the engineer

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CHIEF'S BRIEFS

Brigadier General John Moulder Wilson was born October 8, 1837 Washington, D.C. Upon graduation from the U.S. Military Academy on July 1, 1860 he was promoted Brevet Second Lieutenant of Artillery.

In July, 1862 Wilson transferred to the Corps of Topographical Enginers. He was awarded the Medal of Honor for most distinguished gallantry at Malvern Hill, Virginia in August, 1862. Wilson transferred to the Corps of Engineers in March, 1863.

During the Civil War Wilson received four brevets for gallantry. After the war his assignments included positions in rivers and harbors improvements, fortifications, and public buildings and monuments construction. From 1889 to 1893 Wilson was superintendent of the U.S Military Academy.

Before appointment as Chief of Engineers on February 1, 1897, Wilson served as Northeastern Division Engineer. While Chief of Engineeers he directed the Corps' activities in the war with Spain and ordered official adoption of the present seal of the Corps. He retired April 30, 1901.

General Wilson died in Washington on February 1, 1919.

JOHN M. DERVAN
Assistant Curator
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THE ENGINEER

VOLUME 7 NUMBER 2 APR MAY JUN 1977

FEATURES

DEPARTMENTS

.PIPELINE.PIPE

THE ARMY HAS A NAVY!

As surprising as it may seem the US Army has a "Navy" of more than 1300 vessels. They range from 27-foot bridge erection boats to 343-foot beach discharge lighters. By 1985 it is estimated that 85 percent of the Army's craft will have outlived their life expectancy. The Army, realizing the gravity of the situation, plans to replace the fleet during the 1980's. Meanwhile, it is up-dating what it has on hand.

As part of this effort, the US Army Mobility Equipment Research and Development Command (MERADCOM) at Ft. Belvoir, Va. is providing technical guidance on pilot modernization of a present Landing Craft Utility (LCU). Technical data developed as a result of this pilot modernization will form the basis for modernization of approximately 60 LCUs.

The pilot craft (LCU 1579) now under test at MERADCOM boasts new mechanical gear, pollution abatement equipment, new electrical system, navigational instruments, and advanced communication equipment.

Many of the LCU's in the fleet are equipped with engines procured during the 1950's. Replacement parts for the old engines became a gigantic supply problem. These old engines on the LCU 1579 prototype have been replaced with a diesel "Clean Air" engine.

Federal Water Pollution standards have come into being since the LCU fleet was commissioned. All commercial and military ships now must meet the Federal standards. The film or sheen left in a ship's wake can be prevented by using an oil bilge water separator. The separator developed by MERADCOM will allow oily water collected in the bilge to be discharged without affecting the environment.

Using minimum flush commodes, sewage is ground up and pumped into a holding tank and later transferred ashore.

The entire electrical system was switched over from direct current to alternating current used by most ships today.

A flying bridge cover was added to protect the ship's captain and his crew communication and bridge navigational gear. This replaces the makeshifts that soldier-sailors have boot-legged for years.

The Army used tube type radio sets which allowed them to communicate with other Army craft but not Navy or commercial ships. The new VHF/FM radio installed in the prototype LCU will be able to communicate with all other ships and ground troops. The old communication gear had a range of 50 miles. The UHF/FM radio can send and receive up to several hundred miles.

A new gyrocompass and radar system were adopted increasing the navigational capabilities of the LCU fleet.

The LCU 1579 upon leaving MERADCOM in February is scheduled for further test at Ft. Eustis, Va. to determine user acceptability of the modernized LCU craft.

200th ANNIVERSARY OF 1st ENGINEERING SCHOOL SET FOR 1978

On 9 June 1778, General George Washington issued the following General Order:

"Three Captains and nine Lieutenants are wanted to officer the Companies of Sappers: As this Corps will be a school of Engineering, it opens a Prospect to such Gentlemen as enter it and will pursue the necessary studies with diligence of becoming Engineers and rising to the Important Employments attached to that Profession, as the direction of fortified Places, & etc. The Qualifications required of the Candidates are that they be Natives and have a knowledge of the Mathematics and drawing or at least be disposed to apply themselves to those studies. They will give in their Names to Head-Quarters."

General Washington's call for engineer education at Valley Forge was the first step which eventually led to America's engineering pre-eminence in the industrial nations of the world. The observance of this date can serve to remind all Americans of the importance of engineering and engineering education in today's world.

On 9 June 1978, the 200th Anniversary of the founding of the first Engineering School in

LINE. PIPELINE.

America will be observed at Valley Forge, Pennsylvania. General Bruce C. Clarke, US Army Retired, is chairman of the planning group. This article is to serve as a warning order to "all Engineers" military and civilian. As the plans progress, information will be disseminated. Start making your plans now.

SYNTHETIC OILS STUDIED BY MERADCOM

Since a lubricant can "make or break" an engine, there is a continuing search for new and improved engine oils. One group of such products, synthetic oils, is under investigation at the US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, Va. As indicated by a recent article in **Soldiers** magazine, many claims of superior service have been made about synthetic oils. At least a portion of the claims are valid.

Synthetic oils are less volatile (resist evaporation) and possess greater oxidation resistance at high temperatures. In addition, they exhibit excellent low-temperature flow characteristics and have "built-in" multiviscosity properties. Other claims such as increased drain intervals, improved fuel economy and reduced wear have yet to be substantiated. Not only is there a lack of data in these areas, but also the means to generate this information presents a problem. With the exception of actual field operation, current test techniques are designed for petroleum products and may not be satisfactory for predicting synthetic oil performance.

Also, economics must be considered from the point of fuel savings and product cost. Synthetics average four, and can be as much as seven, times more expensive than petroleum oils.

Another area of concern is the development of additive technology for synthetic engine oils. An investigation which has just been completed shows most of the commercially marketed products contain standard petroleum additive systems. This indicates that special systems have not been developed for synthetic oils. Synthetic engine oils are expected to play an increasing role in the lubrication of Army equipment. Although future oil specifications may not specifically require their use, the performance criteria will necessitate synthetic or hybrid (synthetic-petroleum) materials.

Synthetic oil is already being used as an engine lubricant in arctic regions. MERADCOM programs are specifically directed towards expanded applications for all season lubrication and extended oil drain intervals.

NEW TV TAPE AVAILABLE FROM USAES

The USAES has produced a new 26 minute color TV tape, titled "The Engineer System," 051-0191. The tape was produced for General Officer Designees to U. S. Army Active Divisions. The film will be shown at the Armor and Infantry Schools to all future Division and Assistant Division Commanders effective March 1977 at Fort Knox and Fort Benning. It contains an introduction and conclusion by General Johnson with a middle film account on the engineer mobility, countermobility and survivability missions to include a wrap-up of future systems being developed. Temporary loan copies are available from the Fort Belvoir TASC, Stop 16F, and permanent copies can be ordered by submitting a blank 30-minute ¾" tape, request by number and title to this agency, Fort Belvoir, VA 22060. Primarily designed for non-engineers it can be used for engineer audiences at the entry level to explain the combat engineer's mission.

Stop 16

NOTE: If you are a member of EOBC 13-56, please read the following article.

SIR:

Thank you for your sending the two diplomas for me. I just receive them today. I am broke now because all my property was sunken when I got onto the fishing boat and helped my children to escape by using the inner tubes as life rafts.

Would you please help me now to find out the address of our fellowship of 13 EOBC so I may ask them for some help while waiting here to go to the United States, or you may give me the photograph of my classmates took all together.

Thank you again for your prompt attention. May God bless you and your family.

TRAN-HIEU TRAI
VIETNAMESE
REFUGEE BOAC 3
SONGKHLA THAILAND

SIR:

Reference is made to Colonel Moellering's article in your November-December 1976 issue: "Something is Very Wrong" (pp. 9-10). I agree with the title, and I believe in its message: There is not enough realistic training. Too often the "problems of coping with actual (as opposed to refereed) problems" cause commanders to shelve that type of training to another day. Let's call those manana decisions what they are: a **training detente.**

I also believe the following passage from the January 1977 Airman magazine: (Ivan is preparing to 'survive you'. It matters not whether you believe it. The Communists believe it.") I have indicated three other places in that (first of three parts) article. The first two are the reason for this letter to you, the Engineers. The first is that the Soviets believe that they must be prepared to achieve total victory in war to include nuclear war. The second is that the Soviets are serious in their approach to Civil Defense. I believe that you have been lulled into forgetting the nuclear, Damocles sword as a result of the aforementioned **training detente.**

The third place that was marked, mentions "surprise". "The Soviets believe the use of surprise brings success in battle". I was surprised to see that the Airman magazine article did not mention the benefits the Soviets achieve in their realistic chemical warfare training. I was happy to see masks being carried in the picture in Colonel Moellering's article. I hope that his article, with your backing, can assist in avoiding an unwarranted surprise on the battlefield. Realistic training could help overcome the **chemical training detente.**

You not only provide engineering expertise on the battlefield but should keep poking the civilian communities into action. Where are your fallout shelters? Do you have one for duty hours when away from family and another for your family? Do you live on post and don't have one for the family? How can you go to work, talk, and train for war and then forget everything about the threat of war at quitting time? Is that the "good" of having a home and family — their ability to help you forget the nagging problem that war might cause? How about your doing some "good" for home and family and assisting in preparing them to survive if you are lucky enough to get to a battlefield? Or is it easier to have a **family (civil) preparedness detente?**

THOMAS P. STRIDER
LTC, USA (Ret)

TRAINING NOTES

SQT IS PERFORMANCE TEST

Soldiers preparing for the new Skill Qualification Test (SQT) shouldn't just study, they should also practice. The theory behind the new testing system is performance. Instead of just knowing what to do, soldiers demonstrate that they can do it.

According to TRADOC, soldiers who practice their skills — and can perform them well enough to do the job — should have no difficulty passing the SQT. In fact, if you want to know the questions and look at the answers on the SQT, it's simple. Get your copy of the Soldier's Manual and test yourself.

If you are in one of the following MOSs you should already have a copy of your Soldier's Manual: MOS 11B, 11C, 11D, 11E, 16B, 16C, 16D, 16H, 16J, 16P, 16R, 95B, 95C, 95D, 76J, 34E, 34F, 34G, 41C, 44E, 45B, 45K, 45L, 63C, 63G, 63H, 63J and 71P. If you don't have your manual, tell your immediate supervisor. For soldiers in other MOSs, manuals are being developed and will be distributed when completed.

The Soldier's Manual is the most important book you own to help you do a better job and to pass the SQT. The manuals can also be used as a refresher for skills taught in basic training, AIT, or schools. The Soldier's Manual can be used to brush up on basic soldier skills.

In addition, the Soldier's Manual also lists all the critical tasks required to perform your job. Remember, if it isn't in the manual, it won't be on the SQT. Some soldiers believe the SQT will have some "trick" questions, but this isn't so. Every question will have a direct practical application to your job. If you need certain tools on the job to perform the task, you'll have them (or simulation devices) during your SQT. The three components of SQT — hands-on, written and performance certification — may be included. That is, certain SQT may have one, two, or all three components, depending on the job.

The following MOSs are scheduled to be tested within the six month periods as indicated below.
(W—written component; P—performance certification; H—hands-on component; SL—skill level).

APRIL—SEPTEMBER

MOS	SL1	SL2	SL3	SL4
11B	WPH	WPH	WPH	
11C	WPH	WPH	WPH	
11D	WPH	WPH	WPH	
11E	WPH	WPH	WPH	

JULY—DECEMBER

MOS	SL1	SL2	SL3	SL4
16B	WPH	WPH		
16C	WPH			
16D	WPH	WPH	WP	
16E	WPH	WPH	WP	
16H	WP			
16J	WPH	WPH	WP	
16P	WPH	WPH	WPH	
16R	WPH	WPH	WPH	
95B	WPH	WPH	WP	WP
95C	W	W	W	W
95D	WP	WP	WP	WP

Results of your SQT will be given to you, your commander and to U.S. Army Military Personnel Center. MILPERCEN will use the scores for career management and promotion purposes.

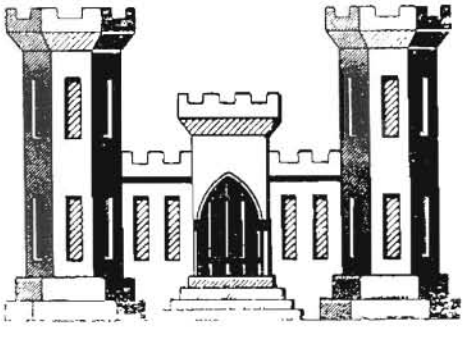
TACTICAL PROBLEM

SITUATION: In a simulated test of the tactical effectiveness of minefields in the anti-tank weapons's system, the results in the chart below were obtained. The defender was a Mechanized Infantry Platoon, the attacker a 15 tank opposing force company. The minefield density has .002 mines per square meter and scatterable anti-tank mines used on the surface of the ground.

TEST	TANK LOSSES	
	NUMBER	PERCENTAGE
Minefield Alone	3	20%
Anti-Tank Weapons's Alone	5	33%
Both Minefield & Anti-Tank Weapons:		
Minefield Kills —	4	27%
AT Weapon Kills —	6	40%

PROBLEM: What is the synergistic effect of the minefield to the anti-tank weapons system? What is the combat multiplier of the minefield to the anti-tank weapon's system?

Continued On Page 24



Engineers in the Assault Crossing

LTC Richard Copeland

In 1972 the author was Chief of the Tactical Bridging Branch at the Engineer School. Asked by the Canadian Liaison Officer at MERADCOM (MERDC) to explain the US doctrine for engineer support to amphibious vehicles during the crossing of a water obstacle, he discovered that the US has no doctrine. No US manual defines the who, what, when and how of the engineer mission to aid amphibians. Subsequent research uncovered some rather startling facts.

In our modern, mobile Army the way to get across a river during an assault crossing, is to swim across in our Armored Personnel Carriers (APCs)! The M113A1 APC is a fine swimmer! Numerous exit sites with gentle slopes exist along most rivers! When the Mechanized Infantry Combat Vehicle (MICV) is fielded we will see it speed across rivers and roar up over the far bank! Right?

Don't bet on it! When you compare the stream crossing capability of the MICV to the actual terrain in which it will be employed, it may be a worse amphibian than the M113. An amphibian must be able to propel itself through the water and power itself up and out of the water at the far bank. With its water propulsion kit, the MICV could have negotiated currents up to 9 fps and surmounted a far bank with a fairly steep slope. The Army has dropped the requirement for the propulsion kit. Although the MICV may be a better swimmer than the M113, it will be twice as hard to get up over the far bank!

The mission or problem of getting amphibians up over the far bank is the job of the combat engineers.

An amphibian's ability to cross a water obstacle is a function of:

- Stream conditions — primarily the current.
- Bank conditions — especially the far bank.

The two conditions are interrelated. Let us assume for this article that amphibians will get across the river unaided. The second condition brings the engineers into the act. Perhaps that statement should be rephrased—this is where the maneuver commander expects the engineers to come into the act!

For example, in Field Manuals (FM's) 5-135, 17-1 and 31-60, it is specified that: The divisional engineers have the primary mission of supporting the assault units during the assault phase by breaching obstacles, operating assault boats, preparing entrances and exits for vehicles, and aiding fording and swimming vehicles. If supporting personnel are not immediately available, it may be necessary to change the order of crossing or select a different crossing site.

FM 17-1 views pessemistically the ability of the engineers to enhance friendly mobility,

> Poor banks can often be improved by use of pioneer tools or dozers and corduroying (laying logs). Track pads should be removed in order to provide better traction. It is seldom possible to improve banks on the far side of the stream.

The problem was recognized in the USADC Engineer Agency Study, ENGINEER-75 which admitted that,

> More effort must be expended in the reconnaissance of fords, improving bottom conditions, and providing aids to tactical vehicles for entry and exit for wet and dry gaps . . . The current M113, or its followup vehicle, has a swimming capacity in moderate currents but experiences difficulty in entering and exiting wet gaps having steep sloped banks.

The 1964 Armor Agency Study defines the existing constraint very clearly.

