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Anniversary!

Engineer

THE MAGAZINE FOR ARMY ENGINEERS

SPRING 81



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THE COVER

Engineer Magazine celebrates its 10th anniversary, **SPRING 1971-SPRING 1981**, with the publishing of this 37th issue. We are able to enter our 11th year only because of the many contributors who have supported **ENGINEER** over the years. Thanks to all for making these first 10 years such a huge success.



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THE MAGAZINE FOR ARMY ENGINEERS

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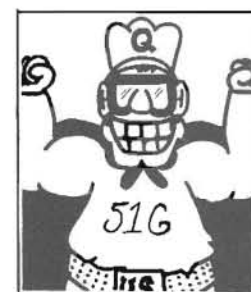
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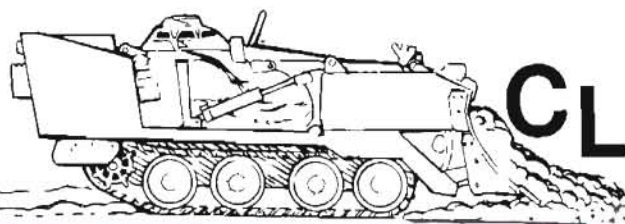


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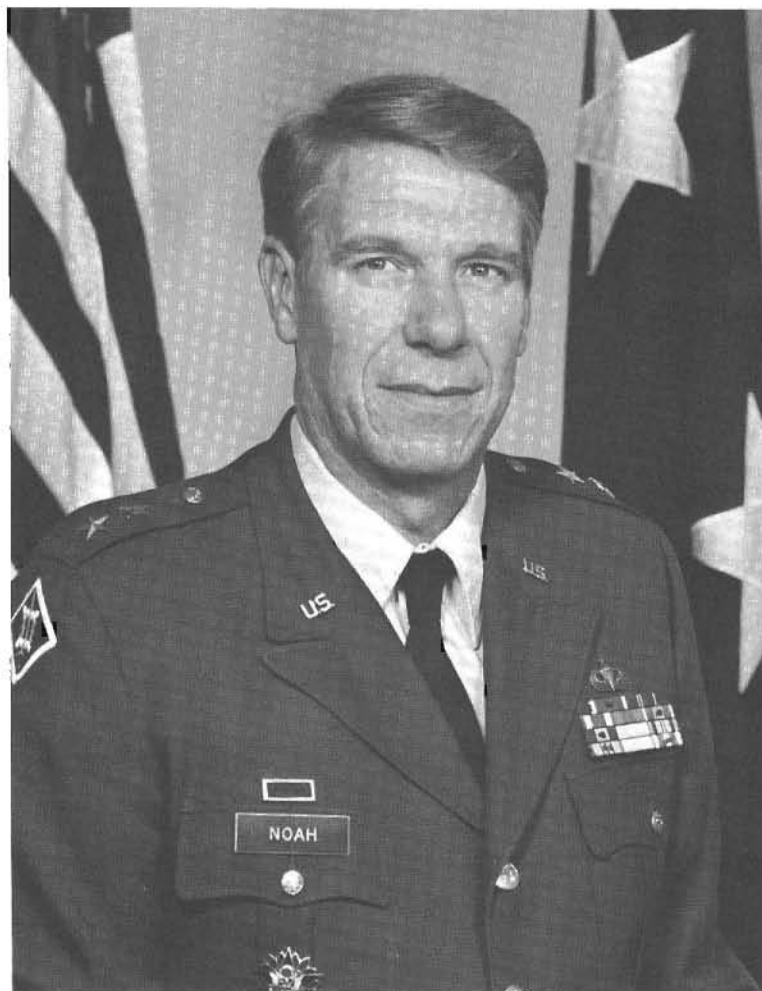
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CLEAR THE WAY



Maj. Gen. Max W. Noah, a 1953 graduate of the U.S. Military Academy at West Point, NY, also attended the Engineer Officer Basic Course at Fort Belvoir, VA that year. Today he is Commandant of the U.S. Army Engineer School.

Other early assignments included airborne training at Fort Benning, GA, and a year as the assistant to the Area Engineer on the Corps of Engineers' Oahe Dam project in Pierre, SD. After completing his Master's Degree in Engineering at Purdue University, IN, Noah served as instructor, and later as assistant professor, in the Department of Electricity at the U.S. Military Academy at West Point. In 1966 Noah joined the newly-formed 45th Engineer Group, travelling

with them to Vietnam as S-3. August 1968 Noah assumed command of the 307th Airborne Engineer Battalion, 82nd Airborne Division, Fort Bragg, NC.

His service then led him to Washington, D.C. where he was a military assistant to the Deputy Under Secretary of the Army for Operations Research in 1971. In 1973 he took command of the 2nd Engineer Group, Korea. In September 1980, Noah was assigned as the Commanding General, U.S. Army Engineer Center at Fort Belvoir, and, Commandant of the U.S. Army Engineer School, where he began his Army training nearly 28 years ago.



by Maj. Gen. Max W. Noah

"We Have A Job To Do!"

As Commandant of the Engineer School I am inaugurating a personal column in "Engineer" to highlight important aspects of our military engineer business. This, together with your heightened personal interest as the engineer soldier reader, and your contributions, should serve to make this magazine a more professional and useful journal. In the true spirit of the military engineer I felt the best title of my piece should be "CLEAR THE WAY".

We engineers serve the Army in many ways. We are well known in combat as we assist maneuver, fire support, and combat service support forces on the battlefield. We provide the means to enhance mobility. We build protective structures for survivability. We are the first ones called to deal with mines and obstacles. On less active combat fronts, our design and construction skills are applied and known world-wide, and our construction contract management skill in the military and civil construction areas is without peer. Our burgeoning mission in facility maintenance is a challenge met daily. Our topographic support is an absolute must for a widely-deployed Army. Our work in generators and environmental equipment design and maintenance is key to the operation of the Army in the field. Clearly our mission is many-faceted and we must use a myriad of skills to do our job and do it well.

Our mission at the Engineer School, one of 16 branch centers in the Training and Doctrine Com-

mand, reads: "Provide the Army with Military Engineering Doctrine, Systems, and Training to improve readiness and modernize the force."

This includes all the aforementioned tasks. Paramount to doing that job correctly is *good communication between you and the school.* To that end I am hoping to visit as many engineer units as I can in the United States and overseas. Where we cannot visit, there is always the telephone and correspondence chain—I invite you to use those means. I have already visited a few units here in the United States and only recently returned from a trip to Europe. I am pleased with what I saw and I learned a lot.

A very critical area of current concern is the mode of operation, organization, and equipping of engineer units in the combined arms at Corps level and below, to perform in *mission areas of mobility, counter-mobility, and survivability* (M-CM-S). In the series of Army '86 studies a new thrust has been generated in how we, as combat engineers, do our business. For example, in order to be more responsive on the battlefield, the engineer unit in many situations is being assigned or attached at the lowest possible echelon. In this respect, the more decentralized we get in execution, the greater problem we have of overall control and preparation for engineer tasks at higher levels.

The engineer company which reports to the maneuver brigade commander must be more inde-

pendent than in the past, know how to do its engineer unit mission well, and know equally well how to support the combined arms mission. The provision of an Assistant Brigade Engineer section should aid in this change.

Newer combat engineer equipment is vitally needed in order to provide more rapid, more responsive combat support of maneuver forces in the future. The M-9 Armored Combat Earthmover (ACE—UET is its old name) will make its debut in the 1982 procurement. New artillery delivered mines and GEMSS are in the Army's program. We are concentrating on the best solution for the counter-mine—SLUFAE, and other counter-mine equipment arena. I recently visited German, English, and Israeli engineer schools specifically to look at machines and ideas in M-CM-S. I found we have significant room for improvement in equipment and systems to support M-CM-S.

The Chief of Staff of the Army, as well as the Chief of Engineers, is very interested in moving forward. During early April, the Engineer School conducted a Systems Program Review (SPR) at Fort Belvoir in M-CM-S for the Vice Chief of Staff, General Vessey. The two-day program looked at the threat, the environment, and solutions to our problems in the combat engineers. With over 50 general officers from all branches present at the SPR we expect to profit greatly. We will report to you on the SPR in future columns.

We have a job to do.
"CLEAR THE WAY".

Noah
Engineer



NEWS & NOTES

BT: LONGER, TOUGHER

The US Army Training and Doctrine Command has announced that a longer, tougher basic training will soon face soldiers coming into this service. The new eight-week program is expected to replace the current seven-week training at some installations this year, with all training installations making the change by the end of FY 82. The revamped training leans heavily on the belief that a physically fit Army begins with tough, demanding standards established in basic, and continues through all phases of a soldier's professional growth. Increased emphasis will be placed on the basic soldiering skills, and new technical subject materials will be added, including communications, map reading, identification of opposing forces, and obstacle courses for confidence and conditioning. Changes are aimed at developing better trained, more disciplined soldiers who can contribute to Army unit effectiveness early in their careers. Steps will also be taken to assure soldiers better understand their role and commitment to the Army.

SEVEN NOMINATED FOR BG

The Pentagon has announced that the President nominated seven Corps of Engineers officers for promotion to the rank of brigadier general. Col. John H. Moellering, executive to the Army's Chief of Staff, will be the first of the Corps officers promoted, on approval of the list by the senate. Others nominated were: Col. James W. Van Loben Sels, commander of the 18th Engineer Brigade in Europe; Col. Jerome B. Hilmes, the facilities engineer at Fort Bragg, NC; Col. Forrest T. Gay III, Executive Director on the Chief of Engineers' Staff; Col. George S. Robertson, Deputy Director of Civil Works; Col. Thomas A. Sands, New Orleans District Engineer; and Col. Anthony A. Smith, of the immediate staff of the Chairman of the Joint Chief of Staff. The new generals will be reassigned within the next year to general officer posts throughout the Army. Their new assignments will be announced later.

PHYSICAL TRAINING STANDARDS RAISED

MEN UNDER 40

Age	Push-ups	Sit-ups	Two-mile run
17-25	40/68	40/69	17:55/13:05
26-30	38/66	38/67	18:30/13:40
31-35	33/61	36/65	19:10/14:20
36-39	31/60	34/63	19:35/15:05

The Army's new Physical Readiness Test will be applied to men and women, who will be tested in three events this year. The scoring table above shows the minimum/maximum needed to pass the test, which is given bi-annually. All soldiers except those in basic training must score at least 60 points in each event, and have a total of 180 points. Soldiers more than 40 years of age must have a medical clearance by an Army doctor before

WOMEN UNDER 40

Age	Push-ups	Sit-ups	Two-mile run
17-25	16/40	27/61	22:14/17:10
26-30	15/38	24/51	22:29/17:25
31-35	14/34	23/41	24:04/19:00
36-39	13/30	21/31	25:34/20:30

taking part in the program. Once the soldier has been cleared, a six month conditioning program must be completed before the two-mile run test will be given. The Over-40 run is graded on a go/no go basis. DA training officials say a new APRT manual published in January 1981 should provide you with complete details of the overall program.



CORPS GETS OFFICIAL CREST

The US Army Institute of Heraldry has approved an official unit crest for the US Army Corps of Engineers, recognizing its status as a Major Army Command. The crest is expected to be issued in pairs early this year, and is authorized to be worn on the uniform shoulder loops of the Corps commander, his deputy, and all Corps military personnel in field operating activities. The same personnel will continue to wear the red and white unit patch on their uniform sleeve, as well as the castle insignia on their lapels. The crest shows a gold eagle, symbolizing the nation, standing behind a scarlet and white castle tower that symbolizes the Corps and its construction mission. The worldwide scope of the Corps' mission and its service to the nation in the past, present, and future are represented by a blue globe surmounted by a rising sun. The globe is garlanded on one side with gold olive branches, denoting the peaceful nature of the Corps mission, and on the other side with oak leaves, symbolizing strength and fortitude. The branches also represent the Corps' concern for the environment. In its beak, the eagle holds a blue banner inscribed with the Corps historic motto "Essayons".

CHIEF VISITS CORPS DAM

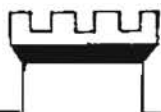
Army Chief of Staff Gen. Edward C. Meyer toured the McAlpine Locks and Dam at Louisville, KY, during a day-long visit to the Corps' Louisville District Office in December. It was believed to be the first visit to a purely civil works district by an Army Chief of Staff. Meyer's tour included stops at the Louisville Repair Station, home of the District Repair Fleet, and the construction site of the multipurpose Taylorsville Lake near Louisville. According to District Engineer Col. Charles E. Eastburn, the Chief's visit was "tremendous for District morale."

ENGINEER DINNER DATE SET

US Army Engineer Officers should circle Friday, May 15 on their calendar in red! That's the date of the 114th Annual Engineer Dinner at Mackenzie Hall, Fort Belvoir, Va. Engineers from all over the world will gather for an evening of reunion, and to see who will receive the annual Itschner and Sturgis Awards, presented to the outstanding Engineer company and the outstanding Engineer enlisted soldier. Chief of Engineer Lt. Gen. Joseph K. Bratton will be the keynote speaker for the evening. The 5th Annual Counterpart Dinner for spouses of Engineer Officers will also be held May 15, and the Castle Ball is slated for Saturday, May 16. Tickets for the Engineer Dinner are \$13.35 per person and may be ordered in advance by sending check or money order, payable to the 114th Annual Engineer Dinner, to the Protocol Office, US Army Engineer Center, Fort Belvoir, VA. 22060. For further information, contact the Protocol Office at (703) 664-4300, or Autovon 354-4300.

