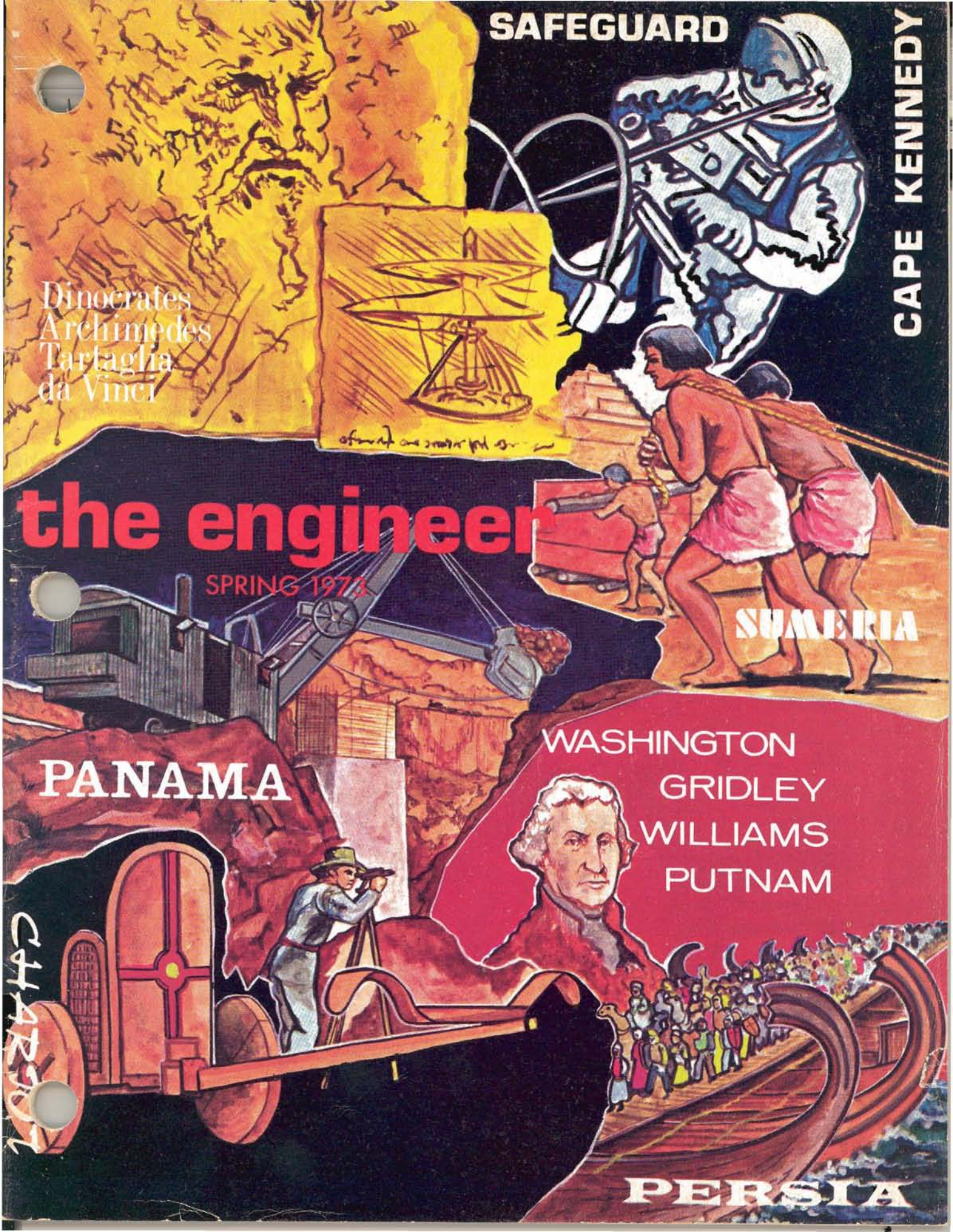
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# the engineer

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# CHIEF'S BRIEFS.....

One of the two initial graduates of the Military Academy at West Point—Class of 1802—was appointed as the Army's seventh Chief Engineer on July 31, 1812 with rank of colonel, concurrently being designated as Superintendent of the Military Academy. He was but 28 years of age at the time.

Colonel Joseph Gardner Swift was born on September 31, 1783 at Nantucket, Massachusetts, and subsequently was appointed a cadet by President Adams. Following graduation in 1802, he served with the Engineers in a variety of assignments, for this was a period when President Jefferson's great dream of expanding the nation to the Pacific was nearing reality. From 1804 until 1812 he worked chiefly on the construction of Atlantic Coast fortifications.

In April, 1813, Colonel Swift reported to the Commandant of the department having jurisdiction over New York Harbor, and by a special order of the President took command of Staten Island with a brigade composed of two infantry regiments. He assumed this command in addition to his duties as Chief Engineer and Superintendent of the Military Academy. At that time, Swift was personally supervising the fortification of New York Harbor.

Later that year he became Chief Engineer of General Wilkinson's Army on the St. Lawrence where, on 11 November 1813, he distinguished himself at the Battle of Chrysler's Field. After completing the defensive works of New York, for which he was brevetted, he was voted "Benefactor of the City" by the corporation in 1814.

Following the war, General Swift assisted in the preparation of a new system of infantry tactics and rebuilding the burned capitol at Washington. He also reorganized the academic staff and planned new buildings at West Point.

Swift resigned from the Army on November 12, 1818, and became the Civilian Surveyor for the Port of New York. In 1823, he founded the first New York Philharmonic Society, and during these years served as Chief Engineer for various railroads. He is credited with laying the first "T" rails. From 1829 to 1845 he was the Superintendent of the Great Lakes Harbor Improvements.

General Swift died on July 23, 1865 at Geneva, New York.

designed for professionals

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### ABOUT THE COVER

**Art Director John W. Savage, Jr., paints a panorama of engineer heritage. This work of art vividly points up random highlights of engineering accomplishments that are further detailed beginning on page 8.**

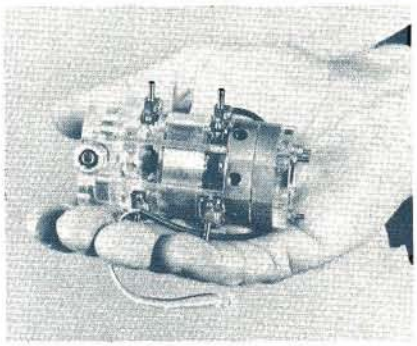
# Pipeline

## NEW CRYOGENIC REFRIGERATOR TESTED BY MERDC

The U.S. Army Mobility Equipment Research and Development Center, Fort Belvoir, Virginia, has successfully tested a new cryogenic refrigerator featuring a miniature turbine-alternator no larger than a pair of flashlight batteries.

Successfully tested to 58 degrees Kelvin, or minus 355 degrees Fahrenheit, this new cryogenic refrigerator is the forerunner of a larger unit being developed with the capabilities of temperatures of five degrees Kelvin or 450 degrees Fahrenheit. The refrigerator is being developed to provide reliable cooling of superconductors in electric power equipment. While at low temperature superconductors can carry very large electric currents without the Joule heating which is a major problem in power machinery. For some high power applications the cryogenic approach results in overall size reduction compared to conventionally cooled electric machinery.

The refrigerator unit consists of a compact heat exchanger, a compressor, and the miniature turbine-alternator which features helium gas bearings. These bearings permit the turbine-alternator's 18-gram rotor to spin at 180,000 rpm at cryogenic temperatures. The bearings also promise long turbine life since they have no rubbing parts during operation.



## HISTORY SERIES TELL ABOUT WWII CONSTRUCTION

From barracks buildings to the atomic bomb facilities, the story of military construction in World War II is told for the first time in the Corps of Engineers: Construction in the United States, the 71st volume in the "United States Army in World War II" history series.

In World War II the Army Corps of Engineers superintended the largest construction program in the nation's history, providing the home base for an Army that grew to more than 8-million men and women.

A vast homefront construction effort by the Army was the bedrock for mobilization and combat in World War II.

Started by the Quartermaster Corps and carried to completion by the Army Corps of Engineers, this building program embraced more than 27,000 projects and cost $15.3-billion, roughly $59-billion in 1970 prices.

Among its major features were camps and cantonments to house 5.3-million troops; plants to mass-produce explosives, ammunition, tanks, and planes; hospitals providing nearly half a million beds; a huge network of ports and depots; improvements to principal waterways and flood protection for vital industries; bomber bases which entailed a whole new technology; the mammoth pentagon building; and facilities for the epochal Manhattan project.

Corps management told all personnel: Reduce to bare essentials. Substitute! Improvise! Comb the country for materials! Get the job done with the means at hand. Military engineers knew the language well. One of them said: "The very basis of military engineering is the ability to make out with the means available." Construction was the first major industry to attain large-scale defense and war production in World War II.

Other aspects of the domestic contribution of the Army Engineers in the war have been covered in the first volume of a subseries to be published: Troops and Equipment, and a second told the story of the Engineer effort overseas in the war.

against Japan.

A final volume still in preparation will relate the activities of engineers in the Mediterranean area and Europe in the war against Italy and Germany.

## NOVEL IDEA COULD MAKE MINEFIELDS SAFE FOR TROOPS

Formed-in-place plastic "stepping stones" soon may be used to provide a safe path through minefields.

The "stepping stones," or pads, are formed by foamed plastic sprayed on the ground ahead of an operator carrying a portable backpack unit.

The special plastic forms and hardens almost instantly to cover an area larger than a mine. This distributes the pressure exerted by the footfall and lowers it below the mine's actuation point to allow the operator to cross the minefield safely as he sprays the path ahead.

The portable pack, which weighs 60 pounds, carries enough plastic to create 30 to 35 "stones." This is enough to provide a safe path through a minefield 100 feet long. The polyurethane foam "stones" are 17 inches in diameter and four inches thick.

The experimental minefield bridging concept was developed by the U. S. Army Mobility Equipment Research and Development Center, Fort Belvoir, Virginia.

## 416TH SLATES NEW MAINTENANCE FOR CAMP McCOY

Despite having units of three reserve engineer battalions taking their ATT's and performing other normal training functions, five battalions under the 416th Engineer Command of Chicago, Ill., will perform over $300-thousand of preplanned maintenance at Camp McCoy, Wisconsin this year.

This maintenance will include repairs to bridges and roads; training sites including tank ranges; and renovation of several wooden buildings.

Over 50,000 tons of rock will be blasted and crushed for roads and parklots while 4,000 tons of asphalt will be placed over existing parking lots and sidewalks. During the two past years annual training periods, reserve engineers of the 416th have developed a recreation site named Squaw Lake Recreation Area.

It is an area where reservists may bring outdoor camping vehicles and equipment so that their families may spend their ATT's with them.

This area will continue to be improved because this year a 200 foot earth dam will be constructed as well as a swimming beach to make it more attractive for family recreation.

## CHINESE TUNNEL PUT TO GOOD USE IN SOUTH KOREA

They call it the Chinese tunnel. And that is as good a name as any because the Chinese have used the 13-foot mountain opening along the Chorwon Valley route between Camp Casey and Unchon.

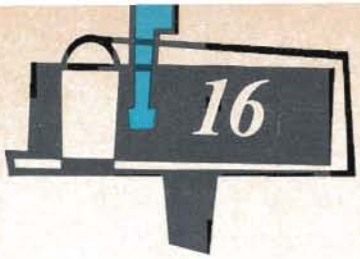
But so have the North Koreans, the South Koreans, the Americans, and most of the United Nations forces that fought in the area during the Korean War. The Japanese used it, too, right after they built it.

For the occupying Japanese, it was either a matter of up the mountain or 200 feet down the river bank to a river which was a flooded torrent during the monsoon—or straight through the rock.

So, 12 months and much chiseling later—Banzai! A tunnel. That was 41 years ago. Since then the tunnel has seen a lot of use.

Route 3 to Unchon is a Sunday afternoon breeze for those who like it. It is bumpy. It is paved and it is Route 3 that takes you through the tunnel.

The crude excavation is no engineering marvel—too short to be ventilated and too isolated for lights. But the courier making his appointed rounds can be grateful for a torturous grind avoided—Chinese Tunnel, Japanese, or whatever you tag it. Maybe the U. S. Army Engineers will find a way to improve it.




# STOP-16

## A FRIEND INDEED

Sir/I have been quite impressed by the quality of your professional magazine as a forum for new ideas. I make a point to read **the engineer** thoroughly for the perspective and insight it provides to an infantryman advising a Reserve Engineer Construction Battalion.

JOHN G. WILCOX
MAJOR, IN
UNIT ADVISOR
244TH ENGR BN
ROCKY MOUNTAIN ARSENAL
DENVER, COLORADO

## ESSAYSONS, PRESS ON AND SO ON

I congratulate Captain George W. Gipe for his fine contributions to the Winter 1973 issue of **the engineer**. However, with tongue in cheek, I suggest the following:

The pictures of Captain Gipe on pages 6 and 7 indicate that he is being worked too hard and that he is not getting enough vigorous physical training and perhaps, due to the job tensions, he is eating too much.

I was taught that the Engineer motto was derived from French, not Latin. Indeed Webster's Unabridged Dictionary indicates that 'essay' and 'assay' (both of which mean to put to test or to try) are derived from the French 'essayer' and the Old French 'essay.' I also thought that our Corps was patterned by and after the French who helped us in our first fight for freedom. Perhaps we should give our basic course students a few more minutes on the Corps' history, buttons and motto.

'Essayons;' 'Press On:' 'Keep Pushing;' persistence and determination alone are omnipotent!

J. M. KILGOUR
LTC, CE

## WE APOLOGIZE

Sir/I would be grateful if you would make known to your readers my disatisfaction with the way in which you represented the "British view of camouflage" in your Winter 1973 issue. When your staff member discussed the subject with me, I stipulated that I should have to approve the wording used in the article and I was subsequently shown a draft, which I approved. I am surprised to find that the final published article bore absolutely no similarity to the draft I had seen. There were 23 sentences in the final article and not one of these appeared in the same form in the draft submitted to me for approval. In fact, only one sentence was even recognizable.

It should be made clear to all your readers that the published article does not reflect the views of my Army, nor of myself, particularly with regard to United States Army policies. As for all the nonsense about "bumper stickers," "the politics of international alliances," "wasting time," and "playing with camouflage," I can only suggest that these ideas reflect a journalistic view of military affairs for which I for one do not share. The power of the printed word, taken out of context, to twist meaning is well known, but the putting of words into one's mouth, even by innuendo, is quite another matter.