VEHICLE STREAM CROSSING CAPABILITIES

VEHICLE						STREAM CROSSING CAPABILITY	
TYPE	NOMENCLATURE	HP	WGT (Tons)	HP/ TON	(PSI) GND PRES	SPEED IN WATER	EXITING CAPABILITIES
APC's	FV 432 (BR)	240	15.1	15.7	11.1	Tracks — 5.6 fps	Approx 15% bank slope
	M113 (A1) (US)	215	12.3	17.5	7.6	Tracks — 5.6 fps	Approx 30% bank slope (25% if clay or loam)
MICV's	MICV (US)	450	22.7	19.8	7.1	Tracks only — 7.2 fps With propulsion kit—9.0 fps	50% bank slope required. 50% bank slope desirable
	AMX 10P (FR)	276	13.8	19.7	8.0	Tracks only — 5.9 fps With propulsion kit — 7.2 fps	Not specified
	MARDER (GE)	600	31.0	19.0	11.0	Tracks only* — unknown	Not specified
ENGINEER SUPPORT VEHICLE	UET (US)	285	16.0	17.8	8.3	Tracks only — 4.5 fps	Not specified
	CET (BR)	320	17.1	19.0	6.25	Waterjets — 8.2 fps	40% bank slope unaided
	ENFRAC (FR)	550	30.0	18.1	8.6	Waterjets — 9.2 fps	Vertical bank

* The MARDER can swim only with a floatation kit. The MARDER can ford a 2 meter stream (with fording kit carried on vehicle).

TABLE 1

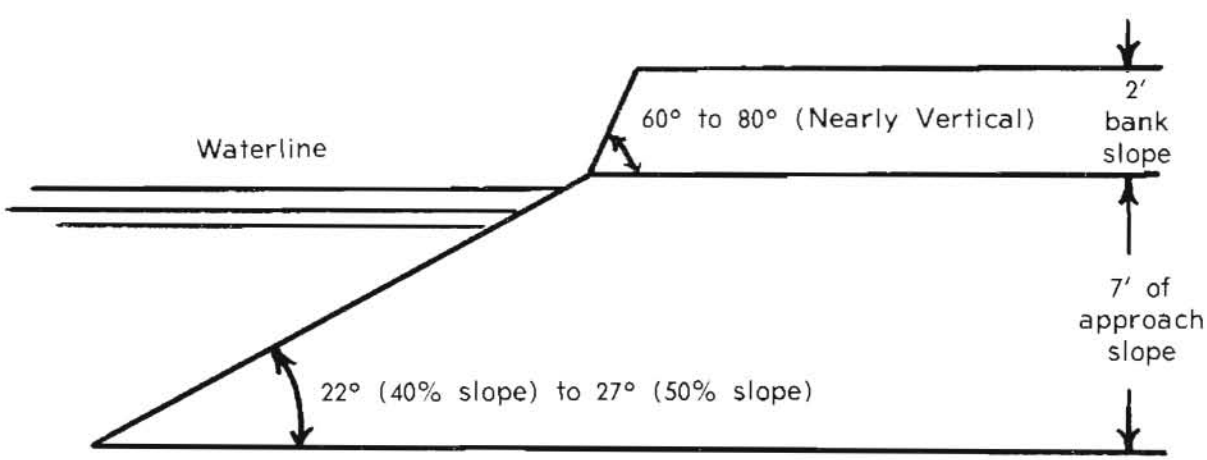
Since the successful completion of mission and seizure of an objective will in many cases depend on a successful stream crossing, the factors effecting the vehicles' stream crossing capabilities must be considered. In view of the swimming and deep fording capabilities of the vehicles organic to Armor and Armored Cavalry units, these factors are determined to be:

- Stream width
- Stream depth
- Water velocity
- Bank height
- Bank slope
- Trafficability
- Stability of stream bottom
- Enemy action
- Weather

When these factors were analyzed, based on experience with swimming and fording vehicles and discounting enemy action, it was found that the determing factors affecting stream-crossing capabilities for both swimming and fording vehicles in most operations, are the slope and trafficability of the banks and condition of soil adjacent thereto. Additional determining factors are: tracked vehicles—depth of water; swimming vehicles—stream velocity . . . It may be generally stated, however, that few locations which have not been specifically prepared will allow armor vehicles to enter and exit from the water with the desired ease and speed . . . Expedient means of getting the vehicles out of the water must be accomplished with dispatch to reduce vulnerability and exposure time to enemy fire. Elimination of underwater demolitions and obstacles will remain a task of Engineer troops.

The exiting problem was also outlined succintly in an article written by a British Officer in Military Review in 1963,

> Nevertheless, the fact that a vehicle can float does not mean that it can cross rivers without assistance. Such vehicles will always encounter difficulties in getting in and out unassisted, of any river but one with gently sloping banks. Such rivers are rare, particularly in highly developed countries where they may be canalized. In any event there are likely to be only a very few places where unassisted crossing is possible. Even when such crossing sites exist,



Soil Conditions:

C = 0 to 0.5 psi
O = 35° to 25°
C.I. = 80 to 120

BANK SLOPE PROFILE

FIGURE 1

the large volume of water brought out of the river by the amphibians as they emerge is likely to make them unusable in short order.

The article presumes that the problem will be overcome through engineer support, stating,

Considerable development effort is going into overcoming this inherent weakness of amphibians, but there is no doubt that earthbound vehicles will always require considerable engineer assistance in the assault crossing of normal European rivers.

The problem definition and possible solution appeared in Armor in 1973,

But the river crossing problem is more than speed. If a major factor in mobility is speed, then it must be overall speed in many enviroments. What good is a high speed amphibian if it cannot exit on the other side? Perhaps the most significant increases in river crossing performance will come from improved exiting techniques. These exiting improvements may come from increased thrust in the propulsors (for we know already that good water thrust materially aids exiting). They may also come from improved vehicle traction components. Some feel we must develop improved winching techniques. But the greatest promise, at present, appears to be in a radical change in vehicle configuration. Perhaps we should develop a river crossing "pioneer" vehicle. This vehicle, with the most advanced river exiting aids, would proceed the main force, exit and provide assistance to following elements by towing them up the bank or by excavating the bank to create a formidable obstacle.

As shown in Table I, the M113 APC can climb a 30% riverbank slope. The M113 can therefore surmount approximately 15% of the riverbanks of Western Europe. If the far bank happens to be clay or loam, as are 50% of the riverbanks of Western Europe, the M113 has about a 10% chance of making it over the far bank.

The required capability of an amphibian to surmount an exit slope is rarely specified. In the case of the MICV the required capability is defined as a 40% slope with 50% capability desired (figure 1). If the 50% capability can be achieved the MICV will be able to surmount approximately 40% of the riverbanks in Western Europe. If the MICV attains the more likely 40% capability, the vehicle will be able to surmount, unaided, only 30% of the banks. The constraint is more severe in Western Europe than in most other areas of the world due to the extensive canal construction which has been accomplished.

In any area of the world the exit is a very difficult operation, as described in FM 17-1.

When exiting from the water, the vehicle should start up the bank at a constant speed never allowing excessive track slippage. Once traction is lost the tracks will dig in and the vehicle will stall or the vehicle will slide in the water.

FM 7-10 warns that we must,

Approach the land squarely, Approach the land at reduced speed (approximately 3 kmph).

The Armor Agency Study concluded that,

Closely related to the problem of negotiating a river bank at a given height, is the actual degree of slope in contact with the track of the vehicle and the nature of the soil. An unassisted exit by a swimming vehicle from a stream with a wet, muddy bank, with any appreciable slope is not probable, without prior bank preparation.

The studies have found that, within reason, the height of the bank step (Fig 1) is not the governing constraint. Once the vehicle gains traction on the bank slope, it should be successful in surmounting the bank step. It should be recognized, however, that 60% of the bank steps in Western Europe are greater than the 2 foot step shown in Figure 1.

The British Army conducted trails in 1962 and 1963 to determine specific aids to amphibians. The tests used Class 30 trackway, rocket propelled grapnels, hand placed anchors and JATO type rockets for thrust.

Further trials were conducted by the British Army of the Rhine in 1971-72. The trials resulted in the adoption of the following aids to amphibians:

- Applique Propellor
- Hub Winches and Hand-Emplaced Anchors
- Rocket Propelled Anchor
- Trackway
- Fixed Line Equipment

The applique propellor is a waterwheel-type device attached to the drive sprockets of the vehicle. The limited thrust provided by applique propellors is insufficient to propel the MICV over most banks.

To date, hand-emplaced anchors have not been able to develop sufficient holding power to permit a MICV winchout. The MICV is heavier than the British FV 432 and the M113 (Table I). The rocket propelled anchor system or any "holdfast" installed on the bank would require the use of a winch on the MICV.

The current US Army engineer capabilities are unimpressive. The following methods are currently available to aid the existing of amphibians:

FIGURE 2

FIGURE 3

• Transport engineers to the far bank on an APC/MICV/assault boat. There, using pioneer tools, reduce the exit bank slope. This method is inordinately time consuming.

• Transport engineers and log deadman to the far bank. Using pioneer tools, excavate for and install the "log deadman" anchorage. This method is enormously time consuming and assumes a winching capability on the exiting vehicle.

• Transport engineers and chain-picket holdfasts to the far bank. Install the chain-picket holdfasts. This method is time consuming, but not nearly as much as the above methods. The method assumes a winching capability on the exiting vehicle. An alternative would be to install a ground-mounted powered capstan winch on the far bank but none exist with more than a two ton pull.

• Helilift an airmobile tractor to the far bank. The tractor would either:

— Reduce the exit bank slope.
— Excavate for a "log deadman".
— Act as a "light" deadman.

Reducing the exit bank slope or installing a log deadman using the tractor is less time consuming than using pioneer tools. If in the unlikely case that testing determines that the tractor has sufficient "deadman" capacity to hold an exiting MICV, a winch could be mounted on the tractor. This method presupposes that:

— The airmobile tractor, organic only to airmobile units, will be available for the mission.

— Cargo helicopters will be deployed in the vicinity of the line of contact.

— The weather will permit the flying mission.

Engineers could provide adequate assistance to amphibians if provided with the following equipment:

• A modified Universal Engineer Tractor (UET). The UET could be outfitted with the rocket propelled anchor. Once on the far bank, the UET would be able to take on soil ballast in order to be able to act as a deadman or to winch out amphibians (12.5 ton winch). The UET would have to be modified, perhaps unrealistically, in order to be able to negotiate high river currents and exit steep banks.

• The Combat Engineer Tractor (CET) (Fig. 2). The CET, being developed by the British Army, has the following characteristics:

— As an amphibious vehicle, propelled by two powerful rear mounted water jet units, it can maneuver with accuracy in high currents.

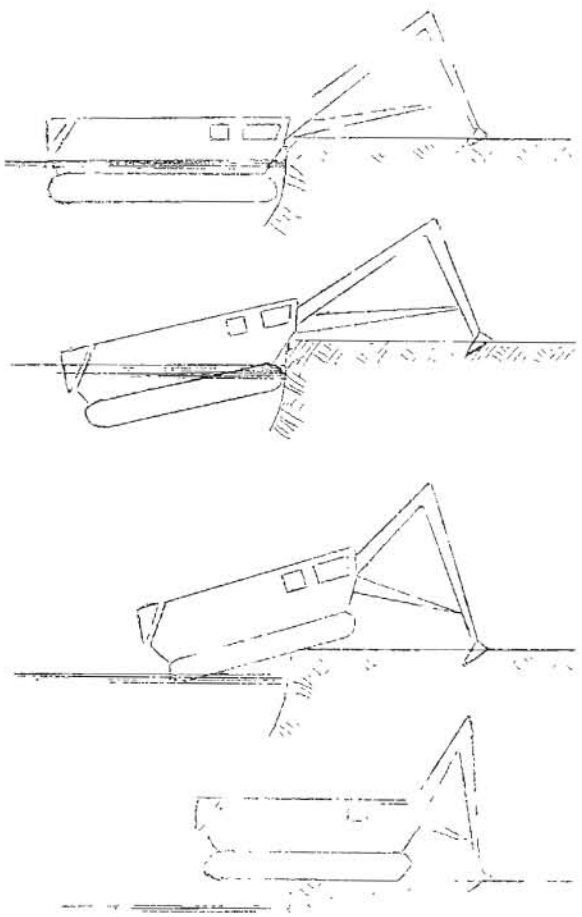
— Exceptional cross-country mobility and is able to exit unaided on all but the most difficult sites. The rocket propelled anchor, a standard part of the vehicles' equipment, adds to the vehicles own considerable exit potential.

— An 8 ton winch can be used to help other vehicles to exit.

— Good earthmoving performance which can be used to improve the exit banks.

— The ability to carry and lay Class 60 Trackway.

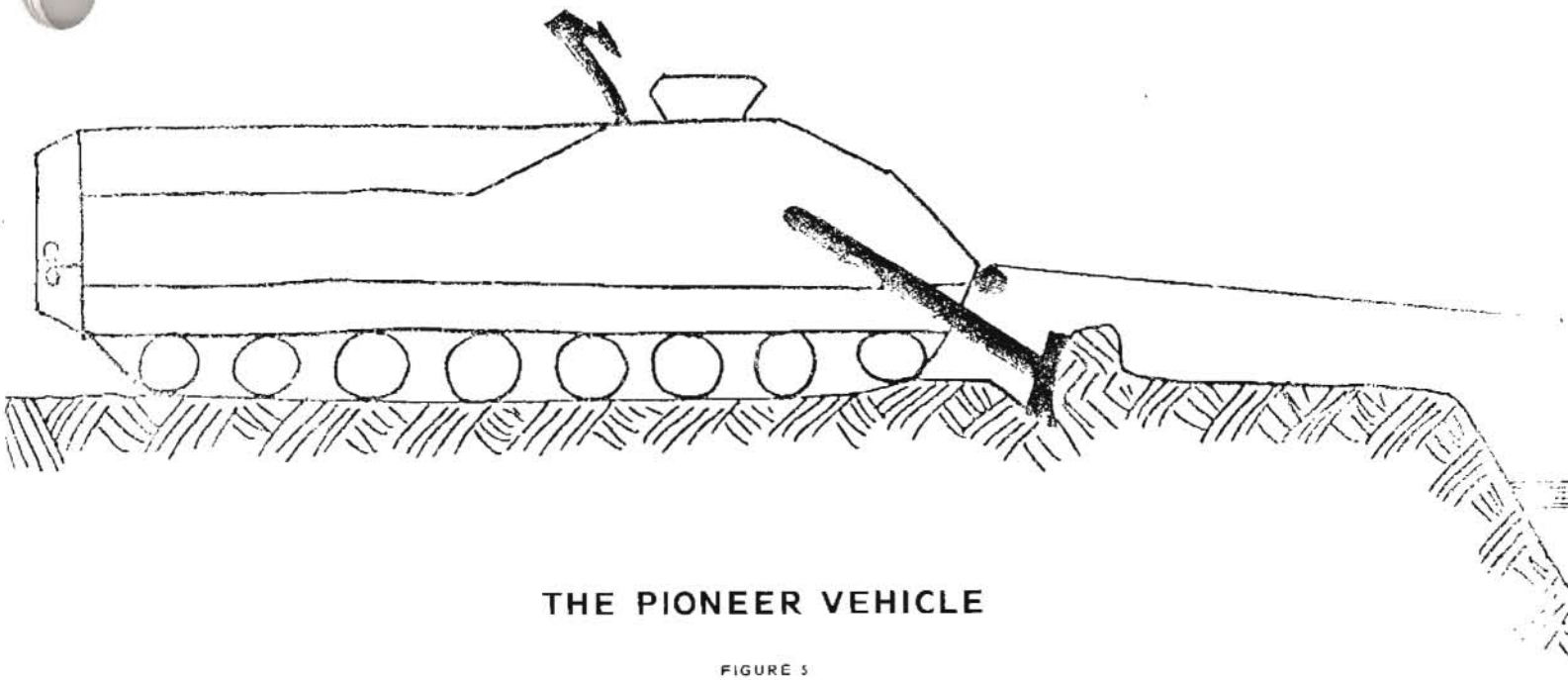
• The Engin D'Aide Au Enfranchissment (ENFRAC) (Fig. 3). The ENFRAC, being developed by the French Army, is an engineer amphibious tracked vehicle and has been designed solely to solve the far bank problem. The vehicle



The ENFRAC

Exiting A Vertical Bank

FIGURE 4



THE PIONEER VEHICLE

FIGURE 5

has the following capabilities:

— Earthmoving (to reduce the exit bank slope).