TDFO FORMED

The newly organized Training Development Field Office (TDFO) has combined the training development office of the Directorate of Plans, Training, and Security, USATC Engineer and Fort Leonard Wood, the USAES Engineer Field Office, and the 62B Team from the Directorate of Training Development, USAES, Fort Belvoir, Va. TDFO is now a tenant unit at Fort Leonard Wood, MO. The Training Development Field Office has the mission of developing new courses and revising existing courses of instruction for Engineer MOS's trained at Fort Leonard Wood, reconfiguring engineer resident courses for use by the US Army Reserve Component, implementing a staff and faculty development program, and performing staff functions for DPTS as resources permit. In addition, the TDFO serves as the US Army Engineer School's point of contact at Fort Leonard Wood and provides interface between Fort Leonard Wood and proponent schools for Basic Training, Ordnance, and Transportation training conducted there.



NEWS & NOTES



76TH ENGINEERS SUPPORT SCOUTS

When the Tenth National Scout Jamboree gets underway at Fort A.P. Hill, VA, next summer, the 76th Engineer Battalion will be there—in spirit if not in body. Over the last year, the Fort Meade, MD based engineer unit has accomplished the bulk of extensive physical site preparations necessary for an event expected to involve 30,000 Boy Scouts and staff, and 10,000 visitors per day. The centerpiece of their efforts was the construction of a 17½ acre natural amphitheatre, scheduled to serve as the focal point of jamboree activities. The amphitheatre will seat 70,000 spectators on a fan-shaped hillside which slopes inward toward a three acre stage area. The Jamboree, scheduled for July 29 through August 4, 1981, will create, virtually overnight, a small city within Fort Hill.

POV HEADACHES

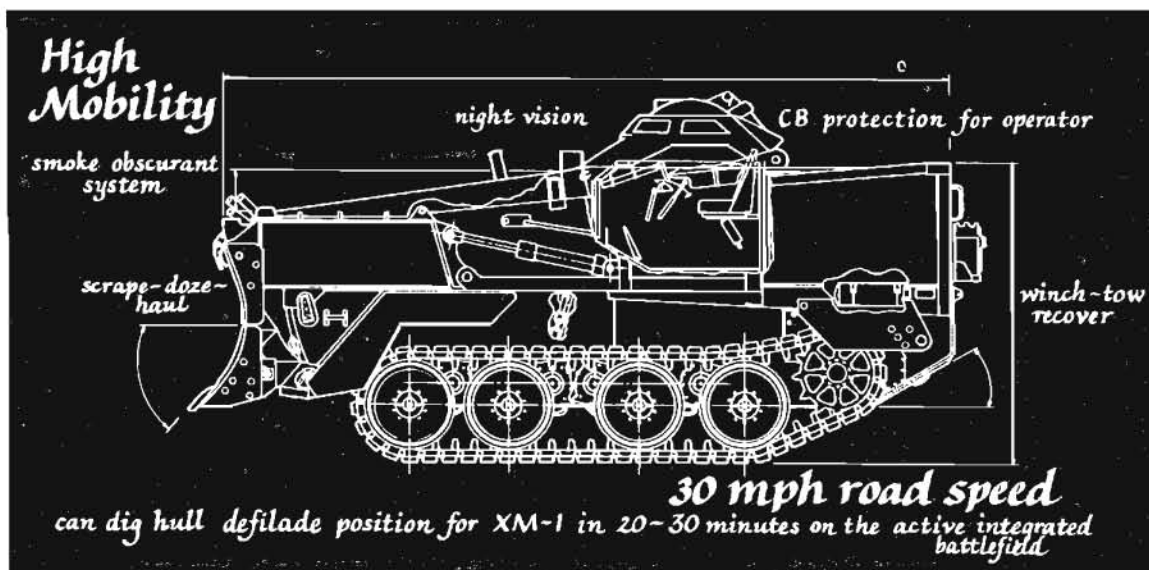
Despite an embargo on the shipment of all privately owned vehicles (POV's) manufactured after 1976, many unauthorized POV's have reached the Yokohama Terminal, Japan in recent months. The embargo—in effect since 1977—was imposed by DOD because of the personal and financial hardship on service members shipping their POV's to Japan or Okinawa. Extensive, and expensive, modifications must be made on vehicles in order to meet the strict environmental and safety standards set by the government of Japan. Although POV's made before '76 are not embargoed, soldiers planning shipment still need to take precautions. Contact your sponsor on the cost of insurance, taxes, and registration fees, and the local transportation office for information on Japan's vehicle emission standards. Plan before an anticipated move to Japan or Okinawa and save yourself a headache.

MOBILE HOME MOVING

A new bill went into effect recently that allows the full cost of moving a mobile home during a PCS move to be paid by the government. Before the bill was signed, soldiers were only allowed 74 cents a mile to move their mobile homes to a new duty station. Now the government will pay, as long as the cost does not exceed the amount it would cost to ship a soldier's maximum weight of household goods. There are a few catches, so contact the transportation office for full details.

457 MILLION VISIT COE SITES

More than 457 million people visited US Army Corps of Engineers lakeside recreation areas in 1980, six million more than the previous year. Four hundred twenty-six Corps lakes and reservoirs provided a wide variety of outdoor recreation opportunities, and nearly 80 percent of these areas are within a 50-mile radius of urban areas with a population of more than 50,000. Although Army Engineer recreation areas are water-oriented, offering excellent boating and fishing opportunities, they are attracting an increasing number of tent, trailer, and motorhome campers. Usage by day visitors is up as well. There were 30 million days of use in 1952 when the Army Engineers first started counting visitors. A day of use is counted for every person entering an Army Engineer recreation area for recreation activities during a 24-hour period. In 1971 there were 310 million days of recreation use, and in 1979 that figure jumped to 449 million. The top five Corps lakes and reservoirs, according to COE day use tabulations, were: Buford Dam, in Lake Sidney Lanier, GA; Hartwell Lake, in the states of Georgia and South Carolina; Denison Dam, in Lake Texoma, TX; Allatoona Lake, in the state of Georgia; and J. Percy Priest Dam and Reservoir, in the state of Tennessee.



M-9 ARMORED COMBAT EARTHMOVER

The Universal Engineer Tractor is no more, at least not in name. The vehicle, designed to give Engineers a tactical earthmoving capability and essentially the same mobility at the units they support, has been re-named the M-9 Armored Combat Earthmover, to reflect the wide variety of missions it can accomplish in a combat environment. The M-9 is much more than just a tractor. It will provide combat engineers, especially those supporting mechanized and armored units, with a versatile, tactical earthmover sufficiently mobile to provide support in the ground gaining environment of the forward battle area. It is designed to travel light and work heavy. Features include a front loading scraper bowl and a hydraulically operated apron with positive load ejector. The dozer blade is hinged and can be folded to increase the angle of

approach when the tractor is used as a transporter. The M-9 converts to an armored vehicle by closing an armor hatch stored behind the operator, who is the only crew member. Dozing and scraping are accomplished by raising and lowering the entire front of the tractor by means of the hydropneumatic suspension system, rather than by independent operation of the blade and bowl. The suspension system can be altered according to the type of terrain that needs to be crossed. The M-9 is capable of speeds up to 30 mph, and it has a limited swim capability approximately equal to that of the M113 APC. The M-9 will increase the survivability of other combat vehicles, too, as it can rapidly dig protected positions for tanks, and firing positions for artillery.

ONE EXAMPLE OF INEFFICIENT EQUIPMENT

by Staff Sgt. Philip Powell

"Basically, all these components are adapted from commercial blasting supplies...(and) are neither quick nor efficient in combat."

After three years as a front line combat engineer with US forces in West Germany, I am of the opinion that slow acquisition, and in many cases slow development, of essential materials is hindering engineer effectiveness and readiness. The majority of the equipment used by our engineers is either World War II vintage, or a quick adaptation of commercial equipment. As a result of not being properly equipped, not only are engineers hampered, but their potential contribution to the combined arms team is reduced. The following example illustrates this ineffectiveness in one engineer area, demolition materials.

In the current state-of-the-art, explosive demolition charges are primed for one of two means of ignition: electric or non-electric. The materials used date from World War II and before, and consist of: blasting caps, electric or non-electric; crimpers, for crimping non-electric caps to fuse; friction tape, for fixing caps to detonating cord; and detcord clips for joining

several branching lines of detcord into one main firing circuit.

Basically, all these components are adapted from commercial blasting supplies. As such, they are neither quick to use nor efficient in combat. As a result, the combat engineer, just to prime a circuit, carries a gadget bag of caps, clips, crimpers, and tape. The dexterity needed to use these components requires bare hands. In total darkness, under enemy

fire, and with numbed fingers, this is like trying to button a shirt without using your thumbs.

The solution to the particular problem lies in setting aside the civilian expedients and designing a new component strictly for military use. This component, which I call an Exploding Connector—or Exploder—would be cheap, effective, and extremely versatile in military demolitions. (Figure 1).

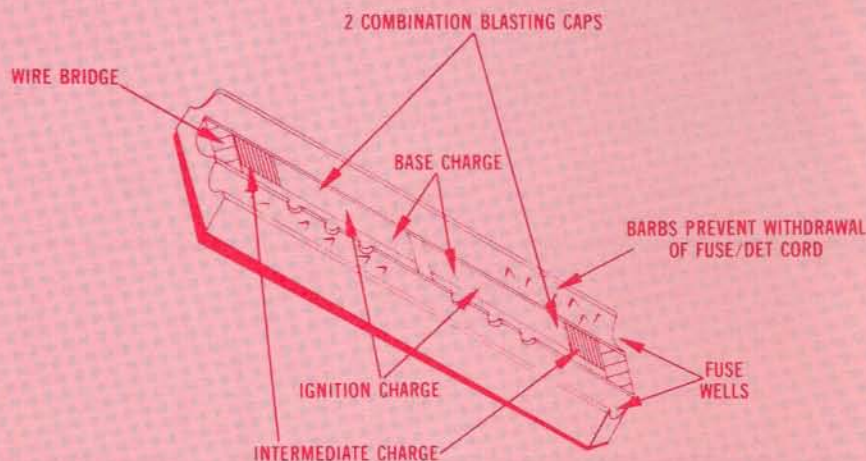


Figure 1

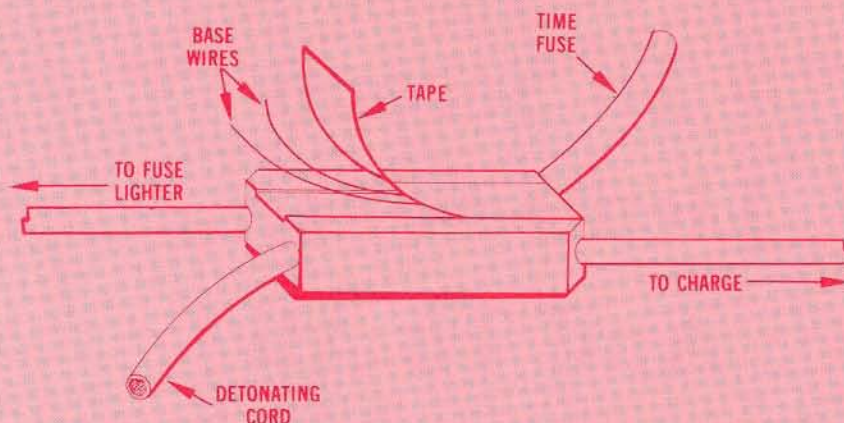


Figure 2

Constructed of hard plastic, the Exploder would measure approximately 3" by $\frac{3}{4}$ " by $\frac{1}{2}$ ". Two fuse wells, sized to accept standard time fuse or detcord, would extend through the length of the device. Aligned end to end, between the two fuse wells, would be two unique, combination blasting caps. These caps are unique because they may be ignited either electrically or non-electrically.

On each end of the Exploder, one corner of the case would be notched to facilitate use in the dark. Each of the combination caps could be ignited by a fuse inserted through either fuse well. Barbs lining the fuse well would prevent fuse or detcord from pulling back out once it has been inserted.

The opposite ends of the two

combination caps would be equipped with base wires for electric ignition, laying along the top and bottom sides of the Exploder. These wires would lie in a shallow groove in the plastic body, and be covered with adhesive tape if not in use. (Figure 2).

Using an Exploder to prime a firing circuit would be fast and simple compared to current methods. For electrical detonation or detonation of detcord, the detcord is inserted into either fuse well and the base wires are connected to the firing wire. For non-electric priming of detcord, time fuse is inserted into either fuse well, and the detcord is inserted in the other well. Compound priming is accomplished by combining the two methods (i.e., the circuit is rigged

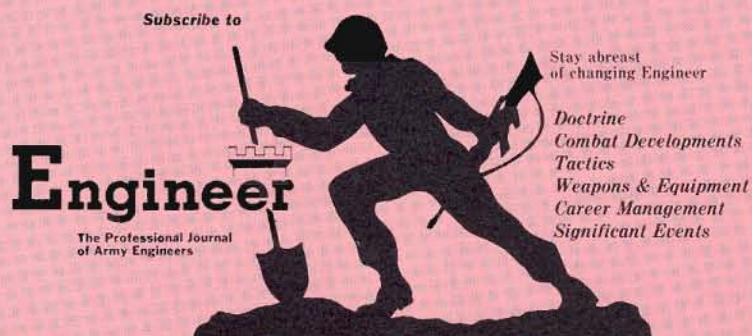
to be fired either electrically or non-electrically).

Since the Exploder contains two independent blasting caps, either one of which can function electrically or non-electrically, a failsafe factor is incorporated that would allow dual priming, per current Army policy, with a single Exploder.

Under combat conditions, the Exploder could quarter the time currently required to prime a firing circuit. It would eliminate the need for separately issued electric and non-electric caps, and require no crimpers, clips, or tape to install. Best of all, it could be easily and quickly installed in complete darkness, it would be easier to handle than a standard blasting cap, and would be impervious to corrosion.

