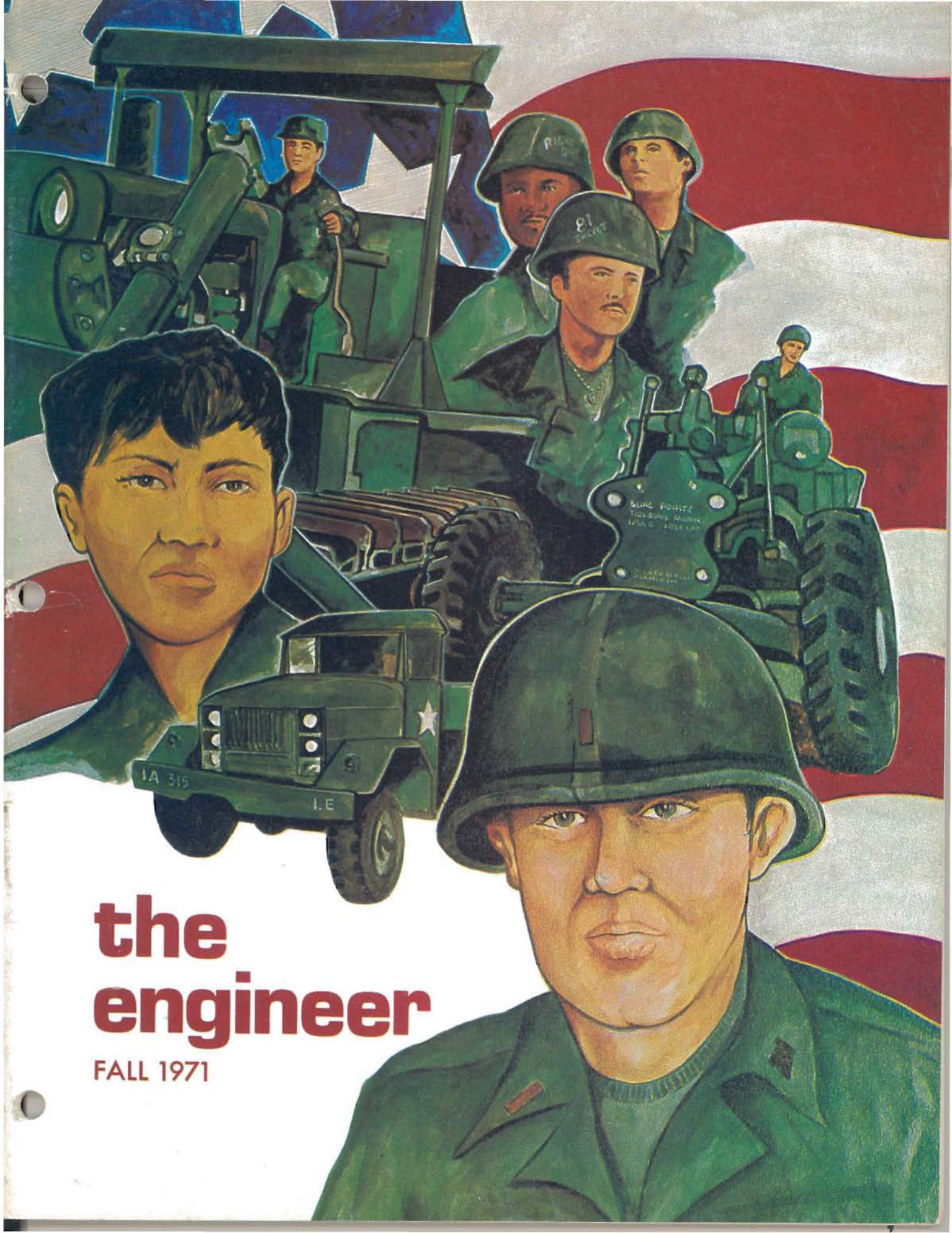

the engineer

FALL 1971

the engineer

FALL 1971 VOLUME 1 NUMBER 3

CHIEF'S BRIEFS.....

Colonel Richard Gridley, America's first Chief Engineer, was born at Boston, Massachusetts, on January 3, 1710. He was the outstanding American Military Engineer during the French and Indian War, from the Siege of Louisburg in 1745 to the fall of Quebec, which ended French rule of Canada. For his services, he was given a commission in the British Army, a grant of the Island of Magdalen, 3,000 acres of land in New Hampshire, and a life annuity. When the break with the mother country came, he declared himself for the colonies; and in the spring of 1775 was made Chief Engineer and Chief of Artillery of the New England Provincial Army, with the rank of Major General. By making this break with the Government in London, he sacrificed all his annuities and emoluments from the British Government.

On June 16, 1775, the Continental Congress authorized a Chief Engineer "at the Grand Army," and that night by lantern light, Colonel Gridley, America's first Chief Engineer, marked the lines for entrenchment for the defenses on Breed's Hill. Then, with spade in hand, he helped throw up the defenses, and in the afternoon was carried wounded from the field after having fought valiantly in the trenches. This marked Colonel Gridley as the first "pick and shovel" combat engineer in the United States Army.

The colonel was appointed Chief Engineer of the Continental Army after Washington took command in July 1775, and directed the construction of the fortifications which forced the British to evacuate Boston in March 1776. When Washington moved his Army south, Gridley remained as Chief Engineer of the New England Department to construct fortifications on the New England coast. He held that position until his retirement in 1781.

General Washington wrote that Richard Gridley was "one of the greatest engineers of the age."

Colonel Gridley died at Stoughton, Massachusetts on June 21, 1796 at the age of 86.

designed for professionals

U.S. Army Engineer School
Fort Belvoir, Virginia

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ABOUT THE COVER

The nameless faces of the men and the machines that "clear the way" in a combat zone as envisioned by Art Director John W. Savage, Jr., illustrates the Engineer presence in Vietnam.

Pipeline

OUT OF THE BLUE

A SKYCRANE AIRLIFTS concrete to tower bases that support the steel towers which in turn will support the new roadway span on the Chesapeake Bay Bridge. In a continuing series of shuttle flights, the Skycrane lifts the prepoured concrete in four-yard buckets, and flies to a barge anchored along the individual towers. Each four-yard load weighs about 17,000 pounds. The concrete is released into a hopper on the barge and is then transferred by conveyor belt to the tower foundation and spread by work crews. U. S. Army engineers have been watching this operation with interest because normally concrete work over water is done with barges. The Skycrane method can do the job in 19 days. It would take six months to do the job under the conventional method.

NO MILITARY CONSTRUCTION FUNDS SLATED FOR SE ASIA SUPPORT IN FY 12

The Defense Department has requested a whopping $2,259.4 million in authorizations for military construction during Fiscal Year 1972 as compared with DOD requests for $1,893.3 million in FY 1970 and $2,069.1 million in FY 1971.

None of the FY 1972 money will be used for military construction in support of operations in Southeast Asia. This is the first time since the buildup began over there that DOD has requested no authorization or appropriations for military construction for that area.

Actual enactments in the two prior years totalled $1,639.7 million and $2,001.2 million, respectively.

The increase in requested FY 1972 authorizations over the amounts requested for fiscal years 1970 and 1971, is due primarily to additional emphasis on housing for both bachelor and married personnel as well as increases for pollution abatement and Reserve Forces facilities.

NEW ENGINEER LAB MOVES FROM NATICK TO FORT BELVOIR

The Earth Sciences Laboratory (ESL) has finally relocated from Natick, Massachusetts, to its new address with the U. S. Army Engineer Topographic Laboratories (ETL) at Fort Belvoir, Virginia.

ESL was officially transferred from the Army Materiel Command (AMC) to the Corps of Engineers last May but the physical move was just completed in September. The Corps of Engineers' U. S. Army Topographical Command is the parent organization of ETL.

The ESL mission is to perform research and development in the fields of environmental and geographic sciences.

BATTALION SOLVES MAJOR PROBLEM FOR SMALL TOWN

The 293rd Engineer Battalion has taken a long step toward cementing German-American friendship for the U. S. Army Engineer Command, Europe.

When the wells went dry in the small town of Odenbach near Baumholder, the citizens were faced with a major problem. The town

had no water trucks and needed help quickly. It came from B Company of the 293rd.

The unit sent a water truck to the town every day until the water supply was relocated. Engineer drivers made 14 trips a day—accounting for 44,000 gallons of water—to keep the town well supplied.

Odenbach did not forget B Company. As a token of their appreciation, the citizens presented a pewter teapot to the company. In addition, all members of the unit were invited to an Odenbach festival.

ARMY TAKES HARD LOOK AT NEW "SOFT" LENS CONCEPT

Engineers who must wear eyeglasses while using optical-lens equipment may soon be wearing special "specs."

Some soldiers have broken their glasses while using surveillance devices and have suffered a double tragedy—they sustained eye damage and the Army lost some highly-skilled specialists.

To counteract this problem, the Army is looking beyond the ordinary contact lenses toward a principal called the "soft" lens.

These are flexible silicone rubber lenses which appear to meet many of the required characteristics such as safety, comfort, stability and continuous wear for a minimum of five days in a military environment.

Recent studies and surveys by the Combat Developments Command indicate that some 35 percent of our soldiers wear glasses (26 percent came into the Army wearing them.)

Also listed are some 92 optical sights and devices that a soldier with glasses would have difficulty operating, or that he could handle more effectively with "soft" spectacles. Engineer equipment that Corps personnel, who wear glasses would have difficulty handling, include—plotting instruments, mechanical stereo platters and other surveying instruments, azimuth measuring devices and theodolites.

24TH ENGINEER GROUP GETS NEW CREST

Members of the 24th Engineer Group, based in Kaiserslautern, Germany, have pinned on a new insignia that significantly portrays highlights of the unit's history since its activation.

The scarlet and white colors of the insignia are, of course, the colors of the Corps of Engineers. The Korean Gate (South Gate of Seoul) and the laurel wreath commemorate the unit's combat history during the Korean War. The 24th earned two Republic of Korea Presidential Unit Citations and eight campaign awards (battle stars) for its service during that action.

The laurel, indicative of merit, together with the scarlet knot, also refers to the Meritorious Unit Commendation for Korea. The 24th Group's World War II campaign service in Europe and historic Combat Engineer mission are noted by the sword.

The pick mattock signifies the organization's subsequent and present Engineer Combat mission.

ENGINEERS LAUNCH PROGRAM TO ATTACK WATER POLLUTION

The Engineer Corps has initiated a two-pronged program aimed at cleaning up the nation's rivers and lakes.

Feasibility studies into wastewater management problems should provide some answers. Two programs, the permit program, aimed at keeping pollutants out of the water and the waste-management program, aimed at finding other ways to get rid of them. ∈

engineer interview:

with major general Robert R. Ploger

The fall issue of **the engineer** *magazine is highlighting Engineer accomplishments in Vietnam and on many of the following pages, hopefully, provides an in-depth account of the trials and successes since the buildup began in 1965.*

To get answers to some of the more probing questions, **engineer** *Editor Bob McClintic asked an expert on such matters.*

That expert, Major General Robert R. Ploger, Commanding General of the U. S. Army Engineer Center and Fort Belvoir, and Commandant of the Engineer School, Fort Belvoir, Virginia, has written a book about the exploits of "Army Engineers in Vietnam—1965-1970."

A veteran combat engineer with 32 years in the Corps, General Ploger commanded both the 18th Engineer Brigade (the first major engineer combat unit in Vietnam) and the U. S. Army Engineer Command during a two-year tour in that country.

McClintic took the following impressions away from the interview:

"General Ploger's headquarters offices are located at Flagler Hall, an old brick mansion that nestles midst gigantic oak trees adjacent to Fort Belvoir's spacious parade ground. Two bronze cannons, their glitter turned to a greenish-blue patina by time and natural oxidation, stand majestically at the entrance.

"At first glance, General Ploger looks like the typical large corporation president, or a banker, or a flag officer. He is the latter.

"He comes across in conversation as a true gentleman with a quick and agile mind. His great compassion for his troops is readily apparent—especially for the private, the noncommissioned officer, and the young officer.

"It is said that the mark of a soldier can be weighed by his combat decorations, his various badges, the mileage he has covered throughout the world, and the wars he has fought.

"It is also said that one need look no further than a man's eyes to find the mark. In General Ploger's case, the mettle shows through in the wisdom and deep comprehension reflected in his piercing, unwavering eyes. Even if he were incognito and in mufti, the general would impress you in a direct confrontation as someone who has been there and back and would like to go back again."

Commissioned in the Corps of Engineers in 1939 following graduation from the U. S. Military Academy at West Point, General Ploger's career has had many highlights.

"We must use every man . . ."

". . . must use every machine . . ."

"and every moment to advantage."

During World War II, he made the Omaha Beach landing as engineer advisor to the commander of the 29th Infantry Division, and later led the 121st Engineer Combat Battalion through the Normandy, Northern France and Germany campaigns. When the buildup in Vietnam began in 1965, General Ploger was tapped to command the 18th Engineer Brigade.

He later became the CG of the U. S. Army Engineer Command and Senior Advisor to the Chief of Engineers of the Republic of Vietnam. The general has served in many other command assignments —Army Division Engineer for New England, Topographer of the Army, and Director of Military Engineering in the Office of the Chief of Engineers.

The general has two masters degrees—one from Cornell University in Engineering, and the other from George Washington University in Business Administration. He also attended the Industrial College of the Armed Forces and after completing the resident course, served for three years on the staff and faculty as a lecturer with a National Security Seminar team of the college.

General Ploger wears three hats at Fort Belvoir and, consequently, has three fundamental missions. One, he commands all of the units that are assigned to him at Fort Belvoir. Two, as Commandant of the Engineer School, he manages a highly-technical institution involved in providing future military engineers with the professional and technical expertise necessary to meet all engineer responsibilities in the future Army. Three, as post commander he provides logistics and administrative support for some 30 organizations that are located at Fort Belvoir but are not assigned to the Engineer Center.

General Ploger sums up his Fort Belvoir assignment most appropriately: "With the preparations we are making, engineers of the future Army will be abreast of every advance and ready once again to respond as professionals."

ENGR: GENERAL PLOGER, YOU ORGANIZED THE ENGINEER COMMAND IN VIETNAM AND HAVE WATCHED IT GROW FROM INFANT TO MAN-SIZE PROPORTIONS. YOU HAVE BEEN VITALLY INVOLVED IN ITS MANY AND VARIED ACCOMPLISHMENTS. WOULD YOU COMMENT ON THE COMMAND ACCOMPLISHMENTS?

PLOGER: I started out when an engineer presence already existed in Vietnam. There were some 5,000 officers and men already on the ground when I got there but I saw the Engineer Command grow to a strength of about 30,000. The accomplishments ranged across the full scope of engineering—from such simple things as preparing terrain analysis for tactical commanders to the erection of highly complex structures. I think the real accomplishment is measured in the statement of many tactical commanders over there who said that no operation, tactical or otherwise, suffered or failed to be performed because of any shortcoming on the part of engineering input.

ENGR: WOULD YOU COMMENT ON THE COMMAND'S PROBLEMS SINCE ITS ESTABLISHMENT IN LATE 1965?

PLOGER: I would say the problems were mostly associated with making the environment adaptable; amenable to our interests. We had a few organization problems such as finding people with the right skills and getting adequate supply support. There was a shortage of engineer and construction materials, and spare parts. I suppose the most serious problem related to spare parts support—keeping the equipment functioning. Another major problem that was unique to South Vietnam was the necessity to keep book on every bit of construction that we performed. We had to set up a cost accounting program to insure that we were not violating congressional appropriations legislation in terms of financial construction. We were also trying to find solutions to things like dust control, and counter-mine warfare.

ENGR: WHAT HAS BEEN THE MAJOR MISSION OF THE ARMY ENGINEER IN VIETNAM?

PLOGER: The major mission has been to insure that the engineer expertise is provided to enhance the success of tactical operations. This goes beyond direct application to the tactical situation because, in order for the tactical operation to work, you must worry about equipment, spare parts, weapons, maintenance, ammunition and petroleum reaching the users where and when they need it. The engineer provides a logistics framework structure, facility support, roads, airfields, and ammunition storage areas. We provide these facilities all the way from the shoreline to a battle site for the tactical commander.

ENGR: WILL THE ENGINEER MISSION CHANGE TO MATCH THE CHANGE IN ITS PERSONNEL STRENGTH IN VIETNAM?

PLOGER: The mission will not change. It is, of course, set forth in Army Regulations. It is further defined locally to meet a particular situation. There will be less involvement of U. S. engineers in combat operations because the elements they support are being removed from this activity. We are now pointed more toward supporting the Vietnamese—through training, education, example, and advisors. Our mission is not changing but the proportion of time devoted to the different aspects will unquestionably change—as it has over any period of time. For instance, in the very early days of our period in Vietnam, a tremendous proportion of our time was devoted to the development of the bases from which U. S. forces could launch attacks. Subsequently, this changed and more and more engineer effort went into the support of tactical formations in the field.

ENGR: AS A VETERAN COMBAT ENGINEER, DO YOU THINK THE WAR IN VIETNAM HAS BEEN MORE TRYING FOR ENGINEERS THAN THE TWO MOST PREVIOUS WARS—WWII AND KOREA?

