deficiencies, shortfalls or excess capabilities surfaced in the evaluations will direct the efforts of the combat developments community towards more immediate improvement of the combat effectiveness of the present day Army. The Commander, TRADOC, has stipulated two requirements which must be met prior to approval of any combat developments action. First, the proposal must be evaluated within the context of one or more of the standard scenarios, and secondly, a comprehensive Cost and Operational Effectiveness Analysis (COEA) must be completed. The combat developments proposal, whether it be new doctrine, materiel development, or organizational change, must demonstrate its worth in both these areas. Some of the advantages of these evaluation techniques are:

- The combat developmental effort is focused on improving the Army in the near and mid range time frame as opposed to long range conceptual planning. Requirements in those areas which can most significantly influence the mission effectiveness of the overall force will receive the most attention.
- The overall force package may be adjusted or reduced, and more effective use made of those elements which are proven necessary for retention in the force structure.
- The Army will be able to maintain a high level of combat effectiveness while operating at a reduced strength level.

In summary, SCORES provides, through its family of standard scenarios, real world situations within which all combat developers will work. SCORES integrates the qualitative factors of human judgement and experience along with computer techniques and quantitative tests results in arriving at recommendations and conclusions. Finally, through the continuous process of upgrading the capabilities of the present force structure, it assists the Army and Corps of Engineers in maintaining a combat ready force; lean, mean and effective on the battlefield.

Lieutenant Colonel Adrian G. Traas is currently assigned as SCORES Development Team Chief, Concepts and Studies Division, Deputy Commandant for Combat and Training Developments, USAES. He holds a BS degree from Marquette University and a MA degree from Texas A&M.



SCORES involves every part of TRADOC in the combat capabilities evaluation of the US Army and guides the subsequent combat developments to improve those capabilities.

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ENGINEER STAFF

"Do you have floorplans which show the dimensions of a Civil War era stockade?" "There's an old World War II TM on gas engines, and I need it as soon as possible." "Were maps used in battle before 600 A. D.?" "Who actually created the geodesic dome concept?"

These, and hundreds of other inquiries have recently come into the Learning Resources Center (LRC) of the Engineer School by mail and by Autovon. Not all requests for reference and research pertain to the historical, either! The LRC is busy locating facts and figures relevant to the whole field of engineering resources available.

While the Engineer School librarians have always received a certain amount of reference requests from the field, they are now actively and enthusiastically putting new emphasis on field support. This program is especially designed to serve members of the Corps of Engineers; military and civilian, active, retired, Reserve, and National Guard, who may not enjoy convenient access to reference and research facilities.

As your "contact at Belvoir," the LRC is prepared to draw upon not only their own sizeable resources, but those of pertinent collections and research centers throughout the greater Washington area. With your inquiry in hand, they can contact innumerable facilities and data banks by telephone, request bibliographies listing all published material within a very specific subject field, supply you with abstracts of those articles, and you, in turn, may indicate which ones you wish to receive in complete text. Hopefully, within the near future, the LRC will enjoy online access to some of the highly relevant data bases such Compendex (Engineering Index), and Nati Technical Information Service, which access unclassified government sponsored research, and

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Defense Documentation Center, which would allow instant access to unclassified Department of Defense publications.

If its books or journals you need, the LRC will be pleased to send them along through interlibrary loan channels to your nearest library facility, or even directly to you if more convenient. Upon completing the loan period, you simply return the book or journal in the original mailing packet, using the address label we provide. Understandably, rare books and official military ublications which are otherwise available to you, e not included in our book-by-mail program. The Learning Resources Center boasts strong subject collections in not only engineering and military science, but in American history (especially Civil War), educational technology, biography, environmental engineering, international relations, management, science and technology, fortification, and Corps of Engineer unit histories.

Other key resource collections which can be tapped are those of the Human Resources Research Organization, Educational Research Informational Center, Geological Survey, Army-Research Institute for the Behavioral and Social Sciences, the RAND Corporation, Environment Reporter, Environmental Protection Agency, National Oceanic and Atmospheric Administration, and the National Referral Center for Science and Technology; the last, in turn, can place you in direct contact with the most relevant information facility. In addition, the library which serves the Office of the Chief of Engineers will make available to the LRC their master file of dissertations and these written by Engineer officers. With the authors' permission, copies can be furnished to serious researchers.

This field support program is just one of the ew approaches to information currently underway in the Learning Resources Center. In July 1974, the formerly separate operations of the Engineer School Library and the network of Individual Learning Centers were meshed, and the total-media concept of information and instruction applied. Through television, sound-pulsed slide packages, diagrams which "talk" directly to the student, and other innovative audio-visual media, students are experiencing far more than books in Thayer Hall. Under the new title of Learning Resources Center, Building 270 now offers the user convenient under-one-roof access to not only the traditional library collection, but to the whole exciting gamut of instructional technology, designed to enhance the learning experience through individual, self-paced instruction. At this moment, a major program in computer assisted instruction is also being installed in the Learning Resources Center; it will make available to students, staff and dependents, the great PLATO educational system which provides University of Illinois courses through computer terminal and cathode ray tube viewing screen.

While the Engineer School Library formal mission remains that of on-site support to students, staff and faculty it simultaneously is eager to explore the dimensions which an aggressive and imaginative field support program might achieve. You are invited, then, to help design and effect that program which will be of significant value to you in the field. Let us know your suggestions, and by all means, direct your information requests to us. Upon your first contact with us, you will automatically be added to our mailing list, and will receive a list of new materials as they are acquired. You'll find us at Autovon 354-2524/1318, Monday through Saturday from 0900 to 1800 hours, or by mail, US Army Engineer School, Learning Resources Center, Bldg. 270, Fort Belvoir, VA 22060. Direct your inquiries to Field Librarian . . . let's hear from you!

ENGINEER COMBAT BATTALION (HEAVY)

Mr. John M. Frank

The Army is in the process of converting the Engineer Construction Battalion to the Engineer Combat Battalion (Heavy). In spite of a tight budget, the Army wants to change the composition of its force, particularly to put more "tooth" into its General Purpose Force structure. This need is accentuated in Europe where solons outside the Army are pressing for adjustments either as a part of the Mutual and Balanced Force Reduction (MBFR) negotiations or as unilateral force reductions.

Indeed the Nunn Amendment requires the Defense Department to improve the "Tooth to Tail" ratio in Europe during FY 75 and FY 76. This amendment reflects the often repeated argument that the US Forces worldwide, and more specifically those in Europe, have too little of the force devoted to "tooth" (or combat) and too much devoted to "tail" or combat service support. Obviously, improvement in the ratio will force reductions in the combat service support elements. In examination of the engineer slice of force structure, studies typically refer to the engineer combat battalion as part of the "tooth" and the engineer construction units as part of the "tail". Thus, the Nunn Admendment invites reductions in the number of construction battalions. Classification as a Category II unit and the organizational name has tended to obscure the construction battalion's capacity for performing combat engineering tasks as well as the heavy construction missions required in a theater of operations. Yet historically, construction battalions have been successfully employed in combat support roles. Current USAREUR plans recognize this capacity.

In January 1974, the Engineer Strategic Studies Group published a study called "The Construction Battalion in the Combat Engineering Role". This report evaluated the capabilities of the engineer construction battalion and the engineer combat battalion to execute combat engineering tasks and to reorganize for combat as infantry. It examined the mission of the combat battalion and the specific tasks performed in accomplishing that mission in a European-oriented scenario. It quantified the capabilities of both engineer battalions to meet these requirements and determined their relative cpabilities. The analysis showed that in several combat zone tasks, the construction battalion could be more productive than the combat battalion. With some equipment augmentation, dual training of selected personnel, and additional unit training, the construction battalion could be highly effective in other combat engineering tasks. On the other hand, because extensive training would be required to prepare the engineer construction battalion for offensive assault tasks, such tasks were not considered feasible for inclusion in the TOE mission of the engineer construction battalions. Also, the construction battalion is not properly equipped to fight as infantry due to the deficiencies in radios and anti-armor weapons. However, these deficiencies could be remedied with a modest expediture.

Based on the ESSG Study, the Chief of Engineers proposed to the Army Chief of Staff, in March 1974, that the name of the present construction battalion be changed to Engineer Combat Battalion (Heavy) and that a new mission for the heavy battalion "to perform defensive operations as infantry when required" be added to recognize this important secondary role of combat engineers. The Chief of Staff approved this proposal on 26 September 1974 and a tasking directive was sent to TRADOC on 4 October 1974 to implement the changes.

When the tasking directive was received at the Engineer School it raised a problem as to how the

battalion TOE should be changed. The "H" series construction battalion TOE is a functionalized organization with different size sections instead of uniform squads. These sections create problems particularly in reorganizing as infantry. A meeting was held at the Engineer School on 5 October 1974 with representatives of DA, OCE, TRADOC, FORSCOM and unit commanders to consider whether to continue with the current functionalized battalion or to swing back to the more conventional squad/platoon organization. The decision was reached to go back to the squad/platoon configuration.

D. A. DIRECTED MISSION

ENGINEER COMBAT BATTALION (HEAVY) TOE 5-115H

A. TO CONSTRUCT AND REHABILITATE ROADS, AIRFIELDS, PIPELINE SYSTEMS, STRUCTURES, AND UTILITIES FOR THE ARMY AND AIR FORCE AND TO ASSIST IN EMERGENCY RECOVERY OPERATIONS.

B. TO INCREASE THE COMBAT EFFECTIVENESS OF DIVISION, CORPS AND THEATER ARMY FORCES BY MEANS OF ENGINEER COMBAT SUPPORT AND GENERAL ENGINEER WORK.

C. TO PERFORM INFANTRY COMBAT MISSIONS WHEN REQUIRED.

Figure 1

The TOE changes to the H series TOE were completed by the Engineer School and submitted to TRADOC on 4 November 1974. On 5 November 1974, TRADOC concurred with the revised tables adding several items of equipment.

On 20 November 1974, DA sent a message to TRADOC which specified the mission and capabilities statement for the new battalion. This message further emphasized the combat support missions of the battalion. The new mission of the battalion is shown in figure 1 and figure 2 contains the capabilities statement.

In order to enable this unit to better shoot and communicate and to perform its combat engineering tasks, certain equipment was added to the battalion. Included were weapons, demolition sets, mine detectors, radios, speech security equipment, telephone equipment and camouflage kits. The Dragon anti-tank weapon is also being considered for the unit. A list of important equipment added is shown in figure 3. The unit

D. A. DIRECTED CAPABILITIES STATEMENT

ENGINEER COMBAT BATTALION (HEAVY) TOE 5-115H

1. CONSTRUCTION OR REHABILITATION OF ROUTES OF COMMUNICATIONS, BRIDGES, FORWARD TACTICAL AND FORWARD CARGO AIRFIELDS AND HELIPORTS.