That such a device has not yet become a standard component in engineering demolitions sets is indicative of a serious problem: the lack of cogent rapport between the industrial producer and the military consumer, and the failure of current acquisition programs to address fundamental engineer problems within the constraints of cost and technological feasibility.

SSG PHILIP F. POWELL is a combat engineer currently assigned to Ft. Polk, Louisiana, having recently returned from assignment in Germany.



The Professional Journal
of Army Engineers



To Second Lieutenants... And To All

by Maj. Gen. Clay T. Buckingham

Maj. Gen. Clay T. Buckingham, Assistant Chief of Staff for Automation and Communications, recently addressed Second Lieutenants graduating the U.S. Army Engineer School Officer Basic Course. His remarks follow.

I want to talk to you this morning about what kind of Army you are going into, and what your role is in that Army.

Most of you are going to be assigned to a specific unit somewhere, either in the continental United States or overseas; Korea, Alaska, Hawaii, Panama, or Europe. This unit is probably going to be understrength in both noncommissioned officers and enlisted men, and will have a mixture of modern and obsolete equipment.

The soldiers (men and women) will be young, with an average age of 18 or 19. Your platoon will be multi-racial, and probably multi-lingual. Many of your men and women will have graduated from high school, but some will not have graduated from high school. They will come from all parts of the United States and its possessions. They will represent a wide variety of attitudes, values, moral standards, motivations, and abilities. Your noncommissioned officers will also be relatively young, mostly in their 20's. You will be short certain key noncommissioned officers, and those that you have will also represent a variety of abilities and motivations.

You will immediately recognize that your platoon has an awful lot of equipment. All of this equipment has been assigned to help you perform your mission. This equipment will range from the individual weapons and equipment of the soldiers to the collective equipment of the platoon. That is, the vehicles and other mission oriented equipment.

One of the first things you must do is to take measure of your platoon, both the people and the equipment. Determine the status of training and maintenance. Establish this as the baseline, accept the platoon as it is, and start from there to make it the best platoon in the United States Army. You must apply your total energies toward making this platoon the best one in the Army. Complaining about the abilities of your people, the shortage of people, or the condition and capabilities of your equipment will not help.

Let me say right here that the Army understands the situations that you are going into and is striving to improve the general, personal, and equipment status of the Army. You must have faith that the Army's leadership is doing this. I can guarantee you from having just spent a solid week in the Army Four-Star Commanders' Conference that the Army leadership understands your situation and is doing everything within its power to make improvements. So, complaining about your situation is not going to help anything. As a matter of fact, it will detract from your primary mission, which is to build your platoon into the best one in the US Army.

Now, I want to give you some hints as to how you can do all of this. First let me tell you that there are two people who will rapidly loom as the most important two people in your life as a platoon leader. The first is your Company Commander and the

second is your Platoon Sergeant. With regard to your Company Commander, you are a follower. With regard to your Platoon Sergeant, you are a leader.

Never forget that your Company Commander is just that: he commands the company of which your platoon is a part. He is your boss. You must learn to relate to him in a healthy, constructive, subordinate-superior relationship. You must continually look at yourself as he looks at you, and seek to be the kind of platoon leader that you would like to have if you were the Company Commander. You may disagree with him on things and, of course, it is your right and responsibility to make recommendations to him in an objective and responsible manner. But he has the final say and you must support him loyally and effectively. You must seek to help him to do his job and to make him successful in his job as Company Commander. You can do this by making your platoon the best platoon in the Army.

Your Company Commander is not really interested in where you went to college, or whether you were a football star, or whether you were President of your fraternity, or have an MS in Civil Engineering. What he is interested in, is how well you command your platoon.

With regard to your Platoon Sergeant, you are a leader. You are his Commander, and you should seek to develop with him a healthy, constructive, superior-subordinate relationship. Once again, you must look at yourself from his viewpoint and seek to be the kind of Platoon Leader that you would like to have if you were the Platoon Sergeant.

Thus, I say to you that these two people, your Company Commander and your Platoon Sergeant, will be the most important two people in your life as a Platoon Leader. Of course, there are other people to whom you must relate: the First Sergeant, your fellow platoon leaders, the Company Executive Officer—if you have one—the other noncommissioned officers within your platoon, and the enlisted men within your platoon. But, never forget the importance of these two people, the Company Commander and your Platoon Sergeant.

I must emphasize that you are a Platoon Leader and not a Battalion Commander, a Brigade Commander, or an Army Commander. During your four years of academic training at the University of your choice, you have studied a variety of subjects. Basically, that education was designed to teach you how to think. Now, as a Platoon Leader, it is your job to focus all of the intellectual powers that you have specifically on your platoon. Do not seek to solve the world's problems or the Army's problems or even your Battalion Commander's problems. Confine your attention primarily to your own company, and specifically, toward your own

platoon. Throughout your career, the people who are most important to you are your contemporaries; your immediate superior, and your immediate subordinates.

Your two most important tasks will be the training of your men and the maintenance of your equipment. You may have a lot of other things on your mind, but the most important things that you will ever do as a Platoon Leader will be to train your Platoon and to maintain your equipment. Superior training and superior maintenance are your primary goals. In training, you must be the coach. You must know your men, the status of their training, where they are coming from, and then you must train them to do the jobs that they are specifically responsible for within your platoon.



With regard to your equipment, you must learn not only what the equipment is used for but also how it operates and how it should be maintained. You must become the expert on the equipment in your platoon. You must study the manual, crawl in and out of the vehicles, learn to operate the vehicles and weapons, learn to operate every piece of equipment that you have in your platoon, and know specifically what standards of maintenance the Army requires. You must then set the standards for your platoon and enforce those standards.

Now, with regard to the relationship between yourself, your Platoon Sergeant, and your noncommissioned officers. If you do not have a copy of Field Manual 22-600-20, dated March 1980, entitled, "The Noncommissioned Officer Guide," you should get one. This little manual identifies the place of the noncommissioned officer in the United States Army. There are chapters on leadership,

authority, the officer chain of command, the NCO support channel, duties and responsibilities of the noncommissioned officer, and the relationship between noncommissioned and commissioned officers. It is specifically written for the noncommissioned officer, but you should read this manual, comprehend it, understand it, and then insist that your noncommissioned officers comply with the provisions of this manual.

Your job is to train your noncommissioned officers to do their jobs and then to insist that they do those jobs. You are not to do these jobs for them. This is a fundamental mistake which many junior officers make and that is to bypass their noncommissioned officers and deal directly with the enlisted men of their platoon. The noncommissioned officer is the first line leader in the Army. As the platoon leader, you must insist that your squad leaders or section leaders do their jobs. And I say again, you are not to do those jobs, but you must insist that your NCOs do their jobs.

The noncommissioned officer at this level is the glue which holds the Army together. You can subvert the whole system of discipline within the Army if you try to do the NCOs job for him, or if you do not insist that he do his job. I cannot over-emphasize this point. Give your noncommissioned officers the responsibility and the authority identified within this manual and then insist that they fulfill those responsibilities and exercise that authority. By so doing, you will be training your NCOs in leadership.

Now, for a few one-liners which apply to your responsibilities as a Platoon Leader.

1. You are responsible for everything your Platoon does or fails to do, 24 hours of every day, seven days a week. You will have more responsibility as a Platoon Leader than most people have in a lifetime.

2. The Army is built on integrity. You should never, under any circumstances, compromise on integrity. However, you must learn to tell the difference between an issue which involves integrity and an issue which simply involves procedures. Ninety-nine percent of the issues are procedural, and probably only one percent specifically involves issues of integrity. I say again, never compromise where integrity is involved, but be flexible with procedures and learn to tell the difference between an issue involving integrity and an issue which is simply one of procedures.

3. Troops want a strong, intelligent leader. They thirst for leadership. They want tough training. They want tough, competent leaders. Do not let them down by being a weak and ineffectual leader.

4. Do not be fooled. The small percentage of your troops who will be squawkers do not represent the majority. And even those who constantly squawk respect and want strong leadership.

5. Your appearance does make a difference.

Learn to present a strong and confident appearance. Keep your hair cut, your boots shined, and your shoulders back.

6. Do not take counsel of your fears. Just go ahead and do your job.

7. Physical training is extremely important. You should strive to be in better physical shape than any man in your platoon and then you should strive to bring them up to your standard.

8. Remember that in any operation, or in training or maintenance activities, 10 percent of your effort will be in planning and giving instruction. The other 90 percent should be in the follow-through and supervision.

9. Not all of your soldiers will succeed. Even with the best leadership, some will fail. Learn to determine the difference between those who are simply immature, but have potential, and those who simply will never be able to make it.

10. Build confidence. Confidence comes through a series of little successes. Every time a soldier does something right it adds to his confidence. Good soldiers are confident soldiers. You can build their confidence by leading them from success to success in little things.

11. There are three things where you must be absolutely precise. These are in the handling of money, in the handling of supplies and in the handling of classified documents.

12. Do not give your signature away lightly. Know what you are signing.

13. Never, under any circumstances, lend money to an enlisted man. It is simply bad practice. If he really needs money, there are ways of getting it for him through the Red Cross, through the Army Emergency Relief or through a partial payment.

14. Respect your First Sergeant. Do not hang around his office, do not lean on his desk, and do not sit in his chair. Remember, the First Sergeant is the top noncommissioned officer in your company and deserves your respect. Listen to him. He can teach you much.

15. In your personal conduct, you must be moderate and self controlled. A drunk or a playboy has no place in the Officer Corps.

Lastly, recognize that your career is built one day at a time. Thereto strive for excellence in all things. And particularly, develop an excellent spirit. In the Old Testament, Daniel rose to the top of his profession because he had an excellent spirit. Don't be simply a critic. No one will follow a critic. Look at everyday and every situation positively. For after all, "This is the day that the Lord hath made. Let us rejoice and be glad in it."

I envy you the opportunity once again to command a platoon. You can make it a great experience and thereby establish a small but important island of competence within the US Army. It's in your hands.



Registration as a Professional Engineer establishes an accepted standard of technical excellence within the engineering profession. Registration also provides a tangible method of qualifying an individual's level of expertise as an engineer and as a professional within the military structure. Supplemental to the recognized standard established by registration, the continuing development of technical proficiency is achieved or fine tuned.

engineer, the effort necessary to obtain registration increases tremendously as the years away from formal schooling mount.

As evidence of this recent emphasis on Professional Engineer Registration for military officers, the US Army Engineer School has experienced a dramatic increase in inquiries and requests for assistance from the active military sector. In view of the above desires for PE registration by military engineers, this article is provided to outline the steps leading toward registration. These steps are derived from experience with the registration process in the Commonwealth of Virginia, and with study programs available in the Northern Virginia area. Most of the steps described, with some variations, can be applied to the registration process in other states.

The three general prerequisites for examination are:

²Engineers Council on Professional Development, renamed Accreditation Board of Engineering and Technology on 1 January 1980.



Use as many different study materials as you can find.

accredited schools, while others allow substitution of additional experience in lieu of graduation from non-accredited schools or for degrees other than engineering. Check with your State Board of Examiners for verification, as necessary.

b. Certification as Engineer-in-Training (EIT). EIT certification is achieved by passing an eight hour examination on Fundamentals of Engineering. This is a national exam given twice annually. Excellent references describing the content of the exam are available in most libraries and engineering or technical book stores. Some states allow applicants for PE registration to take both the EIT and PE exams on successive days.

c. Four years of approved engineering experience. Military experience is acceptable if it shows "responsible charge" of engineering work; "responsible charge" meaning a position requiring initiative, skill and independent judgement in the planning, design and supervision of engineering projects and activities. The experience gained by the junior military officer in the Corps of Engineers often involves these functions, and should not be overlooked by the applicant because he did not carry the title of "Civil Engineer" or "Project Engineer". The applicant must describe his experience in terms understood by board members unfamiliar with the military. For example, experience as Platoon Leader can read: Responsible for operations and training of 40 engineering personnel and equipment. Designed, planned and supervised construction of a 2 mile bituminous road; 250 sq. yd. parking apron, 30 ft. timber tower and 3000 ft. of fencing. Supervised borrow pit operations and completed barracks renovation project budgeted at \$250,000. Avoid acronyms and abbreviations. Experience in non-engineering military assignments should not be listed as qualifying experience.

STEP TWO: COMPLETE THE APPLICATION.

Obtain an application from the State Board for Professional Registration, usually located in your state's capital. Virginia applications are available from the P.E. Program Coordinator at Fort Belvoir, as well as from the state board. When requesting the application, also request a copy of regulations governing registration necessary to help you satisfy any special state requirements. Type the information neatly and completely. Do not use continuation sheets unless specifically permitted.

STEP THREE: VERIFY EXPERIENCE AND EDUCATION.

Military experience can usually be verified by the signature of the Installation Records Officer who maintains your personnel files. Civilian experience must be verified by personnel managers from each engagement. Education must be verified by the school directly; through submission of an official transcript or completion of a form supplied with the application. EIT certification is verified by the State Board.

STEP FOUR: GET ENDORSEMENTS OF PROFESSIONAL ENGINEERS.

Most state boards require endorsements of three to five registered PE's; some of whom must be registered in the state of application. Junior officers should start keeping a record of possible endorsers as early as possible in their careers, and should not be hesitant to ask university professors or Engineer School faculty to make such an endorsement. Recommendations from registered Engineers should be based upon work demonstrated while under their supervision or instruction.

STEP FIVE: PAY ALL FEES.

Submit the required fee by check with your application. Most fees will range from \$25 to \$100 (Virginia charges \$30), with an exam fee to be paid

following approval of your application. The exam fee is currently \$18.