R. B. HILL
MAJOR, RE

*Major Hill/In reference to the article 'Four Other Faces of Camouflage' in which your thoughts on the British version of that subject appeared,* **the engineer** *staff can only say that it made a mistake. It is and has been the clear intent of this publication to 'tell it like it is.' We try not to take anyone with expertise in these technical fields out of context. As this article was not intended to be questions and answers in the strict sense, the writer was able to have some journalistic license. This, of course, in the journalistic trade is called interperative reporting---his interpretation of your thinking on the subject. In this case, I was led to believe that your views on camouflage had been cleared by you. Obviously, such was not the case. Now that the record is straight, please accept our apology. It will not happen again.*
*the editor*

## U. S. ARMY REORGANIZATION

# ENGINEERING BONANZA

The most far-reaching reorganization of the U. S. Army since 1962 has considerably strengthened the role of the military engineer in the structure of the Senior Service.

A move by the U. S. Army last January to streamline its command structure for the first time in 11 years with a reorganization responsible primarily of elements within the Continental United States resulted in some major and pointed changes for the Corps of Engineers.

The changes chiefly involve CONUS elements that are responsible for the readiness of deployable units; the operation of the training establishment; the development of concepts, techniques, and materiel for land combat and logistics support.

Basically, the reorganization redistributes responsibilities, rationalizes existing missions, and concentrates on the more efficient production of the basic outputs of the CONUS base-trained personnel and units, effective weapons and equipment, and modern techniques and organizations for employment.

The reorganization also was designed to improve readiness training, the materiel and equipment acquisition process, the quality and responsiveness of management, and better support for the soldier in an era of limited personnel and a shrinking budget. The reorganization will be implemented in phases throughout this calendar year.

Under the reorganization, the Continental Army Command, the Combat Developments Command, and the Third United States Army, were eliminated; the Forces Command (FORSCOM), a single field headquarters to supervise the unit training and combat readiness of all Army units within the United States to include the Army Reserve and National Guard, has been created; the Training and Doctrine Command (TRADOC), a single field headquarters to direct all individual training, education and development of organizations, materiel requirements and doctrine, has been created; and the Army Materiel Command (AMC) continues its mission of providing materiel and support services for the U.S. Army.

The most significant impact of the Army reshuffle on the Corps structure is in the reestablishment of a Staff Engineer in the grade of O-6 (colonel) and a section with a strength of between 70 and 80 military and civilian personnel at each of the two new commands—FORSCOM and TRADOC. Under this program, the Staff Engineer will report directly to the commanding generals of the two commands on engineer matters. This means that this is the first time since the reorganization of the Army in 1962 the Corps has been represented by a Staff Engineer in a major field headquarters in the Continental United States. Before 1962, CONARC had a Staff Engineer. The 1962 reorganization resulted in engineer functions being fragmented among the general staff elements of CONARC.

The return to the concept of having a staff engineer as a special staff officer at a major field headquarters in the Continental United States is in concert with the current organizational programs that exist in U. S. Army, Europe; U. S. Army, Pacific; the Eighth United States Army, Korea, and other major commands.

Under the new reorganization, the Staff Engineers will be the principal advisors to the commanding generals of both FORSCOM and TRADOC on engineering matters. They have staff responsibility for supervision of engineer functions throughout the command; developing concepts, plans and policies for engineer support, and providing for integrating and coordinating engineer matters by assisting other members of the staffs of the two commands in actions that have engineer implications.

Other key moves under the reorganization that will affect the engineers are—

- The Combat Developments Command Engineer Agency becomes part of the Engineer School and comes under the guidance of the Deputy Commandant for Combat and Training Development.
- The 62B Mechanics Course relocates from Fort Belvoir, Virginia, to Fort Leonard Wood, Missouri.

• The Chemical Corps functions are being consolidated and, under this action, doctrine, training, materiel requirements, and organizational responsibilities for smoke and flame operations are being transferred to the Corps of Engineers.

• The Mobility Equipment Command in St. Louis is being converted into the Troop Support Command, and dedicated primarily to improving the personal equipment and environment of the individual soldier. Initially, Natick Laboratories and other personnel equipment related activities will be assigned to this command. Later, responsibilities for materiel handling equipment, construction equipment, and industrial engineering will be transferred to the Tank Automotive Command in Detroit, Michigan.

The new Forces Command is moving into the old Third Army facilities at Fort McPherson, Georgia. Its mission is straight-forward—combat readiness. The FORSCOM will command all operational divisions and STRAF units in the Continental United States. Troops under FORSCOM—about 225,000 active Army and 660,000 in Reserve units—will represent about 60 percent of the total Army strength. About 37,000 civilians also will be employed by the FORSCOM.

Although active installations under FORSCOM will report directly to FORSCOM headquarters, the commander, FORSCOM will use three Continental U. S. Armies (CONUSA) headquarters—First U. S. Army at Fort Meade, Maryland, Fifth U. S. Army at Fort Sam Houston, Texas, and the Sixth U. S. Army at The Presidio of San Francisco—to help him command and supervise the Reserve components. These Army headquarters will command the Army Reserve units assigned to their control and supervise the training and readiness of the Army National Guard in their areas.

Since the mission has been tightened for the CONUSA, the size of the headquarters has been reduced considerably. Through the reduction in the size of the CONUSA's, personnel resources will be freed for use in establishing nine Army Readiness Regions (AAR) to serve as extensions of the CONUSA and to provide dynamic, on-the-spot assistance to the Reserve components.

The ARRs are small, active Army elements with functional specialist and branch assistance teams and selected unit advisors. Most battalion-level advisors are being withdrawn from single Reserve unit dedication and placed into support teams to capitalize on their branch and functional expertise.

There will be few major structural changes in the Reserves, but several training brigades of the Army Reserve training divisions will be converted to maneuver training commands to increase the current Maneuver Area Commands' capability to help units in their planning and execution of command post exercises, field training exercises, and Army training te

Thus, the management of Army readiness has be improved by—

• Dedicating a single command to its readiness functions for active and Reserve components.

• Removing a command element between the Department of the Army and the major active Army forces.

• Dedicating the CONUSA and their regional extensions to the readiness of the Reserve components.

The other new command, Training and Doctrine Command, is being headquartered at Fort Monroe, Virginia. It will manage all individual schooling and training, the development of combat organizations, better ways to use them, and the Army Reserve Officer Training Corps program.

The TRADOC will have a strength of about 180,000 military or 22 percent of the active strength of the active Army force. The new command also will employ about 49,000 civilians. TRADOC will merge the previously separated CDC agencies with the service schools. This removes the organizational barrier between the experience found in service school faculties and student bodies and the organization charged with distilling that experience into new combat development products such as doctrinal literature, TOEs and eq ment requirements.

As a result, military education will be improved and the opportunity for fresh input to the combat development process will increase. With basic and individual training and the service schools all under the same command as the combat developments process, a closed loop between teaching and doctrinal development will emerge.

The service schools will be responsible for the analysis and development of the basic organizational building blocks of the Army, the Tables of Organization and Equipment, through the brigade level. They will produce field manuals and publications, and develop and examine proposals for new equipment and support requirements.

To provide a mid-management assist to the Commander, TRADOC in coordinating the combat developments effort, three new functional centers will be created. These functional centers will be the Army-wide focal points for the design and development of doctrine, organization, materiel requirements and functional systems. They will use the building blocks developed by the schools and develop organizational and support concepts through the corps level.

The Combined Arms Center will be located at F Leavenworth, Kansas, the Logistics Center at F Lee, Virginia, and the Administration and Personnel

Center at Fort Benjamin Harrison, Indiana. These centers also will be charged with the responsibility for curriculum and instructional consistency of the schools in their functional areas to insure early integration of doctrine into service school instruction.

As a change to the current system, TRADOC will manage the Army ROTC program through four regional activities, each commanded by a brigadier general. These ROTC regional activities will be located at the sites of the ROTC summer camps—Fort Bragg, North Carolina; Fort Riley, Kansas; Fort Knox, Kentucky; and Fort Lewis, Washington. In recognition of the ROTC as the source of 65 percent of its second lieutenants, the Army has placed great emphasis on insuring the continuation of a viable training program.

Thus, the management of individual training and combat developments will be improved by—

- Combining the responsibility for the production of creative combat developments outputs with the training and education functions of the service schools whose instructors and students teach, learn, and maintain a continuous enriching dialogue about organization, techniques of employment and materiel requirements.
- Providing dedicated management of Reserve Officer Training Corps.

With the creation of FORSCOM and TRADOC, the role of the installation commander has been increased in importance. In both of these new major commands, the installation commander will have a direct line to the major command without intervening headquarters layers.

In the new organizational concept, the installation commander has both training and readiness responsibilities to both FORSCOM and TRADOC for units of those headquarters assigned to his post. In carrying out these responsibilities, he optimizes the resources provided by both commands. Assignment as either a FORSCOM or TRADOC post is governed by the size of the largest activity on the post.

The new organizational changes also recognize the prominence of the installation commanders in area support activity on a geographical basis. This means that area boundaries based on population density, state or regional boundaries have been drawn to give the installation commanders increased area support functions for Reserve component, ROTC, public information or other functions.

There are other ways where the installation commander will benefit from certain aspects of the current reorganization not involving FORSCOM or TRADOC. For example, the reorganization of club management at Department of the Army will allow the installation commander to call on a DA agency specializing in this function for technical assistance while retaining command of the clubs and messes on his post.

The end result is that the installation commander becomes the dominant figure in the accomplishment of FORSCOM and TRADOC missions, and is the central figure in the accomplishment of Army policies on a geographical area basis.

The key action involving the Army support structure is the organization realignment of the Army Materiel Command. It will continue as the Army's major command concerned with the design, development, procurement, distribution, and support of modern, reliable combat and support materiel for U. S. forces. The organizational changes within AMC will improve its capability to do this. Actions include—

- The Armaments Command at Rock Island, Illinois, will pull together activities now widely dispersed at Dover, New Jersey; Joliet, Illinois; Edgewood, Maryland; and Rock Island into one command. This action consolidates the Munitions Command and the Weapons Command—the guns and bullets people.
- The consolidation at Fort Monmouth, New Jersey, of the splintered Electronics Command, presently headquartered at both Philadelphia and Fort Monmouth, will clear up the management problems caused by the geographical separation of several important functions.
- The Army Depot System will be realigned to reflect managerial improvements and reduction of the workload. Overhead and support functions at the depots will be consolidated, and specialization and concentration of depot maintenance and supply assignments will occur.

Department of the Army headquarters, as well as its major commands in the Continental United States, also is affected by the reorganization. Most importantly, DA will reduce its involvement in the day-to-day operations of the major commands and restrict itself to planning and integrating broad programs, developing policies, arranging priorities, allocating resources, pulling together the activities of TRADOC, FORSCOM, and AMC, insuring controls for tasking new missions, and providing for disciplined association of resources with new missions.

It is anticipated that this reorganization will permit a significant shift of personnel from headquarters and logistics support functions to combat and combat support activities.

While the current Army structure proved to be excellent in support of the war in Vietnam, the streamlining will enable the new organization to refocus and more easily handle its normal peacetime war-deterrent role.

# ENGINEER HERITAGE

**Lieutenant Colonel Clifford C. Lussier, Jr.**

With the constantly accelerating pace of technology and the ever-rapid tempo of military operations, today's military engineer has little opportunity to become acquainted with the rich heritage that history has endowed his profession. The feats and accomplishments of renowned military engineers of the past, not only advanced military arts, but also laid the foundation for and gave the impetus to all later engineering disciples.

The birth of civilization, now recognized as ocurring independently in several widespread areas of the world, has been characterized by advances in arts and crafts, urbanization, religion, specification, and, regretably, warfare. From its earliest days, the art and science of engineering has been tied intimately to the waging of wars. As prehistoric villages grew in size and wealth, protection from marauding tribes became necessary. To answer this problem, walls surrounding entire cities were constructed.

These are among the earliest significant engineered structures that have survived to this day.

Archaeologists generally agree that between battles, the ancient soldier spent his time at constructive pursuits—building history's first structures. Recent evidence suggests that military men of ancient Sumeria who first drained the marshes of the lower Euphrates and constructed dams, dikes, and a network of canals were responsible for completing man's first irrigation system. Although all early civilizations have been characterized by warfare, the ancient Assyrians emphasized this aspect more than others.

The Assyrians are credited with the invention of the first wheeled vehicle, the war chariot, with which they conquered the entire Near East as well as Eg[illegible] The battering ram, scaling ladders, siege towers, [illegible] ponton bridges were among other developments of the Assyrians, and it was during the reign of Tiglathpileser-I in the 11th century B. C. that military engineering as a distinct discipline was born. Fortifications such as walls and defensive towers were emphasized, but these early soldiers also planned and laid out parks and plantations for the use of the citizens; shrines and temples were also among their early achievements.

This engineering versatility, both in military and civil works, continued during the dominance of the Persian empire in the 5th century B. C.

Although more famous for her philosophers, artists, and theological scientists, Greece also provided us with several military engineers of renown.

Dinocrates, master architect, planner, and builder of the historic city of Alexandria, was the field engineer to Alexander the Great.

The earliest evidence of the use of engineering specifications results from the work of Philon, another military engineer of the 4th century B. C.

His written outline of the general dimensions, wall thicknesses, and window sizes of a naval arsenal at Piraeus is the equivalent of four page of today's specifications. The great mathematician and inventor Ar[illegible] medes, put his considerable talents to use as mili[illegible] engineer for his native city, Syracuse, where in 214

B. C. he constructed numerous ingenious devices for the defense of that city against Marcellus. His efforts enabled the city to stave off the superior Roman force for over two years.

Just as Alexander's army spread Greek culture from Europe and the Mediterranean to Africa and India, so too, Roman legions subsequently carried Imperial civilization to the far corners of the then known world.

The importance of rapid communication was quickly recognized by these early empires, and road networks were originally constructed for the primary purpose of moving legions from one frontier to the other.

From the writings of Vitruvius, one of the most famous engineers of the era, we know that schooling in military and civil engineering subjects was required in the training of the well-rounded engineer of the day. Pliny the Elder, better known for his monumental 37-volume "Natural History," was a naval engineer of some repute, arising to the command of the vast Roman naval base at Misenum in the Bay of Naples, where he perished in the calamitous eruption of Mount Vesuvius in 79 A. D. To these and other great Roman engi-rs, we owe our gratitude for the invention of poz-lana-type cement, used extensively in structures of this age.

Meanwhile, Roman field engineers accompanied Caesar's legions, building structures throughout the empire, many of which remain to this day as testimonials to their talent and ingenuity.

Caesar's famous bridge over the Rhine near what is now Bonn, was a historic achievement of the military engineer, Mamurra. Without power or machinery, he supervised the construction of a 1,300-foot, pile bent, timber bridge that was completed in less than 10 days. Many of us can commiserate with Mamurra, for only 18 days later, he was directed to destroy his bridge for tactical reasons.