PLOGER: I think Vietnam presented more of a challenge. This might not be universally true. We had people in the Southwest Pacific and in the Burma, China-India area who endured the same kind of weather that is characteristic to Vietnam. But there were new challenges. There was a demand for greater competence in the construction business than was true in the past. We combat engineers from combat battalions were involved in constructing some rather sophisticated facilities. For example, at An Khe, the 70th Engineer Combat Battalion built an ice plant. Although prefabricated, it was still a fairly complicated structure. Another challenge to those engineers

who lacked experience in the tropics stemmed from the intense rains and heavy runoff characteristic of Vietnam. Engineers had to worry about drainage every place over there. You can get up to five to seven inches of rain a day nearly anywhere in the country. Another serious challenge was the cost accounting program. This was a very tough problem to address in a combat circumstance. But we did address it and did a very fine job of accounting for construction. Both combat and construction battalions had to keep cost records on whatever they built. This is something that was not required in previous military tactical operations. We used to be able to draw supplies to do whatever construction was required with little regard to its intended use. This time we had to account for how much went to Army military construction. How much went to operations and maintenance for the Army? How much was chargeable to other purposes? This was a whole new problem area that was unique to tactical operations in South Vietnam. I would hope we could find some shortcuts if we should ever have to repeat this kind of operation outside the United States. Engineers are not using their skills to best advantage when they are required to be accountants. This is not their area of expertise. If we need accountants, perhaps we should have some people so qualified, come in and handle that side of the program, and let the engineers go on with their own special skills.

ENGR: WHAT DID YOU THINK OF THE ENGINEER SOLDIER AND OFFICER IN VIETNAM? WERE THEY AS GOOD AS THEIR COUNTERPARTS IN PREVIOUS WARS WHERE YOU HAVE SEEN ACTION?

PLOGER: They were the best ever. I placed trust and confidence in both the officer and enlisted man working on engineering items in South Vietnam. They responded with enthusiasm and never let me down. They had a staggering task and yet they handled the job with characteristic aggressiveness. They did not complain about working 10 to 12 hours a day, seven days a week. Work was the byword. I always felt that the engineer soldier and officer in South Vietnam worked more diligently, harder, and longer hours than any other element of the military command. I agree that the engineer's job is probably more interesting. In any event, the response was universally tremendous.

ENGR: DID THIS WAR REQUIRE MORE SOPHISTICATED EQUIPMENT TO GET THE JOB DONE THAN WWII AND KOREA?

PLOGER: Yes, I would say it did. Of course, one could do most engineer field tasks with shovels and manpower. The more sophisticated equipment we received over there, made it possible for us to do more, faster and better. We received larger trucks for highway construction, pneumatic drills for rock quarry work, and new well-drilling equipment. During WWII, we used PSP —Pierced Steel Plank for our airfields. We needed something better than that in Vietnam for the more sophisticated military aircraft of today. Thanks to development efforts back in the States, we were able to use Solid Steel Plank, SSP, and two

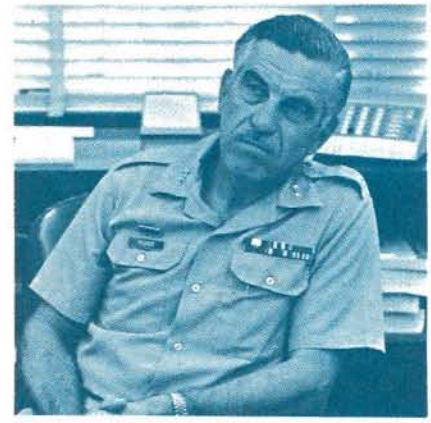
forms of aluminum matting for runways.

ENGR: WHAT WERE SOME OF THE MORE IMPORTANT LESSONS MILITARY ENGINEERS LEARNED FROM THE VIETNAM WAR?

PLOGER: Probably the most important single lesson is the recognition of the need for using every man, machine, and moment to advantage. One must do earth work even when it is raining. You must find ways to build and to move and mold earth in spite of the weather. A prime example of this is reflected in the building of highways in the Delta. We took a technique which had been used in the States, expanded it, and improved upon it to construct roads of clay using lime as a stabilizing material. I was also personally involved with trying to build an airfield at Long Thanh, where in spite of frequent rains, we had to build a four-thousand-foot runway in a relatively short period of time. Yet, we could expect some rainfall every day. Fortunately, even in a monsoon period you get some sunshine between the rain storms. We developed methods to keep the ground covered with some T-17, a rubberized membrane. When the rain started falling, we would cover what was being worked on and as soon as the rain stopped, uncover it and begin working again. We found it possible to work in some areas even during the course of the rain. If the rain does not get so heavy that your wheels are bogged down, you can continue moving. This, I think was a major technical advance. There were a number of others involving airfield construction. The combat battalions, in particular, got into this one. The air mobile concept of engineer support was another major innovation. It has proven out very well in South Vietnam. We have developed good systems for supporting air mobile operations. The line of communication development was not really something new. Wherever engineers go, we are in the road building business. Dust control systems, revetment systems for protection of facilities, protection of bridging against sabotage, against interference by enemy forces, were the principle things we had to think about in that respect. You can not build roads in that country without including these programs in your overall plan.

ENGR: HOW DO THESE LESSONS RELATE TO THE PROPOSAL FOR REVAMPING THE CONSTRUCTION BATTALION?

PLOGER: The school study on the construction battalion resulted from a Chief of Engineer's Board which was looking over our organization for construction. Based upon the experience in Vietnam where construction has been so extensive, the Board came up with a system of organization that would sort of parallel the way a contractor operates in this country. A major contractor has his various crafts operating under different management setups. This is the most efficient way to perform for a major construction operation. Certainly a contractor would not organize in that manner otherwise, because he is working to make money. So, why don't we do the same thing in our construction battalion? Why don't we organize according to skills and put all the electricians in one element, all the carpenters in another, and all of our equipment in another? This way, when you need a particular skill or craft on one job, you call on that element of command. A lot depends on the size of the jobs. An alternate proposal, then, is instead of using a battalion organized as a contractor, we would use a company organized as a contractor. The counter-proposal to the Board's was to use the company as the base, as a contractor, but distribute these various skills so that each company has the same skills apportioned evenly. The battalion organization where Company A might have all the carpenters; Company B might have electricians and plumbers; Company C might have something else, and Company D might have all the equipment; would conform to a larger contractor. The question as to which proposal is right is partly answered by knowing how big the jobs are you are going to be handling. Is one job going to absorb a complete battalion in one location? Or is it going to absorb one company in one location with the others elsewhere—at three other sites? Then you would need four companies; each capable of doing the same thing. Another, almost philosophical question, is—should the Army seek to operate like a contractor? I tend to feel we should not, because in the military the incentive for performance by a construction organization is not measurable in dollars. It is measurable in lives; it is measurable in responsiveness. Dollars must be given secondary consideration; whereas for a contractor, it is the principal factor. We are trying to save lives and we do that by exercising very tight control over our soldiers. The tighter control comes about in the smaller organizations with clear-cut near-continuous lines of command —with parallel lines of command and operational control.



ABOUT THE USE OF THE CIVILIAN CONSTRUCTION OUTFITS IN VIETNAM? THEY HAVE BEEN DOING A JOB OVER THERE AROUND A COMBAT SITUATION WHERE A HOT WAR ACTUALLY EXISTS.

PLOGER: If we can pay money enough to have civilians work in a combat situation, it is fine. They have made major contributions in South Vietnam, even in near-combat situations. In fact, this is one way in which we tried to divide up the work. Where the situation requires people with weapons to guard the workmen, we have tried to use our troops. Where there is no imminent danger to the workman, the contractor should and can work to the advantage of everyone. Any contractor will have difficulty hiring people if they are going to become shooting targets while at work. If these people are fired upon, they scatter—and are rather slow to return. If repeated, a point is soon reached where they do not produce at all. This is not the right place for a contractor to operate, but I certainly would emphasize that in Vietnam they did perform a major service. They filled a role which we were not prepared to replace.

ENGR: COULD OUR RESERVE CONSTRUCTION BATTALIONS HAVE DONE THE CIVILIAN CONTRACTORS JOB IN VIETNAM IF THEY HAD BEEN CALLED UP? WOULD THIS HAVE SAVED MONEY IN THE LONG RUN?

PLOGER: If we had called up the Reserves, yes, they could have done the job. They probably could have done everything because our Reserve construction battalions have the same kind of skills you would find in a contractor's outfit. So that could have been done but military manpower is more expensive than civilian manpower. A contractor does not have to worry about training his people on military aspects, tactics, and all this sort of thing. This is not part of his business. He does not particularly care whether his people wear dungarees, undershirts, or shirts at all. He is concerned about their health and safety. But there is a difference between training and equipping a work force and offering them steady employment. A contractor can hire people for one job. When they are no longer needed, they are off the payroll. A contractor does not have to carry workers over a long period of time when they are not doing something constructive. These things all tend to make the military man more expensive to the taxpayer than the civilian workman. After all, when you pay for a soldier, you are paying for a lot more than a construction worker. You are paying for much more than just construction ability.

ENGR: DURING WWII, ENGINEER SOLDIERS LAID DOWN THEIR PICKS AND SHOVELS, GRABBED A WEAPON AND FOUGHT AS INFANTRYMEN, ON OCCASION. HAS THIS ALSO BEEN THE CASE IN VIETNAM?

PLOGER: Yes, I guess the most frequent brushes with the enemy by our engineers were in connection with ambushes. Units were hit from time to time from ambush. This meant they had to always be ready for anything. Our troops took a heavy toll of the enemy that tried to ambush them.

ENGR: NOW THAT THE WAR IN VIETNAM IS WINDING DOWN, WILL THE ENGINEERS PLAY A MAJOR ROLE IN THE RETROGRADE OF SUPPLIES AND EQUIPMENT FROM THAT COUNTRY?

PLOGER: This is principally a logistics operation. Engineers are involved but I suspect that there will be few items brought back by the engineers. South Vietnam needs most of the bridging and other construction materials and equipment to carry on what we started. We are involved in making sure that the Vietnamese can continue with the construction modernization of the engineering base in South Vietnam. The LOC (lines of communication) program, which in lay terms means road network, has been a major contribution to the economy, the cultural development, social development, and political development of South Vietnam.

ENGR: WHAT CAREER ADVICE CAN YOU PASS ON TO THE YOUNGER ENGINEER OFFICERS AND ENLISTED PERSONNEL RETURNING TO NEW ASSIGNMENTS FROM VIETNAM?

PLOGER: I would urge each of them to commit their experiences to writing. Secondly, I would urge them to seek to widen the value of their experience. One of the shortcomings of many people returning from Vietnam is that they saw a little piece of the country and many of them think that their little part is just like every other little part. mate, in the types of works and in the types of organizational relationships across the country. So, they should seek to exchange ideas with their peers and subordinates and those superiors that remain around. They should not accept observed practices as absolute. They are not absolutes. They are activities relating to a particular environment which may not apply in the next location. I would say to each of them—capitalize on that experience to the maximum degree, work to improve their education, and learn through exposure to the different experiences of others. These things will make them more valuable to the Army and to the country in the future.

CLEARING THE WAY

ROBERT G. McCLINTIC
Editor—the engineer

His name was Robert E. Knadle.

There was little to set him apart from the average young man in mainstream U.S.A. except that he was a second lieutenant in the Corps of Engineers.

Even after he was ordered to Vietnam, there was nothing to distinguish Lieutenant Knadle from hundreds of other young officers over there doing their jobs as platoon leaders.

But, as things turned out, Lieutenant Knadle was quite different from many of his contemporaries. He had a date with destiny. It cost him his life. It also put his name on this country's records as a winner of the nation's second highest combat decoration—the Distinguished Service Cross.

This is what happened: While enroute to his base camp by jeep from an operation near Phu Li Bridge on October 9, 1967, Lieutenant Knadle and his squad were ambushed by a numerically superior Viet Cong force firing automatic weapons and grenades from both sides of the road. The lieutenant was wounded and his vehicle was disabled by the barrage but he directed his men to defensive positions while remaining in the open near the jeep to radio for reinforcements and medical evacuation. Disregarding his own safety, the lieutenant maintained radio contact with friendly forces until he was seriously wounded by an enemy grenade. Even then, he refused aid and led his men against an enemy attack. Although he was mortally wounded during the fire fight, Lieutenant Knadle's actions inspired the squad members to continue fighting until reinforcements arrived and defeated the hostile force.

Highway 19 is surfaced with asphalt.

Grader is used to spread and level lime.

Engineer-built base camp post exchange.

Saigon's 100-acre port complex.

This is but one example of engineer determination and sheer guts against a crafty enemy. There are hundreds of others.

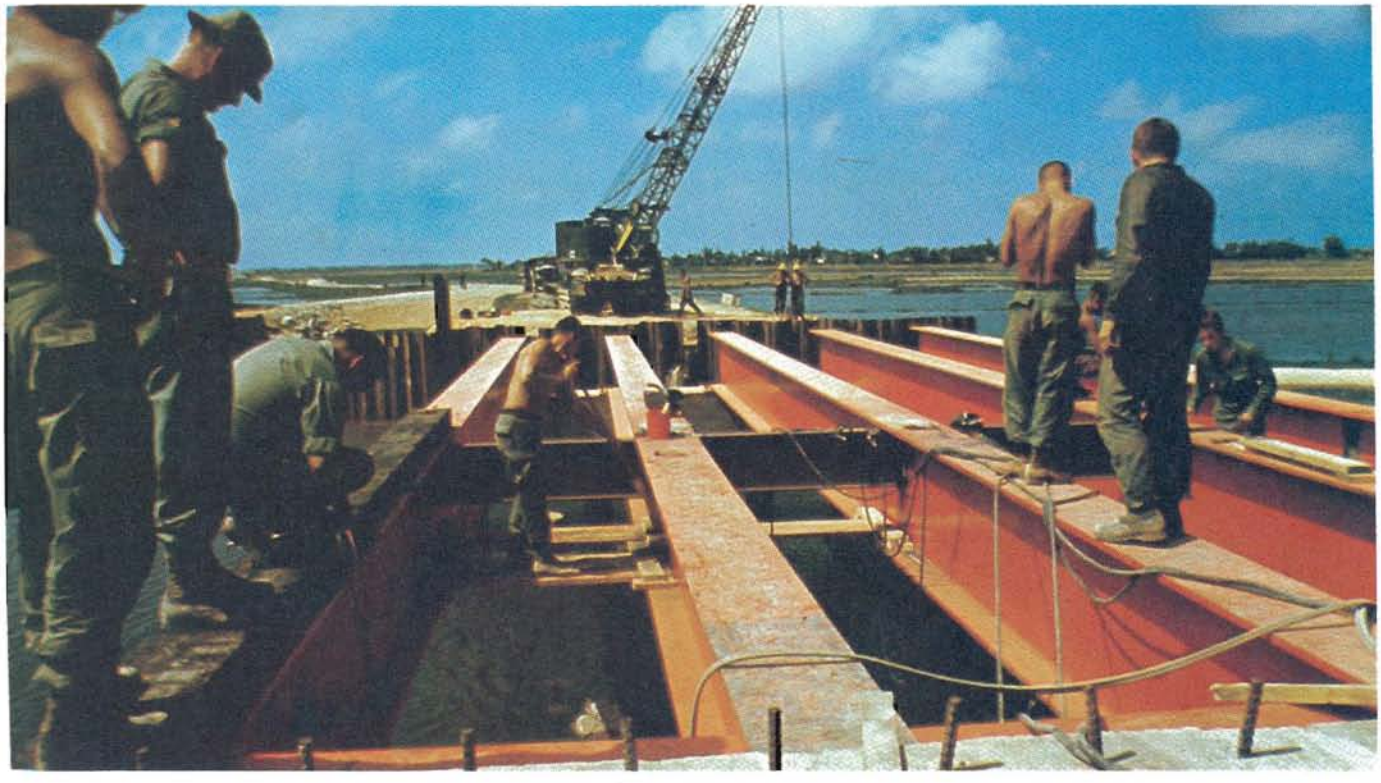
Heroics, of course, was not the big engineer story in Vietnam. Theirs was an untold story of flexibility which enabled them to get the job done in the early going with little more than determination and good old American ingenuity.

When the buildup began in Vietnam, the engineers were faced with challenges they had never had to cope with in previous wars. There were old roads, dense jungles and the new air mobility concept that introduced the helicopter in varied roles to an elusive enemy.

Engineers rebuilt the roads, cleared the jungles with the "Romeplow" and the LeTourneau tree crusher, and surfaced the airfields and heliports with a new type of landing mat and a waterproof membrane that can control dust swirls caused by propellers and rotor blades.

Also introduced for the first time in military history was the DeLong pier—a dock that can be towed from one harbor to another to berth deep-draft cargo ships.

These are only some of the major highlights of the story but what about the rest? Engineer operations are usually back page filler but if it were not for their unexciting projects the combat job in Vietnam could not be accomplished.



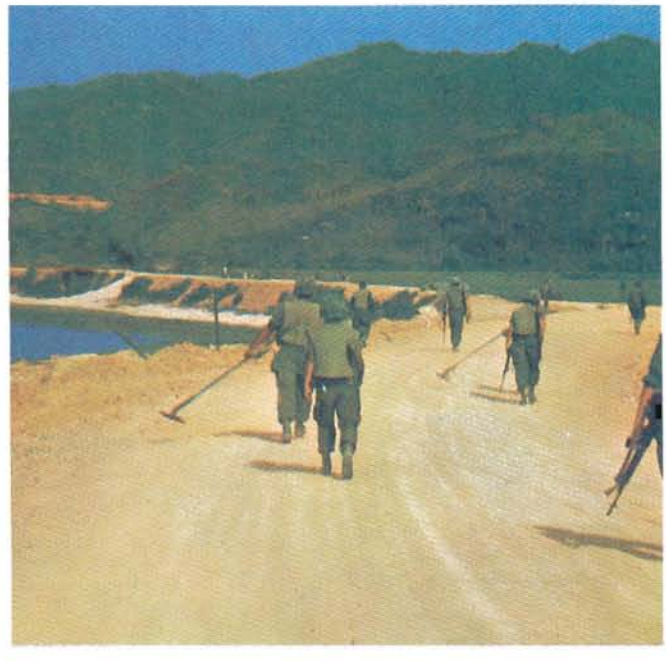
Steel and concrete bridges replace low load capacity bridges.