STEP SIX: ENSURE TIMELY SUBMISSION OF ALL PAPERWORK.

The state board will require submission of the application and all supporting endorsements and transcripts 60 to 90 days prior to the examination. Submit your paperwork early and follow up on endorsements. Boards will not act on an incomplete file.

STEP SEVEN: STUDY

Utilize as many different sources of study material as you can find. Some excellent sources are:

a. *Texts.* Reference books from the Engineer School or college with which you are familiar are excellent study materials. Review class notes and refresh your knowledge of engineering disciplines.

b. *USAES Correspondence Courses.* PE study courses are available in several disciplines, and may be requested by completing an application, available from: US Army Engineer School, ATTN: ETM Branch, Fort Belvoir, VA 22060.

c. *University Review Courses.* Many universities offer review courses in several disciplines at their main and regional campuses. The University of Virginia, for example, conducts courses at Fort Belvoir and other Northern Virginia locations prior to each exam. Contact your education center for information.

d. *Informal Group Review.* USAES personnel conduct a Civil Engineering lunch hour review four weeks prior to exam dates, and are currently writing a course which can be used by other military installations.

STEP EIGHT: TAKE AND PASS THE EXAM.

The Professional Engineer exam is an eight hour exam administered in April and October/November. Specific test dates and locations are determined by each state board. Most states, including Virginia, use a national exam. Examinees may take the exam in any one of the following disciplines:

Civil	Agricultural	Petroleum
Chemical	Ceramic	Sanitary
Electrical	Industrial	Structural
Mechanical	Manufacturing	Aeronautical/ aerospace
Combined*	Nuclear	Mining/Mineral

*The combined engineering exam includes the disciplines of civil, chemical, electrical and mechanical engineering. The discipline to be examined must be selected prior to the morning session, and cannot be changed once the exam has started.

Each examinee will be given a problem booklet for the four hour morning session containing 10 problems in the discipline selected. The examinee will work four problems for credit. The afternoon problem book will contain ten problems, nine new problems in each discipline and one engineering economics problem common to all disciplines. As with the morning session, four problems will be worked. In most states the engineering economics problem may be included as one of four problems solved, while some states require that it be worked by all examinees. A small number of states do not allow the problem to be solved for credit. Check with your state board for specific requirements.

Examinees selecting the "combined" discipline may work any four problems from the disciplines of civil, chemical, electrical and mechanical in each session. Problems may be selected from one discipline or any combination within the combined selection.

Problems are graded based on work accomplished, with partial credit given for partial solutions. 10 points are allowed for each problem, with a perfect score of 80 points. 70% correct, or 56 points, are required to pass the exam. All problems have equal grade weight.

All bound references are allowed in the exam, as are silent calculators. Check with local exam sites about availability of electrical outlets. All assumptions made in the solution, as well as references used, should be listed on the solution to ensure full credit.

These steps and descriptions are not going to answer all questions, and may raise additional inquiries. Questions should be addressed to state boards, registered PE's or the PE Program Coordinator at the Engineer School. We hope that the engineer, military or civilian, reading this article may be encouraged and assisted in his pursuit of registration. Engineer registration is the most acceptable and most important evidence of professional competence, and although the preparation may be trying, their final results are well worth the effort.

Capt. Robert W. McBride is the Assistant Secretary to the General Staff, U.S. Army Engineer Center and Fort Belvoir. McBride is a licensed Professional Engineer and serves as proctor for PE/EIT examinations for the State of Virginia. Capt. Thomas B. Nelson is an instructor in the Roads and Airfields Branch, Department of Military Engineering, U.S. Army Engineer School. Nelson also serves as Program Coordinator for Professional Engineer Registration.

VERTICAL CONSTRUCTION TRAINING for



SECOND LIEUTENANTS

by Maj. Lester C. Roth

The modern battlefield is envisioned as a short, intensive conflict with engineer effort priority in support of the Combined Arms Team. Accordingly, vertical construction training for second lieutenants has been reduced in recent years. However, the vertical construction mission still exists, especially in support of peacetime requirements. It is important, therefore, that field commanders be aware of the capabilities and limitations of second lieutenants assigned to their commands from the Engineer Officer Basic Course (EOBC).

An increasing number of lieutenants commissioned in the Corps of Engineers do not have engineering or engineering-related degrees. The thrust of EOBC train-

ing, therefore, is to prepare young engineer officers to manage a construction project as opposed to the designing of buildings or utility systems. Such training, requires at least a rudimentary understanding of the technology involved. Classroom instruction focuses on terminology and a few of the basic principles involved. Let's follow a typical EOBC student through his program of instruction:

The student first receives a two-hour class on plumbing systems. Nomenclature, advantages and disadvantages of various materials available, selection of fittings, and functioning of the drain, waste, and vent systems are covered. The next three-hour block deals with construction print reading as it applies to plumbing systems. Drawings from

the Army Facilities Component System (AFCS) are used by the student to prepare a bill of materials, correctly specifying all pipes and fittings.

Next, the second lieutenant performs a four-hour, hands-on practical exercise in installing plumbing systems. Students are split into groups of 4-5 and given a set of construction plans. They are required to install and check the plumbing. They must interpret the plans, submit the appropriate BOM, and use the pipefitters tool kit to install the iron and copper piping. Their plumbing is pressurized with a water hose and critiqued. Demonstrations are given on plastic and other types of piping.

Electrical classes follow the same basic format. A two-hour class on

nomenclature, principles of operation and basic circuitry, followed by a three-hour class on print reading and preparation of BOMs. Only interior wiring is covered. A four-hour practical exercise follows in which small groups install outlets, lights, 3-way switches, special purpose outlets, circuit breakers, etc., according to a given set of plans.

Next is a two-hour inspection class. Students are provided with a set of construction drawings for the electrical and plumbing system of a Theater of Operations bath house and latrine which have been constructed with various deficiencies. The students are taught how to conduct an inspection as well as the typical things to look for. Emphasis is placed on identifying the deficiency; determining why it happened; evaluating the deficiency's effect on the system; and if necessary, stating the corrective action required.

Short classes totaling six hours in wood frame construction cover print reading, nomenclature of building components, stair design, use of the framing square and other carpentry tools, and tool accountability at a project site.

During the same timeframe, students also receive instruction in engineer management. They learn how to conduct a site investigation at a proposed construction site; how to develop a critical path method (CPM) network with corresponding early start schedules; how to use TM 5-333, Construction Management, for estimating crew sizes and durations; how to prepare activity estimate sheets in conjunction with material take-off lists and BOMs; and how to develop resource constrained CPMs.

After completion of these individual classes, a comprehensive integrated construction exercise is conducted which requires students to utilize the skills they have learned in the classroom. The platoon is once again split into small groups and given a construction directive to plan

and construct a 16x24 Theater of Operations bath house, utilizing prefabricated plywood panel construction. A CPM, resource constrained to an 11-man squad, is required of each group, as are activity estimate sheets for installing the plumbing and electrical systems along with two other activities. Each group must present their plan at a preconstruction conference in which instructors represent battalion S-3 and Facilities Engineer personnel. Group presentations include layout of the site, impact of the constrained CPM, safety and tool accountability plan for the project, how VIP visitors will be handled, material requisition and storage plans, and support required from other units.

An 18-hour practical exercise follows in which the student officers actually construct the building and install the plumbing and electrical system. The small groups are combined once again to form a squad size element. Each squad has its own building. The squad leader is pretty much left on his own and allowed to make mistakes that do not materially affect the structure or delay progress. For example, if a squad forgets to order an item on its BOM, the instructors might require that squad wait 30 minutes before the item is issued, emphasizing the importance of having a complete BOM. Throughout the construction, leadership skills are closely monitored and critiqued. Leadership positions are rotated at various phases of the construction. Use of the CPM at the project site is stressed.

Sometime during the project, each squad is visited by a VIP. It might be the battalion commander, the Facilities Engineer, or even the unit chaplain. The project leader must alter his briefing to match the interests of the VIP. This has been noted as an area where second lieutenants are initially very weak and may require additional training once they get to the field.

Each squad is required to construct a truss, set of stairs, wall panel, etc., as time permits. Thus, the student receives good introduction to the skills and techniques which enlisted members of his platoon must use as well as the tools that are normally available. Throughout the construction, pointers of "tips-of-the-trade" are given, realizing that such knowledge is normally gained only by experience.

Several inspections are conducted by the instructors, to show students how to conduct an inspection as well as what to look for and how to correct it. Emphasis is placed on discovering the cause of deficiencies so that they may be prevented in the future.

When the second lieutenant reaches the field, he will not be able to perform construction design. He receives only a brief introduction to electrical, plumbing, and wood frame construction in EOBC. He will, however, know how to use a CPM to organize and prepare for a construction project. He should be able to do BOMs and read construction prints. He should be able to conduct an on-site inspection and direct corrective action for deficiencies discovered. Commanders, however, must remember that a second lieutenant's exposure to construction tasks is very limited. He must receive extensive on-the-job training at his first permanent duty station.

Maj. Lester C. Roth is presently assigned as Chief, Structures and Utilities Branch, USAES. He has served with the 307th Engineer Battalion at Fort Bragg, NC and the 2nd Engineer Battalion, Korea.





The Earthmoving Platoon in Tank Ditch Operations

by Capt. Michael L. Hoots

"A balanced US tank and mechanized infantry company team of 12 tanks and 12 armored personnel carriers, occupying a battle position in the active defense, may confront a first echelon array of some 90 to 100 armored vehicles. To defeat such a formation, first slow the attacker's momentum; that provides time to kill his tanks and infantry fighting vehicles."

—TRADOC Bulletin No. 12
Battle Report Terrain Reinforcement:
Tank Ditches
28 March 1980

The effectiveness of properly constructed and well positioned antitank ditches has been well documented. The Corps combat heavy engineer battalion concentrates a tremendous amount of terrain reshaping equipment in the earthmoving platoons of each of its three line companies. These three platoons can project enough combat engineering power to alter the course of battle if they are properly and efficiently employed.

In August and September of 1980, the 548th Engineer Battalion (Combat) (Heavy) conducted tests to determine

the most effective employment of earthmoving platoons in tank ditch operations, and to determine the most effective construction techniques utilizing current TO&E equipment. The tests were conducted at the 548th's home station, Fort Bragg, NC.

Each combat heavy earthmoving (EM) platoon has three D8K bulldozers, four 290M wheeled tractors with 18 CY scrapers, and one 5 CY scooploader.

Company B of the 548th was selected to conduct the actual tank ditch field testing and to complete the planning and coordination of all other phases of the operation. The platoon leader and platoon sergeant were confronted with the following very probable battlefield missions:

- Organize the platoon in such a manner as to effectively construct as many ditches simultaneously as possible;
- Determine the most efficient method of construction for each "team" organized.

The keys to organizing the independent teams were rates of construction and overall efficiency, reliability, and flexibility. The most effective team envisioned consisted of two D8K bulldozers using the push/strike-off method of construction. The D8K bulldozer is well known for its all-weather capability, maneuverability, and ease and reliability of maintenance.

The least reliable team envisioned would have consisted of all 290M tractors or tractor/pans (three scraping, one pushing). Even under the control of an experienced operator, the 290M is difficult to operate in unstable soil conditions. The reliability of the 290M tractor as a pusher is also highly suspect. A recent construction project by Company B at Carrboro, NC, confirmed the weak pusher ability of tandem 290M teams in anything but ideal weather and soil conditions. Also, because of the age of the equipment and its unique design within the construction equipment community, a consistently good operational readiness posture is often difficult to maintain.

When actual construction techniques were analyzed, the simplicity and overall superiority of the double D8K bulldozer team was obvious. The push/strike-off method is a two-step continuous process. It can be continued indefinitely, and cycle times are negligible. A team consisting of all 290M tractor/scrapers constructing a U-shaped ditch might be fairly efficient in the beginning, but it would eventually lose efficiency through excessive cycle times as the ditch lengthened. A constant rate of construction could be maintained if the 290M tractor/scrapers built the ditch in segments, but "dead spaces" in the overall ditch pattern would result.

The solution was a team of one bulldozer and one tractor/scrapper constructing a U-shaped ditch. The 290M tractor/scrapers would provide the ditch-digging impetus. The bulldozer would ensure a reliable pusher capability, and would also perform a unique function to ensure a constant rate of construction.

The bulldozers would dig entry slots into the enemy

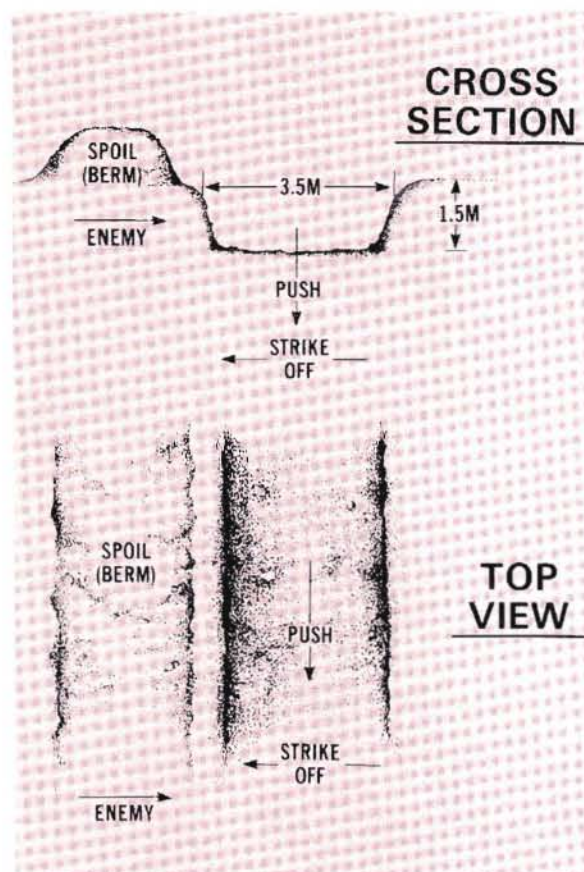


Figure 1

side of the ditch at predetermined intervals. Then the 290Ms could enter the ditch and continue construction at a constant rate. If the time for slot construction could be minimized, an efficient rate of construction could be maintained. It meant sacrificing a highly efficient D8K bulldozer team, but it was hoped that increased team reliability and flexibility would be gained.