— Winching.

— Road obstacle clearing.

— Transport for engineer teams.

The vehicle self-exits the far bank (Fig. 4) using its "anchorizing foldable arm." The ENFRAC mounts a "4 in 1" scoop loader.

• The Pioneer Vehicle — an M723 with propulsion kit and rocket-propelled anchor (Fig. 5).

— Provide divisional engineer squads the MICV (M723) chassis (minus the weapons turret) with propulsion kit permanently installed.

— Each Pioneer vehicle would mount a rocket-propelled anchor. Additionally the vehicle would mount a winch under the splashboard.

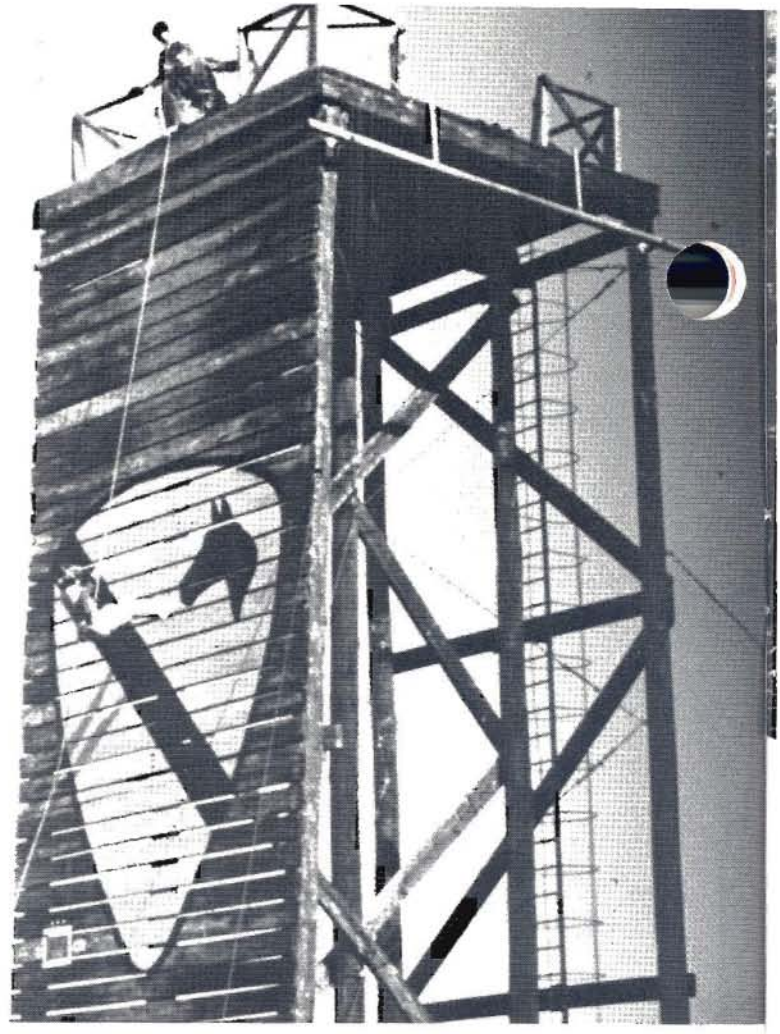
— In order to ensure that the Pioneer vehicle can hold fast while winching out MICVs, it may be necessary to mount a dozer blade on the front.

In summation, the exit conditions at streambanks (i.e., slope, bank step height, soil conditions, etc.) of streams in Western Europe are documented. The required exiting capability of the MICV will enable the vehicle to exit, unaided, only 30% of the streambanks of Western Europe. The exiting constraint to amphibians can be overcome by the use of external aids and those aids currently available in the US Army do not adequately meet the required operational capability.

Items of equipment are under development which meet the required operational capability. Thus if the US Army is serious about conducting the assault river crossing with APCs/MICVs, we have a serious capability gap. Will the US Army Engineers take the initiative to fill this gap? LET US TRY.

LTC Richard L. Copeland is assigned to the Office of the Deputy Chief of Staff for Research, Development and Acquisition, HQDA. He commanded Co A, 10th Engineer Battalion, 3d Infantry Division (Mech) and the 553d Engineer Company (Float Bridge), and served as S-3 and XO, 577th Engineer Battalion (Construction). A mechanical engineering graduate of Northeastern University, he holds the master of arts from Eastern Michigan University and the master of science in administration from George Washington University. LTC Copeland is a graduate of the Engineer Officer Advanced Course and the Command and General Staff College.

That Extra Effort



The old Cavalry spirit rides high in the 1st Cavalry Division (FIRST TEAM)! As the Division Engineers for the FIRST TEAM, some of that extra effort required by the Cavalry spirit rubbed off on the 8th Engineer Battalion (Skybeavers). The primary mission of the FIRST TEAM is to be able to go any where, anytime and win the first battle. To achieve this goal, considerable training is required. This training can be ordinary or it can be spiced with many activities that not only results in a combat ready unit . . . but is fun also!

Over the past few years, the FIRST TEAM ENGINEERS have developed a training program that has three component parts. Technical Engineer training from ARTEP's is combined with support to maneuver units in ARTEP training, and a heavy construction program. These three types of training consume about 60% of the available effort with the remaining 40% split between maintenance, housekeeping details and support to other non-divisional units and schools.

The most important item in training management is the thread that ties it all together. The FIRST TEAM ENGINEERS weave a program that challenges both the trainers and the trainees to perform at high standards. The annual program includes all unit levels of ARTEP tasks. The SQT is not yet available for the 12B series, but the 11E and 11B and 12B draft SQT's are used in individual training conducted by the NCO's of the battalion. The thread that ties the ARTEP training together is the number of projects that can be funded. The number of timber trestle bridges, bunkers, culverts, revetments and other items are managed to insure that each unit gets equal challenges in completing them. Other items included in the training program are Spouse Day, NCO Responsibility Day, Officer Training Day, New-Comers Day, Dining-Ins, Monthly Battalion Award Parades, Professionalism Seminars for NCO's, Personal Effectiveness Training for Leaders, Hot Shot Squad competitions, SERE Training, and dynamic movement training that includes actual air movement.

Programmed throughout the cycle are all the weapons and demolition ranges. Pride is taken in the volume and frequency of our support of the maneuver battalion ARTEP's. Operator training on the full spectrum of our equipment provides operators with both maintenance and driving training. Civic action includes support to Boy Scouts, Girl Scouts and local agencies. Meshed with the foregoing tactical training are many construction projects. Last year $390,000 of construction benefitted both the FIRST TEAM

and Fort Hood.

All of these events will be more fully described in the remainder of the article. This full training program did just not happen . . . it was the result of considerable planning and coordination. Any unit can conduct a similar program if they sit down NOW and block out the events to happen over the next six months. The planning within the battalion is reasonably firm six months hence. Thus the events described in this article are planned and repeated, with new touches added, on a six month cycle.

Hopefully, these examples will provides some ideas for commanders to use when providing guidance to their staffs on training programs.

ARTEP TRAINING

The climax of the training cycle is the annual battalion level ARTEP. Two different methods of achieving this goal have been tried. A multi-level system of doing squad, platoon and company level ARTEP tasks combined with SQT tasks has been tried, with all conducted concurrently throughout the year. The other method (cyclic training) uses a progression of squad to platoon to company to battalion level ARTEP tasks. Ideally the multi-level method should work best. However, the best method for our unit turned out to be the cyclic method because of the personnel turbulence and junior leader shortage problems. In the cyclic training cycle, the year is divided roughly into quarters. During the first quarter, the training focuses on squad level ARTEP tasks, the second quarter on platoon level tasks, the third quarter on company level tasks, and the final quarter is on battalion level tasks. Each quarter builds on the previous quarter so that, for instance, platoon and squad tasks are included with the company tasks during the third quarter. The thread tying the training together is construction projects which provide visible evidence of having achieved unit and individual proficiency. During the annual cycle, each platoon gets the opportunity to build a timber trestle bridge, bunker, timber loading platform, several culverts, helicopter revetment or other large construction training projects. All of these construction items are financed thru the training budget and not by the Director of Facilities Engineering at Fort Hood. Because they are training facilities, they can be destroyed by demolition or other expedient methods in training. For instance, of the seven multi-span timber

trestle bridges built in past year and a half, five have been blown by demolition. The others are scheduled for demolition on the coming ARTEP cycle.

Each level of ARTEP training is concluded with a test using ARTEP guidelines to insure the battalion commander that the companies have indeed met their standards. The Engineer Military Stakes are conducted at the conclusion of the squad training quarter. This is a round robin event with fourteen stations that test the proficiency of all squads in the battalion. The test takes three days and the squad bivouacs at the event locations while being tested. All squads are evaluated concurrently so there is no opportunity to compare notes between squad leaders. The competitive spirit is enhanced by making intermediate results available so the squads can compare their overall standings. The best squad in each event is recognized as well as the best overall squad.

Platoon tests signal the conclusion of the platoon training cycle. This event is conducted in a three day period during which each platoon goes thru nine ARTEP events. The last test includes a hasty protective minefield, a light tactical raft (LTR) construction, a bridge demolition, ginpole and boom derrick construction, an infantry platoon assault, a field fortification exercise, a maintenance event and a communication event. The competition challenges the participants to excell. The best platoon for each event, and for all was selected and recognized.

The Skybeavers support all the other ARTEP's in the Division. Maneuver units have one or two engineer platoons supporting their ARTEP. Often engineers are used with the opposing forces (OPFOR) to provide a better challenge for the "friendly" engineers. Artillery units include a river crossing operation using mobile assault bridges (MAB's) during their ARTEP's.

ROLL OUT EXERCISES

To retain the keen readiness edge required for combat employment, frequent Emergency Deployment Readiness Exercises (EDRE) are conducted. These have ranged from simple alerts to full scale aerial movements.

One roll-out began at 0200 hours with the alert notification. At 0430 hours the Battalion assembled and moved out with their vehicles from the motor pool. After a trip around a predetermined route, all platoons received missions. Two platoons relocated to a C5A and actually combat loaded their equipment including a CEV. Eight other platoons were heli-lifted to a field location and required to hike back to the cantonment area. Another platoon received a mission to tear down an old building while two other platoons went thru the POR processing set up by the Battalion PAC section.

Another EDRE required all companies to static load a C5A and C141 per their loading plans, and to load C-130's and make a combat landing on a nearby assault strip. The troopers really enjoyed the opportunity to fly with their equipment.

Needless to say, for a battalion to undertake such complex coordination to make these exercises a success requires considerable lead time and fairly stable training plans.