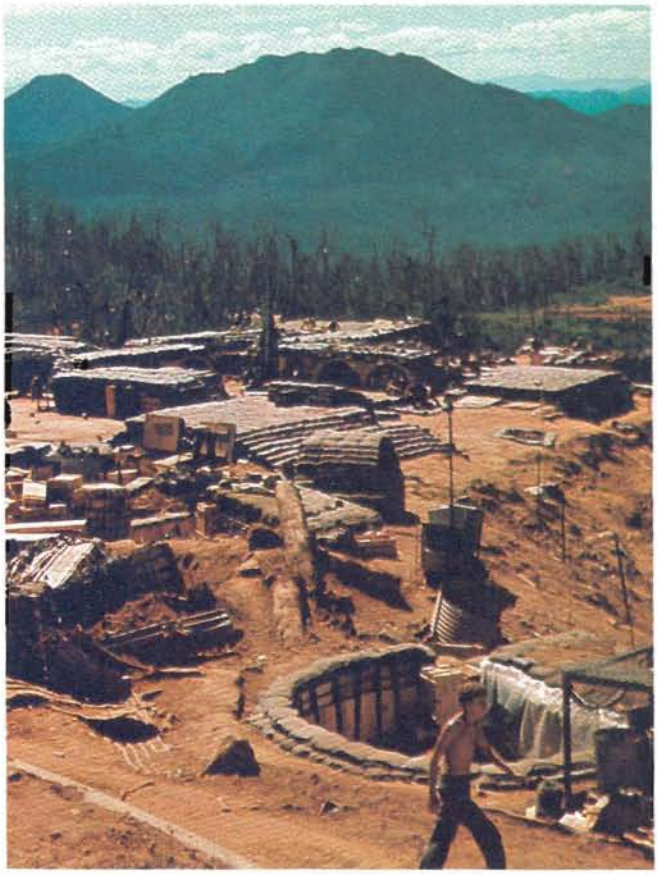
To get true insight into the total engineer picture over there, we must look at all of the innovations and methods our people have employed to make their mission a success in a complicated environment.

First off, we should set the stage with a geography lesson. South Vietnam is crescent-shaped and is perched on the southeastern edge of the Indochina peninsula. The arc formed by South Vietnam is about 700-miles-long and ranges in width from 40 miles in the north to 120 miles in the south. The country is bordered on the north by Communist Vietnam and on the west by Laos and Cambodia. The South China Sea is on the east and the Gulf of Thailand is on the Southwest. South Vietnam comprises about 66,000 square miles; has a coastline of more than 1,500 miles, and a population of about 16-million people.

Vietnam's climate is tropical monsoonal with a wet season in most sections during the southwest monsoon (from mid-May to early October), and a relatively dry season during the northeast monsoon (from early November to mid-March). Most of the northern two-thirds of the country consists of forested mountains and hills characterized by steep slopes, sharp crests, and narrow valleys. Most peaks are from 2,000 to 6,000 feet above

Daily mine sweep.





Forward fire base construction.

sea level. Few exceed 8,000 feet. In the west central part of the country, the mountains give way to rolling plains 1,000 to 3,000 feet above sea level while the southern third consists primarily of the vast delta of the Mekong River. The Mekong Delta is a flat, low lying rice growing plain, mostly flooded from early June through December. Elevations throughout the Delta are generally less than 10 feet above sea level and dense networks of canals and ditchs connect the wide, deep, and meandering distributaries of the major rivers.

The mountains and hills of the north and west are covered with a dense jungle growth that prohibits cross country vehicle movement and serves as cover for guerilla operations. The silty soils of the delta are rich in clay and organic material and present many problems for building foundations, roads, and airfields.

On top of all this, there is the dust. It exists almost everywhere when it is not raining or muddy. The dust acts as an abrasive when caught up in the working parts of equipment. It also presents a morale problem because it sifts into the clothing, food, and living quarters of our troops.

This, then, was the terrain and climatic situation our engineers faced when the buildup began in 1965. When the engineers got there they were in immediate trouble because of the poor roads in South Vietnam. The total highway system consists of about 12,000 miles of roads; one-fourth of which had a bituminous-treated surface. Only primary roads had sections permitting two-way traffic.

Through hard work and perseverance, the Engineer Command, Vietnam, rebuilt the roads and did many more things than can be told here. The Command, which consists of four Engineer groups and three Engineer districts (also two brigades until recently), expends nearly 50 percent of its effort on combat and operational support and the rest on base and road construction.

Here are some of the Command's major accomplishments during the past five and one-half years in Vietnam:

• *Item*—Engineers developed deep draft ports at Danang, Qui Nhon, Vung Ro Bay, Cam Ranh Bay, Saigon, and Vung Tau to accommodate the some 600,000 tons of incoming cargo per month.

• *Item*—Engineers began work in June 1965 to construct a port and logistics facility at Qui Nhon. How to do it was the problem. Qui Nhon was an overcrowded coastal town that reached almost to the shoreline. Little real estate was available close to the harbor for building a port or depot. No facilities existed for handling deep draft ships and the harbor channel was too shallow to accommodate them. The construction of the port included the extension of the peninsula with about 45,000 cubic yards of fill to create a useable area of 220,000 square feet for off-loading and lighterage. The mission was to build a port and harbor capable of handling deep draft ships. The Army Engineers' large sea-going Civil Works dredge, the Davison, was withdrawn from its operations in the Portland, Oregon, area and sent to Vietnam. It was brought in to deepen the two-mile-long approach channel to the Qui Nhon port area. The turning basin was deepened by a hydraulic dredge. A deep draft port was then constructed using hydraulic fill providing a large surfaced transit storage area and causeways with paved roads. Today, the port of Qui Nhon has four deep draft berthing spaces at the DeLong pier and transit storage space along the causeways.

• *Item.* Engineers have constructed four deep draft piers at Cam Ranh Bay which is one of the best natural deep water harbors in Southeast Asia.

They also built a gigantic depot there.

• *Item.* Engineer soldiers built the community facilities in the base camps. These facilities included the post exchanges, the chapels, and the libraries.

• *Item.* Engineer troops and civilian contractors have drilled hundreds of water wells at the various camps throughout Vietnam. In developing the wells, they had to construct water tanks and install treatment facilities.

• *Item.* Engineers built many of the Army hospital facilities in Vietnam. They also constructed many of the field hospitals and convalescent centers.

• *Item.* Engineers have established quarries and crushing units throughout the country that produce about one-third of a million cubic yards of crushed rock each month.

• *Item.* Engineers have built many steel and concrete bridges as replacements for low load capacity bridges. Some of the longer bridges represent significant engineering achievements.

• *Item.* Engineers helped construct the many airfields throughout the country. They have also built numerous aircraft support facilities such as control towers, protective parking revetments for rotary wing and fixed wing aircraft, and maintenance hangars.

• *Item.* Engineers have been applying dust palliatives to roads, airfields, and base camp areas daily for the past few years. They use an asphalt emulsion known as peneprime to suppress the dust which has caused serious maintenance problems with our complex equipment.

Of course the primary mission of the Army Engineer in Vietnam is to support the combat soldier. As in World War II and Korea, he has been doing just that.

Engineer soldiers often accompany Infantry assault waves or sweeps. After being "choppered" to a jungle clearing, Engineer troops cut helicopter landing zones with chain saws and demolitions and help construct defensive positions.

The jungle has been a major problem because it is here that the enemy has had some sanctuary. So, the U. S. Army developed a new concept in jungle warfare. An Engineer land clearing team outfitted with 30 tractors with special tree cutting blades can mow down all vegetation in any section of the jungle in a matter of hours. To date, more than three-fourths of a million acres of jungle have been cleared by the special Engineer teams.

Constructing forward fire bases is another job that has been set aside for the Army Engineers. There are a number of ways engineers complete this mission. Some engineer units have an air mobile capability. So they prefabricate smaller bunkers, guard towers, and other structures in the rear areas and airlift them to the forward fire bases. The larger bunkers are constructed on-site. Engineers also provide this type of combat support by constructing artillery fire support bases.

The roads are still the principal means for the movement of supplies and equipment even though both the helicopter and new transport aircraft are used extensively for this type of thing. To keep the access roads free from land mines and booby traps, Engineer troops must sweep hundreds of kilometers each day. They do almost all of it by hand because it is the most reliable. This method is also the most dangerous. Mine rollers and mine dogs have been used to detect mines with only partial success.

The scope of the U. S. Army Engineer Command, Vietnam, is tremendous. During a one-year period, the Command cleared more than 100,000 acres of jungle, paved some two-million square yards of airfield surface, moved more than 20-million tons of earth and fill, built more than 150 miles of road and logged more than seven-million hours in the repair and the service of equipment. The Command also rebuilt and graded the north-south coastal highway, erected troop housing, storage depots and other facilities totaling over 10 million square feet, and completed four miles of tactical bridging.

Army Engineers have done an outstanding job in a difficult land during a difficult war. They have been the builders of the landing pads and the runways for our aircraft. They have built new roads and rebuilt old ones. They have drilled and blasted through rock banks to open passes for our troops. They have mapped that country to provide precise information in support of Army artillery, hydrography and navigation, and the location of Air Force and Navy radar sites. They have carved out an engineering record that is unparalleled in the annals of warfare.

Our engineers have learned their lessons the hard way and well in Vietnam. But they have forged ahead through know-how, sophisticated new equipment and modern management techniques. The knowledge they have acquired over the years in Vietnam will be the hub of the programs military engineers must use in the Seventies—to help provide for the modernized Army of tomorrow.

BASE DEVELOPMENT

Major General Curtis Chapman

A new system Engineers will use as part of the total planning picture.

ARMY ENGINEERS have long recognized that base development planning is an integral part of the total planning system.

Base development includes the advance planning and all subsequent actions necessary to provide, in a timely manner, facilities in the quantities, types, and proper locations to enable military forces to initiate and sustain the operations directed in joint contingency operations plans.

Lessons learned in Vietnam have shown that there is a pressing need to devise and use a base development planning and execution system which will be responsive to the needs of the field commander. Such a system is evolving now.

Our poor experience in Vietnam has sparked the Joint Chiefs of Staff (JCS) decision to ensure that the commanders of unified commands assume direction of base development planning and execution rather than following the previous procedure of accepting separate plans prepared by the Service components.

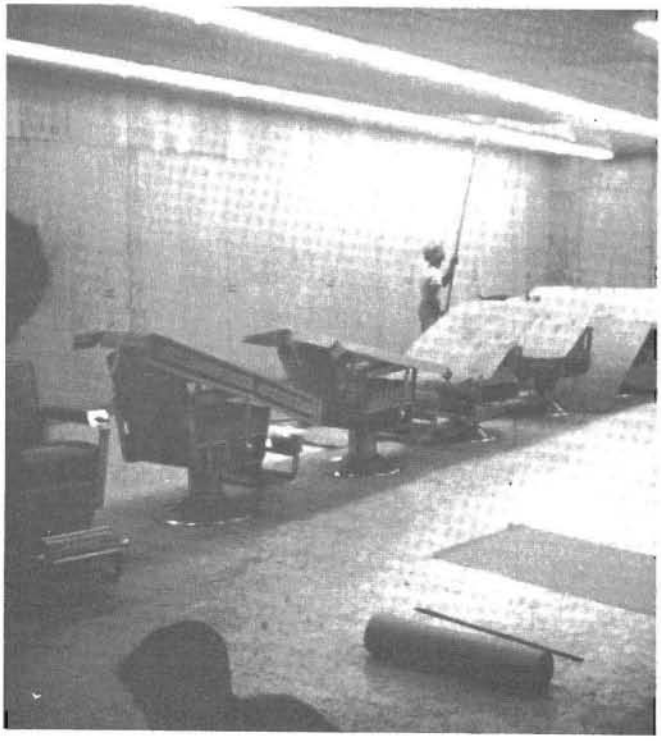
The JCS decision evolved over several years, with certain significant milestones. Perhaps the earliest information that influenced the JCS decision was re-

Engineer troops buiding hospital at Qui Nhon in 1966.

Building forms for foundations.

Storage Warehouses.

Base Barber Shop.



leased in May 1967 in a publication from the Military Assistance Command, Vietnam (MACV) titled "Observations." It was a compilation of observations, suggestions, and recommendations from the Director of Construction of MACV, the three components commanders, the Officer-in-Charge of Construction (OICC), and the cost-plus-award fee Contractor.

To correct the weakness of the base development system documented in "Observations," the JCS initiated a comprehensive study of the entire planning system in November 1967. They established the Joint Military Construction Study Group which examined every facet of the system and made recommendations in key areas. These recommendations brought about the JCS decision for unified commanders to assume responsibility for base development planning.

In 1968, the Deputy Assistant Secretary of Defense for Properties and Installations published another important document, "Base Development for Contingency Operations," which provided information, policies, and guidelines to assist in planning and executing base development in overseas areas of contingency operations.

To further coordinate the planning process, the JCS established a Joint Staff-Service Construction Board for Contingency Operations in 1969. This board has been collecting, developing and proposing construction standards and planning factors for JCS approval and implementation in contingency operations. The board also publishes a joint catalog of facility components to disseminate information among the Services.

The most recent evaluation of base development in support of the Vietnam effort was completed by the Joint Logistics Review Board (JLRB). In November 1970, the JLRB presented its report on base development in Southeast Asia. The report's recommendations have helped solve significant problems in base development planning and execution.

Within the Army Staff, the Deputy Chief of Staff for Logistics (DCSLOG) organized a Base Development Board which identifies staff responsibilities to ensure that future Army support in contingency Operations is both effective and responsible. And early this year, a final draft of FM 31-82 "Base Development" was prepared and distributed by the U. S. Army Combat Developments Command.

Since the fall of 1968, the Chief of Engineers has supported the Army component commands by drafting their base development plans. Due to this experience and requests from component commanders, a decision was made for the Chief of Engineers to operate an Army Base Development Planning Office, consisting of trained planners assisted by computerized techniques

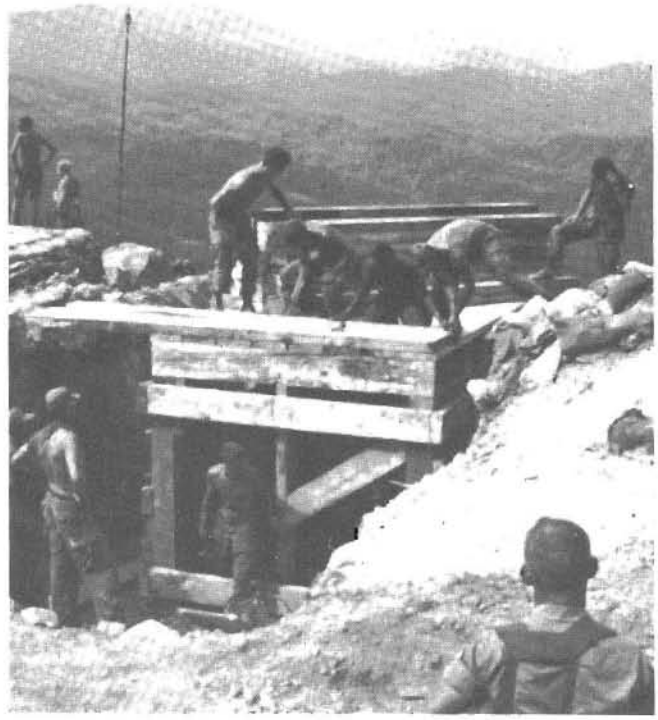
who can provide expert planning support for the Army components worldwide.

The various boards and study groups have provided still other lessons from our experience in Vietnam. Some of the more important lessons and their implications are—

• Facility Components. These components are pre-engineered and prefabricated items (or families of items) of facilities that are required to support contingency operations. They are easily transportable, easily assembled and may be relocatable. The Army catalogues these items in the Army Facility Components System (AFCS), formerly the Engineer Functional Components System, which also identifies most common-use facilities necessary to support troop units, regardless of mission. In addition to construction planning served by the former system, an updated AFCS will provide logistics planners with data for base development planning and operations planners with information for development of project stocks. It will also accommodate phased development of military complexes through application of space criteria and standards of construction. Recently, the Chief of Engineers, Lieutenant General Frederick J. Clarke, has applied renewed emphasis to AFCS management by establishing a special office within his Directorate of Military Engineering.

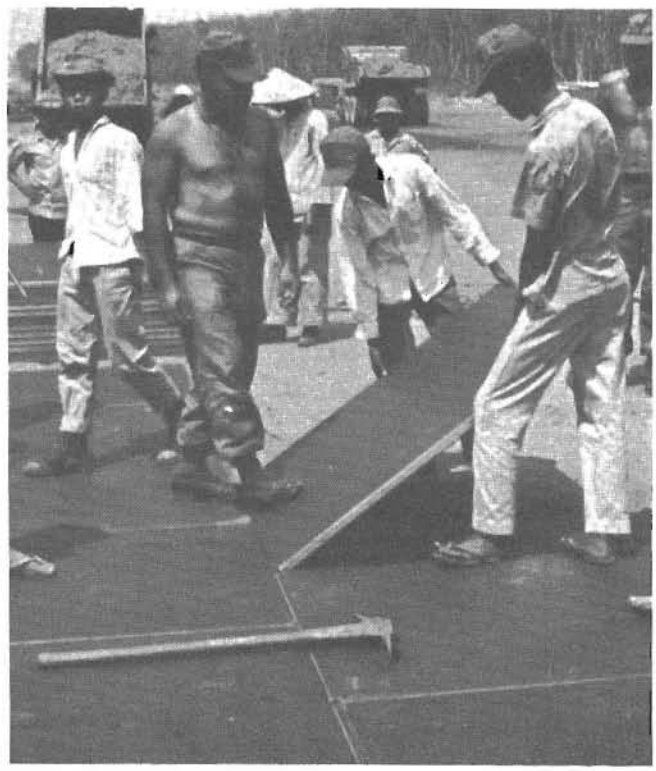
• Construction Capability. The construction required as a result of the 1965 decision to build up forces in Southeast Asia generated the need for far more troop construction units than existed in the active Army. Since the DOD planning policy was to rely on the Reserve Components, the Army's mobilization concept emphasized combat engineer battalions in the active establishment with the bulk of the construction battalions in the National Guard and Reserves. Because of the decision not to call up Reserve and National Guard units, the initial Army construction capability was severely limited. Significant reliance had to be placed on contractor capabilities while all Services accelerated their programs to increase the number of construction units in active forces. The contractor had inherent limitations, such as being tailored for specific endeavors, needing considerable time to mobilize, requiring comparatively extensive sustaining base facilities, and being employed only at relatively secure sites.