It was shortly after this period that the precursor to the term "engineer" was first used. In 200 A. D. Tertullian, latin historian and writer, referred to an early military siege device, a battering ram, as an "ingenium," an invention or product of ingenuity.

The word "engin" came into use in later years applying strictly to engines of war, and the "ingeniator" was one who devised, built, and operated these devices.

During the Dark ages, the two most noteworthy developments in engineering structures were the forti-castle and the Gothic cathedral.

At first this may seem incongruous, yet during this period, most educated men were churchmen, and the employment of ecclesiastics as military engineers was not uncommon. Perhaps the most famous of these was Gundulfus, Bishop of Rochester and military engineer to William Rufus. Gundulfus, not only reconstructed the cathedral of St. Andrew in Rochester, adding bastions as part of the city's defenses, but also, in 1078, constructed the White Tower, the magnificent inner keek of the Tower of London.

The Domesday Survey in 1086 lists one "Waldivus ingeniator" as owner of nine baronial mansions, undoubtedly compensation for services as chief engineer to William the Conqueror.

Ailnoth, another early military engineer, was the chief surveyor of Westminster and builder of Windsor Castle in 1174. It was also in England at this time that the official in charge of the maintenance of works of defense and the operation of engines of war was entitled "attilator," a term then synonymous with engineer and most probably the origin of "artillery."

The Renaissance witnessed the rapid development of military engineering as a distinct profession. The invention of the cannon quickly made the feudal castle obsolete, and new techniques of fortification and siegecraft were developed. Italian military engineers were in the vanguard of the innovators. Valturius is credited with authoring the first printed engineering book, "De Re Militare", in 1473, and Francesco de Marchi (1504-1577) was one of several to devise and publish works on fortified bastions. His contemporary, Niccolo Tartaglia, authored treatises on fortification and gunnery, and although his calculations were later proved inaccurate, his new techniques earned for him the title, "Father of Ballistics." The beginnings of canal building in Europe has also been attributed to the Italian military engineers. Thirteenth century Milan was the site of the first large canal, reputedly an extension of a castle moat; and an engineer of that period invented the hydraulic lock, a most significant step in the history of transportation.

Bridges building was not neglected by fortification engineers of the day. The famous Ponte Vecchilo, spanning the Arno at Florence, Italy, was originally a bridge fortress, and is still noted for the daring flatness of its arches and the slenderness of its piers.

Perhap the greatest military engineer of any age more noted as a scientist, painter, sculptor, and thinker, was Leonardo da Vinci. Creator of the Mona Lisa (La Gioconda), da Vinci began service as military engineer for Ludivico, Duke of Milan, in 1483, a relationship that was to last for 16 years. Some excerpts from his famous resume to the Duke displayed his wide knowl-

edge of field engineering: "I can construct bridges, very light and strong capable of easy transportation, and with them pursue or on occasion flee from the enemy . . . I have means by tunnels and secret and tortuous passages . . . to reach certain and designated points . . ." for the purpose of mining. "I will make covered wagons secure and indestructable, which, entering with their artillery among the enemy, will break up the largest body of armed men." Leonardo also served for two years as military engineer to the infamous Caesar Borgia, during which time he devised and constructed a mobile siege tower for the assault on Ceri in 1503. His voluminous drawings and notes reveal many catapults, armored vehicules, and flying machines; and they also contain one of the earliest detailed sketches of a truss bridge. These reflect an extraordinary, fertile and inventive, mechanical mind that anticipated many later developments.

Military engineering continued its advancement in England through the Feudal ages. The notorius Henry VIII, being extremely fearful of invasion, lent special emphasis to the development of coastal defenses. In 1513, he appointed a "Master Trenchermaster" who later became the "Master of the Ordanance," responsible for all defensive fortifications.

In 1747, the king's engineers initiated a military survey of Scotland which became the foundation for the Ordnance Survey. This activity remains under the control of Royal Engineer officers to this day.

Then British military engineers pioneered in the development of large masonary dams in the 19th century. In India, Colonel Sir Arthur Thomas Cotton and Colonel Sir Probly Thomas Cautley undertook monumental irrigation projects. On the Ganges and Indus Rivers, and in the Madras area, Poona, Bhatgarh, Tnasa, and Peryar dams rapidly set successive height and length records during the last 20 years of the century.

Their efforts in creating a modern version of an ancient art helped India lead the world in irrigated acreage of the time. Royal engineers continued their predominance in the big dam field with the construction of the original Aswan dam on the Nile in 1902.

Meanwhile, in the 17th and 18th centuries, France went forward to become the outstanding nation of Europe and leader in the development of modern military engineering. This was the age that gave us Sebatian Le Pretre Vauban, who must be included among the greatest engineers of all time, military or civil.

He began his military career in 1651 at the age of 17 and in five years had become "engineer-in-ordinary" to Louis XIV. For 55 years he was involved in studying, planning, and directing the construction of fortifications, and his unfailing siege techniques gained for him the title of "the man who captures cities." Voltaire, not noted for his compliments, called him "First of engineers and first of citizens."

Among Le Pretre Vauban's many feats of construction was the fortified harbor at Dunkirk, still of interest to all harbor engineers. But his greatest contribution to the engineering profession was his proposal in 1672 that the engineers of the army should become an organized special branch of the service. The corps' Imperiale du Genie, history's first organized engineering body, was to carry engineering in France to new levels of achievements.

Promoted to Marshal of France in 1703, Vauban shortly thereafter began a study of abuses in the administration of the king's tax. He was impressed with the plight of the peasants and disturbed at the burden of their taxes and the exemptions of the upper classes. His work, published in 1707, remarkably foreshadowed the principles of the French Revolution and was promptly banned by order of the king.

Heartbroken, Vauban died a few days after publi-


cation of the order. In 1702, a member of the Corps du Genie, Alain M. Mallet, in addition to writing a famous book on fortifications (Le Travaux de Mars, 1671), first combined a telescopic sight with a level bubble to produce the form of instrument we know as a dumpy level.

Another great French military engineer was Charles-Augustin de Coulomb, usually recalled for his electrical experiments. His engineering works may still be seen in the outstanding fortress of Martinique.

Coulomb received special recognition in 1776 for his resolution of the classical problem of the resistence of a beam, and he laid the foundation for the common theory of flexure still used in the design of beams and girders.

Military engineers have had a significant role in both military and civil functions of the United States government since its founding. Washington's experience with engineers during the revolution led him, as President, to establish an engineer school at West Point in 1805.

Then under Jefferson, the present Corps of Engineers and the U. S. Military Academy at West Point were established in 1802. Until the Civil War, West Point was part of the Engineer Department, and for many years it was the sole source of academically trained engineers in the country.

The Academy's impact during one of the nation's most critical growth periods (1820-1870) cannot be understated. West Point graduates actively taught in fledgling scientific institutions, compiling technical texts for use in other schools as well. This influence may be seen dramatically from an inspection of the roll of West Point's first 65 years. Among graduates of this period were 26 college or university presidents, 23 principles of academies of other schools, and 85 professors and teachers.

During the same period, military engineers were playing a vital role in the exploration and mapping of our expanding country. The planning and the surveying of internal improvements such as roads, canals, railroads, and river and harbor works were also among their early projects. These engineering activities implemented the work of the War Department and other federal agencies and materially aided the growth of state and private enterprises.

The list of great U. S. Military engineers is too long for inclusion here, but their accomplishment in the fields of science and engineering will live as testimonial to their greatness. The Washington Monument, the Panama Canal, the great Pacific railroad surveys, the myriad river and harbor and flood control works, and the Manhattan project, where our nation entered the atomic age, were all managed and directed by military engineers. Yet the tasks are not complete.

Our predecessors have but laid the foundation on which we must continue to build. As military engineers, we have unique capabilities to respond to emergencies, whether they be war or in peace, and we must continually look to the future. Lessons of yesterday should help pave tomorrow's road; reflections on the achievements of our predecessors hopefully will inspire even greater accomplishments in years to come. e

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*Lieutenant Colonel Clifford C. Lussier, Jr., is presently assigned to the Armor and Engineer Board at Fort Knox, Kentucky. He holds a Bachelor's Degree in Management and Economics and is a graduate of the Engineer Officer Candidate School and the Officer Advanced Course at Fort Belvoir, Virginia. The colonel has served with engineer construction battalions in CONUS, Europe, and on group staffs during two tours in the Republic of Vietnam.*

## APPRENTICE TRAINING FOR ENGINEER SOLDIERS

# UNION RECOGNITION

**Colonel W. R. Hylander, Jr.**
**and**
**Major Kenneth D. Jobe**

What is "union recognition"? Why should it be of interest to you?

If you are an engineer soldier with construction experience, it is a plan to help you document your skill, so it will bring a better job and higher pay when you return to civilian life.

If you are an engineer leader, it means some of your men will be seeking to upgrade their skills through on-the-job training and cross-training. They also will want you to certify their training and experience in their "log books".

If you are a recruiter—and this includes a lot of engineer leaders these days, particularly in the Reserves and National Guard—you now have an added incentive to offer the young man you are trying to enlist or to re-up for another hitch.

At this point, we ask you to read the letter in the box on the opposite page. That letter promises the recognition we are talking about. The Associated General Contractors of America, Inc. (AGC) have provided a similar letter acknowledging their chapters and branches will recognize and give consideration to the experience reflected in the "log book."

To win the benefits of this recognition, however, the Army has to do its part. This article describes how the Army's part affects you, as well as how union recognition got started, where it now stands, and where it is headed.

As the US Army began to think about the challenge of recruiting an all-volunteer force, The Engineer School started to look into union recognition. We talked to the British, who have had a similar program for more than a decade. Brigadier S. E. M. Goodall, OBE, MC, Commandant of the Royal School of Military Engineering at Chatham, told us: "Within the British Army, only the Royal Engineers consistently meet their recruiting objectives, and only because of their trade union apprenticeship program." A statement like that was enough to set us to work in earnest. Our plan was to pick out one engineer skill; to win recognition from that union and to start a pilot program; then to expand into other skills and into an Official Army-wide program.

After comparing all engineer enlisted MOSs with related civilian job classifications and union affiliations, we selected MOS 62B, Engineer Equipment Repairman, for the pilot effort. It matches very closely the civilian trade of Heavy Duty Repairman, affiliated with the International Union of Operating Engineers (IUOE). It had the added advantage of being taught at Fort Belvoir. Informal discussions at Department of the Army and Department of Defense level and with the US Department of Labor disclosed that no one else was doing anything along the lines of union recognition, and also that none would object to our development of a pilot program. So we called the IUOE; we met and talked, and we learned about some problems.

The first problem was local autonomy. Unlike Great Britain, local U. S. unions have wide latitude in accepting new members. The national or international headquarters publish standards for apprenticeship, but it's up to the local how the standards are applied. The IUOE cannot, as an example, guarantee that every ex-serviceman who meets its standard for Heavy Duty Repairman will be automatically accepted into any local in the country. It is fact of life that we have to live with, but it is not insurmountable.

The second problem was the lack of a military work record meaningful to a union or to a contractor. A discharge certificate will only show that the Army called this man an "Engineer Equipment Repairman" and perhaps that he finished some course in it at a place named United States Army Engineer School. Did he change oil and fix flats, or did he rebuild transmissions? Did he really work at it for two and one-half years, or did he spend much of his time pulling guard or playing on the football team? Apprentices in a union-sponsored apprenticeship program must compile a record of thousands of hours of training and ex-

SKILL RESPONSIBILITY INTEGRITY
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

**THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.**

1957 E STREET, N. W. WASHINGTON, D. C. 20006 · EXECUTIVE 3-2040

January 4, 1973

TO: All Soldiers in Construction

You are receiving valuable training and work experience as heavy construction equipment operators and as repairman. The skills that you are acquiring in the service can lead to a satisfying and well-paying career in the construction industry after you are discharged.

A completed and properly authenticated log book of your training and your work in the Corps of Engineers will provide a record of your ability if you should decide to work in construction after you leave the Service. All Chapters and Branches of the Associated General Contractors of America and the Joint Apprenticeship Committees with which they are affiliated will recognize and give consideration to your log book and the experience it reflects should you decide to enter our industry after you have completed your service in the United States Army.

Very sincerely,

J M Sprouse

James M. Sprouse,
Executive Director

perience, all certified by a card-carrying union member. So we designed a soldier's log book, which we call an Apprentice Master Record. It contains sheets for recording his training and work history, with each sheet to be certified by the soldier's supervisor. This log book appeared to solve this problem, but it led right away into the next one.

"I was in the Army, too, and I've seen M1 pencils used on rifle targets. How can you keep guys from faking their records" No doubt about it—this union man had a good point. So the idea of a Central Registry was born. Quarterly, the soldier will summarize his hours worked, get it certified by his supervisor, and mail it to the Engineer School. There it will be maintained in a computerized Central Registry, and made available on request in order to verify the soldier's log book totals .

One last hurdle remained. IUOE apprenticeship standards and guidelines are governed by a National Joint Apprenticeship Training Committee, made up of contractor and union representatives. Their approval of the Engineer School's union recognition program was required. In November 1972 the USAES program was presented to them at the IUOE's annual meeting in New Orleans, and approval was obtained. This approval, as can be seen from the letter in the box with the article, covers all operating engineer skills and not just Engineer Equipment Repairman—so we were one step further down the road toward union recognition.

We've deliberately dwelled at some length on how the program got started, because it is important for engineer leaders and soldiers to understand why individual log books are needed, and why they need to be accurate and true. One phony log book can tarnish the future of everybody involved in the program.

Here is how the program will work. Starting this spring, trainees in 62B and other operating engineer courses (see list in box) will get an orientation on union recognition and be invited to apply for enrollment. Individuals already holding one of these MOSs are also invited to enroll; a letter is going out to unit commanders worldwide. Active Army and Reserve Components, giving details on how to do it. If you somehow miss getting the word, just write to the Secretary, US Army Engineer School, Fort Belvoir, VA 22060.

Those who are enrolled will receive a log book—the Apprentice Master Record. Each participant enters his hours worked and his training received, and weekly he gets a supervisor to sign the log for verification. Quarterly he sends a certified summary to The Engineer School. That's all there is to it. When the participant leaves the service, he has his log book as a record of his skill, and The Engineer School will confirm it on request from its Central Registry.

The log book is an unofficial, individual record. It is not a part of a soldier's 201 file. He keeps it—not the unit. The unit's only responsibility is to verify the soldier's entries. If he loses it, he's lost the master record; the USAES computer will be able to produce only his quarterly totals. He—and not the Army—is the loser. It's up to us, and to you as his leader, to insure that he understands this.