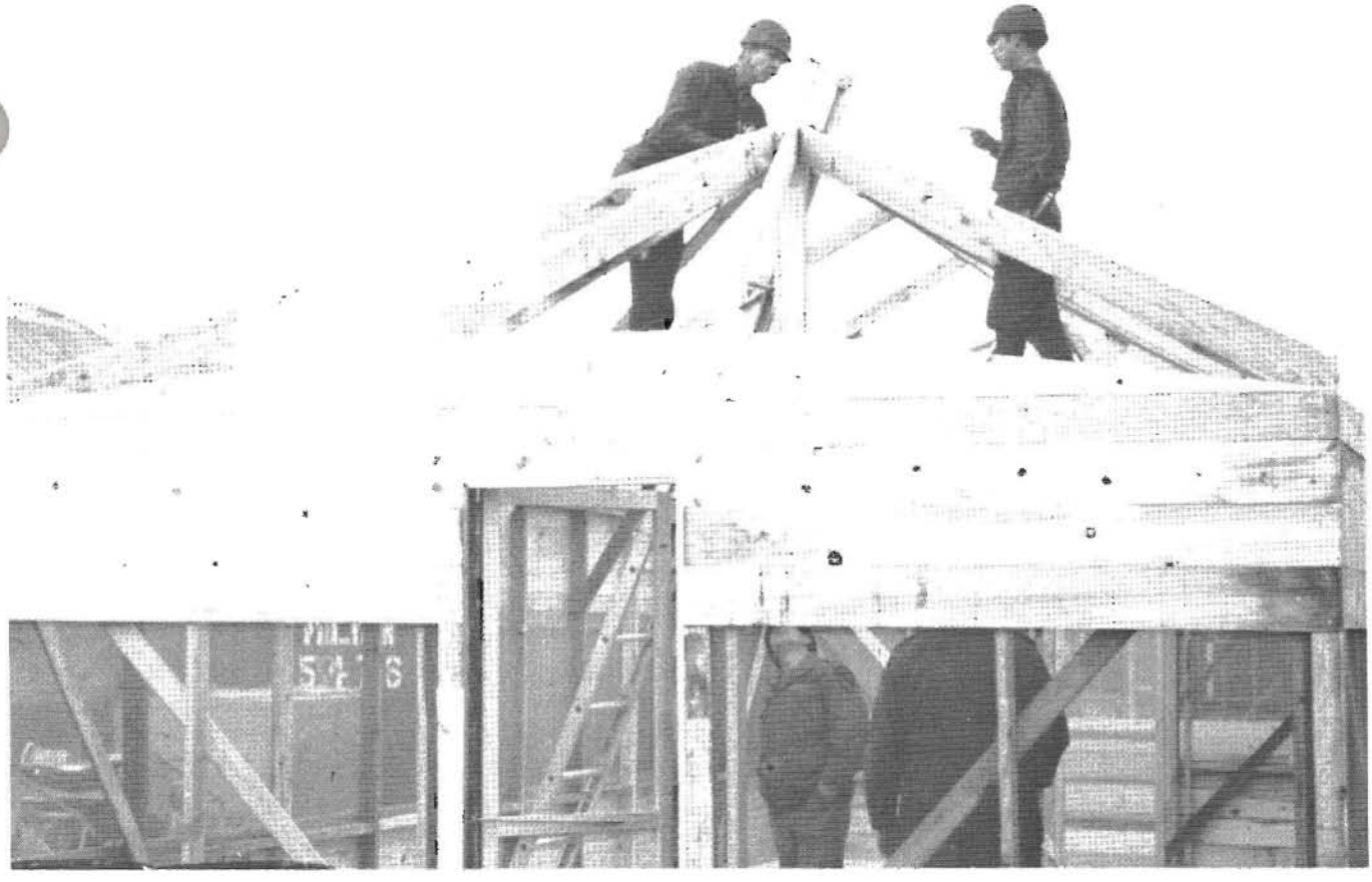
HOT SHOT SQUAD

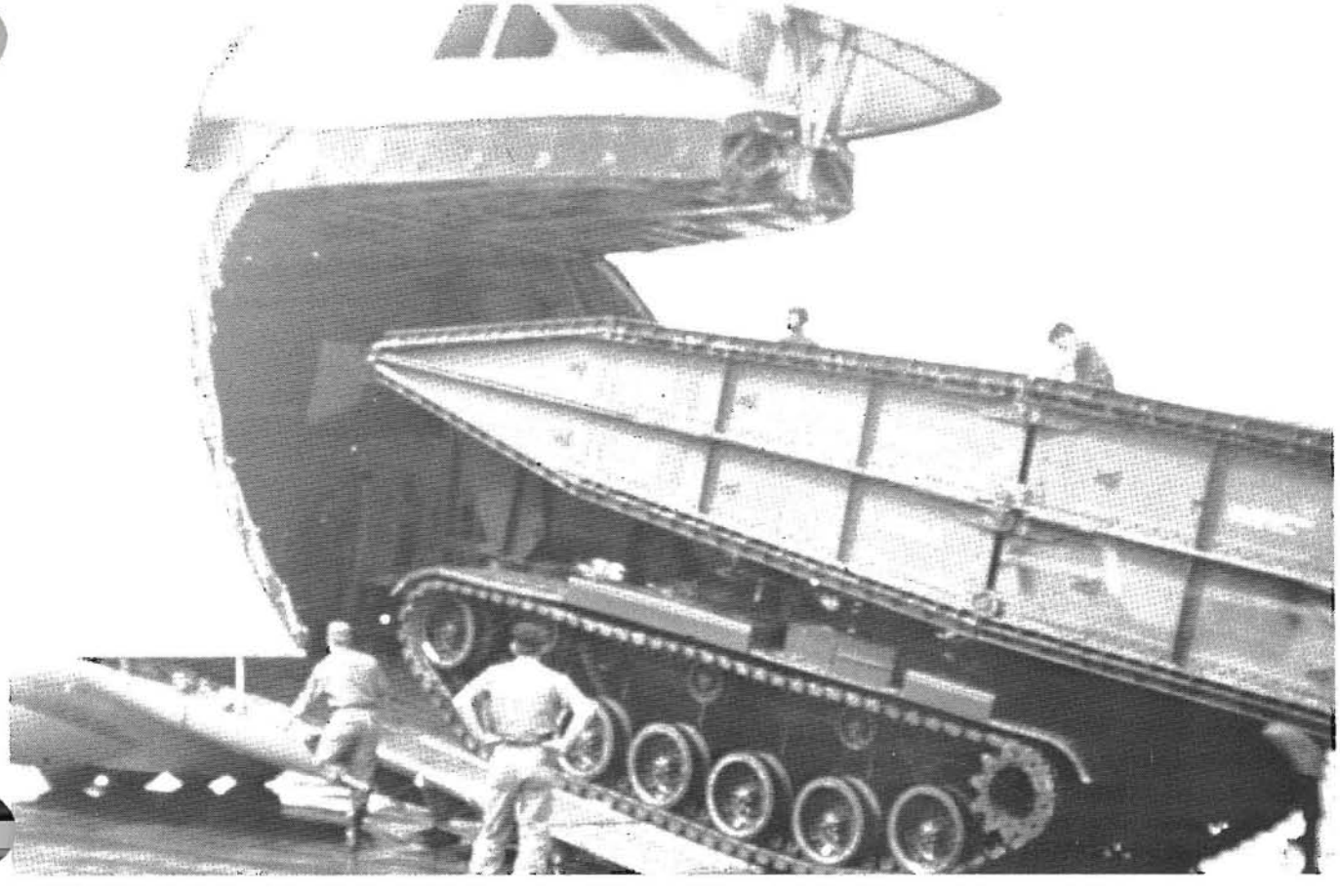
One training event that combines both ARTEP tasks and physical training is the HOT SHOT SQUAD competition. It is conducted during the squad and platoon portion of the cycle, about once a quarter. This competition consists of having all thirty-six squads compete simultaneously doing the same identical engineer tasks while racing against each other for both time and quality of construction. There are usually five events in the two hour competition. Some of the events have included assembly of CMP culvert, constructing batten boards, building a machine gun emplacement, building a knife rest gate, building a ginpole, filling sandbags and running with them, building an expedient antenna and entering a communications net, sawing railroad ties into several sections and similar type events that require a minimum of quality control yet can be done in a competitive spirit. At the end of the afternoon, the squads know pretty well of their weak areas in organization and planning. They have really tried hard to win the event . . . and had fun doing it.

SPOUSE DAY

Each six months, the FIRST TEAM ENGINEERS have a spouse day. The wives and children are invited to share a day with their husband. One Spouse Day was spent in a tour of the battalion facilities, motor pool, billets and a welcome by the Battalion Commander.

Another Spouse Day included a demonstration of an Engineer Company at work supported by the Heavy Equipment Platoon, a rappeling demonstration and a fire power demonstration of all weapons organic to the battalion. The third Spouse Day was a deliberate river crossing of a company using MAB's, swimming their APC's and supported by





the demolition of obstacles on the far shore. All of these events were more than s Spouse Day . . . they were good training that was real and different for all those involved. All were conducted in a three to four hour time span so mothers could be home when their school age children returned from school. All of these events had attendance of over 60% of the battalion wives . . . a good attendance.

SERE TRAINING

Survival, evasion, resistance and escape training is an excellent opportunity to test the individual training of the trooper. In this two day training event, the soldier was given intensified survival, escape and evasion classes. For the evening meal, a live rabbit and some vegetables were turned into engineer stew for each five man team. After the evening meal, the company was air assaulted to an objective, were surrounded and had to evade for a distance of twelve kilometers to their rally point. The area was infested with the scout platoons from the maneuver battalions. When an engineer was caught, he was taken to a POW compound manned by the Military Police and interrogators from the Military Intelligence Company. After sufficient interrogation, the engineers were given the opportunity to escape and continue their evasion to the rally point. This was well received by all even those picked up lost going in the wrong direction.

NCO RESPONSIBILITY DAY/OFFICERS TRAINING DAY

One day, the officers did not come to work. Rather, the NCO's took over and ran the battalion. The officers began the day with an early breakfast, then had the opportunity to attend a class on operating engineer equipment such as the CEV's, APC's, graders, cranes, and bulldozers. After a C-Ration lunch, the officers then rappeled, shot pistols and were airlifted to a lake where they had the opportunity to actually operate the Mobile Assault Bridges.

Another such day saw the Officers conducting a river crossing operation in the Fort Hood Battle Simulation Center using terrain boards, and several of the same wargames used by the maneuver units in their training.

ADVENTURE TRAINING

The day to day humdrum of activities can get even those involved in a high pitched training program down. To provide the change of pace, several activities have been tested. The AVLB platoon took a week trip down the Colorado River in rubber assault boats. Another company took a week hiking/rafting trip thru a National Park. They also returned four months later to build rustic bridges using native timber. Another unit boated on a large nearby lake. All adventure training provides a challenge for the staff to get it all coordinated; however, the benefits received, make adventure training a worthwhile change of pace.

CONSTRUCTION

Another important facet of training is construction. In FY 76, over $390,000 of construction projects were financed by the Director of Facilities Engineering for the physical enrichment of the FIRST TEAM and Fort Hood. The battalion's goal is to have one major construction project per platoon underway at all times. This provides the platoon leader with an alternative to field training. By accepting post level projects which have no completion date specified, the platoon leader can grapple with the conflicting priorities and determine what his platoon will do, training or a construction project.

Construction projects are not all work either. One project required six wooden tent floors and frames to be built. Rather than doing them successively, a contest was organized. One day, six platoons assembled around a pile of lumber and when given the signal, began construction. Ten hours later, the first of these tent floors and frames were completed. The structures were scored for both quality as well as speed. Similar ideas have been used on other projects. So . . . construction can also be training . . . and fun to do.

INDIVIDUAL TRAINING

Not all of the individual training conducted can be discussed in this limited article. Several key individual training programs should, however, be discussed.

To insure the maintenance is kept at a high level, a semi-annual cycle of operator training is conducted. This training last two to three days and is conducted for each of the fifteen types of vehicles and equipment in the battalion.

Officers attend a 45 minute class each week to hone their skills in various subjects as well as to practice giving classes and learning proper methods of instruction. The Chaplain conducts eight three-day sessions of Personnel Effectiveness Training (PET) for NCO's each year. Twice a year, the Battalion Commander conducts a daylong

Professionalism Seminar for all NCO's to refresh their leadership skills. When the new FM 5-34 was issued, several hundred copies were obtained and a two hundred question open book test was given to all NCO's and officers. Physical training is not neglected either. A program of daily PT coupled with a two hour A & R program, once a week, insures physical readiness.

The range program includes both familiarization and qualification on all weapons not only during the day but at night and in protective masks. Fort Hood has a Musketry Program for infantry units that begins at the squad level and progresses thru a company team of a mechanized infantry company, a tank platoon and COBRA-TOW support. To insure the Skybeaver's can perform the secondary mission of fighting as infantry, the battalion has completed the squad portions of the Musketry program. Over the coming year, the battalion will progress thru the program to hopefully achieve the ability to serve as a mechanized infantry company.

AWARDS CEREMONY

The start of each month is greeted with a Battalion parade called the Awards Ceremony. A scoring system is used to evaluate the companies in the area of communication, safety, maintenance, supply, best areas, most Espirit-de-Corps, security, administration and the best overall company for the month. The scoring criteria is arranged so that all subjects in an area of interest receive emphasis during the year. Thus when AGI/ORI time comes, each area has been thoroughly inspected and corrected. Plaques are awarded to the unit commander. Also, individuals are recognized with letters of appreciation, certificates of achievement. Army Medals, certificates for maximum score on the PCPT test and the best driver and mechanic for the month. The formation also provided the Battalion Commander with the opportunity to recognize the outstanding and not so outstanding events of the previous month and set the tone for the coming key events.

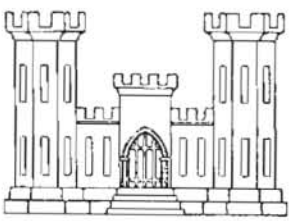
CONCLUSION

Hopefully, some of the ideas and concepts in this article that have been helpful to the FIRST TEAM ENGINEERS could also be helpful to other units that are looking for activities that will provide a real sense of accomplishment, achievement and participation on the part of all unit members. Other ideas and comments from other units that have been successful could be beneficially shared in such a format as the ENGINEER provides. Usually, ideas such as these have to be "reinvented" with each succeeding command group because no consolidated source of these dynamic training ideas is collected and made available to other units.

MAJ James L. Campbell is currently assigned as XO of the 8th Engineer Battalion, 1st Cavalry Division. In the two years he spent as S3 of the 8th Engineer Battalion, MAJ Campbell organized several of the training cycles described in this article.

Previous assignments have included tours with the Engineer Studies Group, OCE and the Engineer Command-Vietnam. He has also served as platoon leader and company commander in both Construction and Combat Engineer Battalions.

MAJ Campbell received a B.S. degree from South Dakota School of Mines and a Masters degree from Texas A & M University. He is also a graduate of the Engineer Officer Advanced Course, Command and General Staff College and is a Registered Professional Engineer. Several of his other articles have been published in Infantry, Military Engineering *and* The Engineer.



Fish Story

Two weeks after last summer's flood waters had subsided to within the banks of the Big Thompson River, members of the U.S. Army Corps of Engineers Emergency Disaster Team discovered an unsuspected tragedy.

About 20 feet from where the Big Thompson was now gently flowing, stood an isolated pool — a remnant of heady flood waters. This shallow pool, about three picnic tables in size, boiled with the activity of soon to die fish.

It seemed that as the rampaging waters crashed down and eastward from Estes to Loveland, native fish sought refuge from wherever offered. This pool, gouged from beneath where U.S. 34 had been, must have offered some respite — at least 30 fish remained there still.

A provider of safety during the flood, this deep

shelter was now a shrinking puddle of suffocation. As dangerous waters receded, the pool became isolated. There was no inflow of fresh, life sustaining water and there was no avenue of escape.

Three members of the Corps' Omaha District happened upon the small basin as they inspected the area west of Cedar Cove in north-central Colorado.

Out of the vehicles, where the highway had been eroded to less than a footpath, the trio trekked upstream along the roadbed. Drinking in the flood's devastation, they hardly noticed the brief drizzle.

From their vantage (where the road had been), the high water mark could be easily seen, 300 yards across the canyon. Bark was stripped from trees, roots bared and the canyon wall eroded — all to the same level — making a distinct line to follow.

On their side of the river the devastation was more dramatic.

The road was shorn away. The two-lane blacktop was overswept, undermined and carried off. Where there had been road was now a 25-foot drop.

All had been consumed: roadway, base and more.

It was at the bottom of this destruction, below them, that the attorney and two engineers spied the isolated pool.

After a few minutes of scanning the water (each counting and searching for surfacing fish), the three started down to the pool.

The recent sprinkling proved almost too helpful in hastening their descent. A twisted culvert pipe helped break their slide.

Quickly surveying the situation, Bob and Pete began digging a small channel from the downstream side of the pool to the river. It would provide the fish with an escape route from the pool.

Although the plan was simple enough, the men found themselves ill-equipped for the excavation work. A small crowbar and a staff from a road sign served as their only tools. Most of the work had to be done with bare hands.

They dug, pried and scraped to make the escape route deep and direct enough for the fish (none less than 10 inches had been seen). It was slow work since the short path was not all sand as it appeared to be; the course was laden with four-inch stones.

This exit channel was soon completed, but it proved anticlimactic since not a single fish made his escape through their effort.

Thinking that the fish needed encouragement they started disturbing the opposite end of the pool. They tossed pebbles and stomped while prodding the distant end with the staff — hoping to force them out.

Terrified by this clamor, the fish huddled — petrified.

For their effort the water became more muddied and the channel remained untravelled.

Disappointed, but not discouraged, the trio began to dig again.

This time a small diversion of the Big Thompson into the upstream side of the pool would provide fresh water for the fish.

Although part of the 20-foot route was downhill, this channel would be far more difficult to excavate since there were several barriers.

Instead of working in a predominantly sandy zone, this was an area of stone. And of this, there was a several-foot section comprised of rocks up to 20 inches in diameter.

The work was hard and the rocks heavy. Each took his turn with the crowbar and staff, wrestling the small boulders from the trench's course.

As a team, the work went quickly, each contributing so that they worked as one.

Soon the last stone was removed and the water began to trickle — run — rush through the trench.

As the fresh water streamed into the pool, the three looked up at each other and heaved a breath of silent satisfaction. The water level began to rise.

They had done their best. Two channels had been vented into the evaporating pool and the fish given a chance to survive.

As they clambered back up to the road, several trout scurried through the first channel.

Broad grins spread over the faces of Ron and Bob and Pete.

A silent applause echoed through the canyon.

— Omaha District —

THE ENGINEER PRAYER

Our Father, who has designed and built the universe in which we dwell, we realize that you call us to build a house where you can dwell in our midst. We are grateful for the task, O Lord, and yet we must confess that we have often mislaid your plans.

We thank you, Lor that you continue to bu

and that your work serves to remind us of your greatness.

We thank you for the food we are to receive, and we thank you for this occasion that honors fellow engineers and that brings us all together.

Help us, O Father, to build homes that speak of love, to construct industrial plants that serve the needs of mankind, and erect courthouses that testify to your justice.