• Responsive Funding. Pin-pointing of funds to finance construction in support of contingencies has always been a problem. Construction support of the Korean War was funded primarily from Operations and Maintenance (O&M) appropriations. This is appropriate in a declared war; however, in a cold war or



Bunker Construction.

Laying an airfield landing strip.



A-Frame Chapel.

Deep Water Port Facility.

a contingency situation, there is no legal authority for using O&M to construct other than very minor facilities. For any major construction effort during a contingency, Congress must appropriate military construction funds. It was learned in Vietnam that to provide the necessary flexibility for changing situations, requirements must be programmed on an area-wide, gross facilities basis for each Service, with provisions for easy adjustment by MACV between various types of facilities. This lump sum procedure was used for all worldwide construction which was in direct support of the Southeast Asia operation. Since the funding was not tied to individual projects, adequate flexibility to meet changing requirements was provided for the in-country commander, with controls on major deviations retained in the Office of the Secretary of Defense.

- Centralized Direction of Construction. This problem was most difficult to solve for Vietnam, and the solution still is not completely accepted by all. Realization of the value of having centralized authority to direct and control all DOD construction commands and agencies (both military and civilian), except for those elements organic to major combat units, is one of the most valuable lessons of the Southeast Asia conflict. It is essential that all requirements be considered as a single integrated program. The execution must be placed under centralized control and direction at the joint level in-country. This arrangement is necessary to establish priorities in accordance with the desires of the unified commander and to allocate resources properly. The elimination of competition and duplication between Services, the application of areawide standards and criteria, the continuing coordination of all construction agencies, and the development of meaningful management information are other desirable characteristics of this "construction boss" concept.

The major construction problems identified in Vietnam have been analyzed, and positive steps have been initiated to avoid or minimize their repetition in future operations. These steps are expected to be reflected in a positive, comprehensive systems approach to base development planning for contingency operations.

Major General Curtis Chapman is the Deputy Commanding General of the Combat Developments Command at Fort Belvoir, Virginia. Prior to assuming his present post, the general was the Director of Military Engineering for the Corps of Engineers. A veteran of two wars, he served in the Pacific during WWII with the 186th Engineer General Service Regiment. Later, he was the Commanding General of the 20th Engineer Brigade in Vietnam, and then Division Engineer for the Army Engineer Division, Pacific Ocean.

AN OVERVIEW OF THE CONSTRUCTION PROGRAM IN VIETNAM

Lieutenant General Carroll H. Dunn

COMBAT ALWAYS PRESENTS a multitude of difficult problems. When the Vietnam War began escalating in 1965, our Engineer units were faced with a question—how to perform major construction in the middle of a combat conflict?

The answer was clear. We did not have enough experienced Engineer units in the active Army to handle the major building program that was required to accomplish our mission.

So, for the first time in U. S. combat history, contractors and civilian workmen assumed a major construction role in an active Theater of Operations.

There are no contingencies to cope with the enormity of the construction problem in the early planning. It was simply a situation where prior planning had not prepared for the massive buildup that was to come.

Before mid-1965, when the first U. S. Engineer units arrived in Vietnam, the only American construction capability there was a small civilian force under contract to the Navy. During this period, the Navy's Bureau of Yards and Docks, now the Naval Facilities Engineering Command (NAVFAC), and the Army Corps of Engineers shared worldwide responsibility for military construction.

This responsibility was limited to contract work and did not include construction by troops. Southeast Asia was among the areas assigned to the Navy. As Department of Defense contract construction agent, NAVFAC had an Officer in Charge of Construction (OICC) for Southeast Asia with headquarters in Bangkok, Thailand, and a branch office in Saigon. In July 1965 the Navy divided the area by creating the position OICC, Republic of Vietnam (RVN).

During the military buildup in Vietnam, engineer and construction forces received high priority for mobilization and deployment. With the coming of contingents of Army Engineers, Navy Seabees, Marine Corps Engineers, Air Force Prime Beef and Red Horse units, and civilian contractors, U. S. construction strength in RVN mounted rapidly. Vietnamese Army Engineers and engineer troops of other Free World allies handled some of the construction for their own forces which helped further the overall effort.

In February 1966, the Directorate of Construction was established in the Military Assistance Command, Vietnam (MACV), to provide centralized management of the U. S. program and I was named its first Director. It was my duty to make sure that the construction effort was responsive to tactical needs and priorities.

I had to hold construction to minimum essential requirements and enforce the most austere standards consistent with operational needs and tactical objectives. Embracing ports, airfields, storage areas, ammunition dumps, housing, bridges, roads, and other conventional facilities, the construction program was probably the largest concentrated effort of its kind in history. Pressure for speed was unremitting and conditions were adverse.

Civilian contractors were a mainstay of the building

Airfield construction.

Roadway maintenance.

Subgrade preparation.

program. Without their contribution many more troops would have been required to do the job.

Our engineers were confronted with many obstacles. For instance, the tropical climate, with its monsoon rains and enervating heat, imposed severe handicaps on constructors. Few building materials, either natural or manufactured, were available locally. The country's extensive stands of timber were in Viet Cong hands, as were many sources of aggregates. Saigon was the only deep-draft port. Roads, most of them primitive, were interdicted by the enemy. Cargoes had to move in coastal vessels or by air. The supply line to the Continental United States stretched 10,000 miles. Native labor was largely unskilled.

Another thing that complicated the entire construction program was the use of essentially peacetime funding methods in a war situation. Initially, requests were itemized and had to make their way through bureaucratic channels—the Department of the Army or other services, the Department of Defense, and the Bureau of the Budget—to Congress. This was later modified materially but never to the extent that bookkeeping could be considered a minor problem. But, in spite of the many drawbacks, the construction mission was a success.

We built many military base facilities in Vietnam. Each of these bases had to have cantonments, storage facilities, roads, electric power plants, communications centers, water supply and sewage systems, and provisions for security. Many also had airfields, ports, and petroleum storage and distribution facilities. Some of the outstanding base facilities and related engineering works included—

• **Ports.** Initially the port of Saigon provided the only unloading facilities in RVN for ocean-going vessels. Its six deep-draft berths were altogether inadequate to handle regular commercial shipping and the hundreds of ships bringing military cargo from America. The result was a monumental shipping tie-up. To alleviate this problem the port capacity of RVN had to be magnified five-fold. Cam Ranh Bay was an excellent natural but wholly undeveloped harbor when the Army Engineers moved there in the spring of 1965. The engineers installed a De Long pier and a causeway pier at Cam Ranh that enabled four ships to be unloaded simultaneously. Six more berths were subsequently constructed in this harbor. Civilian contractors constructed the Newport port facilities on what had been ricepaddy land two miles north of Saigon. As silt from the river bottom was unsuitable for fill, great quantities of rock and sand were brought in by barge and truck. Today, Newport can accommodate simul-

taneously four ocean-going vessels, four shallow-draft landing craft, and seven barges. Deep-water berths and appurtenant coastal facilities have also been constructed at Da Nang, Qui Nhon, Vung Tau, and Vung Ro.

• **Dredging.** The Republic of Vietnam has been the scene of one of the world's largest dredging operations. Since 1966, 14 or more dredges have been doing harbor and land-fill work in that country. They have cleared and deepened harbors, rivers, and canals; stockpiled sand for road and base construction; and reclaimed land for military, industrial, and housing sites. Without continuous dredging the accumulation of silt would close the harbors and inland waterways to navigation.

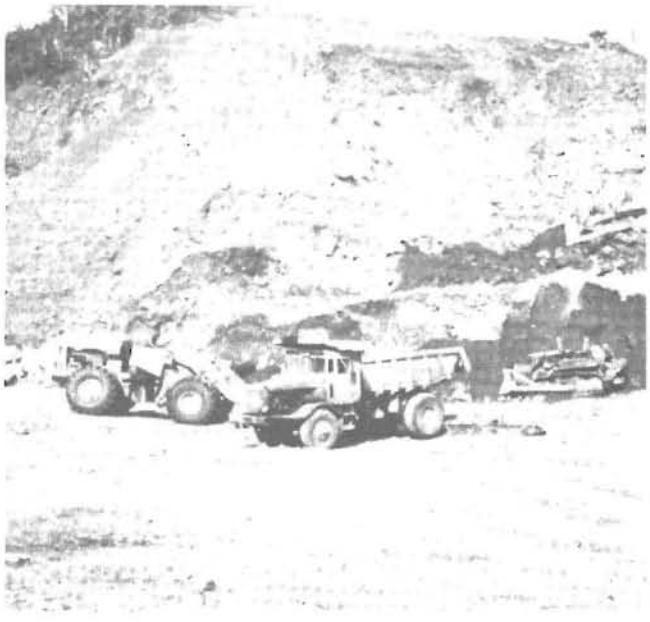
• **Airfields.** Eight airfields which accommodate the big jet aircraft were constructed at Da Nang, Chu Lai, Phu Cat, Tuy Hoa, Cam Ranh Bay, Phan Rang, Bien Hoa and Tan Son Nhut. These are huge installations with 10,000-foot runways and the whole range of appurtenant facilities, including administrative buildings, hospitals, hangars, repair shops, warehouses, barracks, officers quarters, and messhalls. In November 1967, of 90 other airfields using expedient surfacing materials, 11 were operational for jets and 62 for C-130 medium-cargo aircraft.

• **Wells.** A massive well-drilling program has accompanied the buildup of American forces in Vietnam. Although the Agency for International Development (AID) has sponsored well-drilling in RVN since 1967, MACV has had to develop its own water supply for the various base facilities. Major work was done under contract to OICC. Between July 1966 and September 1967 contractors drilled 233 successful wells and 48 test holes at 25 sites. These wells have an average depth of 170 feet and an average test yield of 96 gallons per minute. Additional wells have been drilled by Engineer Well Drilling Detachments. As of December 1, 1967, a total of 100 drilled wells has been developed and 14 more were under development. Besides those wells now in production, the records of the well-drilling program will be valuable to geologists and engineers charged in peacetime with the responsibility for developing Vietnam's water resources.

• **Major Command Posts.** Major command posts for MACV and USARV were specially designed to get the American troops out of the scattered offices and billets of the congested city of Saigon. "Pentagon East," as the MACV command post is sometimes called, is situated near Tan Son Nhut Airport. It is a network of two-story prefabricated buildings that provide air-conditioned working space for 4,000 persons. In addition to cantonments and utilities, it includes mortar shelters, security fences, and guard towers. The headquarters complex for USARV was constructed

Ships have no problem unloading cargo here at Cam Rahn Bay. Engineers built the four deep draft piers.

An Engineer Port Construction Company built this POL jetty at Qui Nhon.



Commercial construction equipment is used to gather rock and soil for road building.

Vietnamese receive on-the-job training in construction of building panels and roof trusses in Saigon carpenter shop built by engineers.

at Long Binh, 16 miles from Saigon. It occupies 25 square miles and houses 50,000 soldiers at a cost of $100-million.

• **Troop Construction Projects.** Among the major projects under construction by Engineer troops at the beginning of 1968 were 15 cantonments large enough to accommodate from 4,000 to more than 17,000 men.

• **Road Restoration Program.** This is the largest project of its kind ever undertaken by the U. S. military in a foreign country. It was started under AID and transferred to MACV September 1, 1968. Priorities have been jointly established by military and civil authorities. The goal is to construct and upgrade 4,300 kilometers of national and inter-provincial highways. When completed, the system of two-lane all-weather roads will pass through the Delta, Saigon, northward along the coast, and into the Central Highlands. Standard bridge designs and standard highway and bridge markings and numbering procedures have been adopted. This vast highway restoration project will strengthen the unity and economy of RVN. Lacking the air mobility of USARV, ARVN will utilize the roads to deploy swiftly toward Red-menaced communities. The roads will end the isolation of rural areas and open them to trade.

American engineers will bequeath a rich legacy to the people of South Vietnam when U. S. forces disengage from that country. Much of the construction completed by our forces will serve as the foundation for national development in the years just ahead. Seven deep-draft ports exist where there was only one. Similarly, roads, bridges, utilities, and many airfields and other facilities will remain as valuable assets to the country.

Perhaps the engineering program's greatest impact has been upon the people themselves. Tens of thousands of Vietnamese have had an opportunity to learn American building techniques and many of them have become skilled welders, electricians, plumbers, carpenters, and heavy-equipment operators. Their competence will contribute measurably to the goal of economic viability.

Lieutenant General Carroll H. Dunn, new Director of the Defense Nuclear Agency, is the former Deputy Chief of Engineers. A combat veteran with 33 years of service as an Engineer, the general participated in the landing at Omaha Beach with the 30th Infantry Division and was Director of Construction and subsequently served as J-4 for the Military Assistance Command in Vietnam during the period February 1966 until October 1967. He holds a Master of Science degree in Civil Engineering from the University of Iowa.

COMBAT ENGINEERS IN VIETNAM

Major W. B. Williard

THE FIRST YEAR

The author assembled as historical, eyewitness account of his unit's combat engineering operations during the first year in the Republic of Vietnam.

Despite Napoleon's immortal aphorism that "an army travels on its stomach," historians have pointed out that his Grande Armee's commissary more often than not was in shambles.

Not so his engineers. French soldiers might come close to starving because the Emperor had ruthlessly denuded his wagon train of horses to squeeze an extra cavalry squadron into his screening operations; but rarely were Napoleon's operations delayed because his pioneers and sappers lacked the know-how or the material to throw up a quick bridge at a vital river crossing.

The secret of Napoleon's success did not lie in some sort of "instant commissary," capable of producing a hot meal at the right time and place, but rather in his concept of small, mobile forces. He reorganized the French Army into self-sustaining corps, any one of which was powerful enough to pin a larger enemy force while the others concentrated on the enemy's flank or rear.

The key to this mobility was a corps of capable, well-equipped engineers. Napoleon realized all too well that while his troops could go without food for several days at a clip, they could not go very far without the engineers.

Military history is full of examples which show that ultimate victory in any campaign to a large extent depends on successful engineer support. The current U. S. commitment in South Vietnam is no exception.

Very little attention has been paid to the engineering aspects of the Vietnam War. Correspondents covering the war naturally concentrate on the more glamorous details of combat. Ignored in the box-score statistics that spelled out the success in a given combat operation are the engineering preliminaries that made it all possible.

Following the decision to commit U. S. troops to action in the summer of 1965, the area of combat shifted from the Mekong Delta area and the south to the Central Highlands of South Vietnam. Fully 75 percent of the U. S. ground operations took place in this region—the II Corps Tactical Zone—during the

first year of the war in that country.

The 937th Engineer Group (Combat) was tapped for the II Corps assignment by the 18th Engineer Brigade, Command Headquarters for all non-division engineer units. The 937th consisted of three combat battalions (the 19th, 70th and 299th); one construction battalion (the 84th), and several attached companies, including the 509th (Panel Bridge), the 511th (Panel Bridge), the 362nd (Light Equipment), the 630th (Light Equipment), and one platoon of the 497th (Port Construction).

On paper, this assignment looked good. The 937th was the only combat engineer group in Vietnam and it was being assigned to the action area. Its mission was to support the infantry with the building of fortifications, the laying and removal of minefields, and the construction of roads, bridges and heliports.

But things did not turn out this way. Though the 937th received its full share of combat support missions (mainly with elements of the First Cavalry, the 25th Infantry, and the Republic of Korea Capitol Divisions), the group found itself in an engineering situation normally reserved for construction units. Combat engineer battalions were not organized or equipped to perform such large scale and sophisticated projects as those that were assigned to the 937th.

The primary mission of the 937th was to provide base development for incoming combat units and off-loading and storage facilities for the tremendous logistics buildup that followed. The 70th Engineers were moved to An Khe to prepare a cantonment site for the incoming First Cavalry. The 19th Engineers developed 20 miles of cantonment roads in preparation for the arrival of the Republic of Korea "Tiger" Division, and a 25-unit permanent heliport.

The construction battalion (the 84th), which had been in Qui Nhon since June of 1965, continued its port development mission. By October, a floating dock and causeway was completed, allowing lighters to unload some 800 short tons of cargo a day from coastal freighters and tankers anchored offshore. By March of the following year, the Qui Nhon Logistics Depot and additional port facilities were sufficiently completed to allow increased off-loading. Cargo handled rapidly rode past 2,000 short tons per day.

In the first few months of fighting, the First Cavalry Division suffered more than 100 casualties a week and the facilities of the division's field hospital were soon exhausted.

Normally, building a base hospital is the lot of the construction engineers. But there were none so the task went to the 70th combat battalion. They constructed a 200-bed facility (the 2nd Mobile Army Surgical Hospital) at An Khe, the division's headquarters. And at Qui Nhon, elements of the 84th construction engineers went on 24-hour shifts to build the 540-bed 85th Evacuation Hospital.

In October, both the 299th combat battalion and the monsoon rains arrived. The 299th was tasked with hacking and clearing a one-mile square area for an ammunition storage depot in the jungle south of Qui Nhon. Under the conditions, it was remarkable that 10 ammunition storage pads were operational by February of 1966. When a brigade of the 25th Infantry Division arrived in January 1966 even this high-priority mission was interrupted to a degree. One company of the 299th was diverted westward to Pleiku to help the brigade's engineers in base development work, and the construction of an 80-bed hospital, the Pleiku Logistics Depot and Camp Holloway.