Old timers that we've talked to, including noncommissioned officers and some warrant officers, have expressed the wish that such a program had been available when they started up the ladder years ago. We are sorry, too, that it wasn't, but at least they can pick it up now if they choose. We invite them to enroll also, and do document their past training and experience by affidavits from former commanders or associates. By way of encouragement, however, we can offer the advice that unions and industry are interested in getting experienced men, and that a military retiree in his forties isn't old by civilian standards. A good documented work history will help get you a job, but if you are good you can get a job anyway. Once you're on the job, it's your performance that counts.

We regret, too, that union recognition is not y available outside the operating engineer skills list in the box with this article. For carpenters, electricians, printers, and others, this involves negotiations and we will let you know via **the engineer** magazine and via letters from the Engineer School as soon as we can.

For those in Reserve and National Guard units, there is no reason why you cannot combine the hours spent at your skill in the military service with those on your civilian job. Get a log book from USAES and record your military training and experience, and add it to that you are building up on your job.

Now you should be aware where all this is headed. It is more than just another recruiting gimmick, and more than just another fringe benefit for the man who is leaving the service. Since the days of World War II, the Army's individual training plans have been designed primarily for rapid mobilization of a draftee Army. "Teach him the minimum he needs to survive and to perform, and ship him overseas. Let his future commander worry about the rest." Rather quickly, the Army's training environment and its training philosophy are changing. We need to attract and to retain career soldiers. In the Corps of Engineers, we need to have a highly skilled base of construction skills, acti and reserve, able to undertake limited wartime a peacetime missions as well as the job of mobilizing a

nscription Army for all-out general war. We need o train mechanics to become future maintenance supervisors, and grader operators who can run any piece of equipment on the job. Over the years, the construction trade unions and civilian construction industry have developed an apprenticeship training system that accomplishes essentially the same goals: progressive career development for the individual, and a capability for the industry to expand rapidly when the need arises. It is worth some study.

Apprenticeship programs vary widely, but all involve several things:

- A period of indentured, probationary service.
- Training, under skilled supervision.
- Experience, demonstrated and documented.
- Standards, recognized and applied.

Civilian apprenticeship programs receive public recognition by being registered with a State apprenticeship agency, or with the Bureau of Apprenticeship and Training, U.S. Department of Labor. Graduates get a certificate that make them journeymen; the certificates are issued by the Department of Labor.

If the Army registered its training program with the Department of Labor, and it was accepted as meeting national apprenticeship standards, *the Army could certify its own journeymen*. We would not need to depend on a local union's or contractor's decision as to how much credit to grant for military service. Informal discussions with labor officials indicate that this is entirely possible. So our union recognition effort at The Engineer School is taking a new tack—aimed at registration of military training as a formal apprenticeship program.

It appears that the Apprentice Master Record will take care of documenting a soldier's experience. He becomes indentured when he enlists, so that's no problem. What does appear a problem, however, is establishing training and experience requirements that approximate industry-wide standards. For operating engineer skills, these are three-four years of experience and about 144 hours of training per year. We have done some preliminary study here at The Engineer School, again for 62B Engineer Equpiment Repairman, and it appears that a military apprenticeship program should look like this:

After finishing basic training, apprentices would take the 62B20 course at Fort Leonard Wood. Missouri. This nine-week course (360 hours) prepares him to perform organizational maintenance and repairs. He would then serve in a unit for about two and one-half years, compiling perhaps 4,000 hours of logbook time. If he then is considered to be qualified, he would return to Fort Leonard Wood for the advanced level 62B30 course. This is also a nine-week course. After another year of work at the 30 skill level, he would get his journeyman's certificate. Hopefully, he would be interested in staying on in the service and would re-enlist. Even if he chose to get out, the Army would have benefited from having a better motivated and better skilled mechanic for four years.

For most other skills, an advanced training course would not be essential. OJT in the unit may be adequate.

There is a related program you should also know about. The Army, Navy, Air Force, and Marine Corps are actively engaged in studying the consolidation of common training. An Interservice Training Review workshop was held at Fort Leonard Wood in February 1973, to identify common areas in training for construction skills. For the equipment operator and engineer mechanic skills, we found commonality by fall-

| IUOE CLASSIFICATION | ARMY MOS | MOS TITLES |
|---|---|---|
| Universal Equipment Operator | 62F | Crane Operator |
| Grading and Paving Operator | 62E | Crawler Tractor Operator |
| | 62K | Grader Operator |
| | 62L | Wheeled Tractor Operator |
| | 62M | RT Forklift & Loader Operator |
| Plant Equipment Operator | 62D | Asphalt Equipment Operator |
| | 62G | Quarryman |
| | 62H | Concrete Paving Equipment Operator |

International Union of Operating Engineers
1125 SEVENTEENTH STREET NORTHWEST ★ WASHINGTON, D. C. 20036
AFFILIATED WITH THE AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS

OFFICE OF GENERAL PRESIDENT • DISTRICT 7-8560

December 14, 1972

To All Operating Engineers in Uniform

I wish to take this opportunity to welcome you into the trade of Operating Engineer. Now that you have acquired some skill as an Operating Engineer in the Corps of Engineers, I would like to encourage you to build on this skill to enhance your service career and to assist you in getting a better job when you return to civilian life.

Although you can expect to be tested whenever you apply for membership or for acceptance into an Apprenticeship Program in the Operating Engineers, this log book, when completed and signed, is evidence of all your training and work experience in the service and will be recognized as such by our locals. I urge you to keep this record up to date and look forward to working with you on your return to civilian life.

Sincerely,

Hunter P. Wharton

Hunter P. Wharton
General President

g back upon the civilian requirements for these skills -the apprenticeship standards we've just been discussing. Workshop findings were reviewed at an Interservice Training Review meeting at Pensacola, Florida in March, and The Engineer School is being tasked to develop a core curriculum for each of the basic operator skills. They are going to be designed to apprenticeship standards, and we believe the Army Engineers will lead the way in putting them into practice.

In summary, union recognition is a reality for operating engineer skills, and participation is welcomed. See your commander, or write to The Engineer School. Similar recognition for other engineer skills is coming soon. And, further on, but within sight, is the prospect for the Army to be able to certify its own journeymen.

We'll keep you informed as it develops. In the meanwhile, The Engineer School invites your participation and your comments. Send us your applications for enrollment in this pilot program, and send us your thoughts about where we are headed.

Back during World War II, Bill Mauldin said it all with his cartoons of an infantryman telling an engineer: "Yer lucky. Yer learnin' a trade." We think u engineers are lucky, too, and we're gaining for you some of that recognition.

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*Colonel Walter R. Hylander, Jr., Deputy Commandant for Combat and Training Development, at the Engineer School, has had tours with the 1st, 2nd, 3rd, 138th, and 288th Engineer Combat Battalions; the 487th Aviation Engineer Battalion (USAR), and at the Republic of Vietnam Armed Forces Engineer School. He holds a master's degree in Civil Engineering from M.I.T., and is a registered professional engineer in New York and a Fellow, American Society of Civil Engineers.*

*Major Kenneth D. Jobe is Chief of the Individual Training Branch, Training Programs Division, Department of Doctrine and Training Development at the Engineer School. He has served with various Construction and Maintenance units both in the Continental Unted States and overseas and with the Engineer Branch, Office of Personnel Operations, DA. The major is a registered professional engineer in the Commonwealth of Virginia. He holds a BS in Geology, a BS in Civil Engineering, and is a graduate of the Engineer Officer Advanced Course and the Command and General Staff College.*

# PIN PULLER

A simple solution has been suggested and accepted to an old problem that faces anyone attempting to extract a stuck ponton connection pin from light tactical rafts (LTR). The solution is an easily fabricated sliding hammer pin puller made from readily available components. If a unit is faced with this problem, the unit shop or support section should fabricate one or more of these pin pullers.

The bill of materials consists of the following items—

- 1 ponton connecting pin.
- 1 railroad track maul head (10 lb). (a similar 10 lb head from other hammers can be substituted)
- 2 Sections of five links of 0.375 inch chain.
- One foot and one six inch section of 0.5 inch diameter mild steel hot or cold rolled rod (cold rolled preferable).

The pin puller is easily fabricated—

Weld a 0.25 inch or heavier fillet bead on the rod end of the pin head for reinforcement. Weld the short 0.5 inch rod perpendicular to the top of the pin head. Weld the other 0.5 inch rod perpendicular to the end of the first rod forming a T; slide hammer head onto the pin. Cut the end of the pin off at top of the taper. Weld two links of one chain to the end of the pin. Turn the pin 180 degrees and weld two links of the other section of the chain to the pin being careful that the free links of chain extend equally beyond the pin end.

Removal of stuck pins requires two men to get the job done.

Attach the chains of the puller to the horns on the pin to be pulled. One man holds the tool in line with the pin and a second man grabs the hammer head and slams it up against the puller head. A few blows in this manner and the most stubborn pin is easily removed.

This information will be included in the next revision to TM 5-210, Military Floating Bridge Equipment.

# HOW LANCASTER, PA. GOT

No one in this Pennsylvania Dutch community thought twice when it started to rain during the middle of June, 1972. The people of Lancaster, Pennsylvania, along with their Amish and Mennonite neighbors, continued their lives as usual and watched as the nourishing water fell from the heavens. No one realized that this rain would continue for days resulting in the worst natural disaster in the history of the East Coast. Tropical Storm Agnes had demonstrated her might and left behind a torn and wrecked community.

Lancaster is a medium sized city located about 70 miles east of Philadelphia. It is the capital of a county with the same name and was once the capital of the United States for one day in 1777. It has one major stream, the Conestoga Creek, that flows from north to south passing through the east side of the city.

During the early morning hours of June 21, 1972, the single day that most of the damage occurred in this area, the rising and rampaging waters of the Conestoga Creek "washed-out" a span of the Engleside Bridge. This bridge is south of Lancaster on the city's major southern artery, United States Route 222. The traffic volume of this route is estimated by the Pennsylvania Department of Transportation as being 5,000 vehicles per day. This number increases considerably during the summer because of the large number of tourists that visit the Pennsylvania Farm Museum which recalls the 19th-century life down on the farm.

A Corps of Engineers Area Office of the Baltimore Engineer District was established for this flood-damaged area on June 26, 1972 to provide relief of the havoc caused by Tropical Storm Agnes. Personnel for this office consisted of Army Engineer officers and Corps civilians assigned on temporary duty from locations throughout the United States. Representatives from this office conducted a reconnaissance of the Engleside Bridge on the first day of operations and immediately commenced removal of the damaged portion of the bridge from the stream bed to eliminate the possibility of further damming of the creek.

The Baltimore Engineer District, after coordination with the Pennsylvania Department of Transportation, directed on July 1, 1972 that a Bailey Bridge be in-

# ITS BAILEY

**Captain George C. Richardson**

stalled at the Engleside site to restore the vital Route 222. The parts required for the bridge were released by the Army Materiel Command in St. Louis, Missouri, and shipment commenced on July 1, 1972 from the New Cumberland Army Depot located about 20 miles north of Lancaster. All bridge parts were at the site by July 3, 1972 allowing construction to start the next day.

After the receipt of the order to install a Bailey Bridge, the Engineer Area Office requested that project proposals be submitted by three General Contracting Firms in the immediate vicinity. The low bidder was the J. M. Brenner Company from Lancaster and a contract was awarded on July 2, 1972. Since the contractor had no prior experience with the Bailey Bridge, a bridge specialist from the 902nd Float Bridge Company of Fort Belvoir, Virginia, and 14 construction engineers from the 76th Engineer Battalion of Fort Meade, Maryland, were obtained to provide technical assistance for the duration of the project.

The bridge installed consisted of a 180 foot long Triple-Double Bailey Bridge. Construction started on July 4, 1972 and completion was realized on July 6, 1972. The bridge was inspected and accepted by the Pennsylvania Department of Transportation the following day. They limited the capacity of the bridge to five tons because of the problems of controlling the heavy trucks which normally use Route 222. Truck drivers have a tendency to disregard bridge classifications and this particular Bailey Bridge will not carry a truck heavier than 16 tons.

Cooperation between the U. S. Army, state and city governments, and the contractor and his crew was exceptional making this operation very successful. The damaged bridge was replaced in a relatively short period of time causing the least amount of inconvenience to the people of Lancaster City. The bridge is expected to be used for about two years until it is replaced by a permanent structure.

If you should ever be in the Lancaster area, you will be amused by the horse-drawn buggies carrying the Amish men with their bonneted womenfolk at their side crossing a tactical military bridge in a modern American city.

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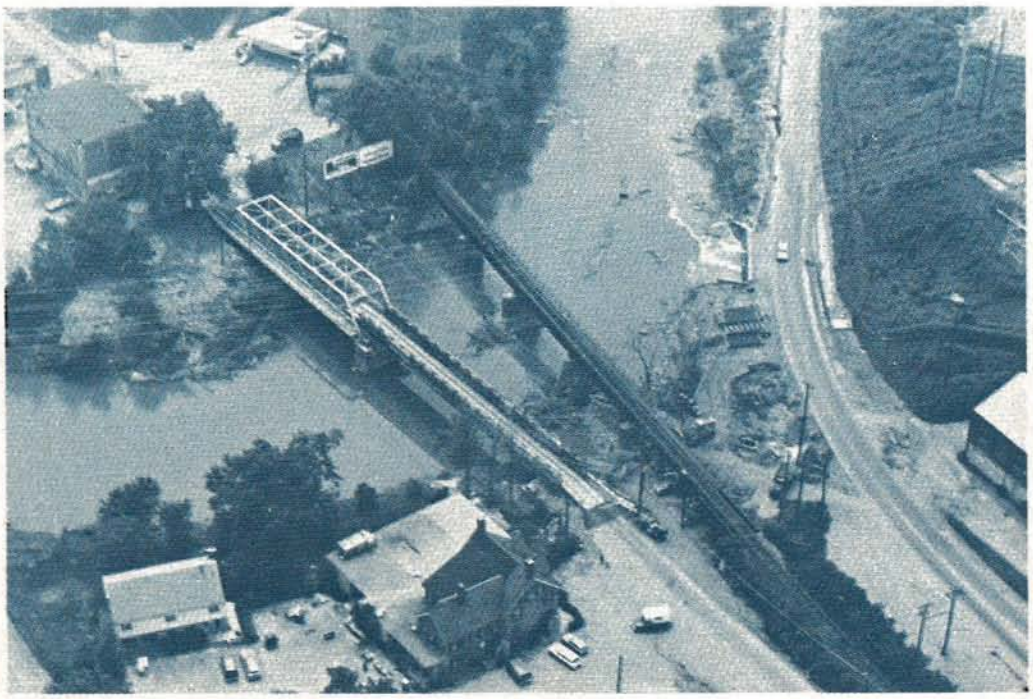
*Captain George C. Richardson is a recent graduate of the Engineer Officer Advanced Course at Fort Belvoir, Virginia. He was recently presented the Henry Larcom Abbot Award for excellence in writing based on his presentation of "How Lancaster, Pa. Got Its Bailey."*



# the essayons button

Distinctive in design, long in existence and exclusively identified with the U. S. Army Corps of Engineers, THE ESSAYONS BUTTON reflects long-standing pride in the military engineering profession, despite some conjecture as to the origination of the heraldic devices embodied on its surface.