The platoon's scooploader and a borrowed D8K bulldozer would both be used in the push/strike-off method (using a D8K pusher) to gain a comparison of each machine's capabilities in the strike-off phase of construction. No great difference in efficiency was envisioned for this relatively non-taxing portion of the ditching process.

Testing concluded that three teams could be effectively deployed by the one D8K bulldozer. Team 3 consisted of one scooploader and one bulldozer. These teams were designed for maximum utilization of indigenous EM platoon equipment and were tailored for effective mission accomplishment.

The ground over which construction was planned for the scraper/dozer team included flat to gently rolling terrain. This made the erection of a high, spoil berm incompatible with the use of direct fire, antitank weapons such as TOWs, Dragons and tanks.

Terrain conditions for the loader/dozer team were

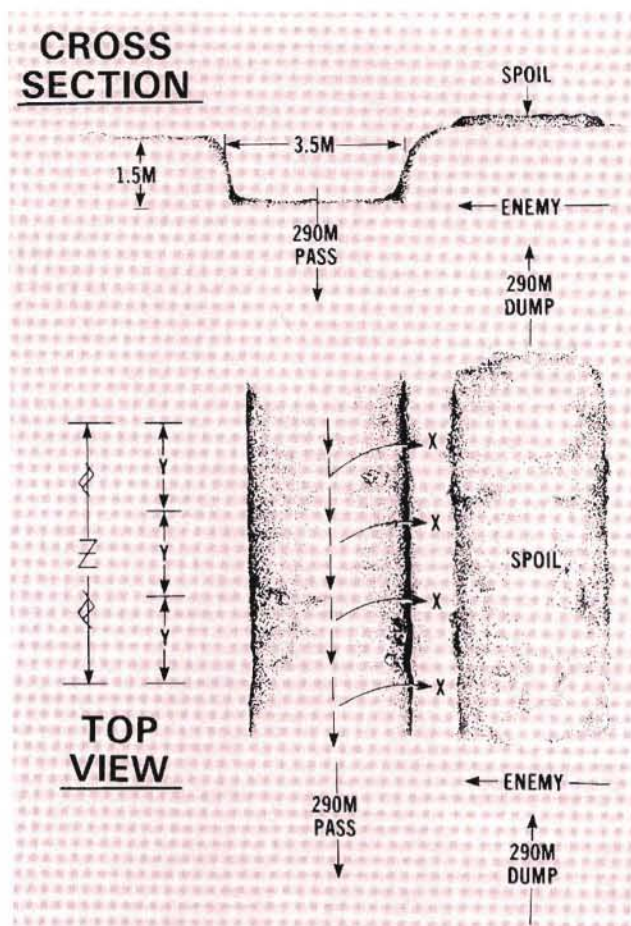


Figure 2

assumed to be broad and steeply rolling, ideally suited for a high berm. The soil was analyzed to be 70 to 75 percent sand and the remainder clay and fines.

Considering the equipment available and the relative effectiveness of each ditch design (U-shape, triangular, and side-hill cut), the U-shaped ditch was selected for construction. The loader/dozer team would build a U-shaped ditch using the push/strike-off method. This two-step, continuous process ditch has proven to be the quickest to construct and the hardest to cross. The plan called for substituting an additional D8K bulldozer (probably from the maintenance and equipment support company) for the 175B scooploader in the strike-off phase of construction. The loader could then be employed to dig road craters in the shape of small triangular antitank ditches elsewhere in the defensive sector.

The straightforward approach of the push/strike-off method resulted in few unexpected findings. It is worth noting, however, that the relatively simple method of construction was not so simply transmitted to even experienced operators. More than an hour of carefully supervised practice was required for operators to achieve an efficient construction rhythm. (Figure 1). The final product was effective in accomplishing the mission.

The rate of construction for the bulldozer/bulldozer team was measured approximately 140 meters per hour in all terrain conditions. This result was surprising, as only 100 meters per hour had been anticipated.

The construction method for the scraper/dozer team was also relatively simple in concept, but proved to be complex in execution. The 290M scrapers were to make a digging pass, accompanied by a push dozer. At the end of the digging run, the dozers were to make a dumping run to distribute the spoil on the friendly side of the ditch. The dozer would then return to the beginning to rejoin the scrapers. (Figure 2).

The tests revealed that the tractor/scrapers began to seriously outcycle the dozers at approximately 100 meters of construction, depending on terrain conditions (rolling versus flat). Therefore, a decision was made that scraper entry slots would be constructed about every 100 meters of ditch. The decision was based on the following criteria:

- Efficient cycle distance was determined to be approximately 100 meters;
- When backing up, the D8K dozer begins to lose final drive lubrication at approximately 120 meters.

After considerable practice, a slot construction time of about five minutes was obtained. Ironically, an overall rate of construction of 100 meters per hour was obtained after operators and supervisors gained proficiency with the technique.

It was also observed that the tractor/scrapers were more efficient when operated in tandem with the push dozer, rather than independently of the dozer. Coordination between operators was difficult at first, but proper supervision resolved the problem. Ensuring efficient cycle times and distances was essential to the success of the operation.

All that remained to be done was to compare the effectiveness of the D8K dozer, the 175B scoopleader and the 290M bobtail tractor in the strike-off phase of the two-step, continuous process ditch technique.

The rate of construction using the 175B loader in the strike-off phase was disappointing. A maximum rate of only 90 meters per hour was obtained. A lack of firm traction and the absence of a clam shell bucket were chiefly responsible for the slow rate. Using the 290M bobtail in the strike-off phase yielded a construction rate of approximately 110 meters per hour. The lack of traction was again the reason for the relative inefficiency. The obvious conclusion was that there is no substitute for a heavy duty blade and a tracked vehicle with deep grousers.

A summary of the test results follows:

- two D8K dozers: 140 meters per hour
- one D8K dozer and one 290M tractor/scrapper: 110 meters per hour
- one D8K dozer and two 290M tractor/pans: 100 meters per hour
- one D8K dozer and one 175B loader: 90 meters per hour

Again, a team of three 290M tractor/pans and one tractor pusher was not considered because of its inability to sustain a constant rate of construction, traction and maneuverability problems, and low level of maintenance reliability.

Various indigenous platoon vehicle combinations yielded two best aggregate construction rates:

- two teams of two 290M tractor/pans and one D8K dozer and one 175B scoopleader: 290 meters per hour
- three teams of three D8K dozers and three 290M bobtail tractors: 330 meters per hour.

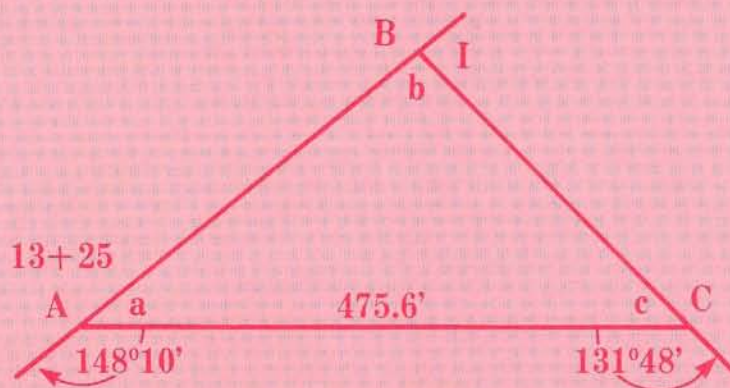
Again, there is no substitute for big blades and grousers. A bulldozer obtained from an outside source would definitely change the platoon's team configurations. Any possibility of creating a team of two bulldozers without sacrificing overall platoon flexibility or efficiency must be eagerly exploited. The addition of only one bulldozer can mean a gain in the platoon rate of construction of almost 20 percent. It is important to realize, of course, that individual test results will vary with soil conditions, operator efficiency, terrain and weather characteristics, and supervisor competence.

The most significant lesson learned by the tests was that there is no substitute for hands-on training in tank ditch construction. Even simple techniques such as the push/strike-off method require training time and effort. Intangibles such as team organization, operator proficiency and supervisor knowledge cannot be adequately tested in a classroom environment. The perfect classroom is the terrain and the best teacher is experience.

Capt. Michael L. Hoots currently commands Company B, 548th Engineer Battalion Fort Bragg, North Carolina.

THE PROFESSIONAL ENGINEER PROBLEM

The Professional Engineer Problem below is presented courtesy of the Fort Belvoir Chapter of the Society of American Military Engineers. The P.E. Problem is designed to provide study and stimulus for engineers aspiring towards Professional Engineer Registration, and to act as a review for currently licensed engineers. The Engineer School Problem will resume next issue, along with a new Professional Engineer Problem. Questions or suggestions regarding Professional Engineer Problems should be addressed to ENGINEER MAGAZINE, ATTN: Society of American Military Engineers P.E. Problems, Public Affairs Office, Fort Belvoir, VA 22060.



Two highways intersect at point "B", as shown above. Line AC is 475.6 feet long, originating at Station 13 + 25. A nine degree curve is planned to

join the two highways. Compute the following: Station of PC, PI, & PT; Angle of Intersection; Radius; Tangent; Length of Curve.

BRIDGE DEMOLITIONS IN THE FACE OF THE ENEMY

by Major Allan E. Younger, Royal Engineers, British Army

The following article taken from the MILITARY REVIEW, Command and General Staff College, Fort Leavenworth, Kansas, Volume XXXIII, No. 4, July 1953, is reprinted to furnish background information and to illustrate one of the more important of the countless problems facing military engineers on a division level and below in the employment of obstacles.

This article was prompted by an earlier one entitled "Who Dictates Destruction?" by Lieutenant Colonel Harold I. St. Clair, which appeared in the October 1952 issue of the MILITARY REVIEW.

There is one aspect of the German failure at Remagen, however, which Colonel St. Clair did not emphasize. He stated that there had been no prepared demolition plan at the bridge and this surely was the key to failure. It is not with the desire to criticize his article that this has been written, but rather to investigate the type of orders, that if given to the Remagen bridge demolition commander, would have ensured destruction of the bridge or at least saved him from execution later!

As Colonel St. Clair correctly stated, we are likely to have to fight a retrograde action in the initial stages of a future war. Men's lives will depend on the thoroughness of their training and the exactitude of their thought before this test comes. Therefore, we must ensure that the complexities and uncertainties of this type of warfare do not result in a "Remagen" by careful and detailed planning and through execution of all operations during a retrograde movement.

From a purely engineer viewpoint, the main problem in demolition remains as it always has been, "What shall I do if the enemy arrives on my bridge and I cannot get in touch with the superior officer who is authorized to order to fire?"

The reason that this question is so difficult to answer is that there are so many variables involved. These are:

1. The circumstances of the appearance of the enemy at the bridge and of their strength.
2. The strength of our own troops cut off on the far bank.
3. The strength of our troops in close proximity to the bridge.
4. The relative air situation.
5. The time factor, including the efficiency of communications.
6. The importance of the bridge.

To illustrate these, let the reader decide whether he would order the demolition if he were a sergeant faced with this situation and able to blow a bridge but lacking any superior orders.

You are a German sergeant at the Remagen bridge. You have been told that at least three divisions of German troops are on the far bank. Suddenly a group of the enemy, you estimate a platoon, which is about the same strength which is available to you, appears at the bridge. Will you fire the demolition? Obviously, the answer is no. Alter this situation to an enemy armored division arriving at a less important bridge, with one battalion of your own on the far bank. Will you fire this time? Obviously, yes.

However, there are many situations between these two extremes where the answer is not so simple and in these

instances remember that all the variables have not been included. The problem, therefore, is how to obtain the maximum chance of ensuring success when faced with so many variables and above all with the uncertainties of battle, particularly the lack of information so aptly called "the fog of war."

THE HUMAN ELEMENT

Another factor in bridge demolition is often forgotten by staff officers, namely, that of the strain on the engineer responsible for the demolition. It is doubtful whether any other single situation in war implies such a strain on a junior officer or noncommissioned officer as the demolition of a bridge in the face of the enemy. The reason for this is that no man can ever be completely certain that a large and complicated demolition will be successful. A chance bullet or mortar shell may have cut his leads, a well directed bomb is almost certain too. There is always a danger of premature demolition from similar causes, particularly when blasting caps have been inserted. Above all, no one on earth can give him an exact time for blowing, so he must be on the alert continuously. At the back of his mind may loom the potential penalties for failure. The physical relief that he feels if the demolition eventually succeeds is comparable with that felt by the airborne soldier when his parachute opens. Also it must be borne in mind that no country, however rich, is likely to be able to provide bridges for practice demolitions by newly commissioned officers or by noncommissioned officers.

This all points to the importance of the orders to the engineer firing part being really accurate, comprehensive, and realistic. A junior officer bearing such technical responsibility and subjected to such mental strain must be protected as far as possible from the chance of having to make decisions of great consequence.