2. GENERAL CONSTRUCTION OF BUILDINGS, STRUCTURES, AND RELATED FACILITIES.

3. LIMITED RECONSTRUCTION OF RAILROADS, RAILROAD BRIDGES AND PORTS.

4. ASSISTS IN THE EMPLACEMENT AND REMOVAL OF OBSTACLES, INCLUDING MINES AND BOOBY TRAPS.

5. PROVIDES TECHNICAL ASSISTANCE TO OTHER TROOPS IN PREPARATION OF FORTIFICATIONS, AND OBSTACLES.

6. PROVIDES ENGINEER RECONNAISSANCE AND PRODUCTION OF ENGINEER INTELLIGENCE.

7. CONSTRUCTS AND PLACES DECEPTIVE DEVICES, AND PROVIDES TECHNICAL ASSISTANCE IN CAMOUFLAGE OPERATIONS.

8. ASSISTS IN THE ASSAULT OF FORTIFIED POSITIONS.

9. PROVIDES LOCALLY AVAILABLE MATERIALS FOR CONSTRUCTION, FORTIFICATIONS AND CAMOUFLAGE MATERIALS.

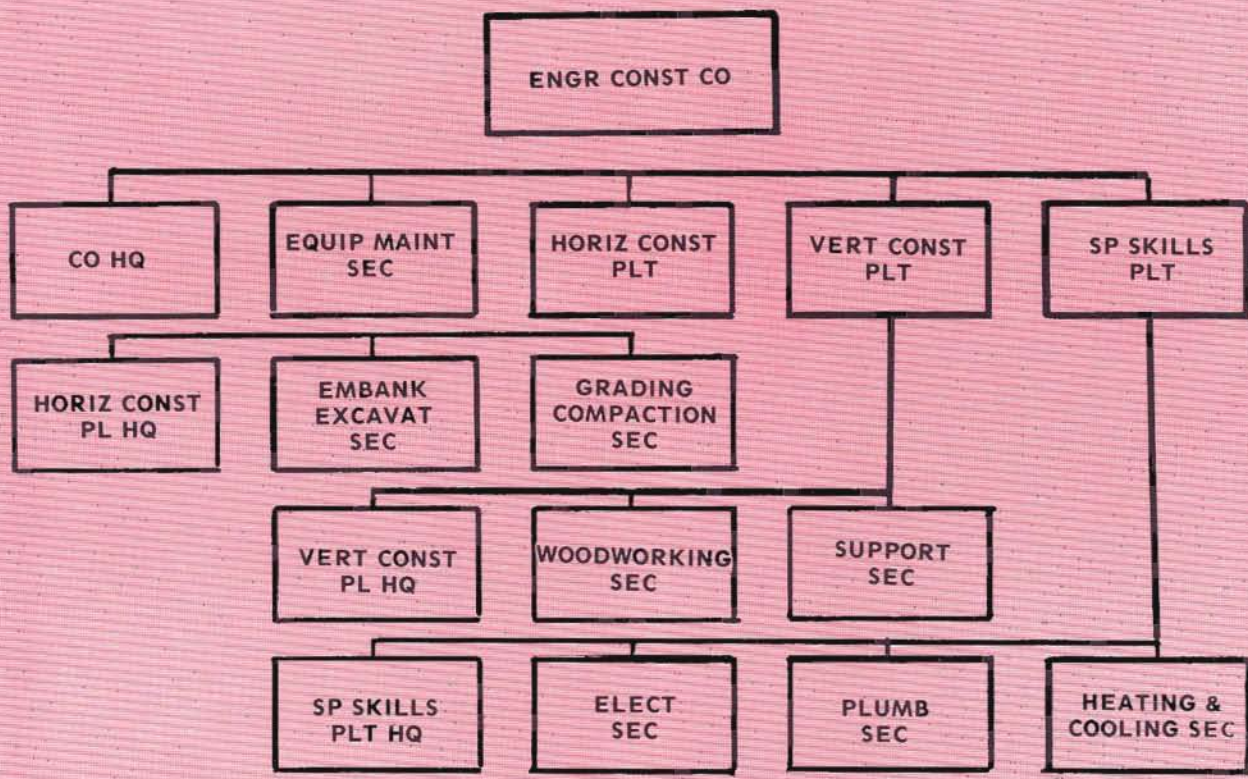
10. UNDERTAKES AND CARRY OUT INFANTRY COMBAT MISSIONS WHEN REQUIRED.

11. THE CAPABILITY TO SUPERVISE CONTRACT CONSTRUCTION, SKILLED CONSTRUCTION LABOR, AND UP TO 500 UNSKILLED INDIGENOUS PERSONNEL.

12. UNIT LEVEL MEDICAL SUPPORT TO THE BATTALION TO INCLUDE MEDICAL CARE AND EVACUATION WITHIN THE BATTALION, ESTABLISHING AN AID STATION, AND FURNISHING COMPANY AID MEN.

Figure 2

ENGINEER CONSTRUCTION COMPANY, ENGINEER CONSTRUCTION BATTALION



ENGINEER COMPANY, ENGINEER COMBAT BATTALION (HEAVY)

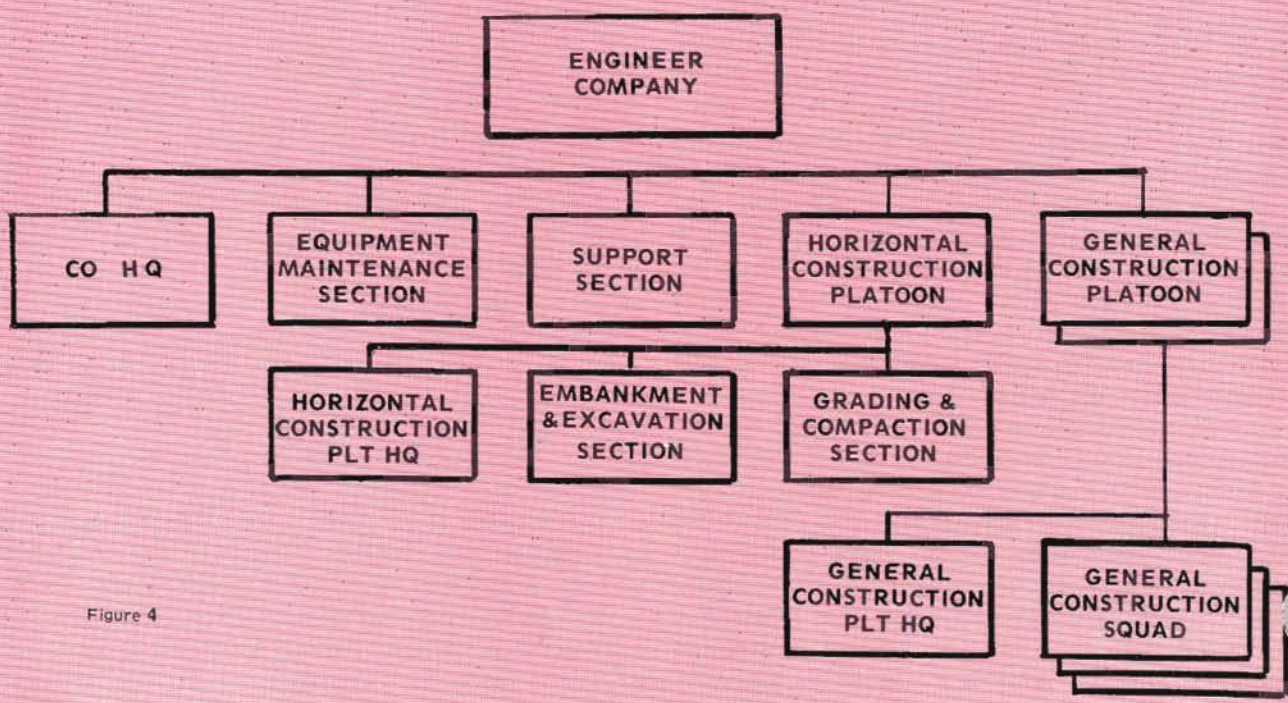


Figure 4

EQUIPMENT ADDITIONS

	NO. ADDED
ACHINE GUN CAL .50	9
GRENADE LAUNCHER 40MM	27
DEMOLITION SETS	17
DETECTOR SET MINE METALLIC	9
DETECTOR SET MINE NONMETALLIC	9
VRC-46 RADIOS	4
RADIO SETS PRC-77	24
SPEECH SCTY KY-38	13
POWER SUPPLY Z-ACD	13
SWITCHBOARD SB-993	8
CAMOUFLAGE NETS	150
CAMOUFLAGE SUPPORT SYSTEMS	150
DRAGON	6

Figure 3

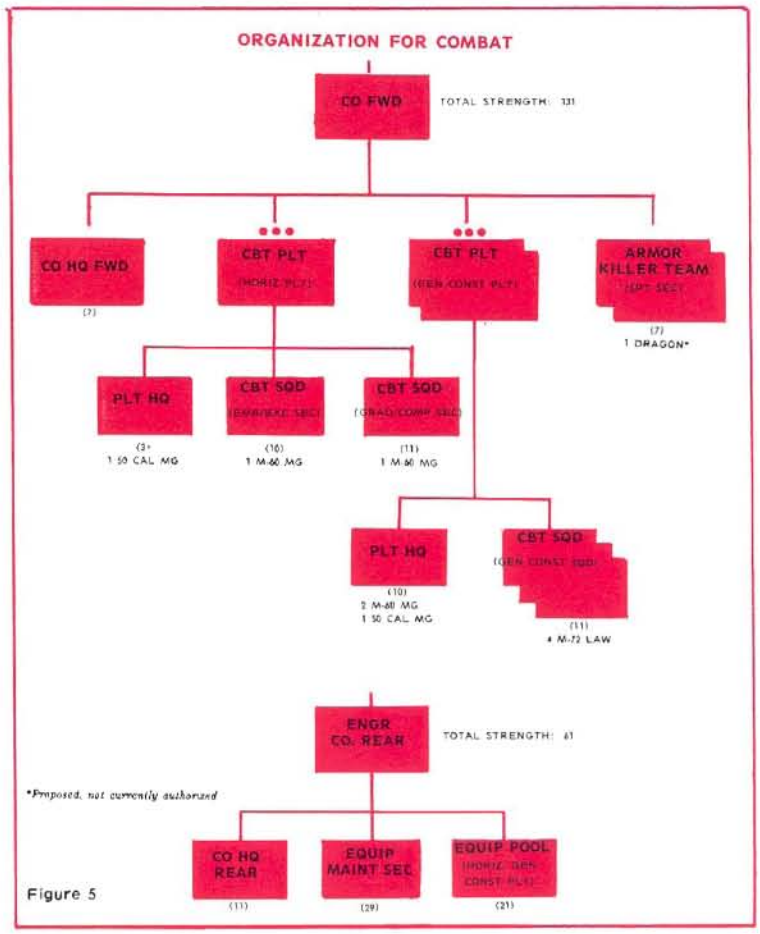


Figure 5

classification category was changed from II to I, and assignment to the engineer combat brigade (corps) was added. Also, six company aidmen were placed in augmentation.

Changes to TOE 5-116H, Headquarters and Headquarters Company, were to accommodate the approved title and category change and communications security equipment. Changes to TOE 5-117H, Equipment and Maintenance Company, included a title and category change and an increase in weapons, radios, and communications security equipment. TOE 5-118H, Engineer Company, Engineer Combat Battalion (Heavy), reconfigures the company as shown in figure 4. The functionalized sections were changed back to the more conventional squad/platoons. These changes were made without changing grades, MOSs, or increasing unit strength. A proposed realignment of the company for infantry operations is shown in figure 5.

The Engineer Combat Battalion (Heavy) will provide the Army with a unit capable of performing combat engineering tasks and the heavy construction missions required in a Theater of operations as well as being able to fight as infantry as required. This flexibility is required to support new tactical concepts.

Mr. John M. Frank is the Chief of the Organization Division, Deputy Commandant for Combat and Training Development, USAES. A 21-year active duty veteran, Mr. Frank is a graduate of The George Washington University, Washington, D.C. He entered on active duty on 24 October 1941; went through the Engineer Replacement Training Center, Fort Belvoir, Va; Engineer OCS, Fort Belvoir, Va; attended the Engineer Associate Advance Course, Fort Belvoir, Va; the Associate Course Command and General Staff College; the Strategic Intelligence School, Washington, D.C.; and the Command Management School, Fort Belvoir, Va. During his sevice career he served with the 30th and 69th Infantry Divisions, commanded the 1269 Engineer Combat Battalion Army, and the 13th Engineer Battalion, 7th Infantry Division, Korea. He also served as Chief, Troops Branch, GHQ, Tokyo, G-2, The Engineer Center Fort Belvoir, Va and Engineer Operations Officer, I Corps, Korea. Since his retirement in 1962, he has served as Chief, Organization and Doctrine Division, CDC Engineer Agengy, Fort Belvoir, Va, until July 1973 and in his current position with USAES since that time.

EMPLOYMENT: ENGINEER COMBAT BATTALION (HEAVY)

LTC Glenn N. Smith

MAJ William M. Jones

CONCEPT OF EMPLOYMENT

The concept of employment of the Engineer Combat Battalion (Heavy) envisions few tasks that have not historically been done by or expected of the old Engineer Construction Battalion. The present day unit is, at long last, being given credit for what it has always been expected to do should the need arise. In fact, employment of these battalions in combat engineer tasks has occurred in the past, particularly in Korea and Vietnam. A look at a typical theater of operations helps to visualize the total engineer role in support of the Army in the field.

Given a standard type territorial organization, one can see a continuum of required engineer effort ranging from construction through combat construction, and combat engineering to combat (Infantry) operations.

Engineer elements operating within this continuum have been historically three; construction,

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Following are excerpts from some of the correspondence received by the Commandant of the USAES regarding the reorganization of the Engineer Combat Battalion (Heavy):

In reviewing your Special Text for the concept of employment for the Engineer Combat Battalion (Heavy), it is clear that you and your staff are in the vanguard of a new direction for engineer employment doctrine in today's Army.

There is no question that renaming the Corps Engineer Construction Battalion is a change which, by mere definition, will more favorably portray the "tooth-to-tail" ratio, and frankly, the new name more aptly describes the battalion in terms of the envisioned use of the engineer battalion on the modern battlefield. It is certainly a fact that the heavy battalion will be an integral element in the ultimate success of the combat division, particularly in the extended frontages which are part of the "real world" considerations.

The proposed doctrine certainly appears to be focused in the proper direction, especially in view of the recognition of the combat potential of the heavy battalion. As has been concisely addressed in the Special Text, the mission requirements on corps engineer assets take on a special significance in the area between the combat zone and the communications zone. Security of this vulnerable area will be strengthened immeasurably.

I feel that the reorganization of the construction battalions is a great step forward for the Army: it maintains the valuable construction capability and, moreover it adds combat engineer and infantry capabilities as well. As a commander faced with maintaining an acceptable tooth-to-tail ratio, I can appreciate the beneficial significance of the change in category from "support" to "combat".