First definitely known to have been worn during the War of 1812, the button has been a mark of distinction to Army engineers since its adoption. Two former Chiefs of Engineers generally are credited with its inception, although some mystery remains as to which of them designed the insignia.

Colonel Jonathan Wiliams, the sixth Chief of Engineers and the first Superintendent of the U. S. Military Academy at West Point, and Major General Alexander Macomb, the ninth Chief of Engineers, are considered to be the most likely designers of THE ESSAYON BUTTON.

History records that while serving as Superintendent of the U. S. Military Academy in 1807, Colonel Williams began to plan and construct fortifications in New York Harbor to preclude possible invasion by any of the great powers then engaged in the Napoleonic struggle in Europe.

Macomb, then a captain serving under Colonel Williams, rendered a map of the harbor at the latter's direction. That rendition carries Macomb's name as delineator. It is interesting to note that the legend and signature section of the map contains the surmounting Eagle, the Water Bastion, the Rising Sun with Rays, and the motto "Essayons"—all of which are reflected in the THE ESSAYONS BUTTON design.

The Macomb rendition included a round fort to the right with flag on top, which is believed to represent the "stone tower" then under construction—now known as "Castle Williams." Also reflected in the map was a frigate entering the space between the two protecting fortifications.

A prima facie case might thus well be made that young Captain Macomb was the enterprising American Engineer officer who symbolized the work of the Corps on-going at that time.

Yet, it could have been his Chief, Colonel William who furnished the idea for the decorative effect co taining the principal elements of the design on the button, and that Macomb was directed to apply the Colonel's own ideas in decorating the 1807 map. Such a conclusion is a logical one, for it is known that soon after becoming Chief Engineer and Superintendent of the Academy, Colonel Williams was permitted a free hand in designing his own special uniform for the officers of the new Corps of Engineers. This he did. It is quite conceivable that he may have designed the button for that uniform before 1807, and whether Macomb merely used a Williams design for an already existing ESSAYONS BUTTON to decorate his map of 1807 is open to question. Existence of this map provided an earlier date, however, than the War of 1812 for the actual use of the design now found on the button.

The year 1814 was selected as the date the button was first known to be used because the button was actually seen on a uniform at that time by an identified individual. General George D. Ramsey, writing about his cadet experiences at the Point during 1814-1820, stated: "Captain Partridge (Acting Superintendent from 1808-1817) was never known to be without uniform . . . His was that of the Corps of Engineers with t embroidered collar and cuffs and the ESSAY BUTTON. . . ." e

# ENGINEER VIEW OF THE C-5 GALAXY

**Lieutenant Colonel Hector Wood**
**Major Ronald L. Lane**

The introduction of the C-5 aircraft into the Military Airlift Command (MAC) fleet has vastly increased the deployment capability of the United States Armed Forces, particularly its Corps of Engineers. Logistics concepts of engineer planners in the past have depended upon surface movements to meet the bulk of even emergency transportation requirements. Now economical air movement of outsize items of engineer equipment and massive volumes of construction cargo is made possible by the giant C-5 transport.

The Army Materiel Command (MAC) conducted a test and evaluation for 22 months of the characteristics, capabilities and limiations of the C-5 aircraft in the air logistics role and its relationship to the Army logistics system. It was completed last December. Headquarters, Continental Army Command (CONARC) has also participated in a study effort to determine the impact of the C-5 system on joint air movement operations and to determine the suitability of doctrine, organization, materiel and procedures for employment of the C-5 in a joint air movement role.

Department of the Army directed both of these study efforts which are managed by the US Army C-5 Evaluation Group under operational control of the Combat Developments Command. Army participation in the C-5 evaluation effort was at the invitation of the Air Force to ensure that the Army is capable of fully utilizing the increased airlift capability of the C-5 system. The AMC and CONARC efforts have already modified old or developed new deployment policies and procedures and air logistics concepts. Final results should present an Army awareness of MAC airlift capabilities never before achieved by the green suiters.

What does the C-5 aircraft offer the Corps of Engineers? How can engineers take advantage of this giant flying machine? It's still early to predict the ultimate C-5 capability for the Corps but some completed tests and actual C-5 missions flown indicate tremendous possibilities for engineer missions worldwide.

Consider its size. In Corps parlance, the C-5 is BIG! Its cargo compartment measures 121 feet in length, 19 feet wide, 13½ feet high, enough space for eight of Fort Belvoir's bowling alleys. Its cargo deck is longer than the Wright brothers' first flight. The cargo compartment can carry six standard Greyhound buses or 90 staff cars, or, properly parked, 128 Austin Healey Sprites—enough to eliminate half the parking problems of the Engineer School's Humphrey Hall at Fort Belvoir, Virginia, when three advance courses are in session.

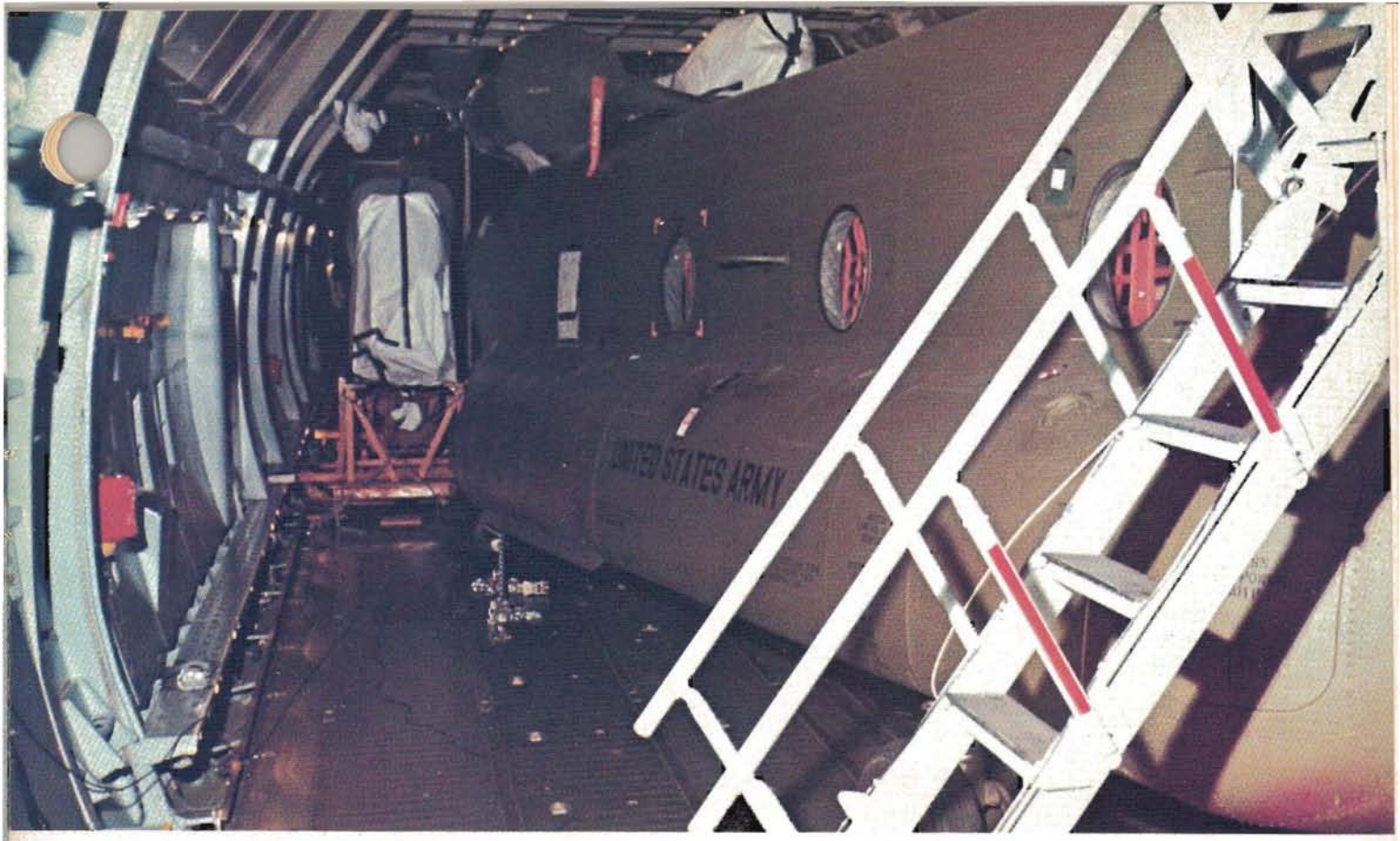
Physically, the C-5 practically covers a football field: 247.8 feet long with a wing span of 222.8 feet. Its tail stands six stories up at 65.1 feet, almost twice as high as the jump towers in airborne training. Its fuel capacity of 49,000 gallons would furnish sufficient fuel to run an average car more than 60 years.

When a C-5 pilot says, "Fill'er up!" he's talking 6½ rail tankers of fuel. Each of the four 8F-39 turbofan engines, with rated thrust at 41,100 pounds each, is large enough to garage a VW. Their power and high-lift devices enable the aircraft to take off within 7,500 feet when fully loaded and land within 4,000 feet. Under rated capacity the C-5 can lift more than 60 tons from Travis to Vietnam with one refueling stop or 75 tons from Dover to England non-stop. It can airdrop 100 tons of cargo on a single pass over a drop zone.

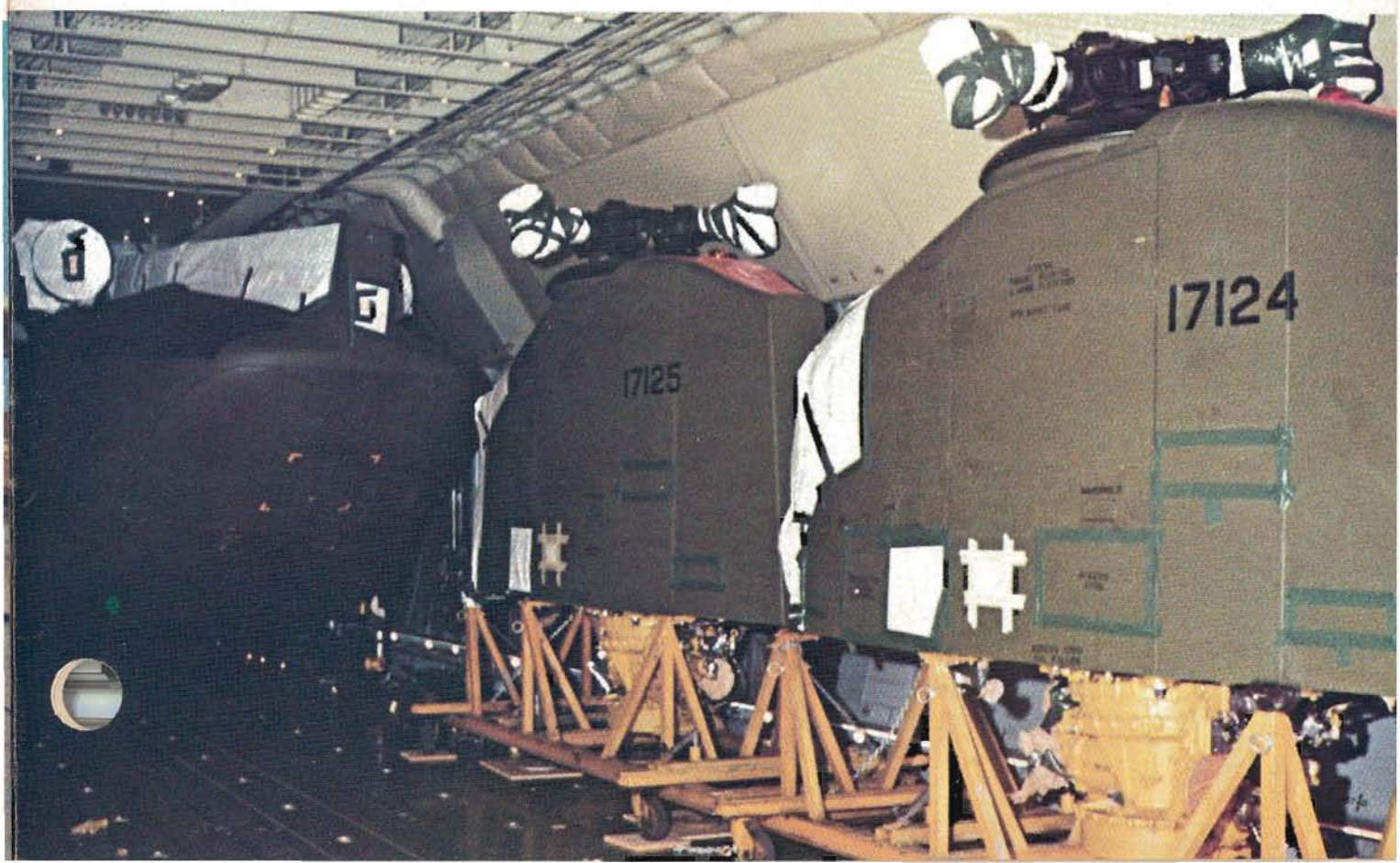
In design, the C-5 has some notable advances of interest to engineers. Its 28-wheel-high flotation landing gear spreads the weight pressure sufficiently to allow sustained operation on unimproved airfields. The wheels can be deflated while the plane is in mid-air in anticipation of unimproved airfield landings. The C-5 can "kneel" forward, aft or both ends to truckbed height and the visor nose and aft doors when open expose the full width and height of the cargo compartment for rapid loading and off-loading. Full width ramps on both ends of the C-5 allow double row loading or unloading activities.