IMPORTANCE OF COMMUNICATIONS

If communications are adequate, there is little problem. A liaison officer in good contact with his headquarters can obtain a ruling on any eventuality; however, dare one rely on radio in these circumstances? During the Rhine crossing, the leading wave of LVTs on one sector was about to enter the water when an officer ran up to the commander of the wave: "There has been a slight change of plan," he said, "The artillery will not lift on a time basis, but when you give the code word "splash" over the radio."

Seconds later, the wave set off. As it did so, someone chose to send out a signal, successfully jamming the radio net. Helplessly the commander yelled "Splash, I say again, Splash," into his microphone, receiving no reply. Inevitably the first wave drove into our own barrage.

This example is only introduced as being typical of circumstances all users of radio have experienced. It is suggested that to rely on radio as being the answer is courting failure by not eliminating one of the variables of the problem. Everything possible must be done so that the commander at the bridge site has no need to fall back on the outside advice unless totally unforeseen cir-



cumstances arise. This indicates a need for written orders at the bridge.

SEQUENCE OF EVENTS

Disregarding any type of demolition not being fired or likely to be fired in the face of the enemy, let us run through a typical set of circumstances to clear the problem in our minds.

A division commander wishes to convert a river into a complete obstacle and withdraw behind it. He, therefore, orders his engineer to prepare the bridge for demolition in advance. The front line may be 10 miles beyond the river and the loss of the bridges of this stage is unlikely. If they are lost, say to unexpected airborne attack, the commander will fight to regain them. At this stage, the sensitive blasting caps should not be inserted into the demolition circuits on the bridge for there is little question of destruction. To avoid the chance of error, the engineer at the site should be given written orders not to fire. This will not prevent an officer senior to him from giving him contrary orders, but it does protect him if he insists on a written authority from this senior officer and he will obviously attempt to check with his divisional headquarters first, if it is possible.

If the bridge is important, the division commander normally will send a unit to protect it. The demolition team should be integrated into this unit so that the whole becomes the bridge garrison. The bridge garrison commander (demolition guard commander), probably an infantry officer, is now the final link between the division commander and the demolition team leader (firing party commander), on the site.

What the engineer at the site now requires is a check

list to tell his new commander the technicalities, such as the time required for inserting blasting caps, and to remind him of the extra danger of premature explosion when such caps have been inserted.

At this stage, the engineer also must be quite sure that all his men know how to fire the demolition in an emergency, and also that a seniority roll is prepared so that there will be no confusion if there are casualties. Similarly, the bridge garrison commander must be in close contact with the engineer and must plan to avoid confusion if he becomes a casualty.

Normally, communications can be assumed to operate, and the division commander can always order the destruction of the bridge. Obviously, he needs to appreciate two situations to give this order, namely the situation at the bridge and the wider situation over the entire front. To keep him in touch with events at the bridge site, and to provide him with a quick alternative means of passing the orders to fire, the division commander may station a liaison officer there, in radio contact with him at his command post.



DELEGATION OF AUTHORITY

As the bulk of the covering troops withdraw over the bridge, or as the local tactical situation changes, the firing of the demolition may cease to be a vital divisional problem. At this stage the division commander will frequently delegate authority to blow the bridge to a regimental commander, who may in turn delegate it lower. This raises no problem except that there must be no doubt in the mind of the commander concerned that he is responsible for the giving of the order. Moreover, the bridge garrison commander must be in no doubt about from whom he will receive his orders. This may be elementary, but it is the very delegation of authority too early or too late that causes failure.

UNFORESEEN ENEMY ACTION

The whole difficulty of demolition orders can be summed up in the need for the junior regimental officer to know accurately the "big picture." This is an oversimplification, but it can be seen that if the division commander set up his command post at the bridge site with

all the communications at his command, and kept it there until the demolition was complete, there would be little difficulty. There would, however, be a great waste of the division staff in the process.

Therefore, the man at the site must be kept in the picture, in the same way that he is responsible for keeping his superior informed of events occurring near him. If this has been conscientiously done there should be little danger of the wrong decision being taken in an emergency. If the enemy arrives unexpectedly and cuts off the garrison, the senior officer on the spot will take charge. If he knows the outside situation he should have little difficulty in meeting his responsibilities.

One human weakness must always be borne in mind. The jobs of both the bridge garrison commander and the engineer are complete when the bridge is demolished. Furthermore, the sooner it is demolished the greater the chance of a technical success. Therefore, there is an understandable tendency on the part of both parties on the site to interpret events in such a way as to favor early demolition. Here, the presence of the division commander's liaison officer may help to keep events viewed in their right perspective.

CONCLUSION

The lesson of history is that where in battle there is uncertainty and a paramount need for determination and clear thinking, success depends, above all, on clear-cut command. There are many instances of demolition failures in battle because of lack of precise orders.

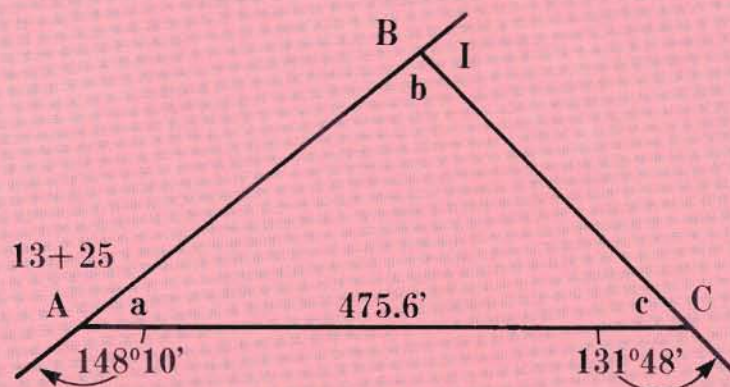
Most often, in the past, the trouble has arisen through confusion as to the officer empowered to give the order. It is contended, therefore, that the chances of success depend primarily on absolute insistence on a recognized drill which must include:

1. Definite specification in writing by appointment and name of the officer authorized to order demolition.
2. Clear written instructions to the engineer officer or noncommissioned officer leading the demolition team regarding technical aspects of the demolition.
3. The possession by the demolition leader of a checklist to cover the engineer responsibility in various eventualities.

This precision is all the more necessary in modern war in the face of possibilities of attack by air or armor.



The Professional Solution



SOLUTION: $a = 180^\circ - 148^\circ 10' = 31^\circ 50'$
 $c = 180^\circ - 131^\circ 48' = 48^\circ 12'$
 $b = 180^\circ - (31^\circ 50' + 48^\circ 12') =$
 $99^\circ 58' \text{ or } 99.97^\circ$

Angle of Intersection: $I = 180^\circ - 99^\circ 58' =$
 $80^\circ 02' \text{ or } 80.03^\circ$

Radius: $R = \frac{5729.58}{D} = \frac{5729.58}{9} = 636.62 \text{ feet}$

Tangent: $T = R \tan I/2 = 636.62' \tan 40^\circ 01' =$
 $534.51'$

Length of Curve: $L = 100 (I/D) = 100(80.03)$
 9
 $= 889.26 \text{ feet}$

Determine AB: $\frac{AB}{\sin c} = \frac{AC}{\sin b}$
 $AB = (475.6) \frac{\sin 48^\circ 12'}{\sin 99^\circ 58'} =$
 $(475.6) \frac{.745}{.985} = 359.72 \text{ feet}$

Station of PI: $PI = \text{Sta A} + AB = (13 + 25) +$
 $(3 + 59.72) = 16 + 84.72$

Station of PC: $PC = PI - T = (16 + 84.72) -$
 $(5 + 34.51) = 11 + 50.21$

Station of PT: $PT = PC + L = (11 + 50.21) +$
 $(8 + 89.26) = 20 + 39.47$



If It's Quality You Want...

by Capt. Thomas B. Nelson

Quality control of materials used in construction cannot be over emphasized. The end product is a direct result of the materials used. The best design and the most energetic supervision cannot build a successful road or airfield if the materials used do not meet specifications. And it is this field of quality control, unfortunately, that often receives only half-hearted attention. In order to ensure this quality we have an asset that we can use; the Material Quality Specialist, MOS 51G.

The stated purpose of the Material Quality Specialist (MQS) is to perform field and laboratory tests on soils and construction materials. The tests on soils, which includes rocks, or geology, are emphasized, because *all* horizontal construction projects are built *on* soil or rock, and *with* soil or rocks.

The specialist, in the rank of E1 through E5, learns the basics of his job in Advanced Individual Training (AIT) at Fort Belvoir, Va. Perfection of his basic skills and the learning of new techniques

are dependent on practice of his skills, completion of correspondence course work and on-the-job training. The success of a construction project often depends on the S1G's training, and associated skill. This article will highlight the S1G's formal training and provide recommendations for his continuing education.

The typical MQS student is an E1, straight from Basic Combat Training. Army students also include National Guard and Reserve Component EM's in the grade of E1 through E5. Most students are high school graduates, and all must have a GM score of 100. The sister services, including the Seabees and Marines, send students in the grade of E5 through E7 for future assignments as instructors or supervisors. Allied countries; notably Canada in recent years, send students in the grades E4 through Warrant Officer, again, usually for future instructor positions. The school welcomes these students and finds that their slightly differing needs and backgrounds add to the classroom training and the class interaction. This diversity is a major factor in promoting the team effort which helps the learning experience.

The Material Quality Specialist Course is taught by instructors of the Roads and Airfields Branch, Department of Military engineering, US Army Engineer School, emphasizing material quality work in support of horizontal construction. The course length is eight weeks, one day, with a total of 324 hours of instruction. The typical academic day includes six hours of class, with the remaining 2 hours being devoted to physical training, studyhalls, or open time. A full 70% of all training is "hands-on", actually working with the equipment and materials. Tests performed and procedures taught conform as closely as practical to those standards set by federal agencies, to include American Association of State Highways and Transportation Officials, (AASHTO) and American Society for Testing & Materials (ASTM).

The course is composed of four subject blocks: geology and drainage, soils, concrete, and bituminous. The soils block is further subdivided into 3 phases: Soils I covers the basic soil properties and tests; Soils II covers compaction and strength parameters; Soils III covers advanced techniques of stabilization, unconfined compression and soils report writing.



A student checks soil samples in the lab.

The geology and drainage block provides the student with a knowledge of rock types and their origins. Students learn to identify the 18 basic rock types and the rocks' usefulness as a construction material. They then learn how to measure rock orientations in the field and how a particular alignment of bedding planes may affect a project. The location of surficial materials is covered extensively, teaching the student where he can find materials for construction without expensive quarrying/crushing. Ground water, quarrying, and drainage fill the remainder of the block, which is tied together with a field trip to actually apply the knowledge gained.

Basic soil identification and properties tests make up the instruction in the Soils I block. Students learn soil identification by the Unified Soil Classification System and a hasty field method utilizing limited equipment. Atterberg limits, grain size distribution, specific gravity and moisture content, tests which determine the properties of soils, are covered in depth, with students spending most of their time actually performing the tests in the soils laboratory.

Compaction, California Bearing Ration (CBR) testing and field density determination comprise the 54 hours of the Soils II block. Students learn how to determine and test specifications for soil

MATERIAL QUALITY

SITE SELECTION

STRUCTURAL GEOLOGY

SURFICIAL GEOLOGY

EXPLORATION

ROCK IDENTIFICATION

STRIKE & DIP READINGS

FIELD IDENTIFICATION OF SOIL

SOIL BORINGS

CONE PENETROMETER

MATERIALS TESTING

SIEVE ANALYSIS

HYDROMETER ANALYSIS

ATTERBERG LIMITS

UNIFIED SOIL CLASSIFICATION

LABORATORY COMPACTION TESTING

CALIFORNIA BEARING RATIO TESTING

FIELD CBR (IN PLACE)

PLATE BEARING

UNCONFINED COMPRESSION

EARTHWORK INSPECTION

MOISTURE CONTENT

SPEEDY MOSITURE GAUGE

EXPEDIENT METHODS

compaction using the sand cone and the nuclear moisture density gauge.

Training in the nuclear moisture density gauge includes eight hours of instruction ending with a combination written and hands-on exam. The MQS Course is one of two sources of licensing on this equipment. Students passing the test are licensed to operate the gauge. CBR testing and analysis complete this block.

The Soils III block completes the soils instruction, and includes teaching the students exploration, stabilization, unconfined compression testing and technical report writing. During this period of instruction, students perform an actual soils test problem from the exploration phase through submission of a technical report.

The concrete instruction teaches students the properties of concrete, mix design, testing and quality control of concrete projects. Students perform the tests on samples mixed to their specifications.

In the bituminous block students learn identification of bituminous materials, their uses, mix design by the Marshall Method and testing the

quality of bituminous materials. A trip to an asphalt plant and a commercial testing lab highlights this block of instruction.

The successful completion of the course prepares the Material Quality Specialist to assist the S3 and using units in a wide range of projects. His education qualifies him to perform exploration, testing, advising and inspection. The specific capabilities in support of these roles are shown in the accompanying table (table 1).

Although the specialist is qualified to perform these functions, his education is far from complete, and requires the assistance of his supervisors. Perfection of techniques requires practice, so utilization of the SIG in his skill in the field is essential. Too often units complain about poor quality control, while a qualified SIG is being utilized as a jeep driver. The specialist needs to practice his skills as much as an expert marksman needs to hone his shooting skills.