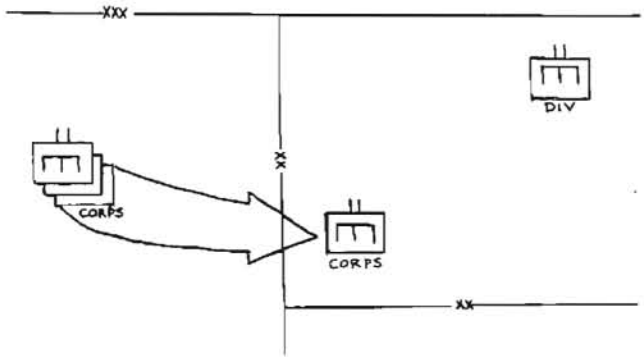
Your draft special text, plus the draft TO&E 5-115H and the October 74 ARTEP 5-115 which was sent to my staff, are helping us to understand the capabilities of this reorganized unit and the concept for its employment. Of importance to me, it appears that I will be able to modify my planned employment of the construction battalions listed for General Support to give them additional missions which will increase our combat power.

Many thanks for yours of 27 December enclosing your Special Text, "Concept of Employment for Engineer Combat Battalion (Heavy)".

If the 1st Armored Division can be of any further assistance, please let us know.

non-divisional and divisional. Each has the inherent capability to function throughout the task spectrum but is, by design, tailored to its most frequently assigned missions.

What is the most critical enemy threat today? Massive Armored Assualt — Bypass, Bypass, Bypass.



Given this threat and the current U. S. Army goal of winning the first battle, force resources are no longer available for "nice to have" support troops. All combat support must now directly contribute to our ability to defeat this threat. Today's armored threat has created an urgent need for the engineer construction battalion to be prepared to assume a more direct combat role if required. The remained of this article will discuss the planned future of the old construction battalion and how it will be tailored to meet its responsibilities.

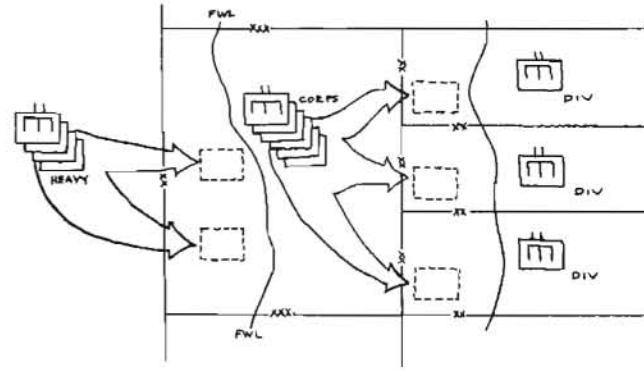
Recent modifications toward maximizing construction efficiency without regard to a possible combat role were correct under the concept of massive buildup toward winning in a long war. Since we must now be prepared to win the first battle, and since today's threat creates a high probability of enemy encouter for units deep in the battle area, combat and combat support capabilities must be formally designed into construction units. It is to this end that the Engineer Construction Battalion TOE (5-115-H) has been modified to TOE 5-115-H, (Chg 1), and the unit title converted to "Engineer Combat Battalion (Heavy)".

The construction battalion, of old, could do many of the combat construction and combat engineer tasks of divisional and non-divisional battalions. In fact, once relocated and supplied, it could produce at a more effective rate on selected combat contruction tasks than the divisional and nondivisional engineer combat battalions.

The employment of the battalion will not vary construction assignments, but in combat engineer combat operations. The unit must become more closely integrated into the battle plan and hence will require a greater degree of tactical small unit sophistication. Small unit leaders will have to perform squad and platoon tasks involving demolitions, mine warfare, and fortifications independently and without extensive prior planning. This change in employment of the squads will likely present the greatest training challenges.

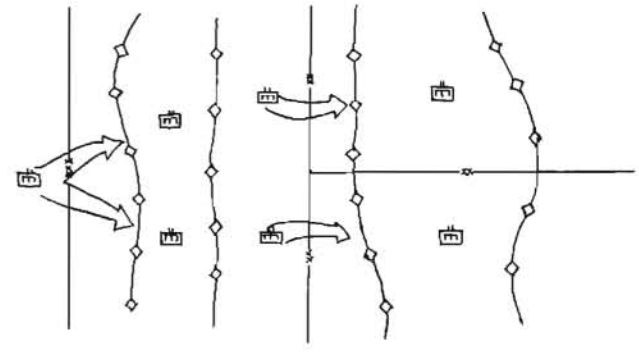
Just how much Combat and Combat Support Operations can the battalion do? To attempt to make the battalion another infantry battalion is not logical from either a logistical or training viewpoint. Unit training must be "doable" if it is to be accomplished. A unit must train in those areas that are most likely to be encountered or are essential to preserve the unit in the combat environment.

How might this Engineer Combat Battalion (Heavy), located in the corps rear/COMMZ likely be employed?



The corps area is large and the engineer requirements can easily exceed the available engineer resources of the corps.

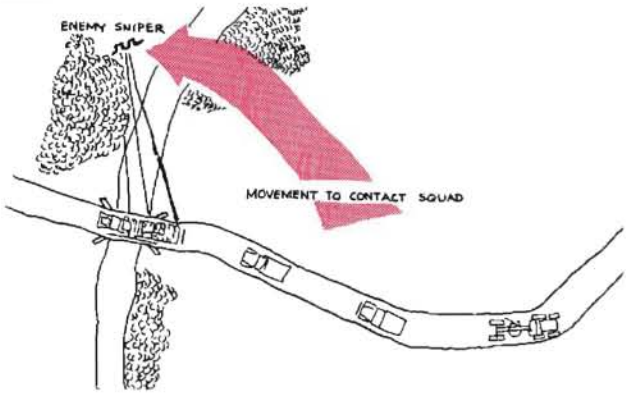
When barrier operations are extensive or, when routes of communication are extended and need improvement, the divisional engineer battalion will need help. All or part of a corps engineer battalion is normally assigned to reinforce it.



The concept is simple. In most cases the forward work limit (FWL) for engineer support is just moved forward.

A second method is presented when corps or

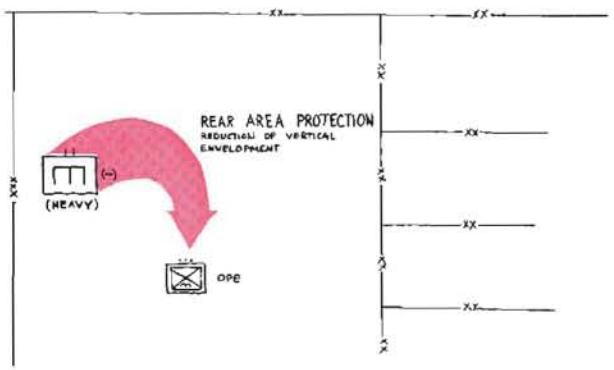
COMMZ engineer units are assigned specific tasks forward of their assigned area, such as rear segments of large barrier systems, preparing blocking positions, or individual construction tasks.



In a combat scenerio the sequence might run like this: The tactical situation is stable with no serious pending action — the Engineer Combat Battalion (Heavy) is behind the corps rear boundary, dispersed between construction sites. The unit is alerted to provide combat engineer support to the corps. Company commanders assemble elements of the battalion that are geographically close by and move toward a given assembly area.

OFFENSE AS A COMPONENT OF SELF PROTECTION

The unit is conducting the above tactical road march when the lead vehicle is disabled by sniper fire. The road is too narrow to turn around so the troops disembark and return fire. Offensive action is required immediately to eliminate enemy fire, minimize casualties, and allow the company to proceed.



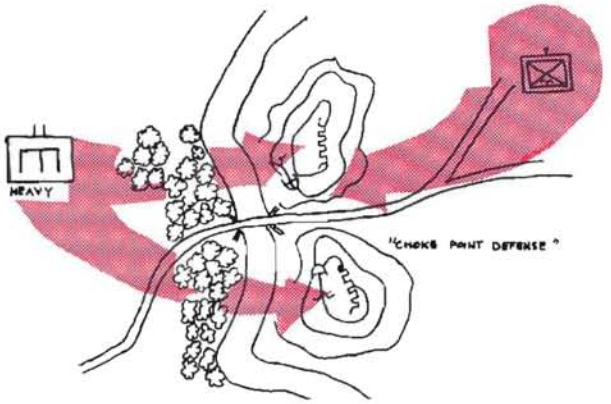
This task (mission) is entitled "Movement to contact — squad 6.4".*

UNIT AREA DEFENSE

Once in the assembly area, units must provide all-around defense (*"Platoon in the defense — 6.3"*), to include patrolling the terrain outside the perimeter (*"Reconnaissance Patrol — 6.2"*).

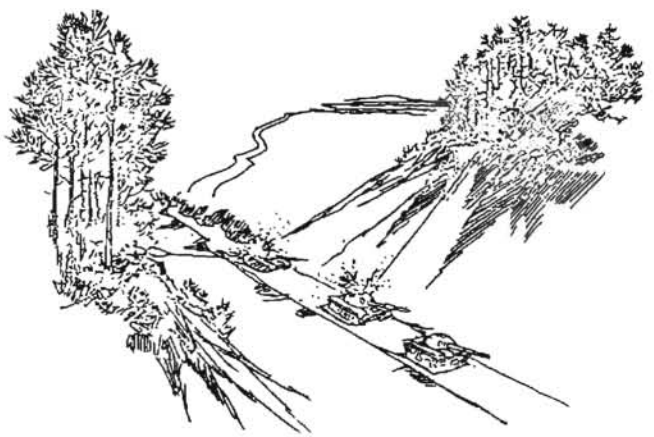
OFFENSE AS A COMPONENT OF REAR AREA PROTECTION

Now that it is assembled, reorganized, and under close control of the battalion, the company learns the enemy has dropped an estimated platoon in a rear area, perhaps a "choke point" (a critical restriction to movement of friendly units) near by. Time is critical so the nearest unit must reduce this vertical envelopment ("Conduct a deliberate attack 6.14"*).



DEFENSE OF A CHOKE POINT

After eliminating this enemy unit, the comp now receives an order to defend and protect t same choke point ("Defend choke point 6.7"*).



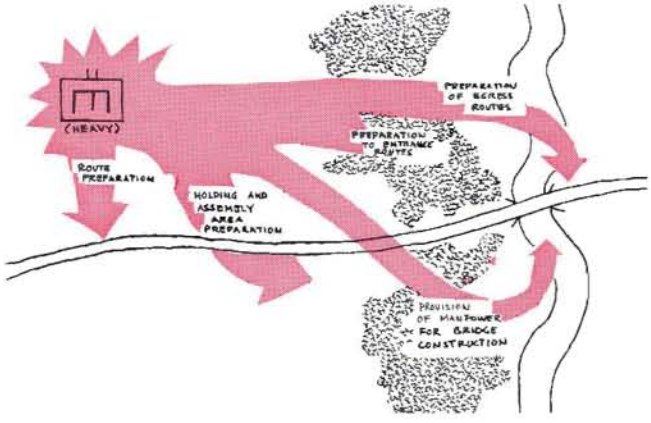
Use of the companies newly authorized Dragons lend teeth to this mission ("Provide tank killer teams 6.1"*).

SUPPORT TO A RIVER CROSSING

Time passes for the hypothetical company another mission is received. To support a crossing being conducted by nearby corps engineers. With no required river crossing training,

what support of this operation would the company assume?

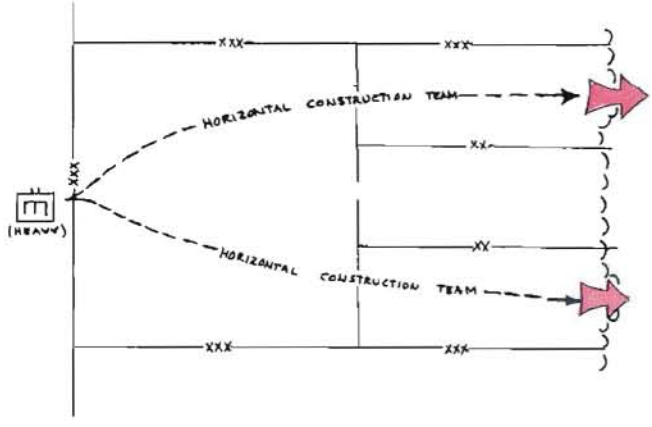
The unit can certainly use its horizontal construction platoon in any location, to including in and around crossing sites, developing access or egress roads; it is business as usual for this platoon. Given a Ribbon bridge, with minimal manpower requirements the company from the Engineer Combat Battalion (Heavy) can provide all the engineer support necessary.



SUPPORT IN THE TACTICAL OFFENSE

The engineer company is not providing general engineer support on road and barrier construction when an order comes through to support an expected exploitation with horizontal construction teams backing up the engineer units engaged in direct support.

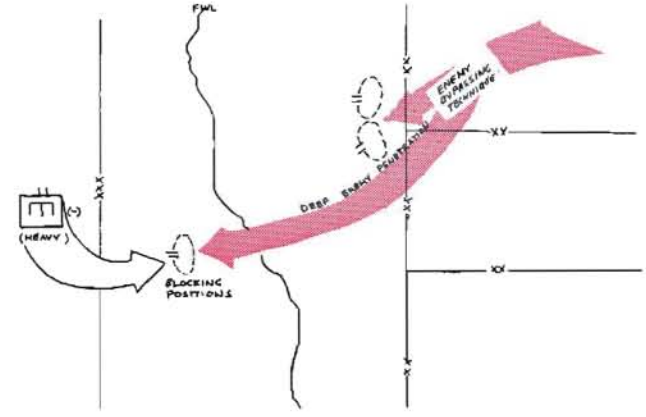
The intended support would at first consist of teams with a couple of pieces of equipment each, but the required support could expand to a company for each line of advance.