The C-5 provides the US Army with an aircraft capable of deploying engineer combat or construction equipment and personnel to any contingency area in the world. During tests to date, a wide range of equipment has been carried on the C-5, varying from the M151A1 jeep to a 75-ton per hour rock crushing unit. Multiple shipments of three CH-47 helicopters to Vietnam from New Cumberland Army Depot, Pennsylvania, have practically made that a routine operation. Recently, one of the engineer construction battalion's workhorses, the model 290 tractor with scraper, was successfully test loaded on a C-5 by the CONARC


**These four photos give one a graphic view of**




## and loading capacity of the giant C-5 Galaxy



Evaluation Group. Significantly, only the C-5 is capable of transporting some equipment by air.

The C-5 is predominantly used for deployment and logistics support in rear areas. If tonnage requirements justify it and the risks for this $54 million aircraft are acceptable, the C-5 could be employed directly to forward combat areas. It is designed to operate in such areas where austere cargo handling facilities are the rule rather than the exception. In May of 1972, five M48 tanks were airlifted into the Vietnam combat zone on three C-5s in a ten-hour mission. This is putting the critically needed Army equipment at the scene of the action in a big way.

In addition to the engineer battalion's equipment, the C-5 can also transport its operators and construction or combat engineers in the upper level troop compartment. Up to 73 troops can fly in comfort in the regular upholstered, reclining airliner type seats, arriving at their destination ready to accomplish the assigned mission immediately upon landing. A galley and all the conveniences of a commercial flight are available to non-drinkers and anti-movie buffs. For emergency movement requirements, a palletized seat kit can be installed in the cargo compartment and an additional 267 passengers can be air transported. For passengers preferring unorthodox delivery, the C-5 is fully capable of paratroop drops, putting the airborne operator into the drop zone with his equipment. An airborne engineer battalion could be delivered to a remote location by C-5, execute its drop, and within a few days prepare an airstrip capable of taking C-5 landings. The event of this happening is improbable because of the exremely high value of the aircraft, but it is conceivable.

The Military Airlift Command has five air transportable loading docks (ATLD) which can be positioned in forward areas, for example newly prepared, engineer constructed airstrips, to mechanically load and unload palletized cargo directly from the aircraft. The ATLD can be extended to a 296 feet length, is 63 feet wide and has an adjustable height of from 48 to 57 inches. It has a capacity equal to three C-5 loads. The use of an ATLD in conjunction with the ability of the C-5 to operate from unpaved airfields would permit delivery of Army cargo and equipment much closer to the objective area where permanent facilities would not be available.

How will the C-5 impact upon engineer operations? Perhaps a little "crystal ball gazing" is appropriate at this point. It's a well known fact that the logistics problems associated with the deployment of an engineer unit are colossal. Troops and their equipment have seldom been deployed together, especially by air. Resupply of newly deployed troops has historically been less than adequate. To help reduce this problem vast quantities of engineer equipment, repair parts and construction supplies are stockpiled in strategic contingency areas around the world. Tremendous maintenance requirements are necessary to keep this equipment and supplies ever ready for emergency use. Now and even more so when the C-5 squadrons are filled, the Corps of Engineers has the capability to air transport engineer combat or construction battalions with their own equipment anywhere in the world they are needed. The necessity for pre-positioning equipment and supplies overseas diminishes with the delivery of each new C-5. Personnel-wise this could mean less engineers required overseas to maintain stocks.

While the Corps has always strived to insure that its battalions have excellent equipment, they must do so within the confines of a stringent budget. The ability to reduce supply inventories because of the rapid movement capability of the C-5 would allow quantity considerations to be applied to further improvements in quality of engineer equipment and supplies. The Corps of Engineers would also assist in reducing the much talked about "gold-flow" by reducing overseas stockpiles and relying more upon the C-5 for rapid deployment. The real estate rental payments, military personnel spending, local national payrolls and "mysterious disappearance" of supplies could all be reduced through reliance upon aerial delivery.

As of July 1972, 62 of the scheduled 81 C-5s had been delivered to MAC. These aircraft have had the unique obligation of satisfactory operational performance while still in a testing stage of development. Its recognition as the world's largest military cargo aircraft has maintained a public spotlight on every one of its successes and failures. Fatigue and reliability problems have accompanied the development of practically every civilian as well as military aircraft. The Air Force is severely testing the C-5 to find and fix its problems and make the C-5 perform its intended mission well. To use our Navy counterpart, the SEABEES' motto, "The C-5 Can Do." And the Corps of Engineers capabilities worldwide have been substantially increased as a result of having this cargo superbird in the MAC fleet.

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# TRAINING TOMORROW'S LEADERS TODAY

**Captain Robert R. Froude**

*The U. S. Army has taken a giant step forward with the establishment of the new senior level school for noncommissioned officers. The school for future Sergeants Major is a prestigious first for our NCO's. As the Army War College is for officers, this school will be the capstone of professional educational development for the "noncom."*

*The Sergeant Majors Academy opened its doors to 100 students (92 Active Army and eight U. S. Army Reservists and National Guardsmen) at Fort Bliss, Texas for the first time this past January. And now a Sergeant Majors Academy Selection Board has convened to select 400 students for the next class that begins July 2nd and finishes in January of 1974. There will be 384 Active Army NCO's and 16 Reservists and Nationalguardsmen in the second class.*

*Selection for this senior course is competitive and tough. To be eligible, "noncoms" must be in grade E-8, have between 15 and 23 years of service, and possess a current EES of 100 or better. The course is [illegible] weeks in duration, therefore involving a permanent change of station. Married students are being encouraged to bring their families.*

*Rather than being aimed toward particular Army specialties, the senior school is purely branch immaterial and broad in scope. It covers functions and operations of various national government agencies, the other services in a joint role, and major Army headquarters and commands. And it goes without saying that there will be plenty of Engineer NCO's taking the course.* the editor

The majority of yesterday's and many of today's noncommissioned officers have been placed in the untenable position of living up to a reputation that reports them as being the "backbone of the Army." And, indeed, they are that. However, in order to support this reputation the NCO has been reduced to relaying solely on the rather questionable "experience factor" or, if you will, "on-the-job training." The foundation was at best shaky in the past. But today the subtilities of modern leadership and the complexity of equipment

have completely destroyed the myth that an effective manager of people and projects can rely on experience only.

The skills of today's NCO must be updated, his methods must be refined and his approach enlightened, if he is to continue to play an effective role as the "backbone of the Army." The dynamic NCO of today must blend up-to-date concepts acquired through formal education with his time-honored experience. Tomorrow's NCO must become familiar with his trade early in his career and periodically, he must update the fundamental knowledge of his skills.

In an effort to provide the necessary formal system of education for its front line supervisors, the Department of the Army and the Continental Army Command developed the Noncommissioned Officer Education System (NCOES). Specifically, in July of 1970, the U. S. Army Engineer School instituted a pilot program—NCOES. After several changes in curriculum, the ENCOES as it exists today was implemented in February and March of 1972. (see Winter 1972 issues of the engineer) The importance of this system in the career development of the NCO and the professionalism of the Engineer Corps demands that some discussion be devoted to a consideration of the objectives of ENCOES, those for whom the course is designed, the concepts of instruction, and finally the methods of performance testing.

Recognizing the Army's need for a more effective leadership, the Engineer School at Fort Belvoir, Virginia, has developed a program of study that seeks to—

- Enhance the leadership capabilities of the senior NCO (E-6-E-8), and to give impetuous and direction to the potential leadership qualities of junior NCO's (E-4-E-5).
- Place emphasis on increasing the level of technical skill of the Engineer NCO through development in one of several major skill areas. In the case of the young soldier, a "hands on" approach toward practical training is stressed. The advanced course attempts to marry the more complex concepts of Army engineering with the senior NCO's wealth of practical experience.
- Instill in the NCO a spirit of self-confidence and motivation. The ENCOES system also provides the soldier an opportunity to plan a career path throu three progressive levels of formal instruction—basi advanced, and senior NCO training.

Each 12 week Engineer Noncommissioned Officer Basic Course (ENCOB) is made up of approximately 60 students. There were 10 classes programmed for Fiscal Year 1973. But the number of classes will be increased to 13 in Fiscal Year 1974. Students entering the course are, to a large extent, E-4's or E-5's who have demonstrated leadership potential, and who are able to meet the entrance requirements established by the school. However, of the 304 students attending the past seven basic courses 54 have been admitted directly out of Advanced Infantry Training. More than half of all students selected for ENCOB come from and return to their parent Continental United States units. Up to a maximum of 25 percent of the total student input is provided by the overseas commands. These students attend the course in conjunction with a permanent change of station move back to the Continental United States.

The Engineer Noncommissioned Officer Advanced Course accepts students in the grades of E-6 and E-7. This student input is generated by means of central selection by the Department of the Army, and is generally of equal distribution between those comi from a parent unit and returning to the same unit, a those attending the course enroute during a permanent

nange of station. Three classes are being cycled through the course in Fiscal Year 1973. The classes will be increased to four in Fiscal Year 1974.

A Department of the Army Noncommissioned Officer Education System Selection Board met April 30, 1973 at the Adjutant General Personnel Center, Fort Benjamin Harrison, Indiana, to select outstanding E-6's and E-7's for attendance at the 19 Army service schools in Fiscal Year 1974. A total of 5,400 soldiers are expected to be tapped to attend the various career management courses such as ENGINEER during the next 12 months.

The student, whether basic or advanced, is the focal point of the course. All are given diagnostic tests early in the first week of the course. These tests and a screening of the individual's record cause students of like ability to be assigned to a carefully selected member of the faculty. The faculty advisor monitors the student's progress, provides council and when necessary —remedial instruction. In addition to providing evening study halls, the Engineer School has recently opened an Individual Learning Center. This center consists of video tapes and programmed texts designed to supplement and reinforce class room instruction.

Both the basic and advanced courses have a duration of 12 weeks, and are divided into four phases. Both make use of the tracking mehod.

Although the level of instruction differs, the course content for ENCOB Phase I and ENCOA Phase I is similar. Each course stresses basic leadership and management principles; supply, maintenance, and administrative procedures; and finally emphasis is directed toward individual development. In general these subjects are common military subjects that are essential to career development.

The common phase or Phase I which lasts just slightly over five weeks is followed by Phase II—a tracked phase. This portion of the course is devoted to the specific career areas within the Engineer Corps—Combat Engineering, Mechanical Maintenance, Construction and Utilities, and Topography.

Phase III is oriented toward increasing an individual's skill in his particular Military Occupational Specialty. Major duty areas at the 40 skill level in the basic and at the 50 skill level in the advanced course are also developed in the phase.

In the basic course, Phase IV provides the student with "hands on" training and practical exercises which provide an opportunity to demonstrate acquired skills. hrough the Engineering Stakes Problem each soldier ids himself in direct competition with his peers.

Phase IV for the advanced student is an interesting

diversion. The student selects a practical work project, develops the problem, and presents a proposed solution. The exercise which lasts two to three days allows the student to apply his training to a real world problem.

The instruction in both the ENCOB and ENCOA courses is further supplemented by an elaborate electives program. The program allows the student to select two courses from a High School Electives Program, Formal College Credit Program, or a group of Military Electives.

Finally after 12 weeks of intensive study and demanding tests the graduate of the school returns to his unit with a better understanding of the Corps, of new techniques, and possessing the ability to impart these ideas to others. The young are aggressive leaders planning for the future. The seniors are experienced soldiers—tempered through instruction—ready to help others do their thing better. e

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*Captain Robert R. Froude is attending the Engineer Officer Advanced Course at Fort Belvoir, Virginia. He was the commanding officer of the 510th Engineer Company (MDS) in Vietnam and also served with the 79th Engineer Battalion (Construction) in Germany. The captain holds a BA in International Affairs from George Washington University.*

# DYNAMIC

# THE DYNAMICS OF IMPROV

**Major Don W. Barber**

Much has been said about quote—dynamic training—unquote since the establishment of the Engineer Dynamic Training Council in 1971. Comments have ranged from commendatory to condemnatory. By and large those comments which fell in the latter category were more than likely occasioned by a lack of appreciation for just what dynamic training really is all about.

When discussing "dynamic training" we are talking essentially about imaginative training,—or better yet, training which is an improvement over previous training ways and means. The improvement results from the innovation and the ingenuity of the trainer. That is the purpose of this article—to focus on some of the more noteworthy accomplishments in the Engineer area of improved training and to highlight USAES training objectives.

Many of the training accomplishments recounted here grew out of council efforts while others derived from the initiative and imagination of staff, faculty and students at the Engineer School.

This article represents the pervasiveness of the desire at the USAES to improve engineer training. The article was assembled with the assistance of representatives from every major department at the USAES.

The Council, on behalf of the USAES, is certain that it would be beneficial to discuss some of the more progressive training achievements (read that improvements) which have occurred at the USAES since 1971. Additionally, for your plans, and hopefully your comments, the USAES wanted to give you a preview of training objectives, a training roadmap, if you will, of the direction in which the USAES is headed.

**What has been accomplished in the past eighteen months? Read on—**

- Engineer Dynamic Training Survey—This survey provided the data needed for an assessment of engineer problems plaguing engineer units and resulted in the publishing of a report which should now be in the hands of most engineer units, both Reserve Component and Active Army. The USAES sincerely hopes that this effort will precipitate training changes for the betterment of unit and individual training. Coverage has been given to the survey findings and recommendations in earlier issues of **the engineer.**

- Army Training Program for Non-Divisional Combat Engineer Battalion (ATP 5-35T)—A new ATP was developed using a systems engineering approach for a non-divisional engineer combat battalion. This effort was a first of its kind for Corps of Engineer units and has since served as the principal model by CONARC for development of training programs Army-wide. Coverage was given to this new concept in an earlier issue of **the engineer.**

- Field Feedback System—In the past, the USAES has relied upon mailed questionnaires to graduates as the principal source of feedback to determine if we were training the tasks the engineer soldier most needed to perform his duties in TOE units. The responses to these questionnaires have often been sparse, occasionally unrepresentative, and usually provoked more questions than were or could have been answered. The goal of the newly developed Field Feedback System is to better determine what you in the field think we should be teaching or, in its broadest sense, what the training development needs of the Army's engineer soldier really are today. To accomplish this goal a Field Feedback Team has been formed and launched visits to engineer units in March 73, visiting selected units in USAREUR first with follow-on visits to Continental United States units during Calendar Year 1973. Data will be gathered by the Field Feedback Team through a combination of questionnaires and personal interviews with members of each unit. This information will then be used to develop: resident training taught in service schools and training centers; MOS tests; the basis for MODB surveys; the framework for preparation of new technical manuals and nonresident correspondence courses; the basis for new Army Training Programs (ATP's) and Army Training Tests (ATT's); Augmentation to Army Subject Schedules (soldier's tasks not taught in schools that can best be taught by unit or self training); and an

# TRAINING

# ED TRAINING AT THE USAES

outline for a "One Stop MOS Study Guide." In the final analysis, field feedback will serve as the basis for the systems engineering of all training development.