This practice of skills should not be limited to periods when projects are being constructed. During those between-project periods of time the specialist can be performing tests on local borrow

SPECIALIST CAPABILITIES

FIELD DENSITY TESTS
SAND CONE
NUCLEAR DENSOMETER
CORRECTIVE ACTION
BITUMINOUS MATERIALS TESTING
FIELD IDENTIFICATION OF BIT.
MATERIALS
MARSHALL STABILITY OF MIX DESIGN
AGGREGATE BLENDING
SURFACE TREATMENTS & PAVING
OPERATIONS
PAVING QUALITY CONTROL
CONCRETE MIX
MIX DESIGN—SLUMP TESTS
COMPRESSIVE STRENGTH
MODULUS OF RUPTURE
QUALITY CONTROL
MAINTENANCE
SOIL STABILIZATION
SLOPE STABILITY
CONSTRUCTION ADVISOR
DRAINAGE
SOIL STABILIZATION

pits, compiling a file on the characteristics of all sources of soil available to the particular unit, possibly saving valuable time at the start of a future project. In addition, he can be practicing skills not used on past projects through working in his Soldiers Manual, the guide to what the man must know for future skill progression. The Commanders Manual will give further guidance on how you can help his progression.

You can also help the 51G by employing him as part of a "team" effort. His work is used by a draftsman in putting the numbers on paper, and checked in the field by a surveyor. The 51G should be familiar with their functions to better assist them, and to prepare himself to one day progress to the 51T level, when he will be the supervisor of the three fields (as shown on the career progression scale) (fig 1). While he will learn MQS skills at the Engineer School, the other skills must be learned in the field through experience or correspondence course, if he is to become an effective supervisor.

As an instructor and a developer of the course I have pride and confidence in the graduates of our

school. The students have a similar pride in their abilities, if not complete confidence yet. They know they can do their job and want to do it. It is only through utilization of their skills that confidence can be built. As supervisors, use these 51G's, building up their skill levels, their confidence and your quality control on projects. With manpower and construction resources limited, proper employment of the trained specialist can help you get the most for your money.

Capt. Thomas B. Nelson is currently assigned as an instructor in the Roads and Airfields Branch, Department of Military Engineering, U.S. Army Engineer School. At the time this article was written, Nelson was the Officer-in-Charge of the Materials Quality Specialist Course.





ENLISTED CAREER INFO



BECOME A WARRANT

Warrant Officers aren't grown in cabbage patches, in fact, most were once enlisted soldiers just like you.

The Warrant Officer Procurement Program for FY 1981 is outlined in DA Circular 601-80-1, dated 15 September 80. The circular encourages applications from personnel who are qualified for appointment and entry on active duty as warrant officers. It identifies seven warrant officer candidate training programs designed to produce appointees in MOS 011A, 031A, 100B, 222C, 223B, 224B, and 841A. It also lists opening and closing dates for other MOS and provides instructions on processing the application.

In addition to eligibility and processing criteria given in AR 135-100, there are other regulatory requirements such as:

- Mandatory MOS prerequisites that cite specific military training courses.

- Preferred MOS qualifications that outline job experience, military training and civilian education.

- General qualifications, including length of service, experience, military training, civilian education level, mental capacity, character, and conduct.

In many instances, the mandatory or preferred prerequisites include the requirement to complete resident courses of instruction. In cases where the required training is available through extension or correspondence course, nonresident course completion will satisfy the resident requirement.

Applications for a warrant appointment may be submitted at any time, but around six years of enlisted service is preferred in most cases. An exception to this is aviation. Soldiers who meet the qualifications may apply for the aviation training program without any required time in service.

The number of female warrant officers is just beginning to grow because it was only in 1972 that expansion of women in the Army began. The Army strongly encourages women to apply.

If you're interested in becoming a warrant officer, talk to your personnel officer for details on how to apply.

SQT NOTICE

The Skill Qualification Test (SQT) is a major training diagnostic for the Army individual training system. It provides feedback for trainers to develop effective training programs. Under the provisions of AR 600-200, soldiers/commanders may request SQT administration to support specific personnel management functions such as promotions, reenlistments, EPMS, and the qualitative management program. Primary Military Occupation Specialty (PMOS) testing by SQT is mandatory on an annual basis.

RESERVE OFFICERS' TRAINING CORPS SCHOLARSHIPS

One plus equals three, according to a new formula ROTC has come up with. One year of enlisted active duty plus one year of college could win you a three-year college scholarship. Not bad arithmetic when you consider it adds up to a commission as a second lieutenant.

In addition to the new program, the Army ROTC Scholarship Program still offers two-year scholarships for those who have completed two years of college. Both programs are designed to give enlisted men and women a chance to get both a college degree and a commission as an army officer.

The application period began January 15, and selections will be announced in June, so apply now.

The awards will pay full tuition, books, and certain educational fees, plus provide a subsistence allowance of up to \$1,000 a year each year the scholarship is in effect. In addition, winners will be paid for attending ROTC Advanced Camp, normally held during the summer between the junior and senior years of college. Winners may also take advantage of Veterans Administration benefits they would normally be entitled to.

Competition for scholarships is limited to enlisted personnel who have:

- served at least one year on active duty.
- completed one year of college and have three remaining, or.
- not reached their 25th birthday on 30 of the year they are eligible for commissioning.
- been accepted by a college for next fall's enrollment and have a GT score of 115 or higher.
- US citizenship.

Winners may attend any of the colleges and universities offering Army ROTC or one of the more than 500 non-host colleges that have cross-enrollment agreements with a nearby host school. Enlistment in the US Army Reserve is required prior to enrollment in the Army ROTC Advanced Course. Upon successful completion of their military science and baccalaureate degree requirements, these former enlisted personnel will be commissioned as second lieutenants and obligated to serve four years on active duty.

Applications must be requested by April 15 and submitted not later than May 1. For information and applications, contact HQ TRADOC, ATTN: ATRO-CM, Fort Monroe, VA 23651.

The following criteria should be used as guidelines for determining eligibility for annual testing:

- Soldiers must have completed a minimum of 12 months active Federal service as of the date of testing.
- Soldiers must be properly classified in accordance with Chapter Two, AR 600-200, in a PMOS identified in the applicable SQT announcement circular.
- Soldiers in pay grade E4 and below must have held PMOS, regardless of time in grade, a minimum of 90 days immediately prior to testing.
- Soldiers in pay grade E5 and above must have held their PMOS and grade a minimum of 90 days immediately prior to testing.

To qualify as exempt from annual SQT, soldiers must:

- Be participating in a course of instruction which, upon successful completion, qualifies them for advancement to commissioned or warrant officer status.
- Be attending a civilian college or university on a full time basis under the provisions of AR 621-1 or AR 621-7.
- Be attending an MOS producing course or functional schooling.
- Be assigned as a patient to a medical holding unit.
- Be within six months of an approved voluntary retirement date or have requested retirement in lieu of accepting a PCS or reassignment.
- Be confined in a civil or military detention facility to include the US Army Retraining Facility and US Army Personnel Control Facilities.
- Be attending the resident phase of an NCOES Course.
- Be within 90 days of ETS. This exemption applies only to first-term soldiers who have previously verified their current PMOS and grade through SQT.
- Be under an exemption granted by Commander, MILPERCEN.
- Be at a new duty station less than 60 days prior to the scheduled test date.
- Be in receipt of SQT notice less than 60 days prior to scheduled test date.
- Performing duties outside of the PMOS for a period in excess of 90 days under the exception of utilization priorities authorized in paragraph 3-5b (3) and 3-5b (7), AR 600-200.

Soldiers may voluntarily request testing while in an exempt status, or prior to the 90 day period after termination in an exempt status. Such voluntary testing can be accomplished during the regular test period. Soldiers missing a scheduled SQT will be rescheduled only upon approval of their commander (O-5 or above).

SERVE FULL-TIME WITH GUARD OR RESERVES

The Army Reserve and National Guard are looking for soldiers to serve the new "Full-time" Manning Program", adopted by the Army in an effort to increase the unit readiness of Army Reserve and National Guard units.

Under the program, soldiers from active components, Reserve, and National Guard units, are assigned to high priority Reserve and Guard units on a full time basis. The full-timers are expected to improve training, mobilization planning, supply, maintenance, and other readiness-related areas.

Soldiers assigned to full-time manning duty are actual unit workers. They live near, work, and deploy with the Reserve or Guard unit to which they are assigned. These units must meet most of the training standards that apply to the Active Army, but only have two days each month and a two-week training period once a year to do so. Full-time manning personnel should make this goal a lot easier to meet.

Junior and midgrade NCO's should check with nearby USAR Centers and Army Recruiting offices about job vacancies.

EARN PROMOTION POINTS

Are you looking for a way to earn promotion points? If so, Army Correspondence Courses may be the answer. If you're in grades E-1 through E-5, you can now earn one promotion point for every five credit hours you complete.

There are three ways to study, individually, as a group, or on-the-job.

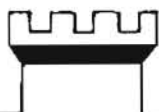
The individual study program lets you decide which courses or subcourses fit your needs, career objectives, or plans for self-development. Group study gives you the opportunity to draw from the resources and experiences of others. Supervised on-the-job training offers "hands on" learning.

The courses, offered through the Army institute for Professional Development, are divided into professional development, skill progression and functional, and individual subcourse categories.

When you have satisfactorily completed a course or subcourse you will get a certificate of completion. A copy of the certificate is forwarded to your official personnel file, however, you are responsible for making sure it gets there. You must have it to get those promotion points. Army Correspondence Courses are accredited by the National Home Study Council.

Check out the courses available to you by talking to a counselor at your education center.





OFFICER CAREER INFO

PROMOTION CHANGES

On 12 Dec 80 the President signed into law the Defense Officer Personnel Management Act (DOPMA) with an effective date of 15 Sep 81.

The transition provisions of Defense Officer Personnel Management Act provide that all Colonel and below Regular Army officers serving in a temporary grade higher than their current Regular Army grade will be promoted to the Regular Army grade which is the same as their temporary grade on the Defense Officer Personnel Management Act effective date. This provision does not apply to officers currently considered as having once or twice failed selection for promotion to the grades of CPT, MAJ, and LTC Regular Army.

Officers in a twice nonselected for Regular Army promotion status to the grades CPT, MAJ, and LTC will be retired, discharged or continued on active duty (e.g. officers within the 18 year sanctuary) until eligible to retire, under current law.

Officers in a once nonselected for Regular Army promotion status to the grades CPT, MAJ, and LTC must be considered for promotion by a selection board. The Army Promotion List and Chaplain Selection board to be convened under this provision is scheduled for 6-16 Oct 1981 with the AMEDD Board scheduled for 19-23 Oct 1981. Officers selected by these boards will be promoted. Officers not recommended shall, unless under new Defense Officer Personnel Management Act provisions be selectively continued on active duty, be retired, discharged or continued on active duty (18 year

sanctuary) until eligible to retire, under current law.

The Defense Officer Personnel Management Act provisions described above eliminated the requirement to convene COL, LTC, MAJ, and CPT Regular Army promotion boards in 1981; therefore, the previously announced 1981 schedule of Regular Army promotion boards is cancelled.

Officers on Regular Army promotion lists as a result of 1980 selection boards will continue to be promoted under current law until 15 Sep 81 at which time the Defense Officer Personnel Management Act provisions described in paragraph 2 become effective.

VETERANS PREFERENCE

Veterans preference for certain high-ranking military officer retirees has come to an end.

Effective October 1, 1980, retired members of the armed forces (1) who are not disabled veterans and (2) who retired at or above the rank of major or lieutenant commander are no longer eligible for veterans preference in competitive examinations and appointments.

The change is contained in the Civil Service Reform Act of 1978.

However, disabled veterans and veterans who retired below the rank of major or lieutenant commander will continue to receive veterans preference.

The decision to discontinue veterans preference for highranking, nondisabled veterans is based on the grounds that they are fully equipped to compete for Federal jobs on an

equal footing with the civilian population.

ASSIGNMENT ALERTS

In a major policy change effective 1 December 1980, commanders and supervisors have been given an expanded role in the personnel management of their subordinates. Unit commanders and supervisors now play an integral role in informing their subordinate officers of forthcoming reassignments.

The new assignment notification procedure applies to all warrant officers and commissioned officers through the rank of major (O-4). Only officers stationed in the continental United States (CONUS) are involved initially. Plans to include officers stationed overseas are still under study.

The policy change was recommended by MILPERCEN action officers following tests conducted between February and May 1980 involving units at Forts Riley, Benning, and Meade. The new procedure includes the coordination of assignment information—location, specialty, reporting date—between the officer, his commander/supervisor and the MILPERCEN assignment officer.

Under the old system, the MILPERCEN assignment officer called the officer at his home or unit and alerted him of the proposed move. Now, officers are informed by their commanders or supervisors, thus providing them with an opportunity to initially discuss the reassignment with someone other than their MILPERCEN assignment officer.

Additionally, the senior officer/supervisor is immediately aware of the possible loss of a subordinate officer.

Assignment officers now call a designated point of contact at each post or installation—usually within the G-1 office of the Directorate for Personnel and Community Activities (DPCA)—and inform him/her of the officers scheduled for permanent change of station moves. The point of contact is provided with the name of each officer, his Social Security number, the date being considered, the utilization specialty, the location, and the name and telephone number of the MILPERCEN assignment officer involved.

This information is provided to the appropriate commander or supervisor, who makes the initial announcement to the subject officer. If the commander/supervisor elects to do so, he may call the assignment officer prior to, during, or after the counseling period for further information. The announcement is expected to be made to the officer within three working days after the installation point of contact has been alerted.

Assignment officers are prepared to discuss with the commander/supervisor and/or the officer, the assignment rationale, professional development requirements, and the needs of the Army. The officer's performance information is not made available to commanders/supervisors unless the individual officer gives approval to release that information.

If the MILPERCEN assignment officer doesn't hear from either the commander/supervisor or the subject officer within three days, he

prepares a request for orders and completes the reassignment process.

201 FILES CHANGING

Officer Field 201 Files will be undergoing some changes in the next year, because of the implementation of the new AR-640-10 which became effective 1 March 81. The regulation, which will be phased in over the next year, classifies many documents now in the 201 File as "excess". Your AG Records Section should be able to give you local advice on what will be pulled, when, and how they will return these "excess" documents to you.