In the meantime, the 70th at An Khe was involved in the construction of an estimated 17 miles of perimeter security lighting, the An Khe Logistics Depot, 60 perimeter guard towers with searchlights, Division Headquarters and Administration Buildings, an underground Division Tactical Operations Center (20 feet by 75 feet with no intermediate supports), the Division Heliport and a temporary C-130 Airfield. Later two companies from the 84th constructed a 30-ton ice plant, a dial central office, and the permanent asphalt airfield at An Khe.

The "First Cav" with its helicopter assault concept was the ideal answer to the severe geographical handicaps Vietnam offered. Its personnel could reach any point in the II Corps area from the An Khe base in less than 30 minutes by chopper. But, as time passed, the "First Cav" became less and less mobile. The Vietnamese dust, which is a lot closer in size to sand than powder, literally sand-blasted a chopper's rotor blades. The blades gave out months in advance of their expected wear out expectancy and dust-clogged engines had to be overhauled about twice as frequently as anticipated. So, the helicopter's life expectancy in Vietnam was cut in half.

The dust problem was not entirely unexpected because the division ran into the same situation during training at Fort Benning, Georgia. Even so, the division's planners felt that the choppers could operate temporarily from forward bases in conjunction with a tactical operation. This supposedly would preserve the natural sod and eliminate the dust problem.

This theory was initially tried when the "First Cav" machines were bedded down permanently in the rolling, green hills around An Khe. More than 100 acres were cleared by hand to preserve the natural sod. This land was promptly dubbed the "Golf Course."

In about three months, the "Golf Course" became the "Sand Trap." To make matters worse, it was soon found that the "dust free" period was reduced to just a few days when choppers were used extensively at forward bases.

The dust problem soon became the number one headache for the 937th. It played havoc, creating safety hazards for all vehicle operations and sanitary hazards for all personnel. Also different types of soils in different areas required different dust-proofing measures to further complicate the problem.

A team of soil experts was sent to Vietnam in the spring of 1966 by the Chief of Engineers to find some answers. After an exhaustive study, they reached the conclusion that the only permanent solution to the dust problem was to bury all roads, bases and helicopter pads under asphalt or concrete. However, several stopgap measures were proposed. All of them met with some degree of success on a short range basis. Among them—

- **T-17 Membrane.** Two-ply, neoprene plastic sections 66 feet by 100 feet were glued together to form the membrane, which proved particularly successful in the fine orange clay conditions prevalent in the low, rolling hills around Pleiku. The stress of C-130 aircraft, however, proved too much for the membrane and required continuous maintenance.
- **Peneprime.** An MC-30 asphalt cutback with several chemical additives, peneprime partially met the requirements of heliports and airfields in the laterite-type soils around An Khe. It was less successful in standing up to the stress on road surfaces.

The lack of aggregate used for soil stabilization, concrete and asphalt work presented still another major problem. With only one construction battalion, the 937th simply did not have enough organic crushers to produce aggregate in sufficient quantity to meet the demand. Although additional machines were eventually sent to Vietnam from the States and a small amount of crushed rock could be purchased locally (at less cost than that produced by the 937th's crushers), this problem was never completely solved. In Pleiku, for example, most of the rock outcrops were too hard for the crushers to handle. The efficient operation of quarry sites also proved to be too costly and too time-consuming a process.

Lack of equipment also hampered the group's earthmoving activities when they shifted into high gear in the early months of 1966. The 937th's machinery also was considered too light to get the job done. So the 937th recommended a modification of the Table of Organization and Equipment to give combat engineer battalions an improved earthmoving capability.

As spring arrived and the monsoon season ebbed, U. S. military operations moved into the offensive phase, and most of the 937th's combat engineers returned to their more familiar combat support roles. Heavy emphasis was placed on the construction, rehabilitation and expansion of air bases and small heliports, and bridge construction.

By May, the 19th battalion had completed most of its task of building a mammoth 112,000-barrel tank farm (begun the previous September) near Qui Nhon. Two 4-inch submarine pipelines were installed by the 497th Port Construction Platoon, and by early June, the first T-2 tanker anchored off Qui Nhon was offloading directly into the storage tanks.

The 937th estimated that by late spring it was supporting about 60,000 American and Korean troops. It was impossible for the group to fully support this number of troops so a "Self Help Program" was established. Under this realistic program, personnel of all branches of the Army and Air Force provided the final assembly touches to structures which had been designed and prefabricated by the 937th battalions. Administration buildings, mess halls, billets, bunkers, latrines, water towers, and open storage sheds began springing up rapidly all the way from Qui Nhon to Pleiku.

Late spring also highlighted other 937th accomplishments. The 299th completed most of its work on the Qui Nhon ammunition storage depot and the entire battalion was reassigned to Pleiku to support a brigade of the 4th Infantry Division that had just arrived from the U. S. And the 19th received the additional missions of constructing a 6,000-man COSTAR maintenance area seven miles west of Qui Nhon just off Route 19 and a post exchange facility at Qui Nhon itself.

When the 937th's first year in Vietnam ended in August, it was estimated that the group's operations had cost more than $40-million in construction materials alone. But the most amazing fact to come out of that first year of operation by the group is that the magnitude, type and high quality of the construction was not accomplished primarily by construction battalions with their sophisticated equipment, but by the initiative and ingenuity of the soldiers of the combat engineer battalions.

Major William R. Williard, Jr. presently teaches environmental engineering at the U. S. Army Engineer School, Fort Belvoir, Virginia. Originally an Infantry officer, he served in Vietnam as a Commanding Officer of C Company, 19th Engineer Battalion (Combat) and later as Assistant S-3 of the 937th Engineer Group (Combat).

Special Training in the Skills

The U. S. Army Engineer Center has launched a training program that is expected to augment mounting shortages in many of the critical construction skills.

Ever need a plumber—or an electrician in an emergency, and couldn't get hold of one? Familiar situation? Homeowners galore have been be-deviled by these circumstances many times.

The Army finds itself in much the same predicament at present, insofar as the availability of soldier-craftsmen trained in construction skills is concerned.

So—what to do?

Harassed homeowner—if he has any practical skills at all, attempts an alternate solution until he can obtain the services of a professional. And if he has any foresight, he seeks to expand his "know-how" to be better able to cope with future emergencies of like nature.

The Army? Not so.

Authorities at the U. S. Army Engineer Center and Fort Belvoir, Virginia, are enthusiastically optimistic that they have devised a program which will eliminate the problem.

Producing and retaining personnel qualified in the construction skills in numbers enough to meet its needs is a continuing difficulty for the Army. Throughout the entire senior service, engineer personnel are expected to provide the expertise that is always required to accomplish the varied carpentry, electrical, plumbing and masonry tasks.

Engineer unit commanders and Facilities Engineers are constantly faced with qualified personnel shortages in these all-important and widely needed skills.

Yet the prevailing climate of austerity under which the military services are currently operating precludes the initiation of any massive training program in these fields. Any such program would be impractical in any case, from the viewpoint of cost per student, and eventually would produce more MOS qualified individuals in these skills than could be absorbed into the military work force.

The Engineer Center has initiated what it calls the Engineer Skills Training Program, which is designed for maximum effectiveness and minimum impact on available resources.

The pilot program is now being tested to determine the feasibility of meeting Army requirements for en-

Plumbing student learns operation of electric snake from foreman on job site.

Electrical students perform practical exercises in connection and installation of switches and control boxes.

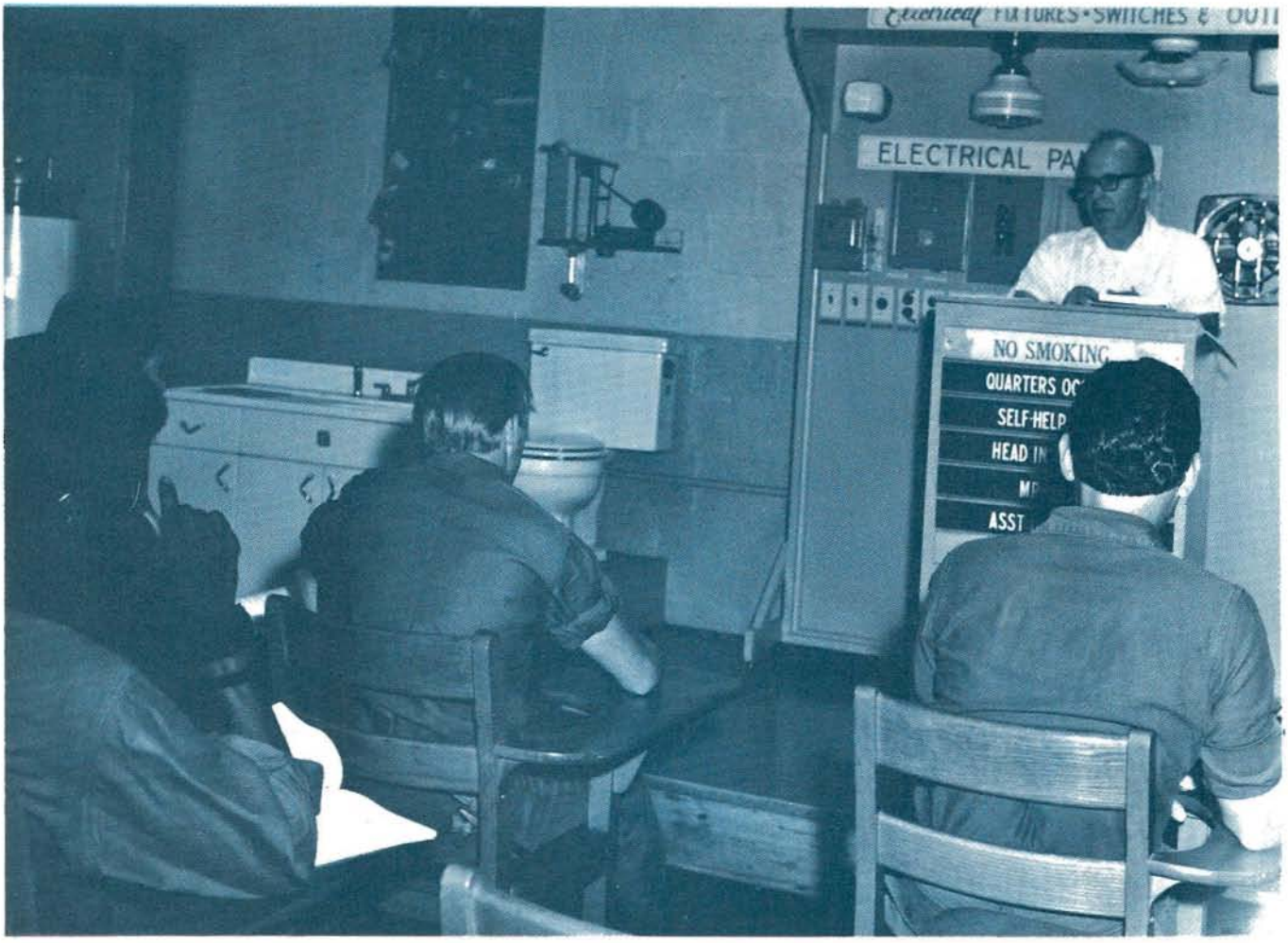
gineer soldier-craftsmen, qualified in various construction skills by combining supervised self-study and on-the-job practical, technical training. The scope of the training parallels that prescribed by the Department of the Army for the appropriate MOS, and hopefully will produce skill levels equivalent to those prescribed by the construction industry.

In August, 16 enlisted men—12 from the 11th Engineer Battalion (Combat), and four from the 77th Engineer Company (Port Construction), became the first group to complete this unique training, and to be designated MOS-qualified in the construction fields of carpentry, plumbing, masonry and electricity, without having been required to attend classes at a service school or neglect their regularly assigned duties.

Text material for each of the skills was developed by the U. S. Army Engineer School's Department of Non-resident Instruction at Fort Belvoir. The training packets include the applicable correspondence course, the program of instruction, class schedule and instructor guides. The Director of Facilities Engineering, U. S. Army Engineer Center and Fort Belvoir, is responsible for the technical aspects of the program and assigns the students to the appropriate foreman for "classroom" (i. e. shop) instruction and practical training.

The actual learning process, though quite simple, has proven to be highly effective, according to the several instructors participating in the pilot program.

The student completes the lessons, studying at his own rate of learning, and submits his solutions to various problem solving situations encountered in the text material. Corrected lessons are returned to him by his Training NCO or Officer, who discusses all aspects of the problems with him to insure that the student is completely informed and understands the solutions. The would-be craftsman then applies the knowledge he gained to practical use under the direction and supervision of his instructor—a foreman qualified in the particular skill the student is studying.



Electrical students receive instruction from expert electrician at DFAE.

At the termination of his training, currently planned as a 16-week course of instruction, the student must pass a written examination and a final, graded practical exercise to determine his proficiency and the effectiveness of the training. The applicable MOS is awarded only after successful completion of the MOS test and a demonstration of competence in all tasks enumerated for that particular skill.

For enrollment in the program, an individual must be highly motivated, while voluntary participation is considered imperative in view of the reliance placed on trainee initiative throughout the program. Those undergoing the training cycle must have a GM score of 90 or higher, and a retainability of four months in the service upon completion of the course.

For the individual, benefits are considered to be many, for he learns a trade which is in high demand in the civilian domain. Under provisions currently being negotiated with the construction labor union, the Army Engineer Skill Rating which the student receives upon completing the training program indicates his level of competence, and is intended as an equivalency union rating should he choose to return to civilian life.

Army authorities are highly enthusiastic about the program. Its implementation incurs no added expenses, as text materials are readily available, and additional instructors are not required due to the size of the classes. Unit commanders are now provided a means of obtaining technically proficient personnel, MOS-qualified, without decreasing unit effectiveness or suffering personnel losses to resident schooling.

Although final analysis and evaluation of the program have not yet been completed, it would appear that the system offers a practical and economical solution to a long-standing problem from which other Army units might well benefit.

Engineer troops construct a bridge in the shadow of Nui Ba Din—the Black Virgin Mountain in Vietnam.

MISSION ACCOMPLISHED

Captain Andrew M. Perkins, Jr.

For years Presidents have made numerous speeches and I have never noticed any effect on my life style. But once you don the uniform of your country, this seems to change. You never realize how much effect the President's words and actions have on you until you become part of the gigantic military establishment. Of course, many military personnel never feel his influence until they are assigned to a war zone.

I did not realize the impact of the President's power until shortly after I arrived in my first war zone—Vietnam. Every move we made was influenced in some way by our Commander-in-Chief's words. His influence on me was exemplified shortly after his historic speech in May of 1970 in which he told the American public he had ordered U. S. troops into Cambodia to clean out major enemy sanctuaries in that country.

Within hours after President Nixon's statement that he was committing U. S. forces to support a combat operation which became known as the "Cambodian Sweep," American and South Vietnamese troops were on the move. My outfit, Company B of the 588th Engineer Battalion went along, and not just for the ride. Engineers of the 20th Brigade were among the lead elements of the operation. ARVN troops hit an area appropriately named Parrot's Beak and the U. S. combat divisions moved into a geographic land conformation they dubbed the Fishhook.

For the road-building and land-clearing engineers, the dramatic eight-week operation became 56 brutal days of clock-racing construction and combat.

To the north, east, and south of the Fishhook, what had been a series of insignificant dots in the jungle, became strategically crucial staging areas as the 79th Group Engineers launched an around-the-clock fight to upgrade and maintain them. The names "Katum" and "Thien Ngon" were hitting newspapers around the globe while the 588th Engineer Battalion repaired de-

teriorating runways and built logistics facilities at both airstrips, in the midst of pounding C-130 landings and one-a-minute helicopter take-offs.

Badly-needed main supply routes, QL-22 and TL-4, were being constructed from Tay Ninh when the 11th Armored Cavalry Regiment and the 25th Infantry Division tanks began rumbling toward the border. To accommodate them, QL-22 and TL-4 were opened to the border by the engineers of the 588th Battalion.

The first engineers to operate from a base inside Cambodia were 53 men from Company B, 588th Engineer Battalion. A vital extension of QL-22 had to be upgraded to TL-7, some 20 miles inside Cambodia, in order to provide a badly-needed supply and withdrawal route. For five days the engineers worked around-the-clock to transform a "trail" into a 20-foot-wide all-weather road to aid the movement of combat vehicles. The road sustained transport movement during the entire operation.

Some 30 miles to the east, Alpha Company, 588th Engineer Battalion, crashed through the jungle border south of Memot on borrowed Rome plows. Behind the plows, earthmoving equipment was cutting out a road that would lay the western portion of the Fishhook open to U. S. armor and facilitate the overland evacuation of fantastic quantities of captured war materials.

As the unit moved through incredibly stubborn and tangled vegetation, enemy sniper attacks hindered the search for natural deposits of laterite, which was needed to give the road an all-weather surface. In our search for this much needed substance, the unit found two bunker complexes loaded with rice, livestock, weapons and an estimated 10,000 pounds of medical supplies. And we accomplished our mission by finding laterite.

Toward the end of the 22 kilometers of driving construction work, the unit was reinforced by members of the 595th Engineer Company. Together, the two units pushed through to Cambodia Highway 7 and to Memot—completing the tactical link far ahead of schedule.

President Nixon had directed that the operation end by June 30, 1970. But as the calendar turned to the month of June and the deadline approached for all Allied forces to withdraw from Cambodia, we were confronted with still another major problem. Heavy winds and rain began building up to monsoon proportions. A real monsoon would have wiped out hastily constructed roads and temporary bridges before the tactical units could get back across the border. My outfit, Company B of the 588th, began a wind and rain-racing, laterite-repaving project to save TL4 south of Katum for an evacuation route during the withdrawal.

When the job was done, we stood by and watched mud-splattered convoys and long lines of tanks stream out of Cambodia over TL-4 to secure areas in South Vietnam on June 29—one day before the withdrawal deadline.