DEFENSE COMBAT OPERATIONS

Starting the illustrative story over again, the battalion is spread throughout the theater area and engaged in various construction projects. Tactical intelligence informs commanders that the enemy is expected to attack soon. The Engineer Combat Battalion (Heavy) is assembled and given the mission to develop blocking positions deep in the corps rear. Combat engineer companies move out and prepare obstacles; dig and camouflage positions; and prepare a concept for defense. (In the event the battalion occupies the position itself).

As the enemy attacks with a massive armor thrust, corps engineers are preparing blocking positions in the division rear. The enemy armor penetrates the forward battle area suffering some losses and is stopped in the main battle areas when his losses becomes unacceptable. The enemy's second wave, following a few miles behind, bypasses the stalled first wave and, although it receives serious punishment, bulls through the divisions blocking positions into the corps rear.



The Engineer Combat Battalion (Heavy) is ordered to defend from its previously prepared blocking positions in the hope that the enemy's progress will be slowed sufficiently to allow combat arms to reorient on this enemy force.

Since the battalion is already located in the rear and is capable of using extensive obstacles and the Dragon in conjunction with smaller weapons, it is ideally situated to provide this needed depth to the battle area.

The foregoing combat scenarios are typical of tasks the companies of an Engineer Combat Battalion (Heavy) will be expected to do. The full engineer support package now orients on the maneuver arms with the single goal of combat support. The Engineer Combat Battalion (Heavy) will play a role significantly different from the construction battalion of old. But scenarios alone are not enough — equipment needs and quality control of training must be assured if this battalion is to truly achieve its designed capabilities.

These numbers and tasks reference specific tasks in ARTEP 5-115. See companion article "Engineer Combat Battalion (Heavy) — Training."

Engineer Combat Battallion (HEAVY): Training

LTC Glenn N. Smith
MAJ William M. Jones

Senior commanders have stressed the priority of training for years, but frequently this is over shadowed in day-to-day activities by what can be called the suspense date syndrome. Basically, a company or battalion commander wants to train, but he has problems that require his undivided attention every day. Each of these little flaps get serious attention in higher HQ and if he lets one slip he will possibly be criticized immediately. Training is let slip a bit with the erroneous assumption that it can be made up later.

The tragedy of this is that what is truly first priority becomes in fact a low priority because it is less easily checked than administrative matters. This cannot be allowed to continue if the hea battalion is to become truly qualified in the w spectrum of areas expected.

TRAINING IN THE PAST:

Individual training in past years has concentrated on developing higher technical skills in the construction trades — this line of reasoning must now cease and apprentice level training be accepted as the AIT goal. In addition, combat engineer skill training must now be offered all Career Management Field (CMF) 51 personnel in the companies.

Unit training has in the past prescribed, through ATPs and ATTs, exposure to hours of training with little attention given towards performance.

TRAINING IN THE FUTURE:

Individual Training

There are currently two actions underway, each of which will have major impact on the CMF 51/52. The first is the implementation of EPMS (Enlisted Personnel Management System), and the second, of course, is satisfying the Engineer Combat Battalion (Heavy) requirement for m versed in combat engineer skills, as well construction engineer skills.

Unit Training

Tactical units must prepare to perform all tasks required or implied in the TOE capability statements. These capability statements are general statements often subject to different interpretation by each reader.

ARTEPs (Army Training and Evaluation Program) have been prepared to replace the ATP/ATTs of the past. Now, instead of prescribing *hours of exposure* to training, *proficiency to a set standard* is required to achieve each REDCON training category. Training becomes result oriented and trained capability becomes quantifiable to the point that senior commanders will know precisely what a unit can do and what it can not do.

ARTEP 5-115 tells exactly what tasks the Engineer Combat Battalion (Heavy) must be able to do and assigns each a level of priority. The force commander adjusts priorities and ties the training level to unit training readiness (REDCON).

To achieve simplicity, level of training members and training readiness category members parallel. While the setting of REDCON standards is not a TRADOC function, TRADOC can set guidelines to be implemented or modified by major commands. Thus TRADOC sets levels and Major Commands set REDCONs after approving or modifying these levels. The ARTEP conditions and standards required for a satisfactory performance of each task are the minimum acceptable performance, not perfection. Since combat engineers are "jack-of-all-trades," it is not prudent to overtrain in some tasks if other tasks must be ignored in the process.

Evaluation — Quality Control of Training

Units will be evaluated by calculating the percentage of tasks *reported as trained* on the unit readiness report that were performed satisfactorily during an ORTT. Pending ARTEP Validation.

Assume a battalion (within FORSCOM) reports C-2 (training REDCON 2) on it's Unit Readiness Report. The unit will be evaluated during an FTX on a selection of tasks from the total task inventory. From this selection, however, only Level 3 and Level 2 tasks will receive scores.

The unit must satisfactorily perform 90% of the tasks scored to be evaluated satisfactorily and verify its achievement of REDCON 2 (C-2).

Required Combat Training

To prevent confusion surrounding the employment of the battalion in its infantry role, the ARTEP for the Engineer Combat Battalion (Heavy), TOE 5-115, provides the commander a catalogue of combat tasks that his unit is required to perform in order to accomplish its stated mission. Tasks are divided into four levels of training (3-2-1-X). Level 3 is the highest training priority and Level X the lowest.

Figure 1 summarizes the Engineer Combat Battalion (Heavy) full training requirement broken down by tasks. Since all combat missions involve several tasks and many tasks are a part of more than one combat mission, the ARTEP cataloging has been done by subject (7 major missions) rather than by combat operation.

To analyze a combat operation, list the engineer jobs involved and then find each job (task) under the subject (major mission) areas. (See Fig. 1 Figure 2 gives several examples. This flexible interplay between engineer tasks and combat missions provides a range of tactical scenarios limited only by the imagination of the engineer unit commander.

It becomes apparent that the Engineer Combat Battalion (Heavy) is not to be just a construction battalion with a combat facade, but a new combat organization that will be equipped and realistically trained to its programmed capabilities.

Major William M. Jones, currently the Chief of Unit Training for ARTEPS, Doctrine and Training Developments Division, U. S. Army Engineer School, Fort Belvoir, Virginia, is a graduate of Norwich University and the University of Missouri at Rolla. He served as a Combat Engineer Company Commander in both the 12th Engineer Battalion, 8th Infantry Division in Germany and with the 27th Engineer Battalion in the Republic of Vietnam between 1964 and 1967. He also later served as the Battalion Executive Officer, 8th Engineer Battalion, 1st Cavalry in Vietnam from 1970 to 1971. Prior to his current assignment, he served as the Chief, Demolition/Mine warfare Division, Department of Applied Engineering, U. S. Army Engineer School, Fort Belvoir, Virginia.

Lieutenant Colonel Glenn N. Smith is currently Chief, Training Program Division, Deputy Commandant for Combat and Training Developments, USAES. He holds a BSCE degree from Ohio University. Previous assignments include: Battalion commander, 8th Engineer Battalion, 1st Cav. Div. (TROCAP); Battalion Commander, 16th Engineer Battalion, 1st Armored Division; 65th Engineer Battalion, 25th Inf Div, Hawaii/RVN; 13th Engineer Battalion and 32d Inf Regt, 7th Inf Div, Korea; Procurement Specialist (Quality Assurance), Defense Supply Agency; Resident Engineer with CEBMCO, Titan II.

ARTEP 5-115 TASK INVENTORY

		LEVEL
1.	CONSTRUCTION MANAGEMENT	
1-1	Analyze construction directives	
1-2	Conduct construction site reconnaissance	
1-3	Perform construction estimates	
1-4	Organize construction work forces	3
1-5	Prepare construction directives	
1-6	Coordinate employment of organic equipment	
1-7	Conduct construction inspections	
1-8	Prepare construction reports	
1-9	Perform construction surveying	
1-10	Perform soil analysis	
1-11	Provide photographic assistance	2
1-12	Prepare critical path networks	
1-13	Prepare bills of materials (BOM)	
1-14	Perform quality control tests	
1-15	Provide terrain intelligence	
1-16	Prepare detailed construction plans	1
1-17	Prepare as-built drawings	
1-18	Coordinate nonorganic construction support	
1-19	Supervise contract construction	
1-20	Manage indigenous labor	X
2.	HORIZONTAL CONSTRUCTION OPERATIONS	
2-1	Manage horizontal construction operations	
2-2	Clear and grub site with heavy equipment	
2-3	Strip top soil from site	
2-4	Layout and develop project	
2-5	Provide site drainage	3
2-6	Perform borrow operations	
2-7	Perform fill operations	
2-8	Perform hauling operations	
2-9	Perform field compaction operations	
2-10	Rough grade structure	
2-11	Final grade structure	
2-12	Excavate building foundation	
2-13	Perform backfill and compaction for building foundations	
2-14	Excavate holes and trenches	2
2-15	Construct and maintain ditches	
2-16	Construct temporary fords	
2-17	Perform compaction operations	
2-18	Perform soil stabilization	
2-19	Install flexible membrane	
2-20	Install military standard matting	1
2-21	Construct permanent fords	
2-22	Construct earth dikes	
2-23	Conduct underwater excavation	
2-24	Install riprap	
2-25	Conduct snow removal operations	X
2-26	Remove existing pavements	
2-27	Clear and grub site by hand	
3.	VERTICAL CONSTRUCTION OPERATIONS	
3-1	Manage vertical construction operations	
3-2	Layout a building site	
3-3	Construct wooden frames	
3-4	Install sub-flooring	
3-5	Install sheathing and siding	
3-6	Install corrugated roofing	
3-7	Perform painting	
3-8	Construct simple concrete formwork	
3-9	Mix concrete	
3-10	Place concrete	
3-11	Remove formwork	3
3-12	Cure concrete	
3-13	Construct concrete block structures	
3-14	Install rigging system	
3-15	Erect structural steel frames	
3-16	Make bolted steel connections	
3-17	Install chain link fence	
3-18	Install electric power generators	
3-19	Perform interior electrical rough-in work	
3-20	Perform interior electrical finish and trim	
3-21	Install threaded steel pipe systems	
3-22	Install copper tubing systems	
3-23	Install plastic pipe drain systems	
3-24	Install space heaters	
3-25	Install exhaust fans	
3-26	Install windows	
3-27	Install doors	
3-28	Install stairs	
3-29	Install wooden roof trusses	
3-30	Construct advanced concrete formwork	
3-31	Install steel mesh reinforcing	
3-32	Install concrete joints	
3-33	Finish concrete joints	
3-34	Erect tubular scaffolding	
3-35	Construct light steel trestles	
3-36	Make welded steel connections	
3-37	Construct brick structures	
3-38	Install overhead electrical distribution systems	
3-39	Install underground electrical distribution systems	
3-40	Install rough-in plumbing	
3-41	Install pipe insulation	
3-42	Install vitrified clay pipe systems	
3-43	Install asbestos cement pipe systems	
3-44	Install sheetmetal ductwork	
3-45	Install roof flashing	
3-46	Install building insulation	
3-47	Install shingle roofing	
3-48	Install concrete reinforcing bar	
3-49	Install concrete or masonry embedded items	
3-50	Finish concrete surfaces	
3-51	Construct steel storage tanks	
3-52	Install security lighting systems	
3-53	Install airfield lighting systems	1
3-54	Install cast iron pipe systems	
3-55	Install welded steel pipe systems	
3-56	Install finish plumbing fixtures	
3-57	Install mess equipment	
3-58	Install hot air furnaces	
3-59	Install sheet metal hardware	
3-60	Perform finish carpentry work	
3-61	Install built-up roofing	
3-62	Perform plastering	
3-63	Make riveted steel connections	
3-64	Fabricate structural steel members	X
3-65	Install compressed air systems	
3-66	Install fire protection sprinkler systems	
3-67	Install air conditioning equipment	
3-68	Install railroad track	
4.	CONSTRUCTION SUPPORT OPERATIONS	
4-1	Develop an existing quarry site	
4-2	Prepare equipment for pile driving operations	3
4-3	Conduct pile construction operations	
4-4	Develop asphalt site	
4-5	Apply surface material	
4-6	Conduct rock excavation operations	
4-7	Conduct material handling	
4-8	Conduct crushing operations	2
4-9	Select an asphalt site	
4-10	Select quarry site	
4-11	Prepare quarry operations plan	1
4-12	Develop a new quarry site	
4-13	Conduct washing and screening operations	X
7.	SUSTAINING OPERATIONS	
7-1	Establish battalion aid station	
7-2	Operate battalion aid station	
7-3	Apply first aid	
7-4	Provide maintenance support	
7-5	Maintain organic equipment	
7-6	Perform operator maintenance	3
7-7	Provide class II, III, V, VI, and VII logistical support	
7-8	Obtain construction materials	
7-9	Provide class IV logistical support	
7-10	Collect and forward reports	
7-11	Maintain unit strength	
7-12	Maintain discipline, law and order	
7-13	Provide radio communications	
7-14	Establish water points	
7-15	Utilize attached sidmen	
7-16	Provide personnel services	
7-17	Provide wire communication	
7-18	Operate water point	
7-19	Operate unit mess facility	
7-20	Provide radio remote capabilities	2
7-21	Defend against NBC attacks	
7-22	Supervise NBC activities	
7-23	Provide map support	
7-24	Operate unit postal service	
7-25	Maintain security	
7-26	Distribute water	
7-27	Provide transportation support	
7-28	Prepare unit services plan	
7-29	Maintain morale and welfare	
7-30	Provide multiple net capabilities	
7-31	Process and evacuate POW's	1
7-32	Coordinate civil action	
7-33	Employ field sanitation procedures	
7-34	Operate battalion ration breakdown point	