AMEN

ANSWER TO OUR PROBLEM

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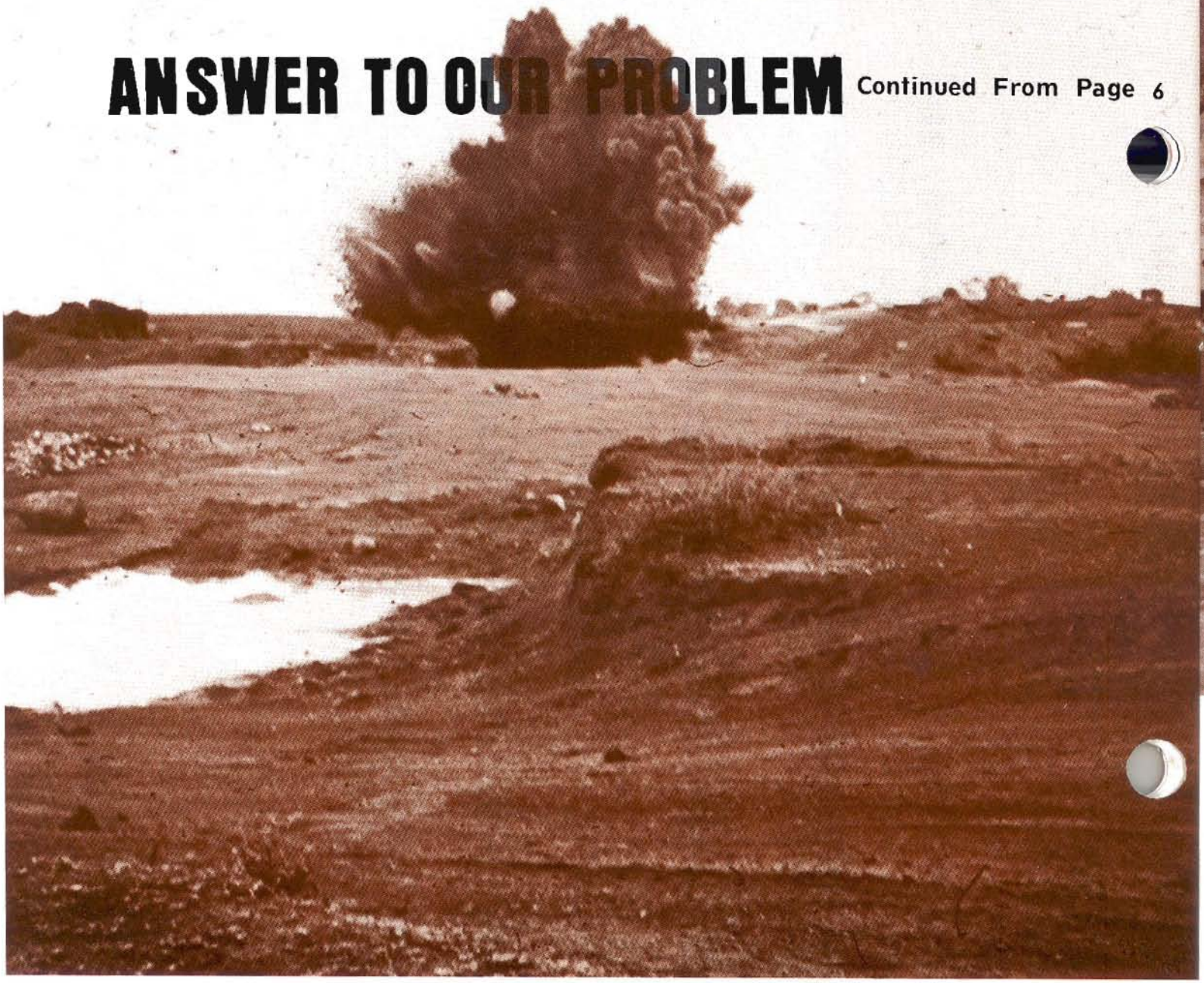
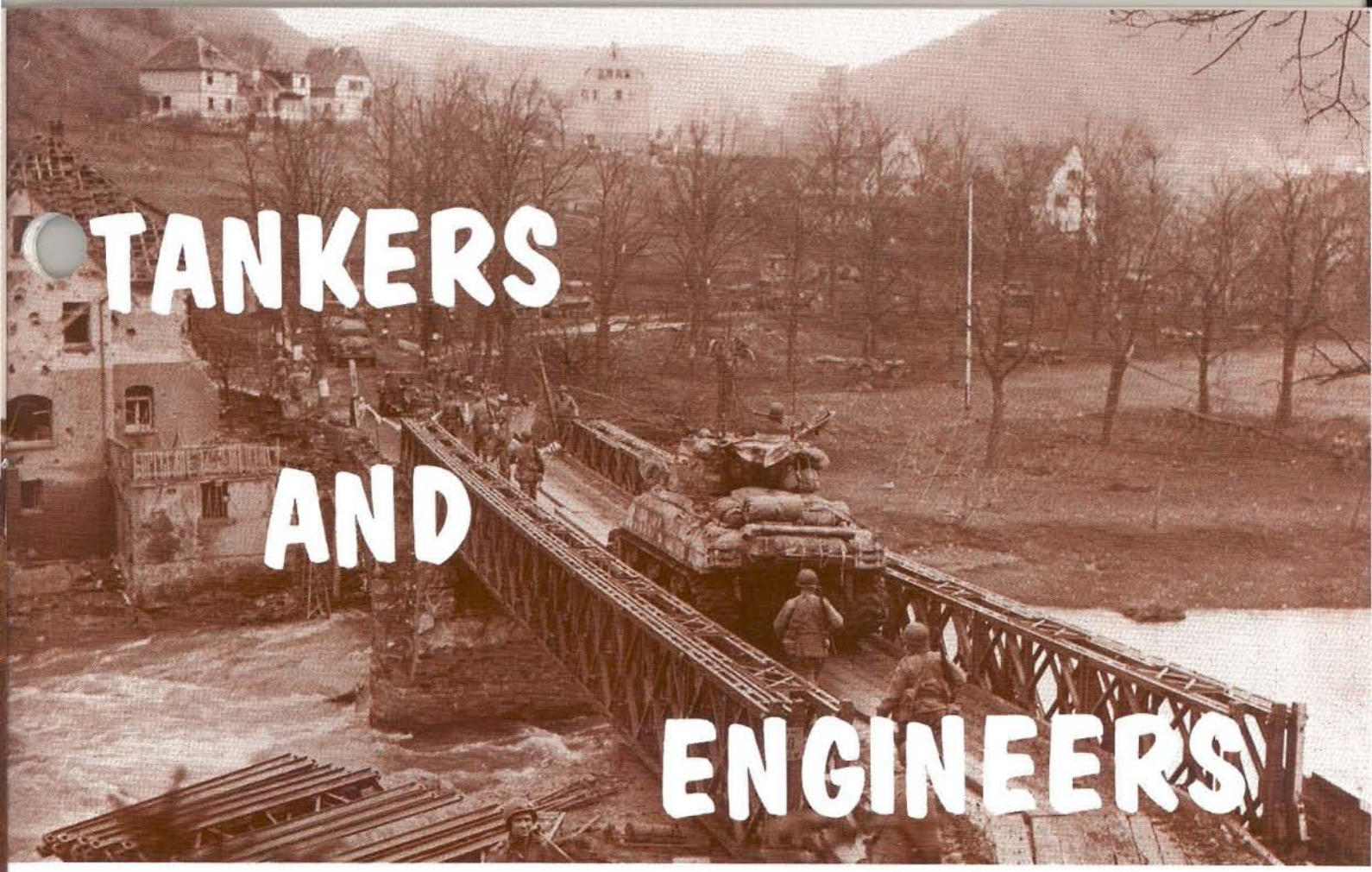


SOLUTION: The synergistic effect is 2 tanks or 25%, the combat multiplier is 2. The total of the two separate systems is 8 tanks destroyed. The tanks destroyed when the two systems are combined is 10 tank losses. The extra 2 losses is the synergistic effect the minefield provides the anti-tank weapons in the defending platoon. The 2 compared to the 8 expected is the 25% synertistic effect. It makes no difference if the 2 extra kills are a result of mines, AT weapons, or both as in this example.

The addition of mines doubled losses from 5 to 10 of the anti-tank weapons. So the combat multiplier is 2, it is also 100% but a multiplier is not given in a percentage. The multiplier includes the synergistic effect and the pure minefield kills.

Other observations are only academic. The anti-tank weapons do not multiply the effectiveness of the minefield. (If it did, it would be 3⅓). The 3 tanks, 20% loss factor of mines is a test or control figure only. The tankers forced the minefield and only ran over mines they did not see or could not stop or steer away from in time. In a real situation, once the minefield was detected, engineers would be called to breach a lane. Total losses would be reduced to 1 or 0. So if you extrapolate that minefields alone, without cover and observation, are effective to stop 20% of a tank force, forget it. Cover and observation are vital today, as 30 years ago, to make any minefield, including scatterable minefields, effective.



TANKERS AND ENGINEERS

Tankers and engineers at Ft. Bragg merged talents on range 79 recently to test the firepower of an M551 Sheridan Airborne Assault Armored Reconnaissance Vehicle against anti-tank obstacles in a live fire training exercise — the first of its king here.

Company C, 27th Engineer Battalion (Combat) (Airborne), worked through the night building barricades specifically designed to halt the advancement of a large armored vehicle.

Reconnaissance vehicles from Company A, 4th Battalion, 68th Armor, 82d Airborne Division, moved onto the range the next afternoon to link up with the engineers.

"We went down and took a look at the obstacles prior to firing," said Sergeant Terry L. Garner, a Company A tank commander. "We saw how they were constructed and how we could do the most damage."

Firing from 600 meters with 152mm, High Explosive Anti-Tank (HEAT) rounds, the tankers destroyed a triple concertina fence and a double apron fence with the first three rounds.

They also succeeded in blasting a path through log obstacles. However, they could not successfully cross a 10-foot trench.

"We just couldn't get across that trench — even the manuals say you can only cross a 7-foot trench successfully," said Sgt. Garner. He admitted that being able to see the obstacles prior to firing was an advantage they normally wouldn't have. They also used more ammunition than would normally be used.

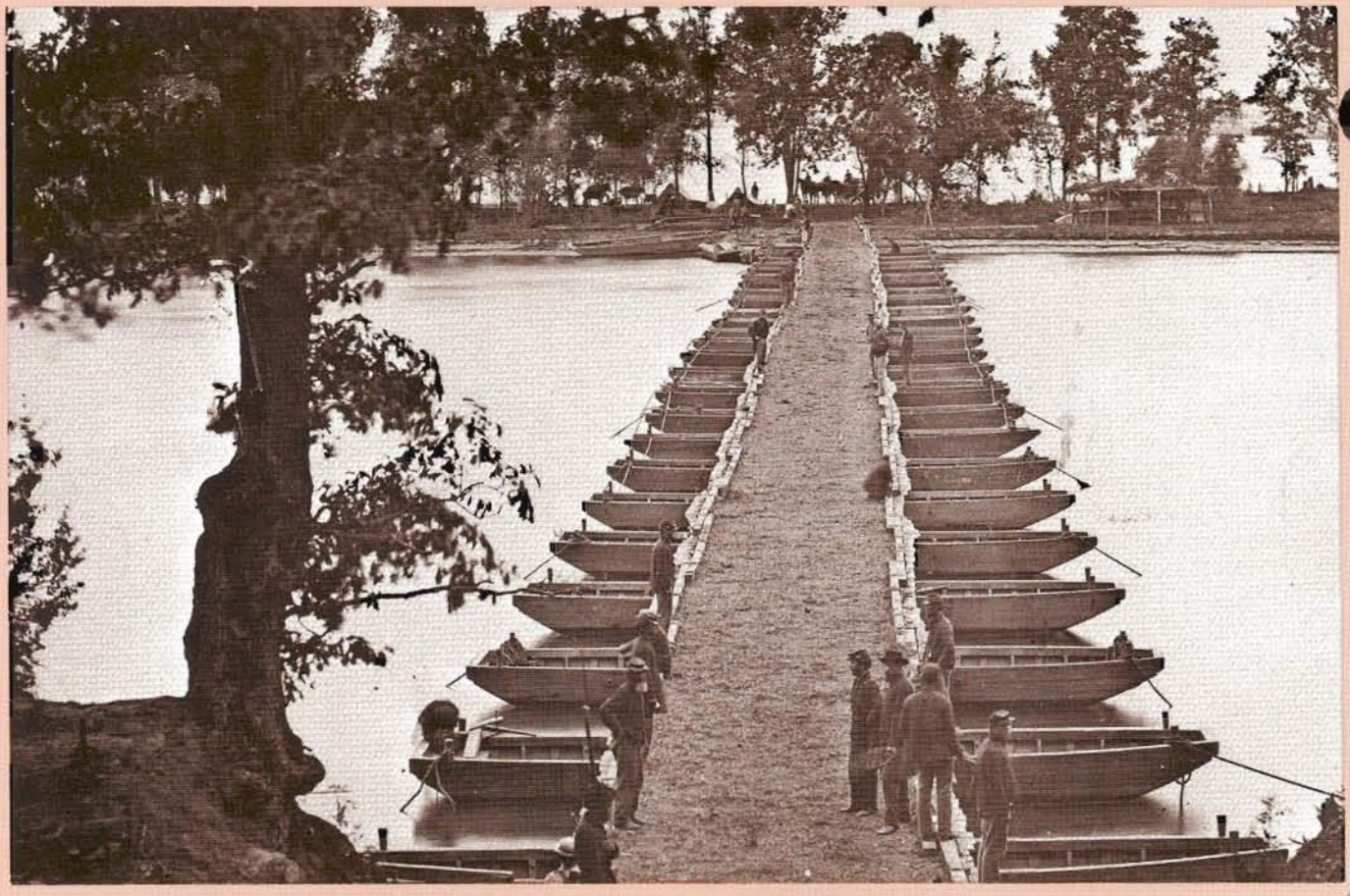
"But the first three to four rounds demolished the obstacles enough to cross them, so the training exercise proved we can do it," he said.

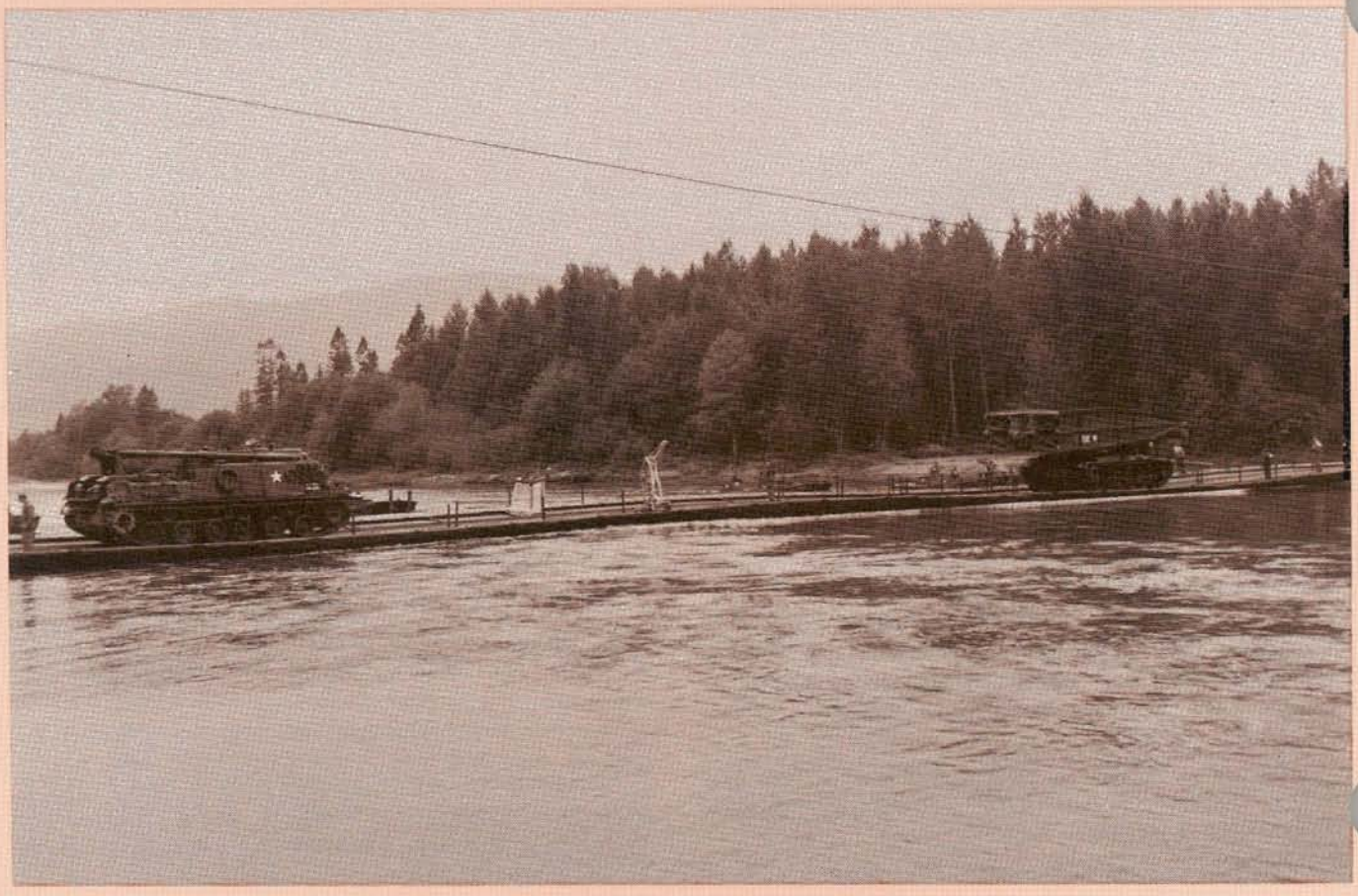
The training exercise also proved the engineers' effectiveness, said Company C First Sergeant Elias Rosas.

"Our goal was to detain their aggression as long as possible, forcing them to use as much ammunition as possible. From our standpoint, it worked, although the engineers build obstacles all the time during field exercises, they've never had the opportunity before to see the tankers in action. It helped us quite a bit."

The tankers echoed this feeling, according to Sgt. Garner. "This exercise was a little more realistic because it was out in the woods, with real ammunition and real obstacles. We weren't firing at artificial targets and it made a difference."

Troops interviewed agreed that it was a worthwhile experience — unique in every way. Both companies felt the exercise was an outstanding training opportunity.





RIBBON BRIDGE IN GERMANY

EDITORS NOTE:

After taking seven years to progress from the initial concept on a drawing board, through prototype fabrication and testing, through initial production and initial production testing, the Ribbon Bridge made its first appearance in the hands of the user in August of 1976. The first unit to be issued the bridge was the 814th Engineer Company, 559th Engineer Battalion in Hanau, Germany.