• Expanded Reserve Component Support Program—Reserve component engineer training support by the USAES was formalized and centralized in the Department of Non-Resident Instruction, in the summer of 1972. The program which is designed to increase the level of USAES participation in and support of reserve component engineer training is just becoming fully operational. Action under the program was taken as the program definition evolved and many units have already reaped its benefits. As formulated the program is comprised of four subprograms embracing over 20 major activities aimed at improving the quantity and more importantly the quality of engineer training for the Reserve Components. The subprograms—resident assistance, nonresident assistance, field assistance and liaison—center around the identification of a myriad of existing assets which are being and will be uniquely applied to reserve component training assistance. To date some of the more salient activities have been the institution of mobile training teams in selected subjects, the presentation of special non-POI, or more precisely tailored POI, instruction and perhaps most importantly the establishment of a clearing home for information on training resources and means within DNRI.—

• Informal Training Literature—A series of informal training literature was developed in concert with the Combat Arms Training Board for map reading titled "Don't Get Lost," Camouflage and Field Fortifications titled "Don't Get Hit," and Mines and Boobytraps titled "Don't Get Blown Up." These publications are written in a style oriented toward the individual soldier and should be available to field units in the near future.

• Trade Union Recognition—A program designed to obtain trade union recognition of Army acquired training and experience was developed for one skill. Fuller coverage is given to this effort elsewhere in this Spring 1973 issue of **the engineer.**

• Camouflage and Mine-Countermine Training—New concepts for training camouflage and mine-countermine specialists were developed which, if accepted by the Army's training establishment, will ultimately lead to the reorganization of the combat engineer squads.

• Company Commander's Preparatory Course—A correspondence course was designed to prepare a junior officer for company command by providing specialized training in selected administrative/managerial subjects. Fuller coverage of this course will be accorded in the **engineer magazine** and Engineer Newsletter.

• Engineer Skill Training Program (ESTP)—A program was developed to train soldier craftsmen in hard skills through the combined application of correspondence course study and both technical and practical training with the Facility Engineer. AR 35-8, Training-Engineer Skill Training Program, has been published and distributed to further inform unit organizations and installations about this program.

• Engineer Commander's Update Packets—A package of selected topics was prepared for new battalion commanders. The packet includes DA policies and writings on managerial and administrative techniques, social problems, and other items of interest to a battalion commander.

• EOAC Home Study Program—An Active Army oriented program was developed for completing the Advance Course by correspondence. This pilot program places the officer in a permissive TDY status for three months at his home station to complete the course. CONARC approval is pending.

• Self-Grading of Correspondence Courses—This procedure was established for two reasons—to improve administration of correspondence courses by reducing processing time and more importantly, to offer the student a first step in self-pacing his study efforts. Under this concept correspondence course enrollees grade their own lessons, with only the final exam graded by USAES.

• Programmed Text Format—Virtually all texts supporting correspondence courses for both new and revised subcourses are being prepared in programmed text format. This is another step toward the full self-pacing of courses.

• ENCOA Dynamic Training—A special block of instruction titled "Operation Dynamic Training" was developed for training the Engineer Noncommissioned Officers Advanced Course. This practical exercise places the student in a realistic training environment, with imposed constraints of facilities, time, and other resources, in which the student is required to produce a training program using ATP 5-35T. This exercise permits the student to apply dynamic training concepts and create dynamic training situations.

• ENCOA Special Student Task—This unique, innovative training situation provides each ENCOA student with an interesting, challenging and individual mission assignment. Having chosen a task from a list of approximately 40 assignments or having created his own assignment, each student performs research, presents a briefing of his findings and observations, and submits a written after-action report.

• Engineer Stakes—This challenging, totally "hands-on" field practical exercise was designed for the Engineer Officer Basic Course (EOBC) and Engineer Non-Commissioned Officer Basic Course students. It places the student in the role of a squad or platoon leader, as appropriate, and presents the student with a series of demanding and realistic missions which must be accomplished within alloted time constraints. The student is required to act both mentally and physically to successfully complete each mission. For example, the EOBC student is required to perform such tasks as: request and adjust artillery fire; land navigate across country; and inspect and determine corrections for when he gets to his home station, to interject more in- layout of road construction stakes, minefield layout, batterboards for buildings, and demolition charges. The non-commissioned officer student is required to perform such tasks as ESC on an item of equipment, land navigate across country, assemble rigging items to lift and move a load, and other rigging tasks. The student is in direct competition with his peers and can opt to take "bonus" stakes to improve his score. The engineer stakes problems provides the student with some sound dynamic training ideas which can be used, when he gets to his home station, to interject more interest in his unit training program.

• Orienteering—Orienteering was introduced into the ENCOA and EOAC training programs.

• EOAC Expedient Military Engineering Elective—This course was designed to stimulate the imagination of and develop creativity in the Engineer Officer Advanced Course student. Creative thinking can be defined as the ability to take bits of knowledge and a[s]similate it into new patterns. New patterns evolve fro[m] divergent thinking. The course is based on the above premise and case studies—the case information is developed to a certain point and the student is then asked to solve the problem. No course of action is given—the ingenuity of the student is used to devise new courses of action. This elective attempts to inculcate in the student the desire to solve problems rather than merely acquiescing to the problems or accepting the first plausible answer.

• Engineer Operations Officer Elective—A 45 hour elective course was designed to provide EOAC students with eight seminar subjects encompassing the major functions that an Engineer Operations Officer may expect to encounter in combat or construction battalions. Students role play as leaders and are required to organize staff positions within their group to solve a variety of problems including task organization, movement of the unit, and training.

• DeLong Floating Barge Instruction—To close a doctrinal gap in USAES instruction, a DeLong "A" barge was brought to Fort Belvoir and appropriate courses of instruction incorporated for employment, siting, construction of related facilities required on shore, and operational problems.

**What are some of the future USAES Trai[n]ing Objectives? Read on—**

• Army Training Programs and Army Training Tests. New Army Training Programs and Army Training Tests will be developed using systems engineering for all types of engineer units, Priority of accomplishment includes:

—Rework of ATP 5-35T. Non-divisional Engineer Combat Battalion.

—Construction Engineer Battalion.

—Divisional Engineer Battalions (Airborne, Armored Mechanized Infantry, Infantry, Air Cavalry, and TRICAP).

—Engineer Companies, Separate Infantry Brigades (Infantry, Armored, and Airborne).

—Engineer Combat Support Companies, Light Equipment, Panel Bridge, Float Bridge, and Land Clearing.

—Engineer Command Units.

—Engineer Combat Service Support Companies (Construction Support, Pipeline Construction Support and Construction Dump Truck, and Water Supply).

• Non-MOS Army Subject Schedules. New Non-MOS ASubjScd's will be developed using systems engineering for mine-countermine, camouflage and fiel[d] fortifications, map reading, security of unit work are[a] and work site, assault phase of river crossing opera-

tions, floating bridges, fixed bridges, T/O horizontal struction, explosives and demolitions, rigging, engineer reconnaissance, and engineer power tools.

• Trade Union Recognition—Implement union recognition with IUOE (International Union of Operating Engineers) and register with the Department of Labor. Extend union recognition to other engineer skills.

• Engineer Literature—Redesign the family of engineer manuals for the soldier, commanders, and staffs. For example, under this concept a family of manuals may be written for camouflage and field fortifications; one oriented for the engineer soldier; one oriented for battalion and company commanders; and a technical manual oriented for the battalion staff. A second goal for literature is to develop separate handbooks for combat and construction engineers—a change to FM 5-34.

• Engineer Dynamic Training Council—The council will continue to assess the engineer training situation and publish annual reports based on information gathered by the Field Feedback Team.

• How to Teach Team Training—A course of instruction for inclusion in officer and noncommissioned officer courses is to be developed on "How to Teach Team Training."

• Field Feedback System—The Field Feedback am will be visiting USAREUR in March-April 1973 d make follow-on visits to CONUS Units in CY 1973. Cyclic visits to selected engineer units worldwide will be performed in future years to continue to refine and update data needed for the systems engineering of all training development.

• Multi-Media Instructional Material—Future instructional materials, both resident and nonresident, will be developed to best capitalize on the latest trends in multi-media methods, i.e., sound-slide, video tape cassettes, time-lapse motion picture, ITV, and programmed tests. Pilot multi-media programs will be developed for individual and unit training that can be used by units in the field.

• Expanded Reserve Component Support Program—Major efforts will be focused on: continued presentation of special non-POI instruction, particularly in the area of staff training; establishment of scheduled special POI courses aimed at teaching teachers to instruct in specific subjects; greater employment of mobile training teams; and extensive liaison with Reserve Component engineer units.

• Computer Assisted Instruction. CAI can be defined as "a man-machine interaction in which most of the teaching functions are accomplished by use of the mputer in direct support of a training situation." The nputer modes will be used for computations, logical problem solving, simulation and gaming, drill and practice and tutorial dialogue. For example, it is envisioned that CAI will be used for simulation and gaming in such areas as barrier planning, PERT and CPM, and tutorial dialogue to teach Advanced Instructor Training.

• Revision of EOBC Curriculum—The EOBC will be changed to an MOS producing course of 12 weeks duration. Upon completion of systems engineering EOBC will include a common phase of instruction for all students plus a combat engineer track producing a 1331 MOS and a construction track producing a 1328 MOS. It is envisioned that at some point during the first four weeks of instruction, the students will be designated for the combat or construction track based upon personal preference, educational background, and Army requirements. As a spin off of this curriculum change, the Engineer Construction Officer Course (ECOC) will not normally be available to immediate EOBC graduates, but probably will be offered on a cyclic basis as Army needs dictate.

• MOS Subject Schedules—Continue to develop systems engineered MOS ASubjScd's with priority to mine-countermine and camouflage and field fortifications.

• MOS Career Management Fields—The military personnel center has completed a study regarding an overhaul of the enlisted engineer MOS structure. The study findings and recommendations have been approved in concept for phased implementation as follows:

Phase I, effective October 1973, will include:

—Regrouping of current MOS into career management fields (CMF).

—Interim retention of current MOS code for each MOS.

—Improved format for MOS descriptions.

—New and revised MOS manual.

—Reduction of the number of additional skill identifiers.

Phase II, effective 1 July 1976, will include:

—Introduction of a new seven-to-nine digit MOS code.

—Complete revision of MOS manual begun in Phase I.

The USAES will be making future input for the MOS manual and for revision of specific engineer MOS's. The USAES has recommended that:

—Four basic career management fields be established: 12 (combat engineering); 51 (construction engineering); 81 (topographic engineering and Map Reproduction) to parallel the three primary types of engineer units, combat, construction, and topographic battalions; and 52 (Power Production).

—A single career management unit be established

in OPO in the interest of efficient and personalized personnel management of the engineer non-commissioned officer.

—MOS 12C and 12D be combined into one MOS. MOS 12B be divided into two MOS's: 12B and 12S. 12B (Combat Engineer) be redefined to include expertise in camouflage and field fortifications while 12S (Sapper) would be an expert in demolition and mine-countermine warfare.

—Certain low density MOS's be converted into additional skills for higher density MOS's, e.g., Sawyer (57D) would become an additional skill for a Carpenter (51B). These skills would be identified by an Additional Skill Identifier (ASI).

• Training Extension Course, Phase II (TEC II)—The USAES is providing assistance to combat arms schools in developing high quality, self-paced, audio-visual training extension courses to assist in obtaining and maintaining MOS proficiency for 11B, 11C, 11D, 11E, 13B, 13E, 16P, and 16R. These training extension courses will provide: small unit commanders with ready access to audio-visual instruction and instructor guides specifically designed to assist the commander in providing MOS training to small groups; and the individual soldiers and small unit commanders with an improved method of determining training deficiencies in MOS proficiency subjects. The sponsoring agency, the Combat Arms Training Board (CATB), plans to extend this program including engineer MOS's. The USAES in concert with the CATB is investigating the feasibility of initiating the development of certain engineer training extension courses in FY74.

The preceding litany of training accomplishments and objectives reflects the kinds of training improvements necessary to the revitalization of training for the new All Volunteer Army. Today's better educated and more socially conscious soldier deserves training techniques commensurate with his aptitude and interest levels. The pretechnological platform, podium, pointer, and poop syndrome is no longer viable in the training environment of the Modern Army. In recognition of today's requirements, the USAES has dedicated much of its time and effort toward meeting current and future training needs.

We hope this up-date has provided an insight into what has happened in the recent past and into the general direction training is taking at the USAES. Earlier we implicitly solicited your comments on what would follow. Let us now make that request explicit. Please share with us and the rest of the Army your ideas, concepts, and opinions regarding training improvements.

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# 518TH NAMED OUTSTANDING ENGINEER COMPANY OF 1972

The Society of American Military Engineers has named the 518th Engineer Company, U. S. Army Forces Southern Command, Fort Kobbe, Canal Zone, winner of the Itschner Award for 1972.

Given annually by the Society, the award is presented to the Army Corps of Engineers unit it selects as the most outstanding during the year. The Itschner Award is named after the former Chief of Engineers and past president of the Society, Lieutenant General Emerson C. Itschner.

The 518th Engineer Company (Combat) is a separate unit in the 193rd Infantry Brigade without the support of an engineer battalion. It not only supported the 193rd but also was the sole engineer company supporting a theater army.

Lack of a parent engineer battalion did not handicap the 518th in 1972. Its leaders developed dynamic training, education programs, and devised realistic exercises and tests of the company's engineering skill. The company maintained an excellent readiness posture all year and when an earthquake almost destroyed Managua, Nicaragua, it was fully prepared and ready to lend a helping hand.

The 518th performed with distinction at Managua. The unit's efforts contributed to containing fires that swept portions of the ruined city and provided cleared roads for immediate emergency use and subsequent clearing and reconstruction activity.

When the company arrived at Managua last December more than 50 percent of the entire city had been destroyed by the 30 second quake.

The 518th swiftly went into action because prevailing winds were threatening to spread fire that was raging throughout the central part of the city. Bulldozers were used around-the-clock to clear a 12 block square fire break to segregate the city between sections that were considered destroyed and those considered salvageable. This action provided access roads for fire fighting equipment and also controlled further destruction.

When the fires were under control, 518th engineers began clearing more than 4,000 meters of city streets and, in many instances, entire city blocks. Their dozers stockpiled so much debris that the scooploader and dump truck drivers were able to remove an average of 293 loads daily.

Personnel of the 518th also launched a construction effort simultaneously with the clearing operations. With the help of local citizens, the engineers built a mess hall, latrines, shower facilities, dug a sump and erected tents for two refugee camps. The first camp was called La Ciudad de Esperanza (City of Hope) by refugees. Later, when the emergency diminished, the 518th turned to community action-type projects.