Once again the engineers had played an invaluable support role. Without that 100 percent effort from the engineers, the entire combat operation could have been in big trouble.

Engineers not only helped guarantee the success of the troop withdrawal but their actions also bought some valuable time for the ARVN troops to strengthen themselves for many more battles to come against a deadly and determined enemy. e

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Captain Andrew M. Perkins Jr. is a graduate of Hampton Institute with a degree in Architecture. A recent graduate of the Engineer Officer Advanced Course at Fort Belvoir, he is now assigned to the U. S. Army Instructor Group, Senior ROTC, Milwaukee, Wisconsin.

THE UGLY TRUTH!

W. T. Spriegel

"The priority of the program is so great that all necessary resources should be devoted to it."

Thus concludes a message last June from the Department of the Army to the Commanding General, Continental Army Command, establishing guidelines for commanders within the continental limits of the United States for treatment of "active duty Army drug dependent personnel returning from Vietnam by aeromedical evacuation."

"It also accentuates the concern of the Army leadership for the problems imposed by drug abuse, and the urgency which is attached to the implementation of measures designed to counter the misuse of drugs by Army personnel," says Brigadier General Robert G. Gard, Jr., Chief of the Army's Directorate of Discipline and Drug Policies, Office of the Deputy Chief of Staff for Personnel, Department of the Army.

In consonance with a concerted Department of Defense and national effort to combat this menace to the health of military and civilian personnel the world over, and the adverse impact which it imposes on operational efficiency, the Army has gone all out to develop an accelerated, comprehensive program to control drug abuse.

General Gard is charged with that mission, and has just recently returned from an extended trip to Vietnam to see first-hand what progress was being made in implementing local programs.

"We have had a remarkably successful response in the initiation of short term programs," the general reported, "but we have discovered that education of our own personnel is paramount, if we are to be successful

in our efforts to control drug abuse, or minimize its use."

Considering the numbers of engineering personnel in Vietnam—and the likelihood that they may well remain in that country for some time in support of the Vietnamization program—the Army's rapidly expanding program to fight drug misuse is of particular significance to engineers worldwide.

Within the Continental Army Command, the First U. S. Army at Fort G. Meade, Maryland, became the first command to publish a definitive Alcohol and Drug Abuse Program, based on the guidelines provided by General Gard's office. Details of the First Army Program were announced and disseminated to subordinate units within that command in mid-July.

Using such guidelines, installations within the First Army Area reacted with speed and effect to initiate their own local programs similar in pattern, such as that now in operation at the "Home of the Engineers" at Fort Belvoir, Virginia.

The programs have four main objectives:

- Prevention—which encompasses educating the individual as to the dangers of drug abuse, and aggressive law enforcement in efforts to reduce the availability of illegal drugs.
- Identification—through which drug users are encouraged to volunteer for treatment.
- Rehabilitation—the first step toward which is detoxification . . .
- Data collection and analysis—through which critical evaluation of the program may be made.

"The increasing use of heroin among soldiers throughout the world is our greatest concern," says General Gard, "particularly among those in Vietnam where high potency drugs are readily and easily obtainable at little expense. Heroin is our primary and most immediate target, and the Army has zeroed-in on that aspect of the burgeoning drug problem which we are bending every possible effort to solve. Highest priority is being given to the identification and detoxification of heroin users before they depart Vietnam—and arranging for follow-on treatment as required upon their arrival in the United States," he declared.

In its counter-offensive against drug misuse, the Army has expanded the identification process to include amphetamines and barbiturates, in addition to opiates, with testing and treatment on a worldwide scale being pushed vigorously. It is anticipated that by November, world-wide spot checks, treatment and rehabilitation of drug users will be underway, although in overseas areas such care at first will, of necessity, be austere.

Three techniques are now in use in the Army pro-

gram for the detection of drug users:

- The Free Radical Assay Technique (FRAT)
- Thin Layer Chromatography (TLC)
- Gas Liquid Chromatography (GLC)

Despite rumors to the contrary, urinalysis by these methods for the detection of drug users has proven to be highly reliable. In fact, it has been reported that there is no substance known to Army toxicologists that will mask the presence of the drug being tested under this system.

To augment tests performed by military medical technicians, the Army has contracted with civilian laboratories to conduct urinalyses. Such firms report their findings by telephone within 24 hours, and confirm the tests in writing within seven days. These tests are more than 98 percent reliable, according to authorities.

Meanwhile, in Vietnam, urine testing machines are operating daily at the Army's replacement centers at Long Binh and Cam Ranh Bay, where all personnel slated for return stateside are tested prior to departure.

Individuals testing drug positive are quarantined for a maximum of seven days in detoxification areas, under medical control, where withdrawal from drug use can be effected.

General Gard cautions, however, that although physical dependence on heroin can be rather quickly eliminated, the hazard of psychological dependence may well remain because it is a most difficult condition to treat.

To combat that situation, the patient receives highly intensive counseling and close medical observation during the detoxification period, by both psychologists and social workers—and, if necessary, by psychiatrists.

Current policy now provides that all drug users be

returned to the United States under medical evacuation, after detoxification and outprocessing. Upon arrival back home they are counseled further as a follow-on measure, and are told about all of the specific treatment facilities available to them.

Urinalysis screening in Vietnam has been extended to include personel requesting extensions, and those departing on leave or for rest and recuperation (R&R). If heroin traces are detected, detoxification and follow-up treatment replaces the individual's proposed absence for such purposes. Current policy precludes ordinary leave or R&R for personnel unless it is verified that they are not drug dependent. The policy does not apply to emergency leaves, however.

In Thailand, SEATO facilities are being upgraded to accommodate urine testing of both Army and Air Force personnel. By November 1, that capability hopefully will be available. Meanwhile, specimens from that area are flown to Vietnam for analysis, with detoxification and med-evacuation to the United States in accordance with the foregoing procedures. Screening for drug use began in Thailand on July 23.

In other overseas areas, similar measures have been implemented. Laboratory analysis is being accomplished in-country if civilian facilities are available, otherwise analysis will be done in the United States. As of the moment, screening of personnel returning to the U. S. for leave, or new assignments—or requesting extensions of their tour has been phased in.

In most areas, dependent families and civilian employees working overseas may voluntarily participate in the Army drug detection program.

Here in the United States, Army authorities are taking unprecedented steps to stave off the onslaught of drug abuse.

During separation briefings at processing points in Oakland, California, Fort Lewis in Washington, and at Fort Dix, New Jersey, dischargees who have been on heroin or other drugs are urged to seek help, if needed following separation, from one of the drug testing centers operated by the Veterans Administration (VA) or other civilian programs.

Although VA capability to treat drug users is presently limited, it has been announced that 27 new drug treatment centers have recently been opened (October 1) to augment the five VA centers previously in operation. This expansion will permit the care of an additional 6,000 veteran drug-dependents, and will relieve long-term burdens on military facilities by phasing extensive treatment cases into VA rehabilitation programs.

The Army program is one which is non-punitive, and offers amnesty to the soldier who has the guts to face his problem, and wants to kick the habit. Under the

immunity—or amnesty—policy, no soldier will be subjected to disciplinary measures under the Uniform Code of Military Justice, or discharged under other than honorable conditions, solely on the basis of volunteering for treatment, or identification as a drug user through urinalysis. This is an integral part of the drug abuse program which encourages those dependent on drugs to voluntarily seek treatment.

The policy, however, does not exempt the soldier from other legal consequences as a result of violation of other laws and regulations, if such disciplinary action is supported by evidence not attributed to urine testing or volunteering for treatment.

According to official statistics, the amnesty feature of the Army's program has had positive effect. For instance, in Vietnam during the first five months of this calendar year—January through May—more than 6,800 persons of all services voluntarily turned themselves in for treatment—an average rate per thousand of 54.6. During the months of June and July, a total of 4,523 persons—or an average of 113.5 per thousand—entered the program.

One of the most important agencies in the rehabilitation of drug dependent personnel is the "Halfway House." Commanders throughout the Army are being urged to establish such an activity as soon as they possibly can do so to help drug users make the switch from hospital to full duty.

Although rehabilitation of drug users actually begins with detoxification—as pointed out earlier—soldiers remaining on active duty, if they really want to "make it," go into an outpatient program of community-based therapy, activity and involvement.

Under the concept of the Halfway House, the soldier spends his duty hours at his unit and stays in the Halfway House after duty hours. Staffed with both medical and nonmedical personnel, the Halfway House system provides housing arrangements and structured activities during non-duty hours—and includes occupational therapy, individual and group counseling, group recreation, and other activities under the close supervision of professional counselors.

During the rehabilitation process, periodic checks through urinalysis—probably about twice weekly—will be conducted. "Rehab-success" will not be confirmed until a patient has undergone a series of "clean" urine tests, and has demonstrated that he is psychologically fit for return to full duty.

If the drug user is unable to pass such tests after a minimum of 60 days rehabilitation effort, he will be considered a "rehab-failure" and administratively separated from the service.

Before separation, he will be referred to the VA or other civilian treatment facilities for follow-on care. Dischargees are referred to specific treatment facilities and given help in making necessary appointments.

Other rehabilitation centers are being pushed by the Army, under its concerted attack against the misuse of drugs. These centers, which will be used for both the prevention of drug abuse and the rehabilitation of those using drugs, will provide various services—individual counseling (psychotherapy), group counseling (group psychotherapy), drug information, rap sessions, recreational activities and referral.

Such centers will operate around the clock, with a hot line telephone for advice and assistance to those calling in with a drug problem—much like the highly successful operation which Alcoholics Anonymous conducts.

Authorities warn that drug abuse is often a chronic condition with occasional relapses, and that short term rehabilitation should be considered on the basis of progress and estimated potential for improvement, rather than as a success or failure. Decisions concerning adequate progress should be delayed until the patient has been afforded a reasonable period to demonstrate his attitude toward rehabilitation—normally after he has been on-post for about 60 days, and then only after consultation with appropriate medical and other specialists.

The Army's concern with what has become an American epidemic is shown in the massive and urgent campaign which it has mounted. Statistics and data about the extent of drug abuse in society are difficult to pin down because drug users, like alcoholics, are good at concealing their problem. Yet both categories subscribe to the same philosophy—the world is wrong—not them. Their problem is one not of their own doing.

Such an attitude is difficult to overcome. Such an attitude, people are beginning to realize, is more closely related to illness than to more unconventional behavior.

Science recognizes that, in the case of drug addicts, some are so psychologically strung-out that they will never kick the habit, or even want to do it.

Many persons who have been successful in shaking the habit, exhibit an enthusiasm about the "clean feeling" they experience. That enthusiasm, and the assistance of such former drug users in rehabilitation efforts for those "still on the hook," have been most helpful.

"Scare tactics" are unnecessary to combat drug abuse. Facts alone are sufficient to make the nonuser have second thoughts before the first "hit." The Army's program is aimed at prevention, and to stop the non-user from starting on drugs.

At the same time, former addicts emphasize the need for a "natural high—something that will involve them, something in which they can lose themselves—such as music, nature, or helping others. But they need the compassion which those around them can provide—they need an environment of understanding.

As General Gard puts it: "We must endeavor to reorient institutional attitudes toward the problem of drug users to provide a more receptive environment and proper support for them. We must divorce ourselves from an outlook upon the drug user as a common criminal. We must accept the premise that not all addicted to the use of drugs are beyond help and rehabilitation."

As to possible changes in the Army's rapidly expanding program, General Gard says that current accent will be to stimulate innovation in the present program—that there is no absolute conventional wisdom as to the best approach to use; that a variety of modalities will be tried—but that education of our own personnel is paramount to any successful outcome.

FROM CONCEPT TO REALITY

CAPTAIN JOHN J. CONNOR

The recent study conducted at the Engineer School involved actual working situations, where the proposals of OCE and CDC were put to the test by the advanced course students. Their findings will suprise many engineers.

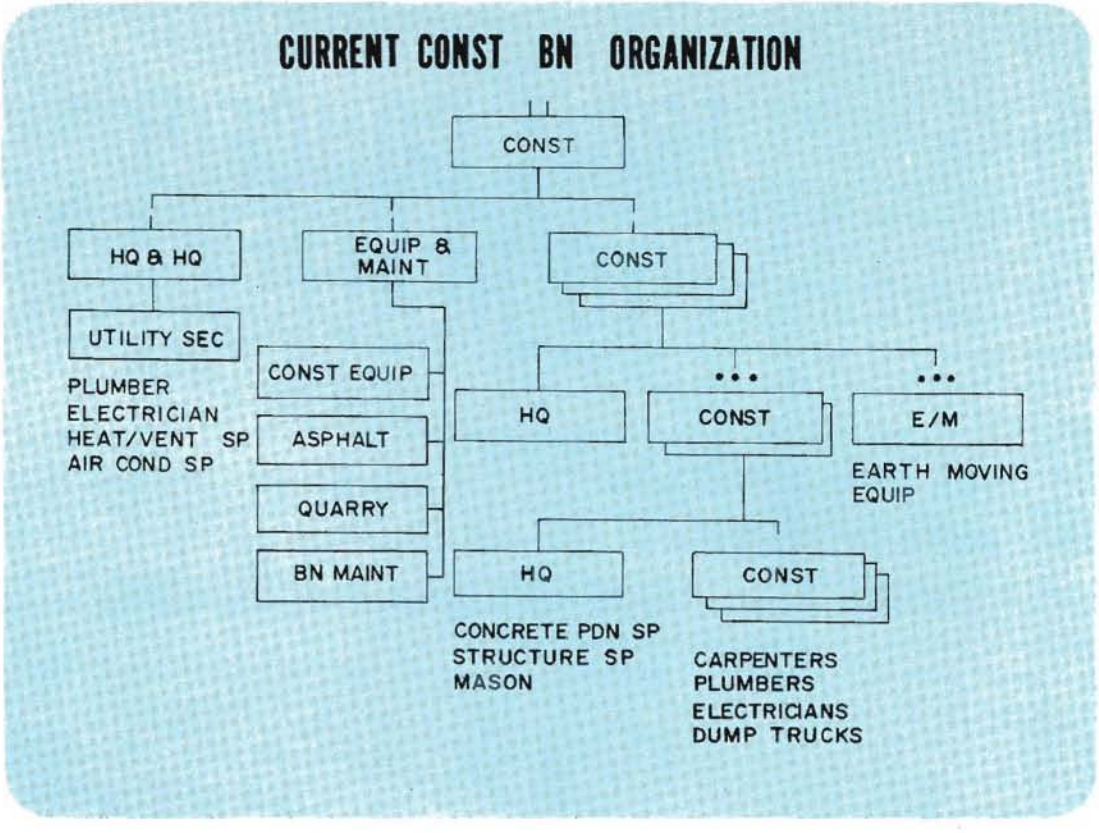
Have you ever heard of the 515th Engineer Battalion (Construction)? Do you know where it has operated recently? If you can't answer either of these two questions, don't feel bad, because the 515th exists only on paper at the U. S. Army Engineer School at Fort Belvoir, Virginia. It is the designation given to four student groups that took part in an evaluation of proposed revisions of the organization of the Engineer Construction Battalion. The exercise, referred to simply as CONBN, was conducted by the school's Construction Engineering Division. This classroom evaluation is just the latest in a series of developments that began in September 1969 when Lieutenant General Frederick J. Clarke, Chief of Engineers, directed that a study be made to re-examine Army engineer organization structures following a policy statement from the Army Chief of Staff on "Austerity and the Future of the Army".

The current structure of the Construction Battalion consists of a Headquarters and a Headquarters Company, one Equipment and Maintenance Company, and three Construction Companies. In addition to normal headquarters personnel, the Headquarters Company contains plumbers, electricians, and heating, ventilation and refrigeration specialists. The Equipment and Maintenance Company is comprised of a construction equipment section, asphalt section, quarry section, and a maintenance platoon. The three construction companies are identical and comprise one earthmoving platoon and two general construction platoons. The construction platoon headquarters includes structure specialists and masons, while the squads (18 in the entire Battalion) are comprised of carpenters, plumbers, electricians, and dump truck drivers.

One of the recommendations made by the board of officers that conducted the study within the office of the Chief of Engineers (OCE) was a reorganization of the Construction Battalion along "functional" lines as opposed to the current "balanced" construction capability now in effect. The board proposed consolidation of personnel by skills to permit "subcontracting" of manpower and equipment to construction tasks as required in the same manner as a civilian contractor. It also recommended that a battalion within the Continental United States be reorganized to test this concept under a normal range of engineer mission assignments, concurrent with development of a new Table of Organization and Equipment. The proposal was favorably received when presented to the Army General Staff Council and as a result, the Assistant Chief of Staff for Force Development tasked the Combat Development Command to perform a "detailed examination and evaluation of the proposed new construction battalion concept in light of current and probable future doctrine and reqirements."

The OCE concept consolidates functions at company level and reduces administrative overhead without a decrease in construction capabilities. This new battalion would be composed of a Headquarters and a Headquarters Company, two general construction companies, one earth moving company, and a materials support company. The Headquarters Company would contain a consolidated mess and a communications section, each

This block diagram displays the current "BALANCED" concept, with each construction company having similar engineering capabilities.