The Ribbon Bridge was developed in response to the realization that, with the introduction of the PMP bridge, the Soviet Union and other Soviet Bloc countries had tactical bridging capabilities which far exceeded those of the United States in terms of deployment time. The M4T6, mainstay of US bridging equipment, was slow and cumbersome to erect. Since it took over six hours to erect a 120 meter bridge, the element of surprise was virtually eliminated and the bridge was vulnerable to enemy fire. The PMP, on the other hand, could be erected at rates of up to 6 meters per minute, allowing a bridge to be built before opposition could be mounted. This capability was subsequently demonstrated by the Egyptians in the Yom Kippur War of 1973.

The American Mobile Assault Bridge could compete with the PMP in terms of erection speed but, due to its high cost, it could only be used in limited quantities to provide assault capabilities. The Ribbon Bridge was developed by the US Army Mobility Equipment Research and Development Command (MERADCOM); Ft. Belvoir, Virginia and, not surprisingly, it looks and works almost exactly like the PMP. The principle difference is that, while the PMP is a steel bridge, the Ribbon Bridge is made of aluminum to save weight and permit a 5 ton truck to transport it. The main advantage of the "ribbon" type bridge is that it is

essentially pre-assembled and each 6.7 meter long module or "bay" is transported on a modified M812 5 ton truck chassis which can automatically launch a bay in less than one minute in most conditions. A minimum of manpower is required and the latching and pinning operations required to connect one bay to another can be accomplished in about one minute.

After the bay, which is transported in the folded condition, is launched, a bridge erection boat ties up to the bay and moves it to the bridge center line where it is connected to other bays to form a bridge. Other means of erection include constructing a series of rafts and then connecting the rafts together to form a bridge, and constructing the bridge along one shore and swinging the whole bridge into position. Erection rates of from 3 to 6 meters per minute are possible depending on conditions and the method of assembly. The end or "ramp" bays are equipped with hydraulic cylinders which allow the tip of the ramp to be raised about 1.3 meters above the water line to adjust to various bank conditions. The bridge bays can also be connected into rafts for ferrying material across the water. A bridge or raft can be disassembled almost as quickly as it is assembled since the transporter virtually self-loads a bridge bay in two or three minutes. A complete bridge can carry a class 60 load in currents up to 2.5 meters per second and a five bay raft can carry up to 75 tons in similar currents. Due to its streamlined shape, very little anchorage is required and normally end anchorage or bridge erection boats are sufficient to maintain bridge alignment.

A special cradle was developed to permit the bridge transporter to carry, launch, and retrieve the bridge erection boat without the use of cranes. The boat can be launched in one minute and retrieved in five minutes or less. A pallet was also developed to allow the transporter to haul cargo when it is not carrying bridge bays or boats. The pallet can be launched and retrieved while loaded with cargo.

The 814th received 30 Interior Bays, 12 Ramp Bays, 14 Boat Cradles, 56 Transporters and 56 Cargo Pallets. The Ribbon Bridge was fielded under the US Army Materiel Development and Readiness Command's (DARCOM) "Project Hand-Off." Under this program, DARCOM or contractor representatives stay with a newly delivered system until the user is satisfied that all problems are solved and the system is performing well. In order to insure proper training and user satisfaction, a New Equipment Training Team (NETT) was sent to Hanau by the US Army Troop Support Command, St. Louis, MO. The NETT was assisted

by personnel from MERADCOM. The unique aspect of the training program was that a bridge company from the Army of the Federal Republic of Germany (FRG) was invited to participate. This invitation was extended in response to a request from the FRG for an opportunity to use the Ribbon Bridge and evaluate it for possible adoption by their Army.

The joint training exercise was broken down into four phases, each one subjecting the equipment and the operators to increasingly difficult conditions. Phases I and II were conducted at Hanau, with the German troops billeted in the US facilities. Phase III was conducted on the Rhein River at Leeheim with all troops bivouaced at the site. Phase IV was based at the FRG's Pioneer Kaserne in Ingolstadt on the Danube River.

During the first phase, from 8 September through 17 September, the NET team instructed officers, NCOs and civilians in the fundamentals of launching and retrieving bridge erection boats, connecting bays together and handling bridge bays and rafts in the water. The Germans used their own bridge erection boats at all times. Although some classroom preparation was necessary at the start, the great majority of the time was spent actually operating the equipment on a pond and on the Main River. The students were given as much practice with the equipment as possible and they generally found that launching the equipment and connecting the bays together was extremely easy. Retrieval was not so easy. Coordinating the boom and winch controls is more of an art than a science and most students required quite a bit of practice before mastering the process. At the conclusion of this two week period the "key personnel" which had been instructed were familiar with the equipment and they were ready to assume their roles as instructors during the next phase.

Phase II, lasting from 20 September to 8 October was the start of training for the soldiers who would eventually operate the equipment. Two entire float bridge companies, one American and one German, practiced over and over again, becoming more proficient each day. The key personnel were heavily relied upon to give instruction and supervision since the NET team could not possibly pay close attention to 190 men training at five launch sites on the Main River. The river was flowing at one half to one meter per second, near ideal conditions for the first exposure to a new piece of equipment.

The third phase, from 11 October to 12 November, was when the fundamentals learned were put to use in large scale bridging and rafting exercises under difficult conditions. Night rafting operations were conducted and complete bridges were built across the Main. It soon became evident that the Ribbon Bridge could be rapidly erected by troops having only three weeks of training. The first bridge across the Main, about 120 meters, was built in only 65 minutes. This time was cut to 47 minutes the second time and 27 minutes, or 4.4 meters per minute, the third time! Midway through this phase the training site was moved to the Rhein River where the stream velocity ranged up to one and one half meters per second. Under these conditions, the average rate for building a 120 meter bridge was 50 to 60 minutes, including launching the boats. The average construction time for five bay rafts was 30 minutes. Retrieval took approximately the same length of time.

The fourth and most difficult phase began on 18 November and ended on 31 March. This training took place on the Danube River at Ingolstadt, and on the nearby Naab River. Stream velocities on the Danube ranged from 1.4 to 2.6 meters per second. The Naab flowed at one half meter per second but the shallow water and poor shore conditions provided different sorts of operational problems. On 15 February, the joint exercise came to an end and the German Army began six weeks of field testing to make a final determination on the bridge's suitability. Approximately 25 men from the 814th remained with the bridge for administrative and maintenance purposes. Working on swift waters did not create any serious problems but launching and retrieving the equipment was more difficult, and the boats were often required to keep bridge bays aligned properly during retrieval. The erection times increased considerably. There was no doubt that as stream velocities increased erection rates were very dependent on the skills of the boat operators. When the exercise was finished the US troops knew that they had a much improved bridge and the FRG had obtained a thorough knowledge of the bridge's capabilities upon which to base their decision.

In summation, the Ribbon Bridge was put through a grueling 7 months of intensive use by American and German troops under a wide range of conditions. The response of the troops using the bridge was generally very favorable. This bridge, like any other, has its defects, mainly related to retrieval in swift currents and adapting the ramp section to varying shore conditions. The advantages far outweigh the defects and the Ribbon Bridge will provide the US Army and possibly other armies with the capabilitity to bridge rivers in a fraction of the time it now takes. By any definition, the Ribbon Bridge is a giant step forward in the field of river crossing equipment.

The Tactical Access Egress System

Current articles concerning the challenges engineers can expect to face in supporting assault crossing's usually only touch the tip of a very troublesome iceberg. The full range of challenges that engineers will have to overcome during tactical river crossing operations is the greatest test of our ability to aid an assault force's mobility and survivability on the modern battlefield. A single crossing operation can require more intensive engineer support than any other tactical operation. That is why at the US Army Engineer School (USAES) (Directorate of Combat Developments) concentrated effort is going into the development of new concepts and materials which will allow accomplishment of *all* the tasks faster, better and with less effort.

Three elements conspire to delay or stop our assault columns at a river; the enemy, weather and terrain.

At Combat Developments, we are looking at how all three elements interrelate to create a formidable obstacle which our combat engineers will have to overcome. A closer look at these three areas will show just how awesome our task is.

The Soviets consider a water obstacle as a natural obstruction enabling the organization of a firm defense. When defending river lines, they create obstacles and prepare demolitions in their security zone (our covering force area), at the river, on the shores, and throughout the depth of the defense.

Their obstacles in the water and on the shores are planned as obstructions for reinforcing the river. For this purpose, underwater obstacles are set up, the river is reinforced, floating obstacles are used and preparations are made to destroy all hydraulic structures, bridges, local crossing equipment. Fords are left in a impassable condition.

River mines (anchored, shallow water, floating) and land mines are used as water obstacles in conjunction with non-exploding obstacles—antitank obstructions, antitank obstacles, and barriers.

Along with setting up mine fields, preparatory work for the demolition of objects is conducted in the defensive zone of their division. Such objects can be accessible sections of the locality, defiles and road junctions.

During combat operations in the security zone, Soviet engineer troops use harassing mine fields for protection, especially along the main roads. Moreover, engineer troops are deployed for setting up obstacles and facilitating demolitions of withdrawal routes.

In addtion to their static defensive measure, the Soviets use mobile defensive tactics to repulse crossing attempts.

An "enemy" approaching a water obstacle is taken under fire at maximum range. Nuclear and chemical weapons can be employed against concentrations of personnel, crossing equipment and our fire support means. Antitank guided missiles, tanks and other artillery are brought up close to the river bank to lay direct fire into our forces engaged in crossing the river. Once our elements have crossed the river, our hold on the near bank will be subjected to counterattacks by second-echelon and reserve forces while first-echelon forces will attempt to prevent additional units from crossing and reinforcing the elements already on the Soviet side of the river.

Within this tactical environment, the engineers

will have to overcome the natural environment of weather and terrain as if it is second nature. To get to a river, into and across the water, and to clear the far shore presents a very significant mobility problem. Failure to move through a crossing area quickly will cause reduced unit survivability, congestion, confusion, defeat in detail and finally, collapse of the attack.

Soft clay-silt soils, which usually surround river valleys, often have a high soil moisture content, are regularly cultivated or are covered with thick undergrowth and dense forests. Steep slopes, both at the river bank and extending inland can deny access to, or exit from, the crossing area. Though these conditions may extend throughout the battle area, they are especially detrimental in the immediate vicinity of proposed crossing area. In addition to the difficulties for amphibians, our wheeled bridge transporters can find moving to the crossing sites to be difficult or impossible. Rain, spring thaws, and seasonal variations in the use of the soil can make cross country movement doubtful. Even if our amphibians get across the gap, our lumbering wheeled transporters could get bogged down short of the river preventing erection of vital bridges for tanks, thus stranding our light assault echelons on the far shore.

Movement along roads will be restricted by Soviet actions and we'll have to rely increasingly on our questionable cross country movement ability in the vicinity of crossing sites to get to areas which are tactically desireable. As it stands now, given a normal combination of weather and terrain in the European theater, our crossing areas will be dictated not by where we want to go but where we can go — and the Soviets know it.

Once a bridge or raft is in operation, repeated passes by heavy vehicles (possibly up to 2000 passes at tactical bridge sites) over the ground to the crossing site can destroy any load bearing capacity of the soil. Even after just a few passes, the bridge access road could become a quagmire of sinking wheels and tracks. The route to the bridge must be a sure route, clear of obstacles and strong enough to support the traffic expected to pass over it.

In the past, the preparation of bridge access/egress routes by pioneer methods could normally be completed before the bridge was emplaced because of the slower assembly times associated with older bridges. (For example, a 20 meter M4T6 float bridge required approximately five and one-half hours to assemble and emplace). Today, however, modern float bridges such as the Mobile Assault Bridge (MAB) and the Ribbon Bridge have reduced time and manpower requirements to the extent that, once the equipment is on site, a 120 meter bridge can be emplaced in 45 minutes or less.

Obviously, the advantages of the new generations of float bridge will be lost if an inordinate amount of time and effort is required for the bridge transporter/launcher to gain access to the crossing site, or if five and one-half hours are required to open bridge approaches to traffic.

To aid combat engineers in meeting the challenge, we are well into a research and development effort, the Tactical Bridge Access/Egress System. This development effort in combination with procurement of the Universal Engineer Tractor offers solutions to the problem. We are addressing all the interrelated problems which cause rivers to become such formidable barriers. Part of the effort has already been funded and preliminary work is underway at the US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, awaiting signing of a formal Letter of Agreement (LOA) for Advanced Development of the System. The full spectrum of existing civilian technology and some new ideas will be examined to find the best candidate for adaptation and incorporation into the military inventory. Though the system is as yet of undetermined design, its purpose will be to maximize the advantages of rapidly emplaced mobile gap crossing equipment. The ultimate goal is to provide combat engineer and bridging units the capability to quickly gain access to tactically advantageous crossing sites to emplace bridges, etc, and to install access/egress roadways suitable for assault vehicles and for sustained passage of tracked or wheeled traffic between existing roads or trafficable sites on both sides of the gap.

There are a number of known technological approaches for solving the tactical access/egress problem. Some which have already been investigated and show promise include:

Subgrade Strengthening Systems—

- Inflated (pillow like) elements which can be used as underlay for structural surfacing or trackway elements to directly support vehicle traffic.
- Prefabricated or fabricated in place foamed plastic elements as underlay or stub pile systems for structural surfacing or trackway elements.
- Random or woven synthetic fiber membranes laid directly on soft soils as underlay for base course or base course substitute systems.
- Neoprene or vinyl coated nylon fabric waterproof membranes as underlay for base course or base course substitute systems.

• Expendable box grid systems (egg-crate) composed of sheet metal, plastic or treated paper embedded in soft soils.

• Rapid strengthening chemical stabilization systems.

Base Course Substitute Systems–

• Structural element treadway runners over waterproof membranes.

• Waterproof membranes over random or treadway structural element runners.

• Expandable box grid systems filled with bank run sands and gravel over membranes.

• Sandwich construction of membrane and soil layers including membrane encapsulated soil layers (MESL).

• Structural element beams between inflatable pillows or foamed plastic piers.

• Rapid chemical stabilization of bank run sands and gravels.

Surfacing Systems – To support user vehicle traffic over subgrade strengthened base course or base course substitute systems, and to support traffic on steep slopes, rapidly placeable, lightweight structural surfacing materials will frequently be required. The following types of materials will be evaluated or developed:

• Existing airfield type landing mat surfacings.

• Airfield and heliport waterproof membrane surfacing.

• Fiberglass-resin surfacings (i.e., Mo-Mat).

• British assault trackway.

• Other rapidly placeable lightweight articulated structural systems in continuously linked configuration.

All of the technological approaches discussed will be examined as to their potential to meet the goal of providing a tactical bridge access/egress system compatible with modern, rapidly emplaced gap crossing equipment (Mobile Assault Ferry, Ribbon Bridge) as well as the equipment being developed for the System of Bridges for 1985 and Beyond. This system shall provide the following broadly stated capabilities:

• Stream egress points for swimming and fording combat vehicles. Egress points capable of withstanding 25 passes by vehicles up to MLC 60 are required. The system must enable one combat engineer squad to install 2 points in 15 minutes.

• Access lanes for use by gap crossing equipment to reach bridge launch sites. Access lanes capable of withstanding 50 passes by vehicles up to MLC 25 (essential), MLC 35 (desirable) are required. The system must enable 10 people from the bridge launching unit to install single lanes at the rate of 100 meters in 15 minutes using equipment organic to the bridge company.

• Crossing site access/egress routes for corps/division traffic. Access/egress routes capable of withstanding 2000-3000 vehicle passes (10% MLC 60) are required. The system must enable one combat engineer squad to install single lanes at the rate of 150 meters in 45 minutes (required), 30 minutes (desires).

The tactical bridge access/egress system will also be sufficiently mobile to accompany the force supported (compatible with that of the tactical bridge equipment itself). This system, whether used with current bridges or with the mechanized systems envisioned for the post 1980's, will provide a great improvement in our operational capability and significant reductions in the cost (in men, time and material) of preparing access/egress roadways. These operational improvements will be realized in the effectiveness of bridge units, supporting combat engineer units, and the supported tactical elements of the divisions and corps when the system is fielded to replace todays pioneer construction methods. We will be able to gain access to one or more *selected* crossings sites in minutes, instead of hours, and be able to build access/egress roadways at both ends of the bridge at a rate of at least 10 times faster than is currently possible. Mission delays due to water obstacles will be minimized, tactical commanders will have a wider choice of possible crossing sites, and swimming and fording vehicles will be provided those much needed quick exit points.