		LEVEL
5.	COMBAT ENGINEER OPERATIONS	
5-1	Determine the effectiveness of proposed obstacles	
5-2	Crater roads	
5-3	Disable bridges	
5-4	Conduct ground route reconnaissance	3
5-5	Secure work site	
5-6	Reinforce bridge with pier/bent	
5-7	Supervise location of individual obstacles	
5-8	Assign and supervise all engineer tasks	
5-9	Breach obstacles with explosives	
5-10	Install a nuisance minefield as a point obstacle	
5-11	Assist in the development of non-engineer defensive positions	
5-12	Construct expedient culverts	
5-13	Construct culvert headwalls	
5-14	Construct culverts using local materials	
5-15	Construct expedient check dams	
5-16	Construct expedient protective bunkers	
5-17	Construct obstacles with engineer equipment	
5-18	Remove obstacles with engineer equipment	
5-19	Install row minefield using M-57 mine dispenser	2
5-20	Install deliberate protective minefield	
5-21	Conduct route minesweep	
5-22	Plan and coordinate construction of fixed bridge	
5-23	Construct fixed bridge with dimensioned timber	
5-24	Construct timber bent abutment	
5-25	Layout Bailey bridge	
5-26	Construct Bailey bridge	
5-27	Construct steel trestle bridge using M4T6 components	
5-28	Construct M4T6 fixed spans	
5-29	Construct timber trestle bridge with native timber	
5-30	Install cable reinforcement on Bailey bridge	
5-31	Plan breaching and clearing operations	
5-32	Conduct deliberate breaching and clearing operations	
5-33	Submit intelligence spot reports	1
5-34	Submit corrections to maps	
5-35	Construct barbed-wire entanglements	
5-36	Construct aircraft revetments	
5-37	Install bridge protection devices	
5-38	Replace damaged float bridge ponton	
5-39	Conduct hasty (Combat) breach	
5-40	Construct panel crib pier	
5-41	Conduct river reconnaissance	
5-42	Reconnoiter enemy minefield	
5-43	Construct light tactical raft	
5-44	Construct M4T6 raft	
5-45	Prepare bridge/raft construction, landing, and regulating areas	X
5-46	Assist in the preparation of barrier plans	
5-47	Construct two lane Bailey bridge	
5-48	Construct light suspension bridge	
5-49	Construct a floating bridge	

6.	COMBAT OPERATIONS	
6-1	Reorganize for infantry operations	
6-2	Conduct a defensive reconnaissance patrol	3
6-3	Conduct an area defense (Platoon)	
6-4	Conduct a movement to contact (Squad)	
6-5	Conduct an area defense (Company)	
6-6	Conduct a tactical road march (Company)	2
6-7	Defend a choke point	
6-8	Conduct an ambush patrol	
6-9	Conduct an reconnaissance patrol with enemy contact	
6-10	Conduct a tactical road march (Battalion)	
6-11	Conduct tank killer team operations	1
6-12	Conduct rear area protection (RAP) operations	
6-13	Conduct a movement to contact (Platoon)	
6-14	Conduct area defense (Battalion)	
6-15	Conduct a deliberate attack (Company)	X

MISSIONS

-TASK BLENDING-

Note training tasks numbers are shown after each tactical mission. This provides the cross reference showing that training one task can yield capability in several tactical situations and that most missions require a blending of several tasks.

OFFENSE

Support an exploition or pursuit through the rapid repair of developing MRS's 2.40, 2.9, 215, 5.8

Support River Crossings through the development of road networks, river access and agress routes, and providing engineer equipment to forward combat engineer units. 2.1, 2.9, 2.15

Construct a floating bridge (note that this is not a river crossing operation). 5.49, 5.8,

Reduce a vertical envelopment. 6.4, 6.12, 6.13, 6.15

Provide demolitions teams in support of the assault of fortified positions. 5.2, 5.3, 5.9, 5.8

Clear minefields. 5.31, 5.32

Construct fixed tactical bridging. 5.22 to 5.30, 5.40, 5.48

Provide engineer intelligence. 1.2, 1.13, 5.4, 5.30, 5.41, 5.42

DEFENSE

Defend Unit area, worksites, and movements. 6.1, to 6.14

Defend choke points. 6.7

Provide Anti Armor (Tank Killer) teams. 6.11

Support retrograde river crossing through route repair, route construction and bridge building. 2.1 to 2.9, 2.15, 5.22 to 5.30, 5.49

Construct obstacles using combat engineer techniques. 5.1, 5.2, 5.3, 5.17, 5.19, 5.20

Destroy bridges. 5.3

Construct obstacles using heavy engineer equipment. 5.17

Provide materials for camouflaging and fortifications. 5.11, 2.7, 7.8, 2.6, 2.7, 5.11, 7.8

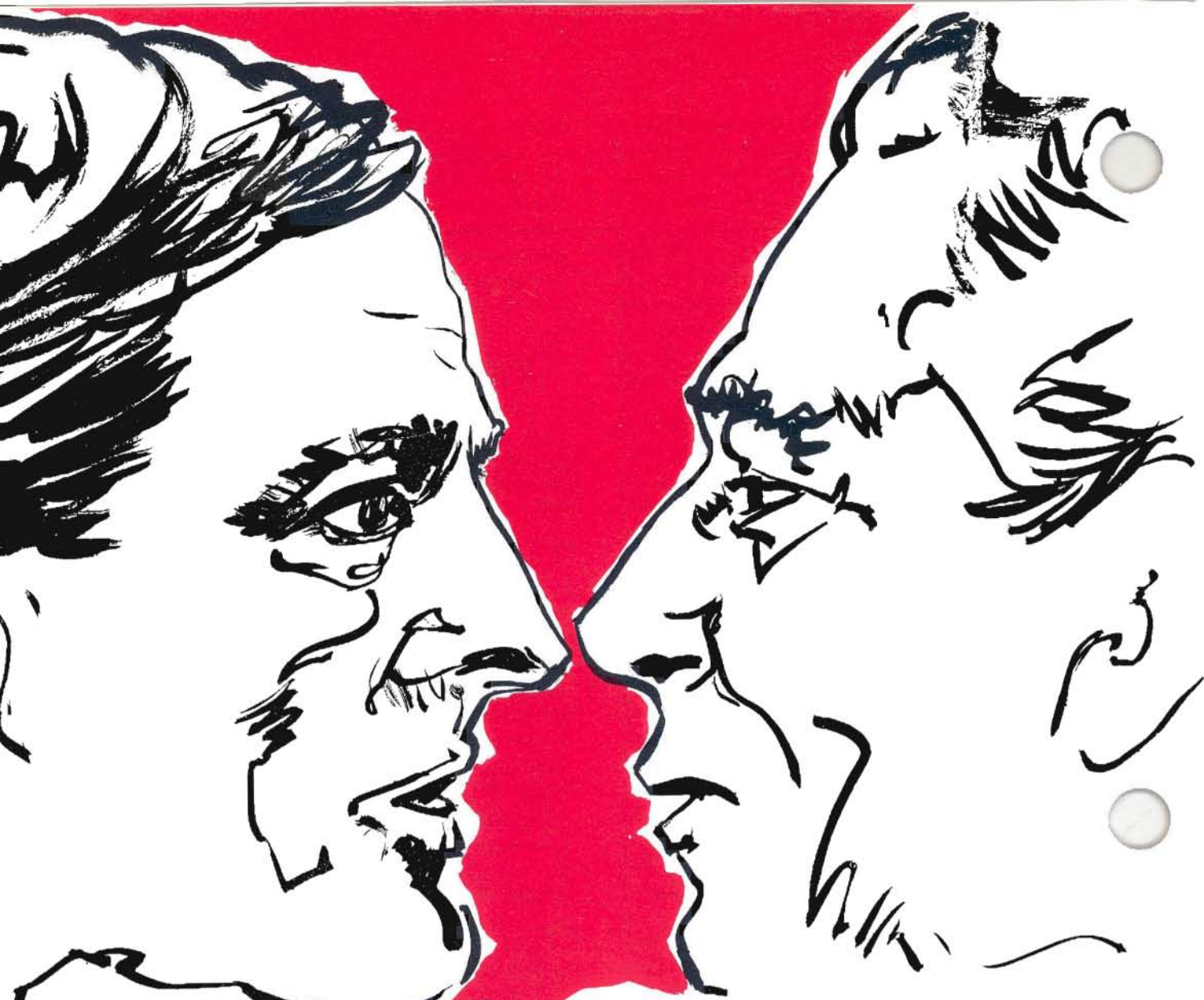
GENERAL

Construction of routes/bridge/LOC's and air fields. 2.1 to 2.10, 2.14 to 2.27, 5.12, 5.13 to 5.22, 5.29

General construction of building 2.11, 2.12, 3.1 to 3.67

Limited railroad construction and repair. 2.1-2 to 2.10, 4.1-4,9 3.68

Construction deceptive camouflage devices. 3.3, 3.9, 3.17



"BUILD AN ICE BRIDGE ?"

CPT Gary L Hyde

Build an ice bridge across the Tanana River! That's the mission of your company. You're the Commander of an Engineer Company (Construction) stationed at Fort Wainwright in the interior of Alaska. An upcoming exercise demands the crossing of the river be capable of carrying the tactical and logistical loads of an Infantry Brigade (Mechanized), for a period of one week, during the middle of the Arctic winter; and it's less than a month away.

Ice bridges are not new to Alaska. Probably the first use of ice as a bridge was by a brave Eskimo thousands of years ago when he crossed a frozen river to hunt. But in his day, the natural ice on most rivers in Alaska during the winter months was more than adequate to carry himself and perhaps his dogsled at gross weight. Not until recent years has technology forced us to explore the possibilities of using ice to support a river crossing operation with heavy wheeled and tracked vehicles. Thicknesses required to support a given load are shown in Table I for good quality water-borne ice.

TABLE 1

Type of load	Minimum Thickness (in)
Soldier on skis or snowshoes	1.2
Soldier on foot	2.0
Infantry (column of 2's)	3.0
Infantry (column of 4's)	4.0
Wheeled vehicles up to 3.5 tons	9.0
Wheeled vehicles up to 6.0 tons	12.0
Wheeled vehicles up to 10.0 tons	16.0
Wheeled vehicles up to 15.0 tons	24.0
Tracked vehicles up to 3.5 tons	8.0
Tracked vehicles up to 10.0 tons	12.0
Tracked vehicles up to 12.5 tons	16.0
Tracked vehicles up to 25.0 tons	24.0
Tracked vehicles up to 45.0 tons	28.0
Tracked vehicles up to 60.0 tons	32.0

[1] *FM 101-10-1, pp. 8-28.*

Obviously, if the natural ice does not meet or exceed the required thickness for the expected loading, some method must be employed to increase the thickness of the ice or an alternate river crossing method or site be selected. In addition, ice may vary in thickness at any point on one selected crossing route due to variations in current velocity, water temperatures, ambient temperatures, and depth of snow cover. Due to these variations, 6 inches for light loads and up to inches for heavy loads should be considered a minimum safety factor above the requirements of Table I.

Several methods have been successfully employed to obtain the desired increase in thickness. The most logical is to simply flood an area and allow it to freeze successively until the desired thickness is obtained. Additional strength can be obtained by emplacing logs, brush, straw, or some other readily available material on the natural ice before flooding. This method gives the ice some additional strength since ice, like concrete, is much stronger in compression than it is in tension. Similarly, it is only moderately strong in shear and any of the above materials will result in an increase in the shear capacity. However, one important characteristic of "reinforced" ice as prepared above cannot be ignored. Although its strength is increased, the foreign materials, if dark in color, will absorb significant amounts of solar radiation during clear days and cause local melting of the ice, destruction of the bond, and partial or total loss of any additional strength gained until it is firmly refrozen. Daily thaws will then significantly reduce the traffic carrying capacity of the bridge. The ideal situation, of course, is impossible to obtain — this being the placement of the "reinforcing" material in the lower layers of the ice, as in concrete, where it would provide the greatest additional strength and would also be protected from the sun. Because of this disadvantage, most ice bridges are now constructed with lifts of pure water and no attempt is made to reinforce it. If a snow cover exists, it must be removed prior to flooding, primarily to eliminate layers of "rotten" ice which has millions of tiny airpockets trapped when the snow layer was flooded. This snow can be most advantageously used as a dam for the sides of the flooded bridge area at a distance of 1½-2 times the roadway width, both upstream and downstream, from the proposed centerline. A beneficial side effect results from removing this snow cover. Even without flooding, some additional ice thickness can be accumulated on the bottom of the slab since heat carried by the underlying water can be more rapidly transmitted to the surface and the atmosphere with the insulating snow removed. This accumulation is normally significant only when ambient temperatures are below 0°F. Accumulation of ice in this manner can be estimated for the first 12 hour period following snow removal and can be estimated with the following equation:

$$\Delta t = .588 \frac{\Delta T}{t}$$

where Δt = accumulation in inches
$\Delta T = 32° -$ Ambient Temperature
t_i = initial ice thickness in inches

This accumulation will be reduced by approximately 25% for each successive 12 hour period due to the additional insulating effect of the accumulated ice.