The true quality of the 518th Engineer Company was reflected in its outstanding performance at Managua. The reaction speed, professional and efficient work effort, and willingness to work long hours at arduous tasks, made a tremendous psychological as well as engineering impact upon relief operations in general and on the people of Nicaragua in particular.

The unit was praised by the U. S. Ambassador to Nicaragua, the Honorable Turner B. Shelton, the U. S. State Department, former Secretary of Defense, Melvin R. Laird, and the Nicaraguan government for its work at Managua.

Ability to get a job done with excellent results in a tense and demanding situation, combined with matchless esprit, made the 518th deserving of the highest recognition and this coveted award.

The Itschner Award Selection Committee also named two other companies to receive honorable mention for their fine engineering performances during Calendar Year 1972. These commendations as runnerup units for the Itschner Award went to Company B, 79th Engineer Battalion (Construction), 24th Engineer Group (Construction), U. S. Army Engineer Command, Europe, and Company D, 44th Engineer Battalion, 2nd Engineer Group, Eighth United States Army, Korea.

# UNIT OF CHOICE

**Colonel Edward R. Ardery**

The draft is ended, but the Army continues strong. However, we have to attract the number and right kind of personnel and sell them on the Army. Through the Unit of Choice program (AR 601-210) and Station of Choice, unit commanders have the opportunity to influence the kind of soldiers that will make up their units. Each unit has its own unique situation and the approach will have to vary to fit this situation. Let's take a look at one unit's successful program.

The 931st Engineer Group (Combat), commanded by Colonel James M. Thompson at Fort Benning, Georgia, is made up of a smorgasbord of different type units; the 43d Engineer Battalion (Construction); the 67th Maintenance Battalion (includes a Maintenance Company, Ammunition Company, and two Transportation Companies); and, the Provisional Battalion (includes 586th Engineer Company (Float Bridge), a Personnel Services Company, two MP Companies, and several detachments; Public Information, Finance, Replacement, and MP), and a Fire Fighting Detachment.

The unit was designated as a Unit of Choice in May of 1972 and was authorized to recruit some 1,100 soldiers in some 91 different MOS. By the middle of September, the group had reached its revised goal of 1,045. Practically all are now on board, although some have not yet completed Advanced Individual Training. The mid-January percentage of assigned personnel to authorized strength and the percentage of soldiers who are volunteers for the major units of the group include—43rd Engineer Battalion (Construction), 99 percent on hand, 88 percent volunteers; 67th Maintenance Battalion, 120 percent on hand, 93 percent volunteers; Provincial Battalion, 130 percent on hand, 85 percent volunteers; 586th Engineer Company (FB), 122 percent on hand, 96 percent volunteers.

The profile of the Unit of Choice soldier in the 931st is very interesting. He is—

- Young—18 to 20 years old.
- From the South—reflecting the recruiting area (Florida, South Carolina, Georgia, and Alabama).
- Approximately 29 percent black.
- Approximately 50 percent high school graduates.
- Blessed with good basic and advanced individual training.
- Well motivated.

The well motivated characteristic is the most significant. These soldiers are willing to learn. They want to be soldiers. Here are some of the factors that contributed to the success of the recruiting effort—

- The 197th Infantry Brigade, also located at Fort Benning, was designated in February 1971 as a Unit of Choice and started a strong recruiting program that embraced the same recruiting area as was later allocated to the 931st Group. The Brigade sent out recruiting teams and accomplished civic action projects through the engineer efforts of the assigned 72d Engineer Company (Combat). These teams also demonstrated some of their equipment to the prospective recruits and their families. For example, they have managed to put in operating order several old tanks that were used in World War II that aroused considerable interest. All of these efforts left a favorable reaction to further recruiting when it was the 931st' turn.
- It appears that the rural character of the area in which they were recruiting may have contributed to the success. While not based on hard facts, it was the opinion of many that the small town young man was more attracted to the Army than his city counterpart.
- The nearness to home was also a factor as young recruit, after he finished up his initial train was able to count on being in the immedate area where

he could get back and forth to his home and at the e time his friends and relatives could visit him out too much expense.

• Another factor was the lack of racial friction at Fort Benning. The strong race relations program at Benning undoubtedly helped in this respect.

• Another significant factor was the appeal of the material type improvements of the Modern Volunteer Army. In the 931st Engineers, the most attractive feature was the five-day work week with guaranteed time off (coupled with the close to home recruiting area, it meant passes home were possible over the weekend). The second most popular feature was the freedom from Kitchen Police, and the third was the smaller two or three-man housing facilities. (The 43d Engineer Battalion had to pull itself up by its own bootstraps by dividing large squad rooms throughout the post for all units into some 2,700 two- and three-man rooms.

• It was found that the 43d Engineer Battalion had a big advantage by being able to offer some sort of vocational training in the many skills found in the battalion that would be of value upon completion of the prospect's Army service. Of the 91 MOS recruited, the first to be filled were the mechanics jobs and the last two were for the 12 C(Pioneer) and the 55 B (Ammunition Handler). The 931st has placed a strong emsis on job satisfaction which appears to be the most ortant single factor as to whether or not the recruit feels that the Army has lived up to its part of the bargain. The 931st has had to actively seek out situations where, for example, the electrician gets electrical work and does not spend his time as a carpenter.

Some of the techniques used by the 931st in their actual recruiting include—

• Keeping close contact with the recruiters, including the local NCO who actually signs the man up and who can direct him either to your unit or elsewhere. This includes helping the recruiter out with programs like a basketball team or demonstration, even though the action benefits the Army as a whole and not specifically the 931st.

• Sending out representatives as canvassers who visit various areas and develop prospects with the recruiter. These canvassers have reflected the best type of people in the unit. Three out of the 10 were black in the 931st. They did have success in sending a young soldier back to his home to sign up his friends. In other cases, the canvassers were left for quite a period of time to get to know the area and to be known by the local populace.

• The engineer units also have a big advantage in ng able to provide some benefits to the local activi- through civic action. This apparently opened the oor to cooperation by local authorities. These projects whereby the local people furnish the materials, gas, food and lodging have a bonus of being excellent training in providing the opportunity for a small unit to operate alone.

• The 931st also sent out equipment displays that attracted a considerable amount of attention. In several cases, engineer boats from the bridge company provided safety patrols for regattas and float parties. This type of activity developed an atmosphere of good will in the recruiting area that made the recruiting easier. Techniques used by units other than those at Fort Benning which may be adapted to your particular situation include—

• Having a town provide a whole platoon that will stick together in the Unit of Choice.

• Emphasizing the availability of further formal education both at high school and college. Some of the units were able to promise duty time daily for pursuance of these programs.

• Appearances of the following type groups at public functions to include a soldiers chorus, drill teams, bands, rock bands, parachute drops, static displays, basketball teams, state fairs, high school activities, rock concerts, local pageants and festivals, domestic action projects, Army nights at games, and Army night on radio or television.

• Emphasizing facilities that are available to the young soldier on post and in the local area such as drag racing, motor cycle enduro, scrambles and hill climbs, sport car rallies and gymkhanas, flying clubs, glider soaring clubs, skydiving clubs, sailing, fishing, hunting, skiing, camping, mountain climbing, swimming, and golf.

What are the conclusions to be drawn from the experience to date? First, the Volunteer is a reality. With all of the many attractions that the Army can provide, qualified volunteers will enlist if properly approached. Fulfillment of the Army's part of the bargain in terms of job satisfaction and the lesser important promises is a must. Second, we can expect an Army made up of troopers who are well motivated and who will make fine soldiers if given the proper leadership and training. e

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*Colonel Edward R. Ardery, Special Assistant for Training and Logistics, Directorate of Military Engineering and Topography, OCE, was recruited several years ago. He holds a BS from the USMA and an MS for MIT. He served as an Armored Engineer in WWII, an Engineer Advisor in the Korean War, and in the US Army Engineer Construction Agency, Vietnam. He commanded three Engineer battalions, latest being the 78th Combat Battalion and the Triple Nickel Engineer Combat Group. The colonel was the designer of a proposed 80-foot AVLB.*

# Bridging

## ENLISTED CIVIL SCHOOLING GOES UNDER NEW MANAGEMENT

DUE TO A RECENT REORGANIZATION, the Enlisted Undergraduate Training and Degree Completion ("Bootstrap") Programs are now being managed by the Education/Professional Development Division (DAPC-EPC-E) of the Assistant Directorate for Enlisted Career Management, Enlisted Personnel Directorate. These two programs remain unchanged by the creation of the new office. The Enlisted Undergraduate Training Program continues to consist of two years of college at Army expense. However, this program is restricted to four disciplines—ADPS, Business Administration, Engineering, and Law Enforcement.

Soldiers interested in furthering their civilian education also should consider the "Bootstrap" program where opportunities are more numerous than in the fully funded Enlisted Undergraduate Training Program. For example, there are still some "Bootstrap" spaces left for Fiscal Year 1973. "Bootstrap" is for enlisted men and women who can complete their associate degree in six months or their bachelor's or advanced degree in 18 months or less. A letter of acceptance from an accredited school indicating the period of time to complete the requirements for a degree is necessary. Potential applicants should read AR 621-1 (Training of Military Personnel at Civilian Institutions) and talk with their education advisor before applying. Questions which cannot be answered by these sources may be addressed to HQ DA, Chief, Education/Professional Development Division, ATTN: DAPC-EPC-E, Washington, D. C. 20310.

## QUALIFIED PERSONNEL NEEDED TO FILL DRILL SERGEANT SLOTS

THE DRILL SERGEANT is the living image of the Army during the formative weeks when the trainee is transformed from civilian to soldier. The drill sergeant builds the foundation upon which the soldier will succeed or fail during the remander of his military life. The responsibilities are great! These responsibilities include developing leadership, motivation, morale, esprit de corps, and professionalism in the trainees in Army Training Centers. If a soldier can measure up, the challenge, responsibility, and the rewards of drill sergeant duties can be his for the asking. The Army needs drill sergeants! To qualify, a soldier must be a noncommissioned officer in the grade of E-5 through E-7; be fluent in English; have a General Technical Aptitude Area (GT) score of 100 or higher (score may be waived to 90 depending on other qualifications); high school graduate or equivalent; score at least 300 on the Physical Combat Proficiency Test (PCPT); weight within the limits prescribed in Table I, App III, AR 40-501; maximum physical profile of 111221; good military bearing and leadership ability; no signs of emotional instability and no record of disciplinary action that would adversely affect an individual's ability to perform as a drill sergeant. Applications must be submitted prior to completion of a soldier's first year of current Continental United States assignment. All personnel serving in oversea commands should apply before or during the eighth month prior to their Date Eligible for Return from Overseas (DEROS). Applications will be forwarded from the installation directly to DA attention: DAPC-EPC-CI. Approval of the application means attendance at one of the Drill Sergeant Schools—Ford Ord, California; Fort Knox, Kentucky; Fort Polk, Louisiana; Fort Leonard Wood, Missouri; Fort Dix, New Jersey, or Fort Jackson, South Carolina—for six weeks of special training. Those who successfully complete the course will be awarded the drill sergeant MOS-OOF and start receiving an extra $75 Special Duty Assignment Proficiency Pay per month while serving in an authorized position. In addition drill sergeants are issued supplemental uniforms that are laundered and cleaned free of charge. Individuals should submit their applications in accordance with Section XV, AR 614-200. A true copy of a soldier's DA Form 20 must accompany each application.

# the Gap

## ENGINEER SCHOOL PROPOSES COMPANY COMMANDER PREPARATORY COURSE BY CORRESPONCE

IN AN EFFORT TO BRIDGE the so-called "company level gap" in the Army Officer Engineer System, the Engineer School has recently proposed a Company Commander Preparatory Course and has received Continental Army Command's blessing for the plan to administer this course by correspondence. The course is designed as an interim measure to assist both potential and active company commanders by furnishing them with instructional material in subject areas that are pertinent to the efficient discharge of their repsonsibilities. A total of 49 credit hours is included in the course to provide the company commander with a comprehensive knowledge of personnel management, military justice, company administration, supply, maintenance, intelligence fundamentals, training management, race relations, and drug abuse. Correspondence courses provide students with a highly flexible mode of study with the inherent advantage of working at their own speed whenever the opportunity presents itself. Unlike most other courses, the Company Commander Preparatory Course is comparatively short and can be completed in a few weeks during the officer's spare time. Interested personnel may enroll by submitting a completed DA Form 145 (Army Correspondence Course Enrollment Application) through channels to the Commandant, USAES, Atten: DNRI, Fort Belvoir, Virginia 22060.

## ARMY POLICY PROVIDES COMMAND CREDIT FOR TRAINING CENTER DUTY

MANY LIEUTENANTS AND CAPTAINS erroneously believe that a training center assignment will not enhance their career pattern. This is not true. Department of the Army policy pertaining to command and command equivalent duty is established by AR 624-100, in operating instructions for the Office of Personnel Operations, and in letters of instruction to Army Promotion Selection Boards. The policy provides that command in training centers, posts, Army confinement facilities, hospitals, installations, and similar organizations will be considered the same as other command duty. This policy is strictly adhered to by the Office of Personnel Operations in maintaining statistics of officers with command experience.

## DA MAKES DECISIONS ON STABILIZATION PERIOD OF COMPASSIONATE REASSIGNMENTS

THE MAXIMUM AUTHORIZED STABILIZATION period for compassionate reassignment is one year. Not all compassionate reassignments authorize this maximum period, and in a few cases, no stabilization is authorized. After approval at Headquarters, Department of the Army, the assignment instructions directing a compassionate reassignment will specify the period of stabilization. Commanders and custodians of Military Personnel Record Jacket (MPRJ) should remember that the Assignment Eligibility and Availability (AEA) code "U" must be reported on DA Form 1-1 in accordance with rules 35 and 36, table 5-3, AR 640-2 (Qualification Records and Management Data Reporting) for approved stabilizations in conjunction with compassionate reassignments. The AEA code "U" remains in effect until the specified stabilization period ends and then it is automaically withdrawn. If the individual's problem for compassionate reassignment is resolved prior to the end of his stabilization period, the custodian must immediate withdraw the AEA code "U" and enter an appropriate AEA code. Individuals receiving permissive reassignments are not stabilized but their eligibility for reassignment, especially foreign service, does not change. They will be reported in the appropriate AEA code during the permissive assignment period.

HAPPY ANNIVERSARY

As the fledgling engineer magazine enters its third year of publication, its staffers would like to take "time out" to salute the Corps when it celebrates its 198th birthday on June 16, 1973.