The Engineer School is not standing still. We are actively working on ways to insure that engineers in the field have the means to "Win the First Battle." Within the next few years, combat engineer bridging units will be receiving the equipment that will enable them to go anywhere anytime to accomplish their mission.

CPT Robert Sperberg received his BS in Civil Engineering from VMI and is a Registered Professional Engineer in the Commonwealth of Virginia. His assignments have included duty with the 9th Engineer Battalion (Combat) in Germany and the Facility Engineer Activity in Korea. Presently he is a project officer in the Concepts and Studies Division, Directorate of Combat Developments, Ft. Belvoir. As one of his projects he is developing the Concept of Employment for the Tactical Bridge Access/Egress System.

A New Way to Prepare for Your SQT-3

How does a 12B (Combat Engineer) prepare for the Skill Qualification Test (SQT) at level 3 and develop expertise in training, leadership and MOS critical tasks? Attend the Basic Noncommissioned Officer Course for Combat Arms (BNCOC/CA), that's what!

The BNCOC/CA replaced the Engineer Noncommissioned Officer Basic Course (ENCOB) taught at Ft. Belvoir. The reasons for the change were based on the fact that during four years of operation the NCOES Basic Course only trained 10% of the required NCO's (SSG) needed by the Corps of Engineers. Costs were high due to the singular location of the service school and course length. The loss of a squad leader coupled with a shortage of trained squad leaders caused strains on unit effectiveness. This led many commanders to send those individuals that they could do without, to the ENCOB Course. Reserve components also complained that the length of the course was not conducive to their training cycle.

To alleviate these problems, BNCOC was developed. The initial course, BNCOC/CA is for combat engineers. Travel expenses were reduced by locating the course at 16 academies throughout the US, Hawaii, Panama, and Europe (12 academies provide 12B MOS instruction, See Figure 1). The course length was set at four weeks to complete the essential training while reducing the soldier's time away from his unit. The course design used the performance oriented training concept. The tasks taught, are those critical to job performance at skill level 3 and prepare him for the SQT at that level.

And now, essential facts about the course itself. An individual selected to attend BNCOC/CA, must demonstrate mastery of selected skill level 1 and 2 tasks. Mastery of these tasks is essential if the student is to comprehend the material taught during the course. A prerequisite test, issued by the NCO Academy, provides the basis for judging the individual's competency. Selected reference material also is provided so that the student can study prior to attending the course.

The course has three phases (see Figure 2). Phase I consists of pretesting and how to conduct performance oriented training. The pretest, de-

SKILL LEVEL	COURSE TITLE	DURATION
5	Senior NCO Course (SNCOC)/SGT MAJ Academy	
4	Advanced NCO Course (ANCOC)	12 WKS
3	Basic NCO Course/Combined Arms (BNCOC/CA)	4 WKS
2	Primary NCO Course/Combined Arms (PNCOC/CA)	4 WKS
1	One Station Unit Training (OSUT)	12-14 WKS

FIGURE 1

BASIC NCO COURSE FOR COMBAT ARMS (BNCOC/CA)

PHASE I INDIVIDUAL TRAIN TO TRAIN	PHASE II TRAIN IN MOS CRITICAL TASKS USING TECHNIQUES ACQUIRED IN PHASE I	PHASE III TRAIN AS COLLECTIVE TRAINER
PRE TESTING	11B INFANTRYMAN	COLLECTIVE TRAINING TECHNIQUES
	11C INDIRECT FIRE INFANTRYMAN	
	11D ARMOR RECONNAISSANCE SPECIALIST	
CONDUCT OF PERFORMANCE ORIENTED TRAINING (USE OF TRAINING MATERIAL, TECHNIQUES AND DEVICES)	11E ARMOR CREWMAN	FIELD EXERCISE (ARTEP EVENT— REALTRAIN TECHNIQUES)
	12B COMBAT ENGINEER	
	13B FIELD ARTILLERY CREWMAN	
	13E FA CANNON OPERATION/FIRE DIRECTION ASST	
	16P CHAPARRAL CREWMAN (REDEYE)	
	16R SHORT RANGE AIR DEFENSE ARTILLERY CREWMAN	

NOTE: THE CORE BNCOC/CA CURRICULUM WILL REQUIRE APPROXIMATELY FOUR WEEKS TO CONDUCT, HOWEVER, THE LOCAL COMMANDER MAY INCREASE LENGTH TO INCLUDE ADDITIONAL TRAINING DEEMED NECESSARY

FIGURE 2

termines, for each individual, which MOS-critical tasks learned during Phase II. If an individual demonstrates mastery of a task by successfully completing a pretest, he will be exempted from normal instruction in that task and may be selected to teach a portion of that task during Phase II.

The instruction on performance oriented training is designed to prepare the individual to effectively conduct performance oriented training for his subordinates to accomplish critical tasks found in the Soldiers Manual using the various techniques, training materials, and devices available.

Phase II consists of training MOS-critical tasks using the methods and techniques acquired during Phase I. All training is geared to performance oriented training. Each student is graded GO or NO-GO on each task. If a student receives a NO GO, remedial training can be given and a retest taken based on the availability of the schools cadre. If a student demonstrates mastery of a task in the pretest but is not selected to teach or assist in training a task in phase I, then he will be offered additional skill training. Additional skill training (AST) is instruction on selected tasks at skill level 3 and 4, and on which a student can train with self-paced materials and little instructor support. Each instructional package for AST includes an average completion time which helps the student to select the appropriate number of AST packages to train himself in the time made available by "passing out" of course requirements in the pretest. Each AST package also includes a post-test so that the cadre can validate the student mastery of the task.

Phase III is a collective tactical field exercise based on ARTEP events and REALTRAIN techniques. The student learns how to conduct and control a combined arms exercise. In this phase he is required to put it all together. All the soldiers from the different Combat Arm MOS's are integrated into a combined arms team and each learns how he fits into the overall concept.

Successful completion of the Course of Instruction will be mastery of all tasks taught during Phase II and completion of the "train to train" block in Phase I. Upon successful completion of the course the student will receive a diploma. If a student is unsuccessful he will receive a statement of attendence. All students will receive a report card, with a listing of all tasks mastered. The student's CO will also receive a copy of the report card, which will indicate to him, areas in which the soldier needs more training and what abilities and skills his squad leader now possesses. The unsuccessful student can be certified as having completed the BNCOC/CA by his CO, if he masters the tasks on which he received a NO-GO, through on-the-job-experience (OJE). OJE will insure that the soldier has all the necessary preparation for his SQT 3.

Now that you know what BNCOC/CA is, your next question is probably, "Who can attend?" First priority will go to the soldier in the skill level 3 position (Squad Leader), who has not previously attended BNCOC or ANCOC. A Specialist 4, Corporal, or Sergeant in this position must first attend the Primary NCO Course (PNCOC). This may be waived for the Sergeant. Second priority will be to those Sergeants preparing for the Staff Sergeant level but not yet in that position. You can see that BNCOC/CA is only one step in the career development of a combat engineer under the EPMS system.

Each course is designed to prepare the individual for the SQT at that level. Although not all tasks will be taught, most will be covered. Other training and skill development will be acquired during unit training and from on-the-job experience.

If you are a squad leader and haven't attended a Basic level NCO course, get your name on the list to go. This course is designed to help you take one more step in the chain of events designed to make YOU a more effective leader and to assist you in attaining the next rung on the ladder to the top.

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SFC Paul Christianson is currently assigned as a project NCO for the Professional Course Development Branch, USA Engineer School. His previous assignments were Squad Leader and Platoon Sergeant in the 2d Engineer Battalion, Korea; 547th Engineer Battalion, Darmstadt *Germany; 299th Engineer Battalion, Vietnam, 78th Engineer Battalion, Germany; and as an instructor at the Engineer School. He is presently working on a degree in Mechanical Engineering from the University of Wisconsin. SFC Christianson has completed the Engineer Officer Basic Course by correspondence.*

BRIDGING THE GAP

MYTHS HAUNT THE NON-COMMAND SPONSORED

For the young soldier (E1-E4 under two years of service) with a family, orders for overseas can be a traumatic experience. These soldiers fall into the category of non-command sponsored personnel.

There seem to be many myths concerning the benefits, or non-benefits, of non-command sponsored personnel. There are even some cases of non-command sponsored families who try to keep their presence a secret in order to avoid such things as tour extension. This is purely a misconception on their part.

There is no tour extension for individuals whose families join them in Europe. There are some families who are not taking full advantage of medical, commissary and Post Exchange facilities because they feel they have to keep a "low profile." These beliefs are unfounded.

First of all, free and complete medical and dental care is available for any dependent who possesses a valid ID card. Care ranging from routine examinations to emergency treatment is available for everyone—command sponsorship has nothing to do with it.

Non-command sponsored personnel are not authorized government transportation to and from the United States but otherwise there are few restrictions for the soldier and his family.

Once the family arrives there are a host of organizations just waiting to help and they are available for everyone. The Housing Referral Office, Army Community Services (ACS), the Economy Wives Club, the Red Cross and the Chaplain's Office are just a few of the agencies that can offer a helping hand.

One other restriction non-command sponsored personnel face is ineligibility for government housing or leased housing and the use of government owned furniture (except excess furniture) for quarters. There is a good chance that a local ACS program, which we'll look at in a minute, will even supply some household furniture.

The financial possibilities are also designed to help. There is the Separate Rations Allowance, which you may already know about from previous assignments. There is the Cost of Living Allowance (COLA) and the Basic Allowance for Quarters (BAQ) that will help make living on the economy a little easier.

When we start talking about finances it is important to remember we are referring to soldiers who arrive overseas at E1, E2, E3 or E4 with less than two years of active duty service. All higher grade personnel (E4 over two years) must be command sponsored to receive COLA and Station Housing Allowance. Your BAQ will not be affected and there is a good chance your unit can authorize Separate Rations.

Living on the economy can be a financial nightmare so if you don't see the words "COLA" or "HOUSE" on your Leave and Earnings statement, see your personnel sergeant or your servicing finance unit. The point is, you are eligible for these allowances and the money is available, so apply.

Trying to find a place to live in the States is a big enough problem but when you are forced to find a residence in a new land things can get mighty rough. That's where the Housing Referral Office comes in.

This office is designed to help everyone no matter what the rank or status. The people there know their job and want to help.

The only legitimate way to move your family into economy housing is with the approval of this office. Normally families are put on a list according to household needs — the number of bedrooms needed and so on.

BRIDGING THE GAP

If you don't want to wait for your name to move up you are perfectly free to look for a place on your own. Don't forget, HRO must approve your selection prior to your moving in.

Housing officials advise soldiers who are in the non-command sponsored category to obtain suitable housing before sending for their families. This will prevent many problems and will also save the soldier from possibly paying expensive hotel bills.

After you have a place to live and have checked into the financial scene, a trip to the Transportation Office is a must. Every family needs those things which make a house a home so the Army will ship up to 225 pounds to Germany for you — free!

According to transportation authorities, your weight limitations at the end of your tour overseas rise to at least 2,000 pounds for household goods and 400 pounds for baggage.

When you are ready to move in, you are going to need the everyday necessities of living until your household goods arrive. ACS offices are ready to fill your needs with such things as pots and pans, dishes, silver-ware, high chairs, and play pens. If the move has been a shock to your wallet, they can also provide expert budget assistance.

If you have specific questions about your non-command sponsored status, get in touch with your chain of command or your Community Service Offices. They all have one thing in common — they are willing and able to help, That's their job.

HOUSEHOLD GOODS CLAIMS

Many soldiers apparently think it is not worth the trouble to make a claim for damaged household goods after a PCS move. From the soldier's standpoint, the Army is providing a free insurance policy on personal property shipped in conjunction with an authorized move. Granted, the insurance is limited but it does give the soldier and his family some protection.

High value items (cameras, stereo, stamp and coin collections and works of art as an example) may be shipped at government expense. The soldier must first request permission from the local Transportation Office and the items will be shipped in a special shipment. If the shipment is lost or damaged, the Army can only pay certain maximums on such items. Soldiers are advised to purchase additional insurance for high value articles. The maximum government liability for high value items is spelled out in chapter 11 of the claims reg, AR 27-20.

Most household goods purchased within six months of shipment may be reimbursed for the full amount in case of loss or serious damage. After seven months, the item is depreciated. The depreciation is computed on a yearly basis so that a couch that is one year and seven months old would be depreciated as if it were two years old.

Claims officials say that different items of household goods depreciate at different rates on the yearly basis but maximum depreciation is 75 percent of the original value.

Alcohol and drugs are items that cannot be shipped under any circumstances. War trophies can be shipped but will not be reimbursed if lost, stolen or damaged. Other items that will not be reimbursed include intangible items, such as stocks, bonds, baggage tickets, bankbooks, etc. In addition, any form of currency will not be reimbursed.

If a soldier finds that there is damage to household goods or that they are missing from the

shipment, the following items will be needed to file a claim:

- Copies of the PCS orders authorizing shipment of household goods.
- A copy of the Government Bill of Lading (GBL).
- A copy of the inventory made during packing.
- The delivery receipt.
- An inspection report (if the value is over $500).
- A copy of the tracer action (if goods are missing).
- An estimate of repairs (for repairable damage).
- Power of attorney (if anyone other than the servicemember is making the claim).

For further information on the claims program, soldiers should contact their SJA claims officer or consult AR 27-20.

SHIPPING YOUR POV TO EUROPE? THEN READ THIS ARTICLE, IT MAY SAVE YOU SOME HEADACHES AND A FEW DOLLARS.

Officials at the Military Traffic Management Command, (MTMC) say that too many soldiers on orders for Germany are not aware of the strict vehicle inspection standards and very high insurance rates.

According to the chief of MTMC's Ocean Terminals Division, insurance rates in Germany vary according to age, grade and marital status. A single soldier, 18-25 years old with a sports car, can expect to pay three to four times the insurance paid Stateside, and this is just for the legal minimum coverage. At the least, a soldier should plan to pay double the Stateside premium.

The Chief also stated, "If the soldier has a valid current Stateside drivers license, he is not required to take a driving test; however, the written test must be taken. Passing this test requires a thorough knowledge of international road signs and traffic rules."

A lack of knowledge about insurance, inspection and licensing requirements has in some cases resulted in delayed pickup of vehicles.

Specific informatioin on insurance, inspection and licensing in Germany follows:

INSURANCE

Minimum insurance requirement in Germany, liability only, as of January 1977:

E-8 and E-9	Married; age 25 years and over	$211 per year
	Unmarried; under age 25	$275 per year
E-1 to E-7	Married; age 25 years and over	$305 per year
	Unmarried; age 25 years an over	$491 per year
	Married; under age 25	$360 per year
	Unmarried; under age 25	$491 per year

All insurance premiums must be paid within 90 days. POV cannot be picked up until proper insurance is obtained.

CATALYTIC CONVERTER INFORMATION

Catalytic converter should be removed prior to oversea movement if possible and legal. This can save the owner time and money. All Ford and Chrysler products have to be serviced a Autohaus Columbus, in downtown Bremerhaven. The charge is $35.00. A word of caution: Ford and

Chrysler product catalytic converters are not serviced on Saturdays. General Motors catalytic converters can be serviced at the European Exchange Service garage for a total charge of $11.75. This includes the adapter that goes into the neck of the gas tank.

INSPECTION REQUIREMENTS

Lights: All exterior lights must be in proper working order.

Horns: Must be in proper working order.

Brakes: All brake systems must be in proper working order, including the hand or emergency brake. The POV must be brought to a smooth stop with no evidence of side pull. Chatter or pull to either side while braking will constitute an unsatisfactory condition.

Tires: All treads must be at least one millimeter deep. Tire walls will be free of breaks or cuts to the extent that breaker strip, cushion gum or fabric does not show. POVs equipped with reversed rims or with tires that extend laterally beyond the fenders are prohibited. Studded tires cannot be used on German highways.

Wheel Alignment: Vehicle will be rejected when steering wheels 18 inches or less in diameter have more than three inches circumferential free motion or wheels over 18 inches in diameter have more than four inches circumferential free motion, or when wheels are incapable of being turned from full right to full left without jamming.