Flooding the bridge area should be accomplished in 1 to 2 inch thicknesses. Freezing times will vary with ambient temperatures, but another lift can normally be flooded in 1 to 2 hours at -10°F. As a rule, succeeding lifts can be placed as soon as the preceding lift is firm enough to walk on. Deeper flooded lifts will normally increase freezing time and should not be employed.

With the brigade being airlanded at a local Air Force base, the tactical considerations required that the bridge be built close by on a site that had never before been used. Just to reach the river, about 5 miles of road had to be blazed through virgin timber. This requirement for heavy equipment soon became a major factor in the construction. An existing Double-Double Bailey Bridge across Piledriver Slough had suffered abutment deterioration to a condition in which it could not support the heavy equipment required to construct the road. Bypass conditions were impossible because of far shore bank conditions and the thin ice on the slough since it was fed by springs and waste waters. Reinforcement of the bridge was a must to insure mission accomplishment. However, time was running out quickly and some

solution had to be developed to accomplish the ice bridge construction and Bailey bridge reinforcement simultaneously. A platoon on snowshoes and with Artic sleds was dispatched with the necessary equipment so that construction of the ice bridge could proceed while the Bailey was being repaired.

Then disaster — the seemingly inexhaustable supply of cold weather which was normally available disappeared. With temperatures between 15°F and -10°F, progress on the Bailey was rapid while ice buildup on the bridge was painfully slow. Complicating matters, two snowfalls, in excess of 12 inches each, further slowed the ice bridge construction. On D-3, the ice on the east channel had a minimum thickness of 24 inches while the west channel had a minimum thickness of 18 inches over a stream velocity estimated at 12-15 feet per second and indeterminable depth. The Bailey had been repaired and the road completed to a passable two-lane condition by this time. The weather began to cooperate again, turning colder, but with little time to spare, so little, that attention was diverted to alternate methods of reinforcing the ice bridge as it existed at that time.

The 11th Engineer Battalion (Combat) had tested the feasibility of using M4T6 components to reinforce river ice in Korea during 1965-1966. The success achieved during these tests proved to be only an indicator of the possible success to be obtained in Alaska. Several configurations were tested in Korea, but the final design selected for the Tanana was the 24/18 balk pattern. In the 38'4" fixed span configuration, this balk pattern is classified as 55/45 for a normal crossing. This would have been sufficient in itself to carry the expected brigade loads. Investigation of the support for the structure itself posed several questions. The use of pontons was considered but eliminated since they would only add to dead loads but would provide load distribution over a larger area. A more promising method of load distribution, both in terms of effectiveness and construction time, was a grillage system. Not only could the loads be distributed laterally as with the pontons, they could be distributed longitudinally as well by placing logs or heavy timbers parallel to the centerline beneath the siffeners. This method, in addition to load distribution, contributed to the rigidity of the structure itself by assisting the balk in carrying the stresses from one stiffener to the next. The grillage system offered the best solution to the reduction of concentrated shear loads in the ice layer while the M4T6 superstructure carried the majority of the moment loading. Due to the non-rigid nature of the support (grillage on ice) and the deflection of the ice during loading, the effective span of the 38'4" section of continuous bridge was nearly doubled without increasing the design stresses or capacity of the span.

One additional characteristic of the M4T6 b[illegible] could not be ignored. Its flotation characteristics in the configuration used (24 balk wide) would have yielded a bouyant force of 9,200 lbs per 15 foot section of the bridge when completely submerged! This additional safety factor did not include any bouyant forces contributed by the ice. The net effect of the proposed system was estimated conservatively to be a 25% increase in classification to a value of 70/55. This estimate proved to be conservative by usage.

Authorization was obtained to draw the necessary bridging from stock and construction began. Due to the distance of 25 miles between the storage yard and the bridge site, one platoon of engineers was employed in alternating 3 hour shifts through the night of D-2 and sunrise saw the 405 feet of the east channel spanned by M4T6 and ready for traffic. The 195 foot west channel was spanned by 1800 hours the same day and opened to traffic. After construction, the grillage was stabilized by two additional 2 inch lifts of ice before the tactical crossing began.

Construction completed, the engineers proudly took on the missions of bridge maintenance, traffic control, and vehicle recovery. All logistics [illegible]hicles, to include fully loaded 5000 gallon ta[illegible] trucks, were crossed following the assault elements. Recovery missions found the bridge crossed repeatedly by loads as heavy as 10 Ton tractor-25 Ton trailers with a loaded D-8 or HD-16 dozer with no sign of stress appearing anywhere on either span.

Once again, the engineers had proven themselves capable of accomplishing the assigned mission(s) through perseverance in the face of adversity, ingenuity, and just plan professionalism.

Captain Hyde is a 1967 graduate of the United States Military Academy. After Ranger School and the Engineer Officer Basic Course, he was assigned to the 562d Engineer Company (Combat) at Fort Richardson, Alaska. In April 1968 he was reassigned to the newly reactivated 808th Engineer Battalion (Construction) at Fort Wainwright. Initially he served on the battalion staff with later assignments as Construction Officer, C Company and Commanding Officer, B Company. It was during his tour with B Company that he was exposed to ice bridge construction. His Alas[illegible] tour was followed by helicopter school and su[illegible] sequent aviation duties in Viet Nam and at Fort Bragg, North Carolina. CPT Hyde is a graduate of 2-73 Engineer Officer Advanced Course.

BASE DEVELOPMENT UPDATE

MAJ Clarence D. Little

Historically approximately one-third of the engineer force has been involved in construction and construction support mission. To the engineer planner these operations are known as Base Development (BD). FM 31-82 defines BD as the acquisition, development, improvement, expansion or rehabilitation of the facilities and resources of an area or location to support military operations or strategic plans. The aim of this article is to bring you up to date on the current actions volving BD.

In every war of US involvement, the engineers have been acclaimed for their accomplishments as combatants and constructors. Viet Nam was no exception. Although the engineers were hailed as "country builders"; some voiced concern regarding the massive logistical complexes, standards of construction and the seemingly lack of BD planning. In June of 1967, the Director of Construction in Viet Nam submitted critical observation on the construction program and concluded that inadequate BD planning had preceded the war. The resultant recommendation was that dedicated agencies be established for future contingencies of US military involvement.

The problem thus defined produced Joint Chiefs of Staff (JCS) action in the form of Change 2 to Pub 3, titled Joint Logistics, Personnel Policy and Guidance. Responsibility for preparing joint BD Plant (BDP) was assigned to the Unified or Theater Commanders, who in turn look to their components for preparation of supporting plans. JCS dictated exact BDP formats to insure completeness and standardization among the services.

What does all this mean to the Engineers? The Engineers are the instruments of rehabilitation and/or expansion of facilities, but the real importance is manifested in that the BDP is the controlling document for construction in the Theater of Operations (TO). In 1968, the Chief of Engineers was asked by DCSLOG to assist the Army Component Commanders in preparing their respective BDP. The Chief assigned this planning support mission to the Engineer Strategic Studies Group (ESSG). An Assistance Office was set up and to date has assisted every Army component with their BDP.

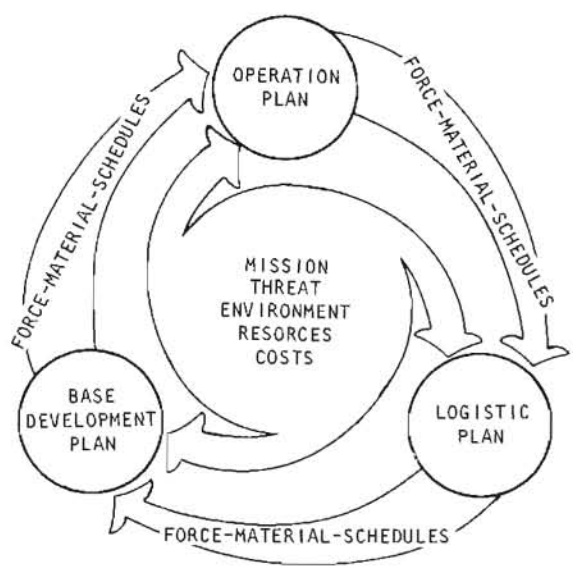


Figure 1

The Base Development Process

In order to understand and have an appreciation for BDP, the Engineer must realize that it is an integral part of the Tactical Commander's Operations Plan. When completed, the BDP becomes an appendix to the Logistical Annex of the Overall Operations Plan. Figure 1 shows the relationship between the essential elements of the planning cycle.

The actual planning process is depicted in Figure 2. In concept it compares the facilities required to support the Commander's Operations Plan to those currently existing in the chosen

battle area. It should be noted that this estimate is based on the Task Organization; that is the actual number of personnel and equipment to be supported. The existing facilities are gleened from the available intelligence of the battle area. The resultant of this comparison is a listing of the shortfalls or facilities required to support the force for the initial phase of the operation, usually 180 days. Once the plan is executed, the staff planners must extend and adjust the basic BDP as deemed necessary.

All this may sound like "Scientific Guessing" at its best and it is; however, it provides a flexible plan, in that, it directly relates to the supported forces requirements. Like any system, BDP is only as good as those staff planners that crank and grind the data and make the myriad of minor decisions and recommendations necessary to complete the plan.

Once the listing of facilities required has been determined, the staff planner can then develop the Construction Program. This is a time phased schedule of how the Engineer plans to support the operation. It includes data of critical importance to both the Engineer and the Tactician. Priorities, time (D-dates of start and finish), quantities of construction materials, construction effort and cost are determined per individual facility requirement. Analysis of the Time Phased Force Deployment List is given due consideration to insure that the Construction Program fully supports the Tactical Commander's scheme of operation. Probably the most important element of the BDP, to the Engineer, is selecting the proper facility to fulfill the requirement. This is normally done using the standard listings contained in the Army Facilities Component Systems (AFCS).

The AFCS is a catalogued preengineered listing of installations and facility designs for the full range of possible TO construction requirements. A representative sampling would be such installations as a 1500 man cantonment, a 100 bed hospital, a POL tank farm, or a 1000 man stockade. Standards of construction range from the most austere to an expected 5 year design life. Engineering design, estimates, cost and logistical data are organized, coded and maintained in data banks to insure currency. TRADOC and OCE are constantly updating, and modernizing the system.

CASTLE

The ESSG Assistance Office discovered early in the BD experience that it was necessary to automate the BD process to the maximum extent possible in order to be responsive to the support requests. Thus the Computer Assisted System for Theater Level Engineering (CASTLE) was born. The System is made up of more than 60 computer programs, written in FORTRAN V. CASTLE

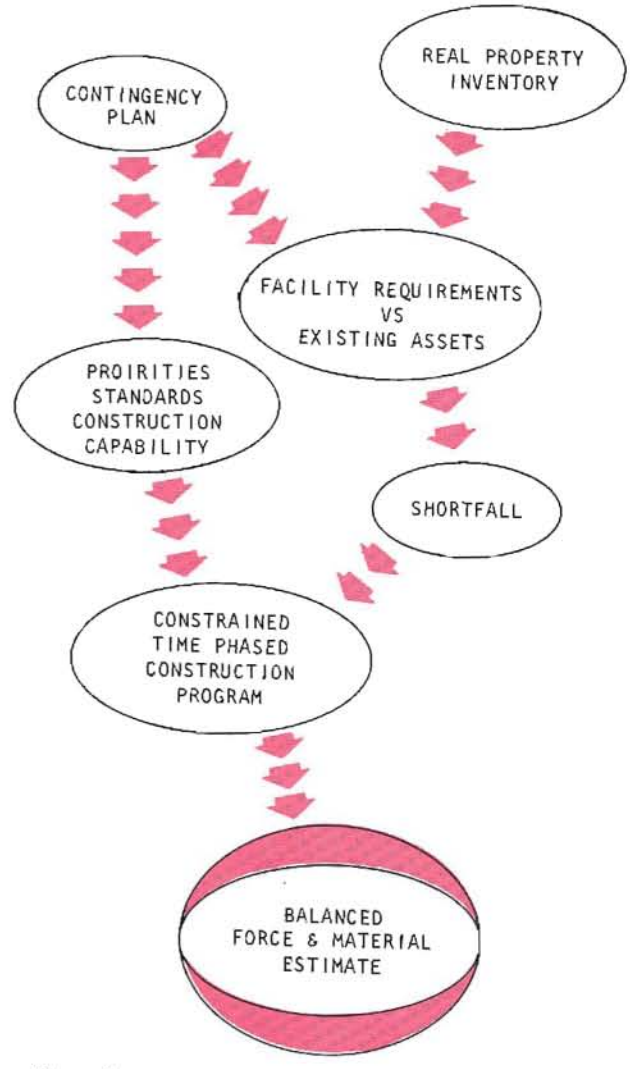


Figure 2

automates the majority of BDP, with the exception of the decisions that have to be made by the planner. The printed output of the CASTLE program is in the JCS directed format.