OFFICER PERSONNEL RECORDS

The Officer Personnel Records Division is responsible for the maintenance of the Official Military Personnel File (OMPF) for all active duty commissioned and warrant officers, and the administration of the Officer Evaluation Reporting System. Major functions of this division include:

- Initiate, update, amend, and transfer officer OMPF's.
- Provide records to the DA Secretariat to be used by Selection Boards.
- Receive, review, and place on file Officer Evaluation Reports.
- Administer the Officer Evaluation Report appeals systems.
- Loan OMPF's to authorized users.

Officers desiring to review their OMPF may obtain a copy free of charge by writing Commander, MILPERCEN, ATTN: DAPC-POR-

RS, 200 Stovall Street, Alexandria, VA 22332. Requests must include the officer's Social Security number. Officers anticipating a visit to the Washington area may also review their OMPF at MILPERCEN by calling Autovon 221-9618/9619 or Commercial (202-) 325-9612/9613. A minimum of two days advance notice is requested.

Officers visiting MILPERCEN to review their Official Military Personnel File are now also provided assistance to update their Officer Record Briefs (ORB's). The new service is part of MILPERCEN's effort to provide "one stop" personnel records service for officers visiting the Alexandria, VA center.

To insure that ORB information is accurate, officers should communicate first with their local MILPO to update the information and not wait until they visit MILPERCEN.

UPDATE YOUR PHOTO

What does your photograph in your Military Personnel File say about you? Are you well dressed? Does your uniform fit? Are you represented as an officer who is ready for added challenges? Your official photograph should represent you at your very best. Don't wear "special" items such as jump boots, unauthorized tabs, ribbons, berets, etc. when having your photo taken. Avoid wearing photo-sensitive glasses which tend to look like sunglasses when placed on microfiche. If your latest photo is outdated, or if you appear overweight, it may be doing you an injustice. Remember that AR 640-30 requires a new photo of every officer every three years.



RESERVE COMPONENTS

GUARD UNIT WINS AWARD

Company A of the 1249 Engineer Battalion, Oregon National Guard, was recently awarded the Governor's Unit Citation for its outstanding contribution to the community and state, in connection with their involvement in the refurbishment of a local community park.

The Guard unit expended nearly 7,000 man hours of work transforming a densely vegetated and rarely used area into a community park. The unit became involved through the persistence of a local resident, John Topits, who decided he wanted to see the area become a place of enjoyment for his neighbors.

The 110-acre Empire Lakes Park was once the municipal water supply for the city of Empire, Oregon, but after World War II the lakes were dropped from the system and designated as a public park. The area was all but forgotten when Topits contacted the Coos Bay City Council and the 1249th Engineers to see if the area could be renovated.

The Guardsmen reconstructed a deteriorating dirt dam, and built a swim/picnic area on the lower lake. An access road was surveyed and constructed, and tons of mud was removed from the lake bottom. Sand was brought in to create a beach, and three and a half miles of hiking/biking/nature trails were constructed.

INGENUITY PAYS

What do you do if you need a piece of equipment that's not available? Build it, say Privates Michael Sapiano and Thomas Miller.

Sapiano and Miller, 442d Engineer Detachment refrigeration specialists, built a vacuum pump for refrigeration maintenance by scrounging used parts. Starting with an old refrigerator compressor, electric outlet cord, and a switch box from an electrician's shop, they added an electrical starting relay and drain tube. The soliders mounted their completed project on a wooden frame three and a half days later.

The vacuum pump is used to flush contaminated freon from refrigerators, freezers, or airconditioners, so that new refrigerant may replace the old. A new pump would cost about \$650.



OREGON GUARD GETS INVOLVED

Specialist Four C.J. Burns of Detachment 1, Company B, 1249th Engineer Battalion, Oregon National Guard, has a good idea. He wanted to get local youths more involved with their community, and with the Guard, so he spoke to his Company Commander about setting up a visiting program.

Burns, a truant officer for Polk County School District, began his project with students from Dallas Junior and Senior High Schools. The visiting program is set up to accommodate up to 10 youngsters per drill weekend. Members of the unit demonstrate some engineer skills, and teach the students how to perform simpler tasks.

So far, visiting students have helped the engineers repair a bathhouse and construct bleachers for an area baseball field. The youths are closely supervised, and parents are invited to speak with Burns or Company Commander 1st Lt. George D. Lanning for an explanation of the program, prior to children attending actual drills.

Burns said community and parental feedback has been "just great" so far. Those attending are presented an Honorary Guardsmen for A Day certificate.

ALASKA'S OWN...AND ONLY

Second Lieutenant Walter Wood enlarges an artillery firing pad at Fort Richardson, Alaska during a recent training exercise held there. Wood is a member of Alaska's only Army Reserve unit, the 813th Engineer Battalion. In addition to enlarging this range, the reservists practiced communications techniques and constructed a portable utility shed. (US Army Photo by Dana Jackson).

ROTC ENROLLMENT INCREASES

The Army's Senior Reserve Officer's Training Corps (ROTC) has registered its seventh consecutive year of significantly increased enrollment, counting 69,663 college men and women this year.

One reason for this increase might be the Simultaneous Membership Program (SMP). SMP allows membership in the Guard or Reserves, and ROTC, at the same time. This means nonscholarship Advanced Course cadets who enlist in the Reserve Components can draw drill pay as an E-5 and simultaneously draw an ROTC living allowance of \$100 per month.

SMP has been in effect for more than a year, and there are approximately 4,000 cadets participating.

Another program boosting ROTC enrollement is called Expand the Base (ETB). In an effort to make ROTC available to more students, 41 new extension centers opened last year under ETB, and 48 more are expected to open this school year. In addition, eight new host schools are scheduled to open next year. Also, Congress recently approved an increase of 5,000 scholarships, bringing the total awards available through Army ROTC to 12,000.

"ENGINEER MAGAZINE"

Information for Contributors

ENGINEER MAGAZINE is an official Department of the Army publication which provides timely and authoritative information on Army engineering concepts, plans, policies, doctrine, procedures, operations, and developments. Acting as a medium for disseminating information, **ENGINEER** seeks to increase general understanding of the role and importance of Army engineering, and promote professional development of all officers, enlisted personnel, and civilians engaged in Army engineering activities.

WRITERS; the primary requisite for being published is your message, not your writing ability. If you have something of value to offer, whether it be in the form of a feature article, announcement, photograph, or illustration, we want to hear from you.

SUBJECTS of articles printed by **ENGINEER** Magazine cover nearly every phase of Army engineering, including systems development or disposal, Unit and MOS profiles, field reports of technical or tactical interest, and more. We are interested in engineer functions at all levels, from the Department of the Army down to the smallest field unit.

STYLE should be clean, concise, and written in the third person active voice. Strive for simplicity in word selection and sentence construction. The editor reserves the right to edit all manuscripts to conform to the **ENGINEER** magazine style, but substantial technical changes will only be made with the author's consent.

MANUSCRIPTS of feature length articles are generally 1,000 to 3,000 words, but may be longer or shorter in length. News items may be one sentence or several hundred words long, depending on your subject. A single copy of your manuscript should be submitted, typed double spaced. Send whatever art or pictorial support

you can. You may want to contact your Public Affairs Office or Post Photo facility to request photographic coverage for your story. Manuscripts should NOT be under editorial consideration elsewhere at the time of submission to **ENGINEER** Magazine. Manuscripts should NOT contain classified material.

PHOTOGRAPHS help to clarify and explain your manuscript. Black and white 5"X7" prints are preferred, but do not limit yourself to this criteria. Submit all drawings or photographs that go with your story. Captions should be typed on a separate piece of paper and taped to the back of the art work. Don't forget to identify people in photographs by rank, first name, middle initial, and last name.

CORRESPONDENCE between authors and editorial staff is made easier by the inclusion of a complete return address and duty phone number. Contact the **ENGINEER** Magazine at Autovon 354-3082, and mail manuscripts or other correspondence to: Editor, **ENGINEER** Magazine, Public Affairs Office, Stop 12, U.S. Army Engineer Center, Fort Belvoir, VA 22060.

CREDITS or by-lines should be included with all feature articles and photographs. Feature story by-lines might include your present title or duty assignment, previous assignments, any education or experience that lends credibility to your story, and of course, your full name, middle initial, and rank.

Remember, **ENGINEER** is *your* magazine, with your help we can make it a top-flight professional journal. I LOOK FORWARD TO HEARING FROM YOU!

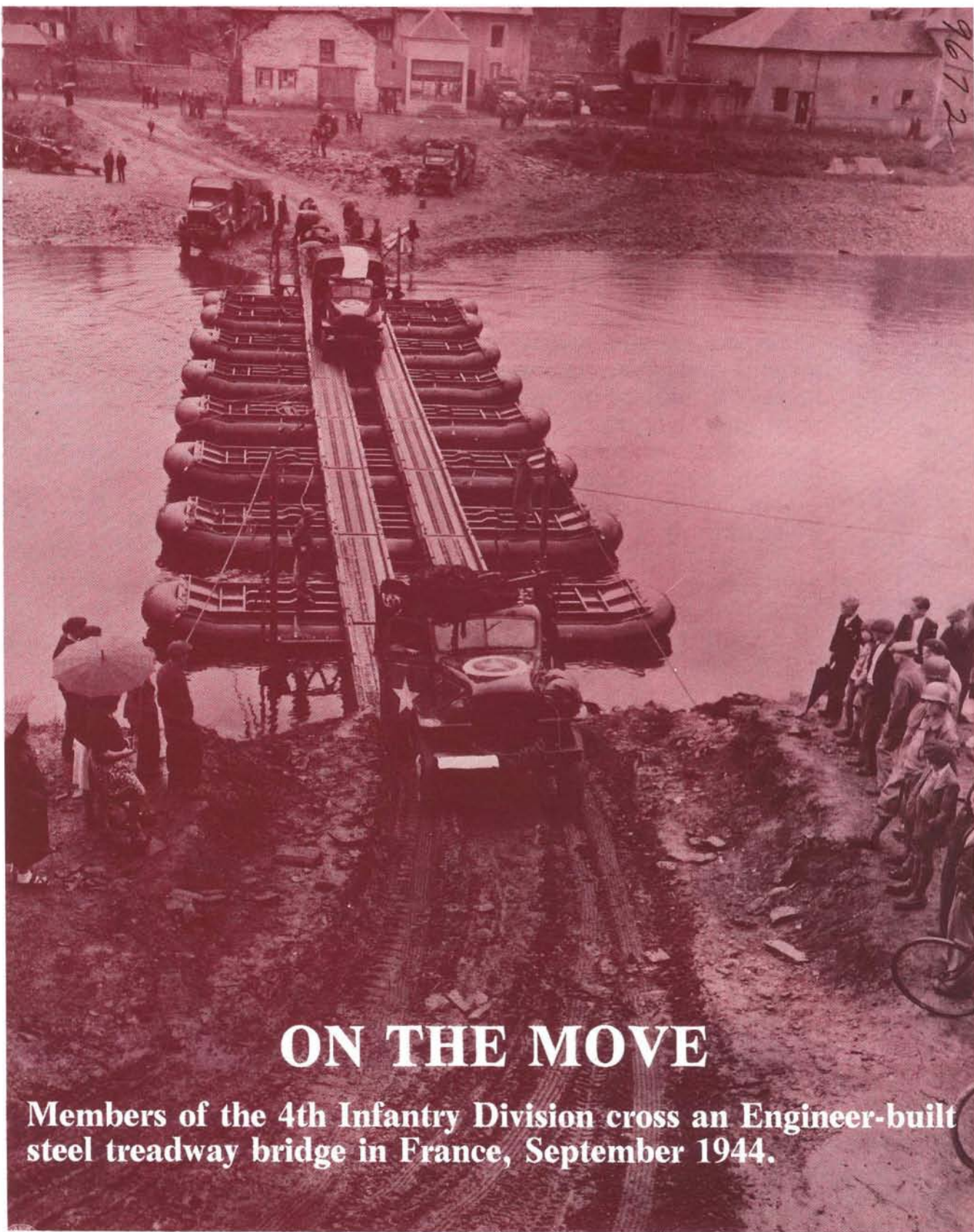
Sincerely,

SP4 Nancy P. Lang
Editor,
ENGINEER MAGAZINE

From the Editor's Desk

It has been my distinct pleasure to serve as Editor of ENGINEER Magazine for the last three years. Even before this issue went to press, I assumed new duties elsewhere. But I intend to follow with more than passing interest the continued progress of ENGINEER Magazine under your new editor. Those of you who wore engineer insignia in 1971 may recall the initial issue of THE ENGINEER, as it was called then. If so, you have witnessed several stages of growth and maturation in the format, design, style and content of the magazine. My own bias notwithstanding, I believe that the most recent changes in design and editorial content have placed ENGINEER Magazine among the top echelon of Army periodicals. I take some of the credit for the layout and design improvements, but you, the readers and authors, are primarily responsible for the vast improvements in editorial content. If it were not for your efforts and contributions—letters, articles, photos, criticism—this magazine would be little more than a newsletter. I wish to express my sincere thanks for your outstanding support during the past three years, and to encourage you to support my successor as well.

Jerome J Hill



ON THE MOVE

Members of the 4th Infantry Division cross an Engineer-built steel treadway bridge in France, September 1944.

"I respect everyone's right to their own view, but we have a right—indeed a responsibility—to talk about the advantages of a military profession to all Americans. All of us must give high priority to explaining to young men and women that service to the country can be productive and uplifting for the individual. I believe that."

—Gen. Edward C. Meyer
Chief of Staff of the Army