Exhaust Line: The exhaust system and muffler will be tightly secured and free from leaks.

Windshield: A break, crack or discoloration which does not impair the driver's vision or create a hazard will not be grounds for rejection; however, the decision as to whether it is a hazard or impairs the driver's vision must remain judgemental.

DOCUMENTATION REQUIREMENTS

In order to pick up his vehicle at the port of discharge in Europe, the member must have a complete set of keys and member's copy of DD Form 788. The member should be prepared to pay any costs of necessary repairs to enable the POV to pass the USAREUR safety inspection. POV will not be released without this inspection.

For registration purposes, owner must present, at time of pick up, two completed AE Forms 1598 (Application for Vehicle Registration) or registration documents and license plates; a "double card" from an insurance company which reflects adequate liability and property damage coverage; a check for $5.00 made out to U.S. Army, 59th Finance; and a USAREUR POV operators license.

The soldier can have his POV picked up by an agency or another individual if two copies of a power of attorney are provided to that agency or individual.

Officials suggest that incoming personnel report to their local installation transportation office (ITO) with all personal property papers upon arrival at their duty station. Queries about POVs or other personal property should be addressed to the local ITO rather than the Bremerhaven Terminal. The POV should be picked up at Bremerhaven within 30 days after notification of its arrival at the Vehicle Processing Center unless permission has been granted by the Commander, Bremerhaven Terminal, for additional storage time based on valid justification.

REVIEWING OMPF DURING THE MICROFICHE CONVERSION

HQDA selection boards use a number of information sources to evaluate a soldier's ability and potential — the primary source being the soldier's Official Military Personnel File (OMPF). By personally reviewing their OMPFs before a particular board meets, soldiers in the zones of consideration can get a good idea of how the board will see them. Additionally, soldiers who regularly review their records have the added assurance of up-to-date and accurate files being available for all personnel management actions.

Soldiers whose OMPFs have been converted from paper to microfiche may review their records by mail. Review by mail enables soldiers to check their files without leaving their commands, thereby saving them travel time and money. Any changes or corrections that may be necessary can be made through the MILPO or by direct contact with MILPERCEN (officer) or the Enlisted Records and Evaluation Center (enlisted).

To date, MILPERCEN has converted general officer, colonel, captain and warrant officer files to microfiche; conversion of the remaining officer OMPFs should be complete by late 1977. The Enlisted Records and Evaluation Center (EREC) has completed the conversion of sergeant major files. Master sergeant files are expected to be converted by the end of May, sergeant first class files by late 1977 and staff sergeant/specialist six files by the end of 1978.

While reviewing their records, soldiers may find that some of the documents formerly contained in their paper OMPFs do not appear on the microfiche copy. During the conversion process, any documents not authorized in AR 640-10 are removed. Any documents not included on the microfiche file can be noted by the soldier and checked against AR 640-10 to determine whether or not the document is authorized in the OMPF.

When microfiche files are sent to soldiers at their request, a reproduction fee of $2 for the first fiche and 5c for each additional fiche is charged and a bill is forwarded with the fiche. Officers requesting microfiche copies of their files should address their requests to Commander; USA MILPERCEN; ATTN: DAPC-PSR-S; 200 Stovall Street; Alexandria, VA 22332. Enlisted soldiers should write to Commander; USA EREC; ATTN: PCRE-F; Ft. Benjamin Harrison, IN 46249. All requests must include the soldier's name, rank and Social Security Number.

Once soldiers' OMPFs have been converted, the microfiche files will be the only documents maintained by MILPERCEN and EREC — and the only copies seen by HQDA selection boards. Also, after conversion, microfiche files will be the OMPFs soldiers see if they review their records at MILPERCEN or EREC. In addition to review by mail, soldier still may review their fiche OMPF when they visit their career managers.

Soldiers whose OMPFs have not yet been converted to microfiche may review their paper files at any of three locations: MILPERCEN, EREC, or the Reserve Components Personnel and Administration Center (RCPAC).

Soldiers planning to visit MILPERCEN to review their records may make appointments with the Records Review Unit by calling Autovon 221-9618/9 or commercial area code (202) 325-9618/9. Officers wishing to review their files must call for an appointment at least three working days in advance of their visit. Enlisted soldiers should call for an appointment 10 to 15 days in advance to allow their paper records to be forwarded from EREC. All soldiers should confirm their appointments shortly before their visit to ensure that their records are available. OMPFs previously committed for other personnel management actions may not be available and a request for review does not guarantee the OMPF's availability.

MILPERCEN's Records Review facility is located in Room 5S33, Hoffman II, 200 Stovall Street, Alexandria, VA 22332. Either the soldier concerned or a designated representative may review the soldier's records. A designated representative may be any person — except someone assigned to MILPERCEN — who the soldier authorizes in writing to review the file. A signed authorization statement from the soldier and proper identification (such as an ID card) must be shown before the representative will be allowed to review the records.

When a warrant or commissioned officer makes an appointment, the review unit automatically requests a current Officer Record Brief from MILPERCEN's Data Management and Reduction Branch. While the officer reviews his or her OMPF and ORB, a representative from the DA Military Systems Division is available to answer any questions about the ORB and to process any required corrections.

Throughout the records review process, records specialists are on-hand to answer questions from all soldiers concerning their OMPFs. These specialists alone are authorized to remove documents to make copies for the soldier. Also, any necessary removals from, or additions or corrections to the files must be handled by the records specialists. Review procedures are monitored closely to ensure that files are returned intact.

In the near future, MILPERCEN will add a new service for soldiers reviewing their files. Final plans are being made which will permit soldiers with missing or outdated official photographs to have new photos taken and added to their files during their visit. AR 640-30 specifies when officers and senior NCOs must resubmit official photographs for their records. Additionally, officers may call MILPERCEN's officer records answering service at Autovon 221-8792 or commercial area code (202) 325-8792 to determine if a replacement photograph is required (see FOCUS Number 4-77, dated 29 March 1977 for details on the records answering service. Additional information on the official photograph service will be outlined in a future FOCUS issue when an implementation date is announced.

In addition to MILPERCEN, soldiers may review their records at EREC or RCPAC. Soldiers wishing to schedule reviews at either of these centers are reminded to make appointments at least two weeks in advance to ensure that their records will be available. Appointments and additional information may be obtained by contacting either of the following facilities:

US Army Enlisted Records and
Evaluation Center
ATTN: PCRE-F
Ft. Benjamin Harrison, IN 46249
Autovon 699-3361
Commercial (317) 542-3361

Reserve Components Personnel and
Administration Center
9700 Page Boulevard
St. Louis, MO 63132
Autovon 698-7733
Commercial (314) 268-7733

Soldiers anticipating a visit to MILPERCEN to review their records should carefully plan their visit in advance. A number of factors should be considered:

- Review requests traditionally rise sharply during the spring and summer months in conjunction with HQDA selection board scheduling.

- Summer is the peak PCS season. Tight scheduling occurs annually at this time as the number of soldiers passing through the Washington area enroute to new assignments increases. In 1975, nearly 5,000 officers and 1,900 enlisted soldiers visited the records review unit between May and September. (Higher 1976 figures are not used due to the increased number of visitors in connection with Washington bicentennial activities.)

- An additional demand for paper records to support the microfiche conversion may make files unavailable for immediate review.

- Reduced personnel resources at MILPERCEN's review unit limit the number of reviews that can be accomplished each day.

- The Washington area is entering its peak tourist season. A shortage of temporary billets and high motel and hotel rates are common during this period.

In view of these considerations, soldiers are encouraged to plan their visits well in advance. In addition to scheduling their reviews as early as possible, overnight accommodations should be found and reservations made at the earliest possible date.

ENGINEER

COLONELS:

RETIREMENTS. Please advise us as soon as possible when you begin to make retirement plans. Even if you have not made "definite" plans, the fact that you are "thinking" about retiring on or about a certain date would be helpful to us in anticipating vacancies.

ASSIGNMENTS. We will begin planning for CY 78 moves in the near future. If you fall into the category of those who expect to move, please ensure that we have a current preference statement.

GENERAL. The Officer Record Brief (ORB) is to be reviewed routinely by each individual for completeness and correctness. Please ensure that you give adequate attention to this. The ORB is an important document. **Each** entry must be accurate and up-to-date.

LIEUTENANT COLONELS:

PREFERENCE FORMS. There is still a significant number of lieutenant colonels whose most recent preference form was submitted more than four years ago. The form is obviously outdated if you have been promoted since the last DA Form 483 submission because the assignment options necessarily change as soon as you are announced as being on a promotion list.

Assignment officers depend on your preference statement for your input to the assignment process!! Without a current DA Form 483 the only assumption that can be made is that you have no particular assignment preferences.

You should submit a new preference form as soon as you are selected for promotion, and whe you are within nine months of completing your present assignment. These are minimum essential submission requirements!

When submitting a preference form, please include a complete resume of your family status in Block 13 (Personal Data), to include the date of birth of your children. If a child is in a school grade other than that which is appropriate for the child's age, it is helpful to know this.

Many preference forms arrive with incomplete duty phone number. Please include the AUTOVON prefix or complete commercial number (to include area code) if you list other than a military telephone number. Assignment officers do not have access to an FTS phone system. For personnel overseas it is helpful to have both duty and home telephone numbers.

In some instances the format of the DA Form 483 does not provide for recording data you wish to have considered. When this problem arises, simply attach an addendum to the 483 with your additional information.

OVERSEAS TOURS. Lieutenant colonels with fewer than four overseas tours and who returned to CONUS from their last overseas tour prior to 1974 can expect overseas assignment upon completion of their current assignment.

ASSIGNMENT OFFICER CHANGE. LTC Thomas Fisher will become the Engineer/Atomic Energy assignment officer for lieutenant colonels effective 27 June 1977.

MAJORS:

COMMAND AND GENERAL STAFF COLLEGE (CGSC). The selection process for Command an General Staff College will be conducted in the same manner as last year. Those to be considered ar majors and promotable captains in Year Group 1964 or later. The selection process has several

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phases. A DA appointed screening board will convene in July to screen all the eligible officers that are already majors or promotable captains. The Major AUS Board that was convened on 19 April 1977 will complete their selection process and then will reconvene to act as the CGSC screening board for the new promotable captains. In August or September the final CGSC selection board will convene to select the actual class from those that made the cut during the screening process. The number to attend the actual class will be selected without regard to rank ordering. The board will also revalidate those officers selected in 1976 who have been deferred for attendance at a later date. These are part of the total selected to attend the class. Additionally, the board will select alternates who will be rank ordered. This list will be used to fill vacancies but will not be published. Expect the results of the process to be published in December.

ASSIGNMENTS. There are no changes from the last issue. Overseas vulnerability remains about the same. Year Group 1964 and earlier can expect a total of four overseas assignments prior to promotion to lieutenant colonel. Year Group 1965 and later did not get caught up in the back-to-back Vietnam tours so their vulnerability is different.

GENERAL. Many of you have received notes and letters from us telling you that you need a physical exam, photo or preference statement. There is only one thing more important in your file than these three items — that being your OER. If you do not have a current, good (presents you in your best light) photo, GET ONE. If your last physical is not current (look on your ORB to determine what is on your record), GET ONE. If you are overweight, lose weight and then get a new photo.

IEUTENANTS:

PROMOTION. The Captain, AUS, Selection Board is scheduled to convene 10 May 1977-3 June 1977. First lieutenants with a temporary date of rank of 31 January 1976 or earlier will be considered. Good luck!

AIRBORNE TRAINING. Effective 1 October 1977, Airborne training will be limited to those officers, not yet Airborne qualified, who are assigned to an Airborne unit. There is currently no change to officers volunteering for Ranger training.

WARRANT OFFICERS:

WARRANT OFFICER PROFESSIONAL DEVELOPMENT. A new edition of DA Pamphlet 600-11, the warrant officer's career planning guide, was sent to the printer in April. It is expected to enter distribution channels about mid-July 1977. Arrangements have been made to provide each individual a copy of the new pamphlet through their servicing MILPO. For many warrant officers, the pamphlet outlines new career patterns, functional career tracks and the subspecialties within each specialty, and career decision points requiring the election of various options. The effective date of the pamphlet will be 1 April 1978. Warrant officers who have not received their copy by 31 December 1977 should contact their MILPO to acquire one so they can familiarize themselves with the forthcoming changes affecting their specialties.

FOR ALL:

REVIEW OF OFFICIAL FILE. There is no better way for an officer to know how a selection board reviews his or her Official Military Personnel File (OMPF) than for the officer to review it himself

or herself. All officers are encouraged to review their files as often as practicable to ensure that assignment officers and future selection boards will get the "complete picture" of the officer's ability and potential. As of March 1977, officers planning to visit MILPERCEN to review their OMPF's must make an appointment **at least three working days prior to their visit.**

STURGIS and ITSCHNER AWARDS presented at the 110th Engineer Dinner

The presentation of the Sturgis Medal to a Ft. Bragg combat engineer highlighted the 110th Annual Engineer Dinner here Friday night, as SSG James Skellion of the 27th Engineer Battalion received the prestigious award.

SSG Skellion, an 11 year Army veteran who participated in the Buffalo snow removal operation last winter, was presented the award by Chief of Engineers Lieutenant General J. W. Morris. The Sturgis Medal is given annually to the enlisted man who makes "outstanding contributions to military engineers while demonstrating technical and leadership ability."

The Itschner Award, given each year in honor of Lieutenant General Emerson Itschner, is presented to the Engineer Company in each component (Active Army, Army Reserve, National Guard) selected as the most outstanding in that component.

The Active Army award went to A Company, 293d Engineer Combat Battalion from Baumholder, Germany. CPT Thomas Nowak, 1SG Donald Wood, and former commanding officer CPT Leon Lang accepted the award for the unit.

For the third consecutive year, a unit from the 99th Army Reserve Component received the Army Reserve Itschner Award. Accepting the award for his company was CPT Frank Prazenica of the 332d Engineer Company, 300th Transportation Group, a reserve unit from Pittsburgh.

LTG Morris presented the National Guard Itschner Award to CPT Robert Treland of the 724th Engineer Battalion, Wisconsin National Guard.

The Engineer dinner commemorated the 202d anniversary of the Corps of Engineers, with LTG Morris emphasizing the importance of engineering in today's Army. In his remarks, LTG Morris lauded the cohesiveness of Engineers. "This year's theme, 'Call to the Castle' conveys a spirit of unity among engineers in all components of the Army."

SURVEY

1. What is your age?
   - 17 to 21 ____
   - 22 to 25 ____
   - 26 to 30 ____
   - 31 to 40 ____
   - Over 40 ____

2. What is your relationship to the Army?
   - Active Army ____
   - Army Reserve ____
   - National Guard ____
   - Retired ____
   - DAC ____
   - Dependent ____

3. If military, what is your pay grade?
   - E1 to E3 ____
   - E4 ____
   - E5 to E7 ____
   - E8 to E9 ____
   - O1 to O3 ____
   - O4 or O5 ____
   - O6 and above ____
   - Warrant Officer ____

4. How often do you read THE ENGINEER?
   - Rarely ____
   - Regularly ____
   - Every issue ____

5. How would you rate distribution of THE ENGINEER at your installation unit?
   - Thorough ____
   - Adequate ____
   - Inadequate ____

6. How would you rate the material contained in THE ENGINEER? Check whatever appropriate:
   - Entertaining ____
   - Useful ____
   - Believable ____
   - Stimulating ____
   - Well illustrated ____
   - Well rounded ____
   - Pointedly written ____
   - Worthwhile ____
   - Dry ____
   - Irrelevent ____
   - Questionable ____
   - Boring ____
   - Poorly illustrated ____
   - Narrow in scope ____
   - Verbose ____
   - Superfluous ____

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7. Would you like to see more or less articles by the following groups (if you're already satisfied, leave blank):

MORE		LESS
_____	Junior Enlisted	_____
_____	Junior NCO	_____
_____	Senior NCO	_____
_____	Junior Officer	_____
_____	Field Grade Officers	_____
_____	General Officers	_____
_____	Warrant Officer	_____

8. Do you have any comments, criticisms or suggestions for the magazine?

_____
_____
_____
_____
_____
_____
_____

9. Can you name any articles which appeared in THE ENGINEER that particularly impressed you? _____

_____
_____
_____