Education

After the BD doctrine had been approved and published in FM 31-82 in June 1971, the Chief of Engineers and the Commandant of the Engineer School agreed that the subject should be taught to the Engineer Officer Advanced Course (EOAC). A 13 hour block of instruction was developed and classes started in 1972. In addition to EOAC, the BP block has been presented many times to US Army Reserves in preparation for their annual training exercise (LOGEX).

With the advent of the end of the war in Viet Nam, the TRADOC Commander directed that the EOAC be Systems Engineered and that the

objectives be oriented toward the company level. The Systems Engineering Committee recommended and received approval to reduce the BD instruction to a 2 hour professional briefing to be presented just prior to the technical engineering subjects. This arrangement has the advantage of providing the frame work of TO construction to the EOAC student prior to receiving instruction in the engineering sciences.

The 13 hour course was retained for the US Army Reserves and special requirements for unit assistance.

The Engineer Officers selected to attend the Command and General Staff College (C&GSC) or the Armed Forces Staff College (AFSC) will receive instruction in BDP. The C&GSC version is dubbed "Operation Talon" and is presented by the Logistics Department. It normally last about two weeks and is supported by an "in house" computer system. The AFSC presents BDP from a joint operations vantage using selected portions of actual TO contingency plans.

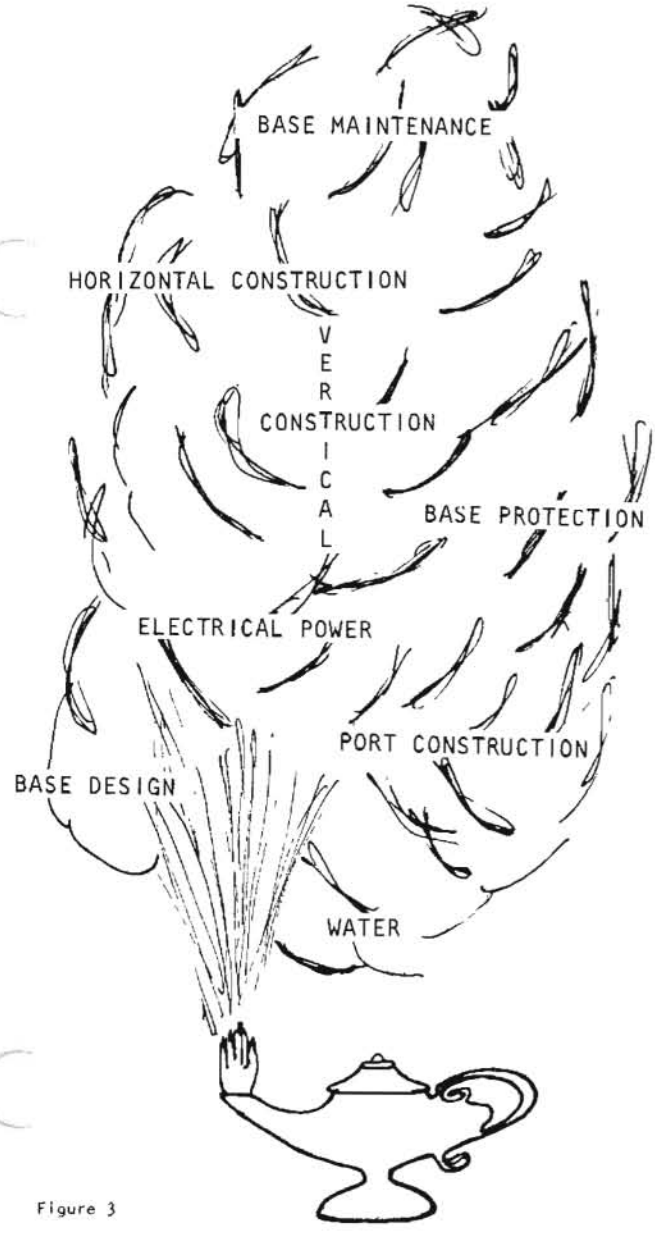


Figure 3

Current Developments

In 1971, during the initial thrust of BD emphasis, proponency for BD doctrine was the responsibility of the Combat Developments Command (CDC). It was further delegated to the Combined Army Group located at Ft. Leavenworth, Kansas. After the decision was made to inactivate CDC, proponency for BD doctrine was shifted to the US Army Logistics Center (USALOGC) located at Ft. Lee, Virginia. In 1973, the USALOGC in cooperation with the Engineer School embarked on a project to improve BD thru a series of studies designed to investigate the "state of the art" of civilian construction technology and determine its applicability in improving BD construction. The Project was guided by the BD Study Advisory Group (SAG) and the Assistant Commandant of the Engineer School was placed in charge. Thru contracts with the Waterways Experiment Station (WES) and the Construction Engineering Research Laboratory (CERL), the SAG determined that eight areas should be studied (see figure

The target date for finishing the studies was set for January 1975, with the formal presentation of findings and conclusions on 17 January 1975. The final written report is due in November 1975. The study objectives were developed based on current senario doctrine, using the Construction Battalion TOE. The expected outcome of the studies is significant improvements in the efficiency and economy of BD construction. The resultant saving in construction material dollars and construction effort should prove extremely beneficial during the current period of military austerity.

Engineers, you have now been brought up to date on the current actions involving BDP. Be on the look-out for future developments as they evolve and impact on your Corps.

Major Clarence D. Little is Chief, Engineering Design Division, Department of Engineering Science, USAES. Since his commissioning from Northwestern State University of Louisiana, he has served with the 2d Armored Division, US Army Alaska; III Corps, 9th Infantry Division, Combat Development Command, and the 31st Engineer Battalion. He has a Masters Degree from the University of Missouri and is currently slated to attend the Command and General Staff College in August 1975.

ENGINEER

Editor's Note: The Engineer Branch Newsletter has been discontinued; therefore, this section will carry some of the information formally found in the newsletter.

• For All . . .

Stability — money is tight! PCS moves have been reduced to the bare minimum-occurring only (at least through FY75) to meet essential military requirements. Stability has been increased to a minimum of 30 months prior to going overseas; 36 months for CONUS to CONUS moves.

Photographs — AR 640-30 outlines the requirements for having official photographs in your military files. If you are a Regular Army officer (regardless of rank), female officer, or First Lieutenant (an above) (USAR) you need **two** photographs: one for your official (PARD) file; and one for your Branch (CBIF) file. Promotion boards look for them. The old adage is still quite accurate — "A picture (or lack of same) is worth a thousand words".

Communication — effective management requires two-way communication — your cards, letters, calls, and preference statement are all invaluable sources which help you to influence and manage your career. The preference statement is a significant element in matching your desires with our daily receipt of requirements. If you haven't submitted one in the last year — do so. We strive to keep you informed personally as requirements surface. One item which we frequently find in error is your official mailing address on your Officer Record Brief (ORB). This is **not** your Home of Record but your present home address. As it changes drop us a n

Professional Registration — though not a necessity for accelerated promotion nor assignments, it is a tangible demonstration of engineering competence and, as such, should be a goal for all Corps officers.

• From those who manage for today . . . Assignments:

Lieutenant Colonels — those of you returning from overseas in 1975 can expect assignments in the Washington, D.C. area, with ROTC detachments across the country, or in the Army Readiness Regions. Those having less than four overseas tours who have been in CONUS four or more years, and those having four overseas tours who have been in CONUS since 1969 are eligible for overseas tours. Few will go to Germany in 1975, most requirements are in more exotic locations, including Iran, Saudi Arabia, Turkey, and Korea. Many of these assignments are two-year accompanied tours.

Majors — during 1975, approximately 350 majors will be reassigned. If you are one of these, is your preference statement up-to-date? Although non-dependent tours are limited, vulnerability will fall to those with two or fewer NDTs who have been assigned to CONUS since 1968-69. Eligibility for overseas dependent tours will go to those with 36 months or more in CONUS. Recently promoted majors should set goals during their majority for accomplishment of the following: troop duty in a battalion/group/brigade, completion of CGSC (resident or nonresident) level schooling, and completion of a baccalaureate or master's degree (fully funded, DCP, ADPRID, or self-supported).

Captains — long tour assignments are available by decreasing frequency to: USAREUR, Hawaii, Alaska, Canal Zone, Middle East, Mediterranean and the Far East.

Most tour assignments to Korea are available and will be filled by those officers having no short tours or those officers having been back in CONUS 4 to 5 years without an overseas assignment. A very limited number of short tour assignments are available through OCE Turkey and the Middle East.

Most overseas assignments will be filled by volunteers. Those interested should make their desires known at least ten months in advance of projected reporting date to insure consideration.

POTPOURRI

Officers having no short tours, or those who have had only one short tour and who have been in CONUS for 4 to 5 years, are vulnerable for another short tour.

Captains eligible for CONUS assignments are considered for assignment approximately five to six months before the desired reporting dates. Captains should insure that an up-to-date preference statement has been provided their assignments officer at least eight months before they reach two years on station. Currently, captains can expect to serve 2+ years on station with a desired goal of three (3) years on station. If an officer desires to move after two years on station in CONUS, he should make that fact known to his assignment officer. Assignments are available in OCE, facilities engineering, and AMC for those officers that are qualified. Officers completing graduate civil schooling stand a fairly good chance of being assigned to OCE.

EOAC will be programmed into an officer's assignment pattern as a normal PCS move. Captains & lieutenants in long tour areas or CONUS may be curtailed up to 6 months to attend the Advanced Course. Captains who have not been to the Advanced Course will be selected for attendance as soon after they reach two years on station as is convenient to the officer and his unit. With the reorientation of the Advanced Course to better prepare officers for company command, officers can expect earlier assignment to EOAC, probably in their third through sixth years of commissioned service.

Lieutenants — Good News! DA forecasts that promotions to Captain AUS will remain at four years of active duty commissioned service. Published DA Selection Board results will reflect selectees with promotion sequence numbers. Assignments of 1LT(P)'s will then be handled by the captains desk.

Warrant Officers — The Regular Army Selection Board for Warrant Officers is accepting applications for Regular Army on a continuing basis. Engineer Branch has received procurement authority for appointment of Warrant Officers in the Engineer Equipment Repair Technician (MOS 621A) field. You should encourage and assist qualified personnel to apply. See AR 135-100.

The Warrant Officer Senior Course (WOSC) is now available via nonresident instruction. It is open to all CW4, CW3 or CW2(P) who have completed at least six years of warrant officer service and who are either on active duty or a member of the reserve components. IAW DA Pamphlet 351-20, paragraph 4, giving the course title and number (1-250-C7) and addressed to Department of Army Wide Training Support, P.O. Box J., Fort Rucker, Alabama 36360.

- **From those who manage for tomorrow . . . Professional Development:**

Project Manager — Within the framework of the Officer Personnel Management System (OPMS), the Project Manager Development Program is designed to select qualified officers for training in order to fulfill future Army requirements in the field of project management. The program, though currently under revision by the Officer Personnel Directorate (OPD) of the US Army Military Personnel Center (MILPERCEN), has the goal to qualify officers who will be responsible for the centralized management of weapons systems. Those selected will have principal responsibility for major project development to include: planning, direction and control of research and development, initial procurement, production, testing, distribution, logistical support, and leadership of an integrated team of government (military and civilian) and industry personnel to accomplish a certain objective within a designated time, cost and performance constraints. If you're interested, read the qualifications in Chapter 30 or DA PAM 600-3.

GRADUATE SCHOOL NOTES:

Requirements — All graduate training, regardless of program, is conducted in support of requirements validated by the Army Educational Requirements Board. The AERB reviews

detailed justifications from the field and validates those positions for which a graduate education is a requirement. Currently validated AERB requirements for Engineers are:

CORPS OF ENGINEERS
MASTERS DEGREE REQUIREMENTS 2/
CPT - LTC

Discipline	Current Reqmts	Displine	Current Reqmts
Civil Engineering	240	ADPS/Engr	3
Engineering General 1/	41	Geological Engr	3
Geodetic Science	21	Mathematics	3
*Nuclear Engineering	19	Architectural Engr	2
*ORSA/Engr	17	Industrial Management	2
*Mechanical Engineering	15	Sanitary Engineering	2
Topography/Photogrammetry	8	Chemical Engineering	2
Engineering Administration	8	Systems Engineering	2
*ORSA/Business	7	Physics	2
*ADPS/Business	6	Psychology	2
Structural Dynamics	6	*International Relations	2
*Area Studies	6	Business Administration	2
*Nuclear Physics	5	Astrodynamics	1
Electrical Engineering	4	Chemistry	1
*Comptroller	4	*Education	1
*Logistics Management	4	Geography	1
*Nuclear Effects Science	4	Geophysics	1
*Engineering Physics	3	Management	1
*Electronics Engineering	3		

NOTES:

1/ Positions generally in the grade of LTC which can be filled by an officer with a degree in any field of engineering.
2/ Excludes approximately 95 positions at USMA filled by Engineers. Generally these requirements are in engineering and the physical sciences.
*/ At least half of the positions in these disciplines support alternate specialty requirements.