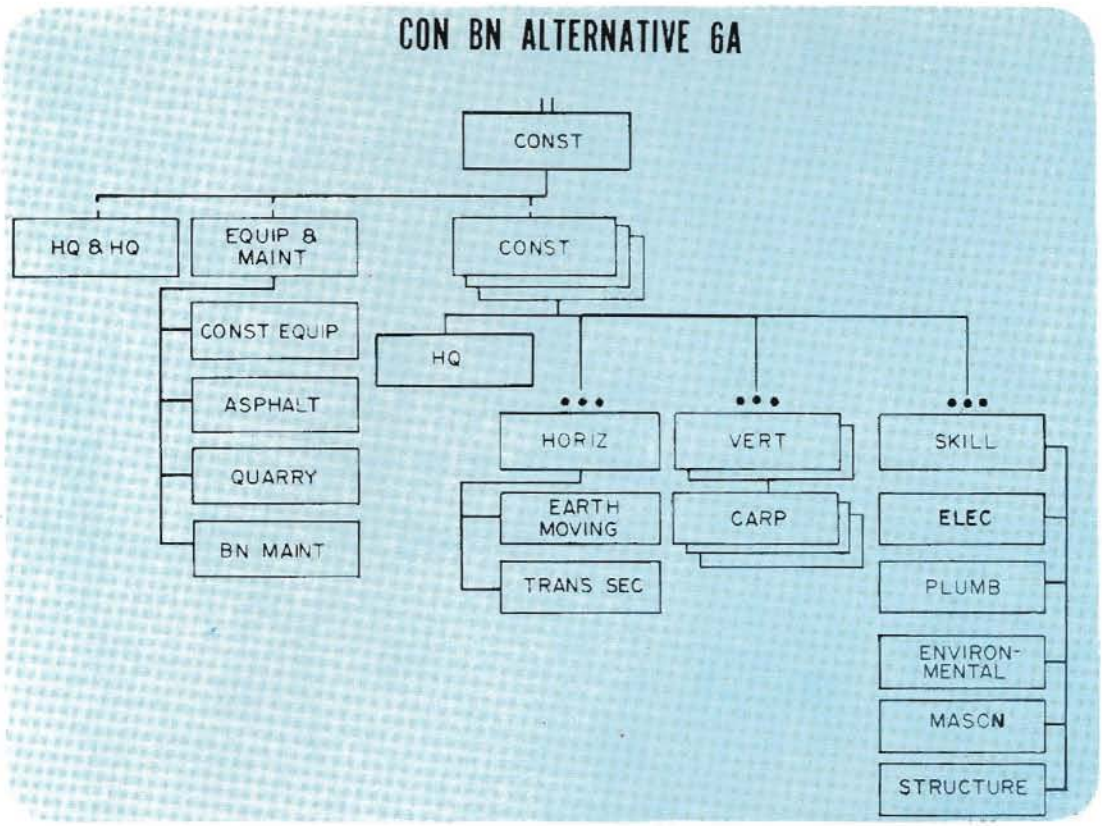


capable of supporting project sites, and a battalion direct support unit for engineer equipment. The Materials Support Company would provide specialized equipment and construction materials support, and would consist of a concrete section, asphalt section, quarry section, and materials section. Equipment would include 18 dump trucks (12 cy capacity), a 150 TPH rock crusher, and three mobile concrete mixers (24 cy/hr). The Earthmoving Company contains the three earth moving platoons of the current battalion and a maintenance section. Equipment includes dozers, scrapers, and compaction equipment, but no dump trucks. The General Construction Companies are organized to do vertical type construction and consist of a general construction section composed of carpenters, structural specialists, and construction helpers; a utility section composed of electricians, plumbers, masons, refrigeration, heating and ventilation specialists, and a utilities helper; and a support section composed of equipment and equipment operators needed to support other sections.

Construction operations of this battalion are envisioned to be similar to those of civilian contractors. The staff organization represents a distinct departure from the traditional S-1,2,3,4 staff. It is a double deputy system (Chief, Support Operations, and Chief, Construction Operations) in which planning and management of construction operations is highlighted. There is no executive officer, so in the absence of the battalion commander, command is passed to the senior chief.

It was with this background information that the Combat Developments Command Engineer Agency began its study in March 1970 "to identify improved alternative organizational structures for the Engineer Construction Battalion, where, through improved management techniques and the introduction of modernized construction capabilities, manpower savings can be realized without degrading the battalion's capabilities". The study employed both quantitative and qualitative techniques to determine the construction requirements placed on an engineer construction battalion and the resulting required capabilities.

After the identification of essential construction equipment and skilled trades, unit building blocks were developed to permit incremental changes to the existing Table of Organization and Equipment (TOE). Finally an analysis was performed to determine the savings which would result from the pooling of skilled manpower and the introduction of off-the-shelf commercial construction equipment (CCE). The study resulted in seven alternative organizations, of which the first four are the same basic organization as the current battalion. Alternative number five and seven represents OCE's functionalized company concept, while number six pro-



This concept takes the present "BALANCED" capability and functionalizes skills at the company level.

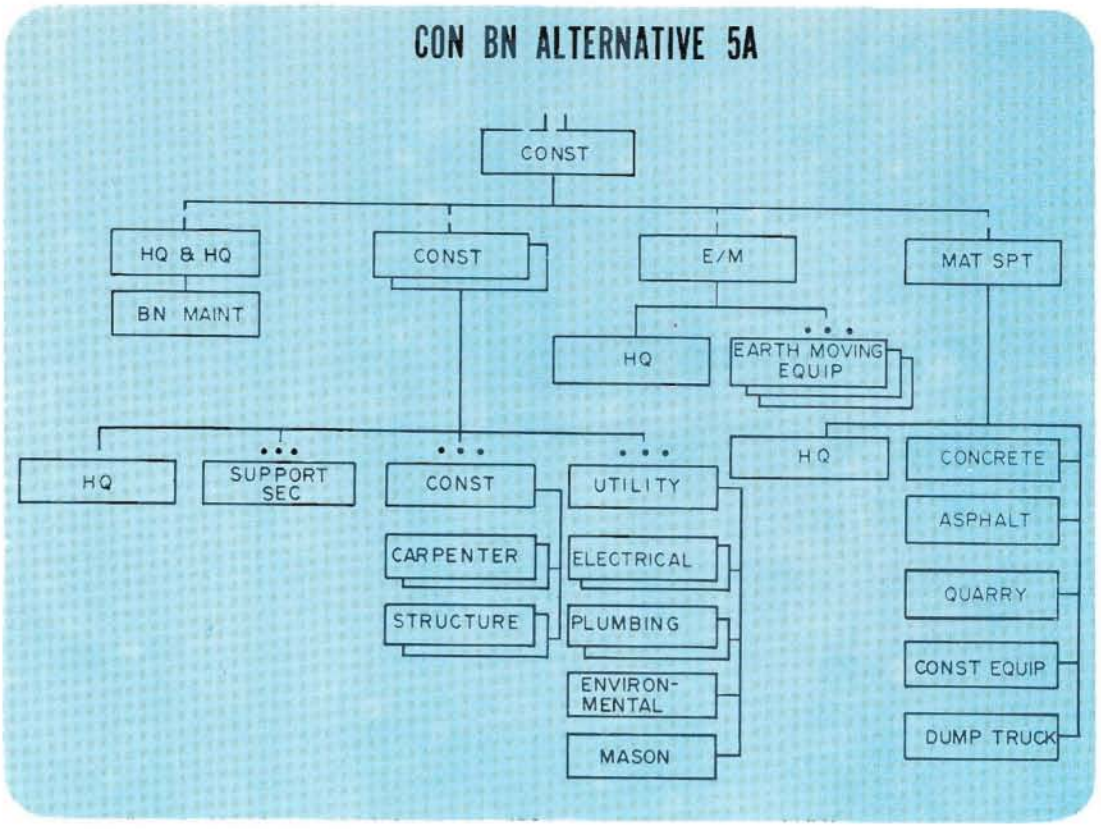
vides for functionalized platoons and sections in an organization essentially the same as the present battalion. Each alternative provides single and double shift options.

The study recommended that a new tentative TOE be prepared for the engineer construction battalion based on the modified functionalized concept of alternative number six, and that a battalion be reorganized and equipped with commercial construction equipment for a field evaluation to be conducted in Europe. It also concluded that the recommended changes could be accomplished at a savings in the number of personnel required and at essentially the same 10-year dollar cost.

The modified functional battalion recommended by the CDC study is composed of a Headquarters and Headquarters Company, an Equipment and Maintenance Company and three Construction Companies. The HQ and HQ Company has the normal complement of a headquarters element and contains no maintenance or construction capabilities. The organization of the Equipment and Maintenance Company is essentially the same as in the current battalion, but in the three Construction Companies major changes are found as they now consist of four platoons each, namely a Horizontal Construction Platoon, two Vertical Construction Platoons, and a Special Skills Platoon. The horizontal platoon contains the entire earthmoving capability of the company and is comprised of an earth moving section and a transportation section which consolidates all of the company's dump trucks. The two vertical platoons consist solely of carpenters and their tool sets, while the special skills platoon is organized into functionalized craft sections and includes plumbers, electricians, masons, structure specialists, and heating and ventilation specialists. With this type of organization each craftsman can now obtain the grade of Specialist Five in his own work section as opposed to the current maximum of Specialist Four, and can progress up to Platoon Sergeant (E-7) in the general field. This will result in higher skill levels and enhance personnel retention.

Neither the OCE or CDC organizations have been field tested as yet and no immediate plans to do so have been announced. Austere conditions in Europe, accelerated redeployment from Vietnam, and longstanding congressional limitations in CONUS make the prospects of a field test of both concepts doubtful and of either concept uncertain. The productivity of a functionally organized battalion has, however, already been proven by field experience. The Engineer Command, Vietnam, reports that the 815th Engineer Battalion (Construction), which has been functionally organized for work on the LOC program, (See "LOC" in the spring issue of "the engineer") "has proven to be one of our

Diverting from the other concepts, CDC's proposal functionalizes skill capabilities at the platoon level. The students favored this concept.



best producers both quantitively and qualitatively". Initially, plans were for the line companies (B,C, and D) to be responsible for the complete construction of a portion of the road---Less paving which would be done by A company—but this organization proved highly inefficient. The battalion was reorganized to make each platoon and company a specialist in one function (earthwork, subbase, haul, etc.), increasing production in all areas at least 100 percent. The 36th Engineer Battalion (Construction) has had similar success with a functional organization.

It was at this point that the Engineer School's Office of Doctrine and Training Development and the former Department of Engineering and Military Science began formulating a method of evaluating the CDC and OCE organizations in a classroom exercise. Working under the guidance of Colonel Charles S. Reed, Jr., (Director, D/E&MS), Colonel Walter R. Hylander Jr. (Director, ODTD), and Lieutenant Colonel Donald A. Ramsey (Chief, Construction Engineering Division) a 30-hour "war game" was prepared by Captains John F. Sheffey and Kevin J. Mahoney, members of the Engineer School faculty, to test the command and control and management afforded by the two organizations.

The students of class 2-71, Engineer Officer Advanced Course, were selected to participate in the evaluation and were divided into four battalion staffs (two for each proposed organization) and a 10-man umpire staff. The Chief Umpire for the exercise was Major Gerald A. Vick, class leader of 2 EOAC. The first 10 three-hour sessions was held on June 28, 1971, at which time the proponents of the two concepts briefed the students after faculty controllers had outlined how the exercise would be conducted. The second and third sessions were devoted to Standard Operating Procedures and TOE study. Sessions four, five and six tested the battalion in a centralized project, while sessions seven, eight and nine presented several decentralized projects. In both cases "conflicts" were introduced to test specific elements of the organization. To simulate physical separation that would normally require communications by radio or telephone, written solutions were required. Only those personnel who would work in close proximity, such as the Battalion Commander, and his executive officer were permitted to converse during the solutions of the conflicts. The students were charged to exert every effort to make their organization work regardless of personal preferences. A final written report was required identifying the preferred TOE and its advantages. This report was presented at a briefing on August 2, 1971. The students decided overwhelmingly in favor of the organization proposed by CDC, with 85 percent selecting this concept. The five main areas which influenced this decision were: command, staff

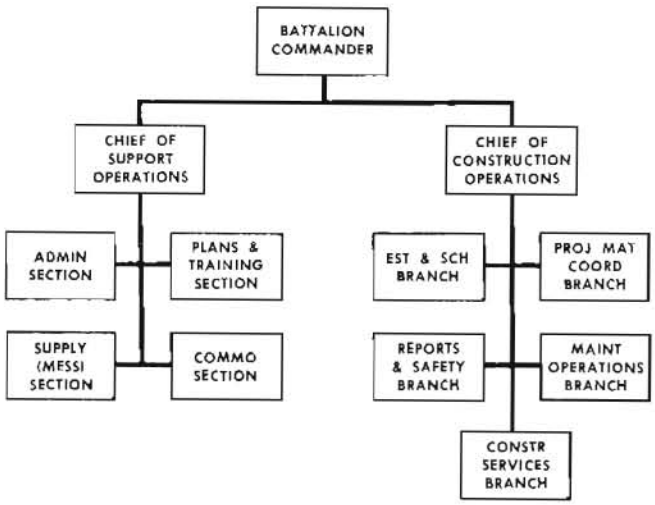
Student Survey Results	PERCENTAGES PREFERRING . . .					
	of 75 who selected CDC		of 13 who selected OCE		totals (88)	
	CDC	OCE	CDC	OCE	CDC	OCE
a. Administration	85	8*	61	31	82	11
b. Staff Organization	84	13	15	85	74	24
c. Task Assignments	82	12	0	100	70	26
d. Area Assignments	82	11	23	77	73	21
e. Planning of Construction Tasks	43	48	8	92	38	55
f. Identification of Responsibilities	100	0	85	8	98	1
g. Chain of Command	99	0	62	31	93	5
h. Logistics Support	49	33	0	92	42	42
i. Ability to Tailor Assets to Projects	55	31	15	85	49	39
j. Self-Defense	71	3	62	15	69	5
k. Unit Integrity	97	1	92	0	97	1
l. Job Efficiency	70	15	8	77	59	24
m. Maintenance	60	19	0	92	51	30
n. Communications	59	7	38	23	56	8
o. Mess Operations	73	16	46	54	69	22
p. Morale of Troops	93	1	38	23	85	5
q. Efficient Use of Earthmoving Equipment	40	45	0	100	34	53
r. Conduct of Training	72	11	15	46	64	16
s. Supervision of Personnel During Hours	86	3	8	62	75	11
t. Supervision of Personnel Off Duty Hours	79	0	42	0	73	0
u. Efficient Use of Officers	90	3	8	85	78	15
v. Efficient Use of NCOs	76	13	0	92	65	25
w. Span of Control	93	0	25	50	84	7

*** figures do not total 100% because of "no difference" answers**

organization, the number of officers at company level, administration, and flexibility.

Both the OCE and CDC concepts faired well in the centralized situation, but in the decentralized situation the OCE organization showed several significant weaknesses. In only two areas did the majority of the students feel that the OCE concept was overall superior, namely, the planning of construction tasks and the efficient use of earthmoving equipment. In general, the OCE concept faired well in construction related categories but was found lacking in the peculiarly military areas such as chain of command, responsibility, unit integrity, morale, use of officers, and off-duty supervision of personnel.

In assessing the student's findings, it must be remembered that the exercise offered a choice between only two alternatives. Neither the present G-series TOE, nor any other possibilities were compared, and certainly the classroom cannot duplicate actual field conditions. The students learned plenty from their work and the opportunity to debate the merits of a new organization. Even so, they still must wait to see the final results of their labors. The 515th Engineer Battalion (Construction) still exists only on paper!



In proposal 5A, OCE employs the new concept of a double-deputy staff in lieu of the traditional S-1,2,3,4 arrangement.

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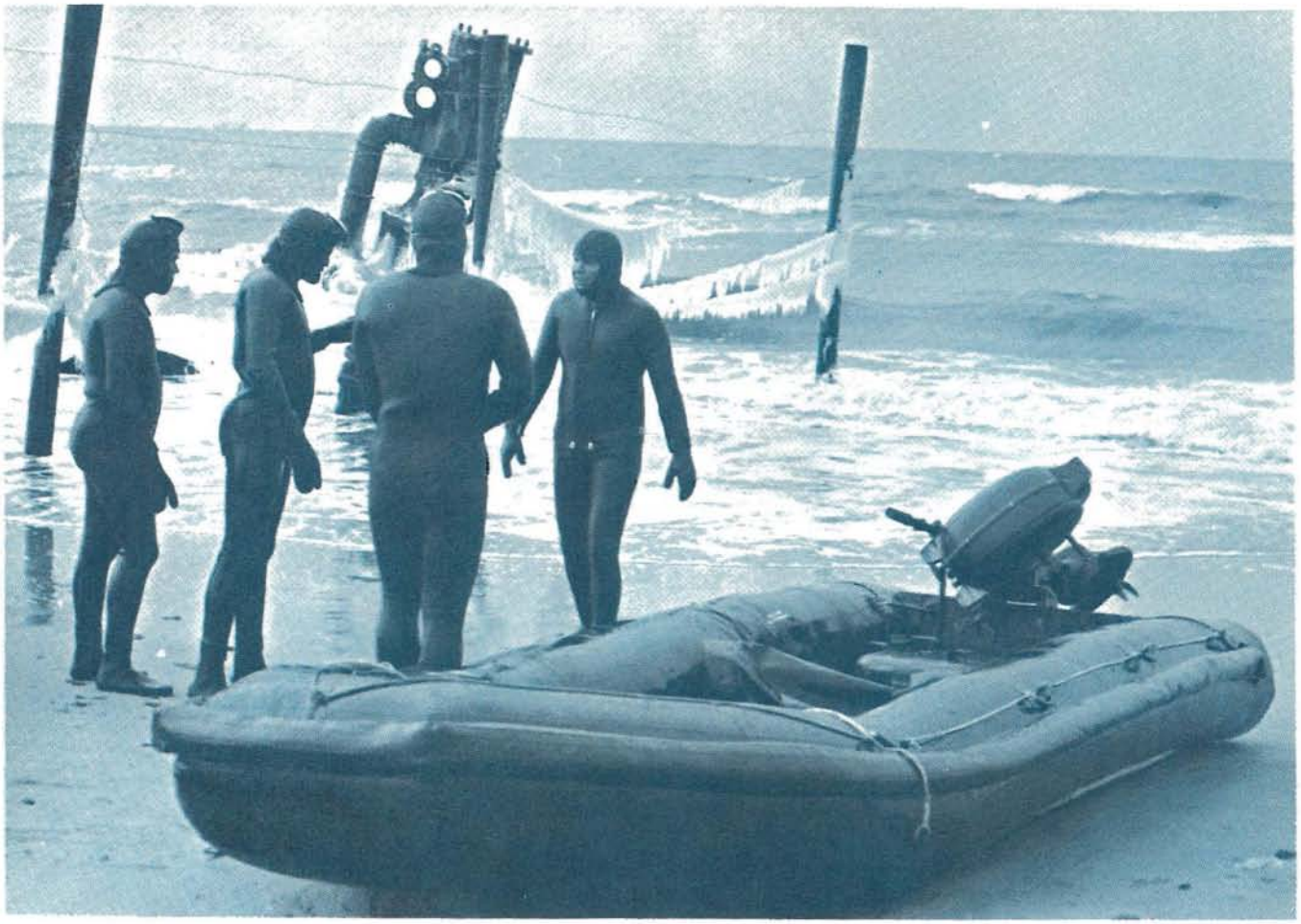


SOLDIERS OF THE DEEP

1LT M. J. TERCY

"Because it was there", is a familiar phrase which beckons to those men seeking the thrill of adventure. Some may set out to climb giant mountain peaks, while others may try "shooting the rapids" of some treacherous river in a small canoe. But to the men who display the badge of the U. S. Army Diver, adventure is routine and risk is simply part of the job.