Fully Funded Graduate Training (AR 621-1) — Application for this program is made by forwarding DA Form 1618-R (Reproducible from the copy in the AR).

CALENDAR

School Input	Application Due	Selections Announced
Jun 75	1 Dec 74	15 Dec 75
Sep 75	1 Feb 75	15 Mar 75
Jan 76	1 Jun 75	15 Jul 75

Advanced Degree Program for ROTC Instructor Duty (AR 621-101) — Applications for this program may be made at any time. ROTC inputs preceeded by graduate training are being programmed ahead as far as the summer of 1977. The academic discipline to be studied must relate to a potential future AERB assignment. As a gross rule of thumb, those academic disciplines with 4 or more AERB requirements in the preceeding chart can be supported. Study in other disciplines is

approved on a case basis considering requirements and trained assets. Study cannot be supported in areas such as generalized business administration, education, or management with 72-1, 17-1, and 20-1 trained assets per requirement respectively.

Degree Completion Program (Bootstrap) for Graduate Degree (AR 621-1, Chapter 8) — Thinking about beginning a masters degree off-duty with a goal of obtaining a "bootstrap" to finish degree requirements? Good plan, but be sure that the academic discipline is one which we can potentially support. On an interim basis until 30 June 1975, a maximum of six months study can be authorized without a utilization assignment in a discipline not validated by the AERB provided the officer has invested substantially of his off-duty time. All new participants after July 1975 must study in an academic discipline for which an AERB position exists and serve in a follow-on utilization assignment. As a rule of thumb, 6 or more requirements should exist on the preceeding list to have prospects for support. To be more specific you should consult DA Circular 351-7, Training of Military Personnel at Civilian Institutions, and/or contact Engineer Branch to insure you are aligning yourself with requirements in your Engineer or potential alternate OPMS specialty.

UNDERGRADUATE SCHOOL NOTES:

The pamphlet "What You Always Wanted to Know About Completing a Baccalaureate Degree, t Were Too Busy to Ask" has been mailed to company grade officers who have not yet completed undergraduate degree. If your copy is lost in the mail, drop us a card with your current address and we will send another copy your way. Opportunities for off-duty education do exist and this pamphlet consolidates that information on major installations world-wide. As officers become available for reassignment, we will attempt to reconcile aspirations for assignments with good off-duty education prospects with Army requirements.

Degree Completion Program (Bootstrap-Undergraduate) (AR 621-1, Chapter 8) — We omit details on this continuing program since the pamphlet "What You Always Wanted to Know . . . Ask" contains the specifics. The current estimate is that 44 Engineers will initiate undergraduate training under this program during FY 75. It appears that this will be the appropriate steady state input level for the forseeable future.

SCHOOL CALENDAR INFORMATION:

School Input	Application Date	Selection Announced
Jun 75	31 Dec 74	15 Jan 75
Sep 75	31 Mar 75	15 Apr 75
Jan 76	31 Jul 75	15 Aug 75

WARRANT OFFICER EDUCATION:

Warrant Officer Civil Schooling (AR 621-1) — There are two programs under which Warrant Officers may attend civil school — Degree Completion Program (DCP) and Warrant Officers Associate Degree Program, formerly referred to as the Warrant Officer Undergraduate Degree Program. AR 621-1 covers both of these programs which permit schooling to the associate degree level. The Warrant Officer Associate Degree Program provides for fully-funded schooling in an MOS-related discipline. The Degree Completion Program provides for schooling with maximum duration of 12 months in any discipline of functional value to the Army.

BRIDGING

TRADOC SETS POSITION ON THE UTILIZATION OF ENLISTED WOMEN

TRADOC Headquarters has spelled out its position on assignment and utilization of Army enlisted women. In accordance with current DA guidelines, TRADOC has issued the policy standards covering a variety of matters affecting assignment, utilization and training of Women in the Army:

Army Women will not be assigned to Category 1 TOE units.

Army Women are noncombatants and will not be trained or used in combat roles.

WAC personnel will deploy with their units of assignment.

Actual firing of weapons by women in the Army is completely voluntary — except military policewomen and women choosing the special unit open, who agree in their enlistment contracts to fire appropriate weapons.

Women will participate in the field training activities of their units. They will not be precluded from participating in defensive training which prepares them to defend themselves and their units.

Women who volunteer to carry arms and are qualified with an appropriate weapon may perform guard duties in selected areas.

As local circumstances permit, WAC units will be disestablished and all command and control of enlisted women will be vested in their units of assignment.

Under certain and specified conditions, female personnel may be detained in Military Po. detention cells. Returnees will be processed in the same manner as male returnees.

SELECTIVE DEFERRED MOVEMENT PLAN NOW BEING IMPLEMENTED

To avoid exceeding maximum strength limits overseas, MILPERCEN'S EPD has implemented a plan to delay or, in some cases, cancel assignment instructions assigning non-combat personnel to Europe or Korea.

The first phase, in operation now, affects service members who would normally have had oversea arrival months of March or April 1975. In these cases, new arrival dates will be set for either July or August.

In cases where such delays would cause personal hardship to the soldier because he had already taken his children out of school, cleared his quarters, or was already in transit to his oversea assignment, he would proceed according to original instructions.

In a case where a service member would not be able to complete at least 12 months of an oversea assignment because of the delay, he will be deleted from current assignment instructions by EPD.

ES REVISIONS FOR PROMOTION

E-4s recommended for promotion to the grade of E-5 must now achieve a minimum of 80 as their MOS Evaluation Score (ES) in order to be eligible for that promotion. In the past, a score of 110 was required with a waiver obtainable to a score of 100. The requirement is now set at 100, waiverable to 80.

Since this change increases the number of soldiers competing for promotion to E- underscores the importance of the commander's recommendation and the responsibility of the promotion board.

Guidelines requiring an Evaluation Score of 110, waiverable to 100, for the promotion from grade E-5 to E-6 have not been modified by the revised policy.

THE GAP

REVISED ORBs BEING SENT TO THE FIELD

Beginning in March 1975, a revised version of the Officer Record Brief (ORB) is expected to hit the field for the first time.

Highlights of the revision include an easier-to-read-and-understand format, first-time space for Officer Personnel Management System (OPMS) specialties, an expanded remarks section, and more room for listing previous duty titles and assignments.

Instructions on the reverse of the new form are reoriented toward the individual officer and personnel specialist, and more complete explanations of codes and abbreviations are now included.

Personnel officers should obtain a copy of Change 1 to AR 640-2-1 which is due in mid-February. The revision to the regulation contains instructions for the use of the revised form in the annual audit of the ORB.

Personnel offices and individual officers are also reminded that the Annual Audit of the ORB is mandatory for all commissioned and warrant officers. Results of a recent MILPERCEN study of ORB audit return rates have revealed that as many as 15 per cent of all officers fail to meet this requirement.

OPUS UTILIZED TO SUPPORT REQUISITION AND ASSIGNMENT

The Officer Personnel Utilization System (OPUS) was put to work in 1974 within MILPERCEN to provide new computer support for the Officer Personnel Directorate (OPD) in the control of requisition and assignment of officers.

OPD and the Personnel Information Systems Directorate (PERSINSD) developed this system to eliminate problem areas in the old requisition system and to eliminate dependence on antiquated equipment used to process assignments.

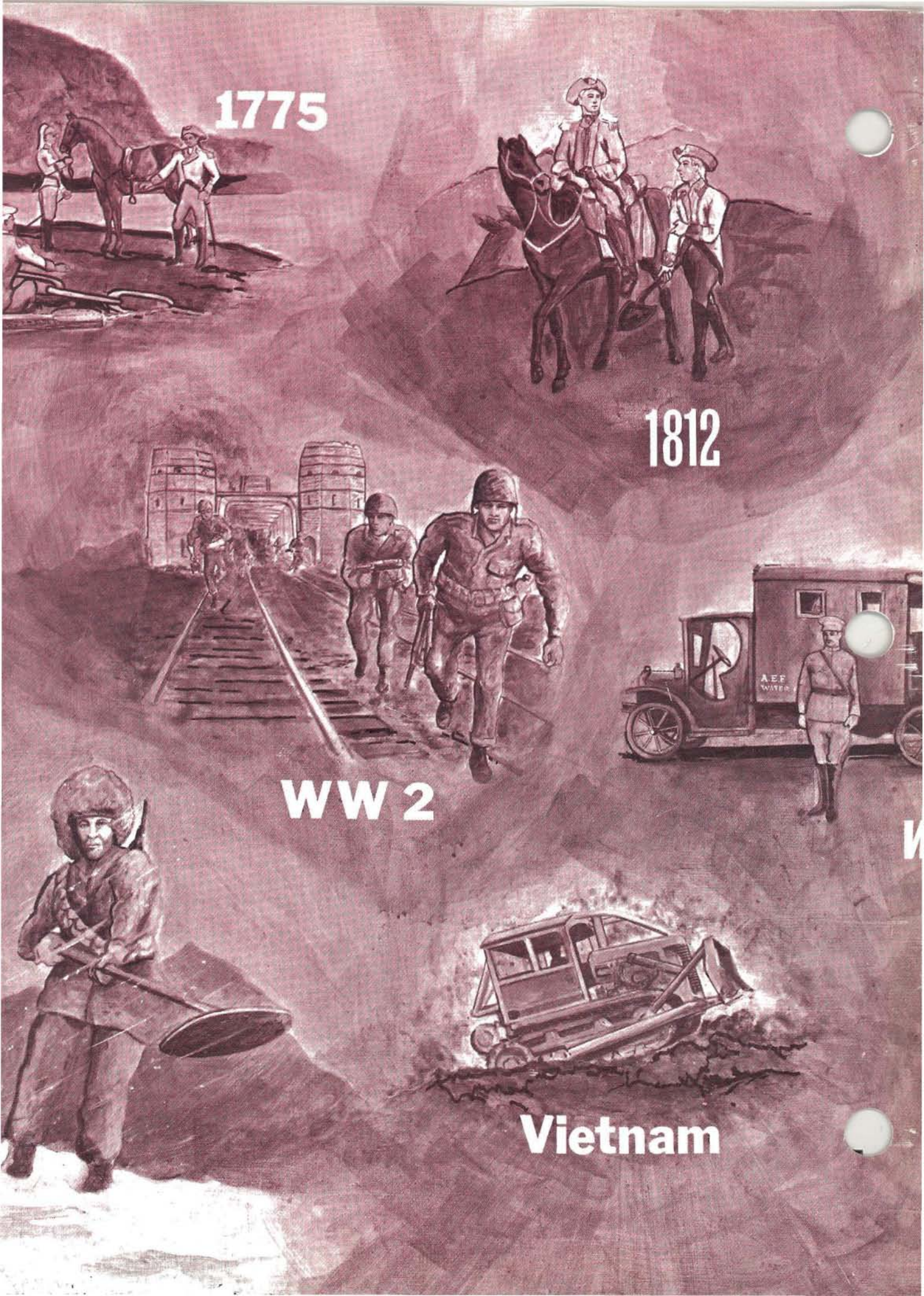
With OPUS, closer control will be maintained on the filling of requisitions by information being immediately available to the Career Branches by computer tie-ins. This will prevent such occurrences as more than one officer being placed against the same requisition or one officer being applied against more than one requisition.

Presently, OPUS has been limited to those Career Branches within OPD with the exception of the Colonel's Division. The Colonel's Division, the Office of the Chief of Chaplains, the Office of the Judge Advocate General, and the Medical Branches are slated to fall within the scope of OPUS in the near future. When accomplished, this will provide a consolidated computer system to support current Department of Army requisition and assignment requirements.

FATIGUES REQUIRED FOR WOMEN ENLISTED AT FORT BELVOIR

If you are an Enlisted Woman and have volunteered or have been selected for Advanced Individual Training at the U.S. Army Engineer School, Fort Belvoir, Virginia you will be required to wear fatigues during your training and duties while at your duty station. This uniform is a necessity for your training because most instruction is centered around working in the proximity of machinery and/or equipment. Courses that will require you to wear fatigues and combat boots during all or portions of your AIT training are as follows: 35E30, 51G20, 51L20, 52B20, 52B30, 52C20, 52D20, 62B20, 62B30, 62C20, 62C30, 81B20, 81C20, 41B20, 41K20, 82B20, 82D20, 82E20. 83D30, 83E20, and 83F20.

If you are coming to Fort Belvoir for any of the courses outlined above, you should inform your commander that you will be required to report with, at the minimum, four sets of fatigue uniforms, two pair of combat boots and one field jacket.


1775
1812
WW 2
Vietnam