Most people might think of the Army Diver as the typical "devil-may-care" soldier, who breeches submarine nets to infiltrate an enemy coastline. Although he may be called upon to perform such a mission, his knowledge and capabilities go far beyond such activities. Because of knowledge of diving and the training he receives, the diver will take no unnecessary risks which may jeopardize his own life, or the mission at hand. He is a professional by all standards.

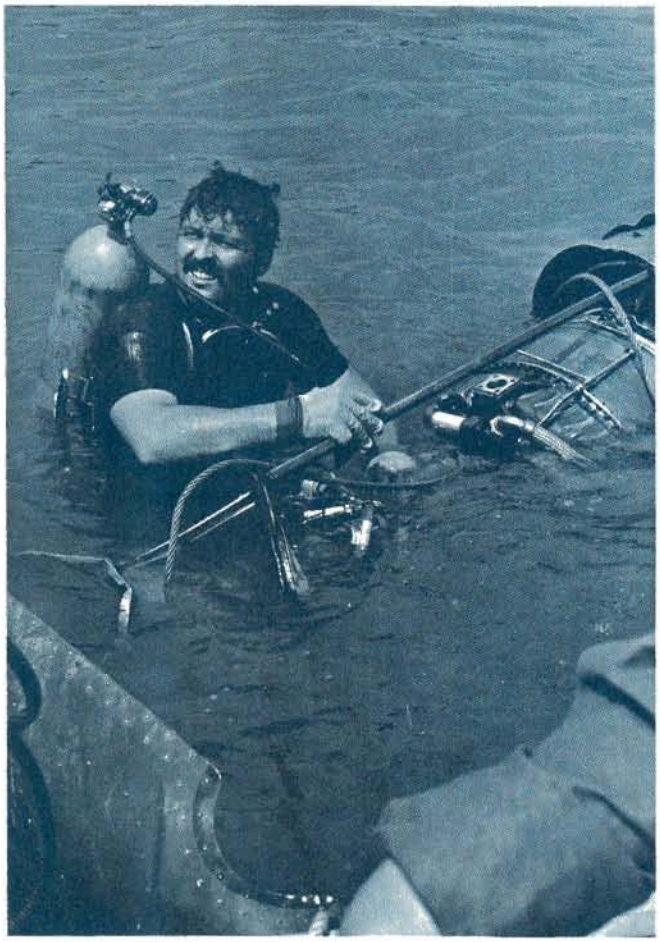
Military divers can trace a proud history back to the time of Ancient Greece. Alexander the Great employed divers while destroying the defenses of Tyre in 333 B.C. In even earlier accounts, Herodotus relates the story of Scyllis, who dove to recover sunken persian treasure for Xerxes. But the U. S.

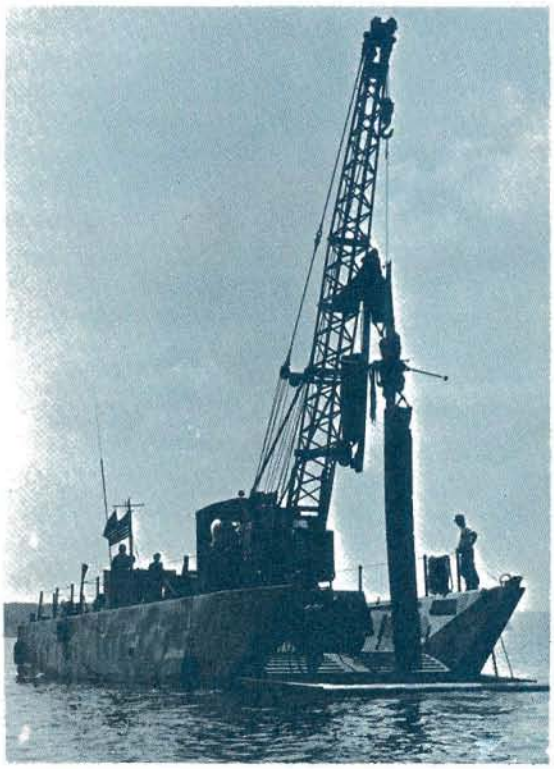
Army Divers of today came into existence at Fort Screven, Georgia, back in 1943. The first Army Diving School took shape there, but three years later in 1946, moved to its current location at Fort Eustis, Virginia.

A diver's training begins with a strong emphasis on physical fitness. To be selected for the diving school, a prospective student must pass the standard U. S. Army Physical Combat Proficiency Test (PCPT), and a series of swimming tests both on and below the water. The keynote here is endurance and coordination.

Chief Warrant Officer Donald L. Branham, who heads the diving school at Fort Eustis, states that the attrition rate is as high as 50 percent. Although the men who apply for the school are all volunteers, the demanding requirements narrow down the classes in the early weeks of the program. Of those individuals who drop out of the school, most fail to meet the standards because of lack of swimming ability, or they succumb to the pressure tests administered at the beginning of the course. Motivation is not a key factor contributing to the rate of attrition. The divers are a small select group of individuals, and commitment to their job is a life or death necessity.

The school is staffed by two Warrant Officers and seven Noncommissioned Officers. All have a wealth of diving experience and a proficiency which comes from dedication to their work. With the physical training portion of the course, they combine intensive classroom instruction on all





The two scuba divers (below) inspect the wreckage of a downed helicopter, and after attaching a cable (above), the wreckage is lifted from the water (right).

subjects related to the field of diving. The potential diver is taught everything from the basic principles of underwater safety to a working knowledge of diving physics. In short, the diver must be able to assimilate himself to every aspect of the underwater world he will inhabit.

To provide the student with an inherent flexibility, he is taught the techniques of both self-contained (SCUBA) and surface-supplied of deep sea diving. The diver must fully understand the capabilities and limitations of each system, so he can determine what equipment best suits a given job.

The most familiar system of diving is scuba. With the scuba equipment a diver has portability, maneuverability, and flexibility while working. The only limiting factors with scuba equipment are the duration of his dive and the depth to which he can descend. Of the three advantages of scuba, portability is a major factor of consideration for planning any diving operation. It simplifies the establishment of an operation by allowing for a large number of divers to be easily deployed so many divers can operate at the same time. Independence of operation is another major asset of scuba gear. The diver can work on his own, shifting his attention to many areas if necessary.

Although lacking the numerous advantages of scuba equipment, the surface-supplied or deep sea diving equipment is of equal importance. With the deep sea outfit the diver requires a supply of air generated from the surface. Normally, the deep sea diver also requires at least two men on the surface tending his life lines, and monitoring his underwater activity. This method of operation is usually employed where the divers work is confined to a small area, and stability is of paramount importance. The actual diving dress of the deep sea outfit provides the diver with maximum protection against the undersea elements. With this suit the diver can operate in even the most rugged terrain. Great depths and other special requirements may also necessitate the use of surface supplied equipment.

Experience is said to be the best teacher, and so it is for the divers. At the school, practical exercises are conducted in a 30-foot diving tank. Here the students become familiar with both scuba and deep sea diving procedures. While working in the controlled environment of the diving tank, they can work out any problems under the direct supervision of the staff. It is here also where they learn the basic techniques of underwater work such as welding and the use of various types of tools.

A scuba diver prepares to surface from the depths during a training exercise.

To add a greater amount of realism to the practical exercise, the school has converted an old barge and created a floating classroom. The only one of its kind, the floating classroom is fully equipped to tender and communicate with six divers at the same time. Excursion tours are planned with the "Barge" where the students participate in simulated underwater repair and salvage work, as well as blasting and demolition techniques and port rehabilitation.

The entire course at the school lasts for 23 weeks. The training a diver receives takes him through the first three stages of development. A student starts out as a "Diver Tender" with a basic MOS of 00B10. There is no hazardous duty pay at this skill level since the training is primarily an introduction preparing the students for underwater work.

Upon successful completion of the first phase of training, the student is awarded the "Scuba Diver" rating with an additional skill level added to his MOS. Accompanying the new rating is an additional increase in pay. At the scuba level, a diver receives an extra $65 a month. This additional pay increases as each new skill level is attained. The Master Diver, which is the highest rating a diver can acquire, receives the maximum amount of $110 monthly.

While attaining his rating, the diver assumes

Two divers helpers dress a soldier in deep sea gear (above), while (below) the diver begins his descent from the "floating classroom."

new responsibilities. He gains complete knowledge of his equipment, and learns to keep it operational under the most adverse conditions. Also he must be competent in underwater repair, methods of salvage, and be proficient in techniques of underwater demolition and blasting.

At the end of the course at the diving school, the student becomes a qualified Army Diver. Each student is given the rating of "Salvage Diver" with the MOS of OOB30. It is only when he achieves this final goal that the diver is ready to put his technical knowledge to practical use and provide invaluable support to units in the field.

One such unit with an organic diving capability is the 77th Engineer Company (Port Construction) based at Fort Belvoir, Virginia. This unit is the only one in the continental United States with a diving capability that can be mobilized and deployed to any point on the globe where diving support is required. The 77th has a complete range of undersea equipment, which allows the divers to meet any underwater requirement. Salvage Diver Jack Brust of the 77th stated that given the job, they could float anything anywhere.

Last year, the divers from the 77th teamed up with divers from the 73rd Transportation Company of Fort Eustis, Virginia, to participate in a marine research project called TEKTITE II. The operation, which took place off the Virgin Islands, was conducted in an undersea habitat to study the movements and habits of marine life. The divers performed as safety teams to insure the well-being of the scientists below.

Of their more recent jobs, the divers of the 77th assisted the Savannah District Corps of Engineers at the Clark Hill Dam and Reservoir in Georgia. The job was to free the waterway from existing obstructions. After inspecting the project site, the operation was carried out. Using more than 3000 pounds of C-4 explosive, the divers removed approximately 200 trees below the surface of the water. When the mission was completed, the river was able to flow unobstructed, and provide the increased need for more water.

These two accounts are but a cross section of the services performed by the divers. Each mission provides a new challenge to be met and overcome. But perhaps there will be occasions in drydock when time goes slow and the divers long for the sea. However, once again in diving dress, diving to some new depth of adventure, they will proudly carry out their mission as professionals of the Corps of Engineers. ⊖

Lieutenant Michael J. Tercy is a former Associate Editor of the engineer Magazine. He is currently assigned to the Engineer School, Fort Belvoir, Virginia, as Aide de Camp to the Assistant Commandant.

Bridging

FEW FORMER OFFICERS QUALIFIED FOR RECALL UNDER CURRENT PROGRAMS

THE DECISION TO LEAVE active duty in the Corps of Engineers has always been an important one. In view of the very limited opportunity to return, the decision to leave becomes even more significant. During the past fiscal year, the Engineer Branch has received numerous inquiries about returning to active duty from former Engineer officers, both regular and reserve. But only a small number of these officers have been qualified for recall under current programs. Only those junior officers who compiled an outstanding record while on active duty can be invited to return to the Corps. While some former officer's motivation for wanting to return is stimulated by current civilian job opportunities, in most cases this is not the reason.

Many officers and their families have later realized that their decision to leave the military was not what they really wanted. These officers have since found they are motivated toward a military profession and desire to pursue a continued military career. It is unfortunate that many highly competent officers will not fulfill their desire to return to the Corps since competition for the limited spaces available is very rigorous. So, if you are having thoughts of leaving the Corps, it would be worthwhile to reevaluate your motives. Is it what you really want? Think it over.

REGULATION BLOCKS FINAL TOUR PREFERENCES FOR MANY OFFICERS

SOME OFFICERS approaching retirement cannot get their "final tour" preferences. Rules are covered in AR 614-100. To clear up apparent misunderstandings, the key points of the regulation are: • An officer must be returning from an overseas assignment to qualify. Intra-CONUS moves purely for retirement purposes are not permitted. • An officer must be scheduled for mandatory retirement as opposed to his stated intent to retire voluntarily. • A valid requirement must exist for an officer to get the final tour of his choice unless he has between 120 and 180 days of service remaining and is returning from a short tour. The branch makes every effort to assign officers to the station of their choice when it is known that retirement is imminent. However, the rules sometimes restrict the branches efforts to meet an individual's desires.

SOME OFFICERS MAY QUALIFY FOR NEW Ph.D. QUOTAS

THE ENGINEER BRANCH has received some training requirements at the Doctorate level in Civil Engineering (Structures) and Geodetic Science. Interested officers with a master's degree in a related field should submit their applications prior to December 1, 1971. The application forms (1618-R) should, if possible, be accompanied by a letter of acceptance from an accredited university which states that an individual will be able to complete the degree in 24 months or less. Consult AR 621-1 for details or call the Branch Education Officer at OXford 3-032, Washington, D. C.

the Gap

10 ENGINEERS MAKE SELECTION LIST TO ATTEND ARMY WAR COLLEGE

SPECIAL CONGRATULATIONS are due to the 10 Engineers who were among the 100 active duty officers recently selected for enrollment in the Fiscal Year 1972 U. S. Army War College Nonresident Course. This is the only military correspondence course for which selections are competitive. Applications this year numbered well over 300; the highest since the program began in 1968. Graduates of the two-year nonresident course receive full credit for War College attendance, and are still eligible to attend the resident course. Details of application procedures are outlined in AR 351-11.

TIME BETWEEN VIETNAM TOURS IS INCREASING FOR COMBAT ENGINEERS

COMBAT ENGINEERS in Military Occupational Specialty (MOS) 12B and 12C have been assigned to involuntary second tours in Vietnam since 1967 to meet operational requirements. Currently MOS 12B and 12C Vietnam requirements are being filled by volunteers and personnel who returned from their first Vietnam tour approximately three years ago—in 1968. This is a marked improvement over the 20 month turn-around time which existed at one point during the Vietnam conflict. Even longer turn-around times may be expected in the future.

To give personnel in MOS 12B and 12C a longer period of time between Vietnam tours, the Department of the Army has made maximum use of MOS substitutions and of retraining other soldiers from MOS's that are less required in Vietnam. This not only increases turnaround time for combat engineers, but also gives other individuals valuable combat experience they would not normally receive.

ARMY INTRODUCES NEW TEST PROGRAMS TO CAREER EM

THE ENLISTED MILITARY OCCUPATIONAL SPECIALTY (MOS) Evaluation System has been expanded and is now more important than ever. In fact, many soldiers will not be eligible for promotion or reenlistment without taking one of the new Special Qualification Tests. The tests are in the same form as the regular MOS Evaluation Tests. Here are the requirements:

- To be promoted in an MOS other than the primary (PMOS), a soldier must take the Promotion Qualification Test. To take the test he will need his commanding officer's recommendation and a score of 100 or higher on his most recent PMOS. Procedures for Promotion Qualification Testing are contained in Department of the Army (COPA-EPPME) Message 221314Z dated June 1971.
- Anyone who desires to reenlist and does not have a PMOS evaluation score of 70 or higher in the last 12 months must take a Reenlistment Qualification Test. Procedures for this testing are contained in DA (COPA-EPPME) Message 141335Z dated July 1971.

These two special testing programs are aimed at further improving the quality of the enlisted career force. They also emphasize that MOS qualification is the responsibility of every soldier as well as his commanding officer and personnel office.

Miss Heroin

So now Little Man you've grown tired of grass,
L.S.D., acid, cocaine, and hash.
And someone pretending to be a true friend
Said, "I'll introduce you to Miss Heroin."

Well Honey, before you start fooling with me,
Just let me inform you of how it will be.
For I will seduce you and make you my slave.
I've sent men much stronger than you to their graves.

You think you could never become a disgrace
And end up addicted to poppy seed waste.
So you'll start inhaling me one afternoon;
You'll take me into your arms very soon.

And once I have entered deep down in your veins,
The craving will nearly drive you insane.
You'll need lots of money (as you have been told)
For darling, I'm much more expensive than gold.

You'll swindle your mother and, just for a buck,
You'll turn into something vile and corrupt.
You'll mug and you'll steal for my narcotic charm,
And feel contentment when I'm in your arms.

The day when you realize the monster you've grown,
You'll solemnly promise to leave me alone.
If you think that you've got the mystical knack,
Then, sweetie, just try getting me off your back.

The vomit, the cramps, your gut tied in a knot,
The jangling nerves screaming for just one more shot.
The hot chills, the cold sweat, the withdrawal pains
Can only be saved by my little white grains.

There's no other way, and there's no need to look;
For deep down inside, you will know you are hooked.
You'll desperately run to the pusher and then,
You'll welcome me back to your arms once again.

And when you return (just as I foretold!)
I know that you'll give me your body and soul.
You'll give up your morals, your conscience, your heart,
And you will be mine until DEATH DO US PART.

—Anonymous Addict