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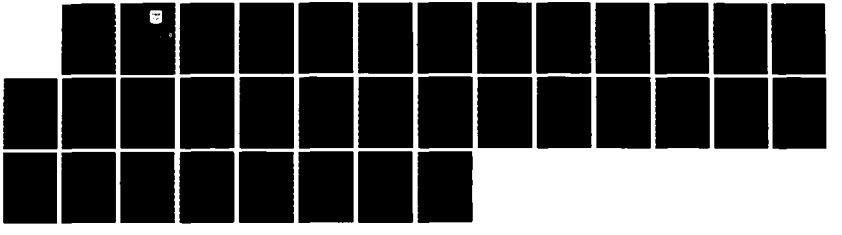

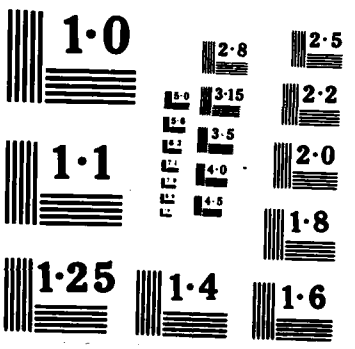
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STUDENT ESSAY

COMBAT ENGINEER EQUIPMENT: ACHILLES HEEL IN THE OFFENSE

BY

LIEUTENANT COLONEL FREDERICK J. CHARLES, III

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There is some question whether or not US Army combat engineers have the equipment necessary to provide mobility support to offensive operations as would be found in AirLand Battle. The current status of engineer equipment and its shortcomings are described. Recent trends in research, development and acquisition of engineer equipment to provide counterobstacle and countermine support on the battlefield are discussed. The inability of engineers to obtain the priority and funds needed to modernize their equipment is

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attributed to a general lack of understanding and appreciation for the necessity of engineer support in the offense. To counter this condition the need to retain the initiative in the offense, the nature of the Soviet threat, and weaknesses in realistic combat engineer combined arms training are cited. The conclusion is that weaknesses in combat engineer equipment can be overcome only with support of the other combat arms who must carefully weigh the risks incurred during offensive operations if engineer equipment does not complement the modernized systems of the combined arms team.

USAWC MILITARY STUDIES PROGRAM PAPER

COMBAT ENGINEER EQUIPMENT: ACHILLES HEEL IN THE OFFENSE

AN INDIVIDUAL ESSAY

by

Lieutenant Colonel Frederick J. Charles, III, EN

Colonel Eugene H. Grayson, AV
Project Advisor

US Army War College
Carlisle Barracks, Pennsylvania 17013
7 April 1986

ABSTRACT

AUTHOR: Frederick J. Charles, III, LTC, EN

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There is some question whether or not US Army combat engineers have the equipment necessary to provide mobility support to offensive operations as would be found in AirLand Battle. The current status of engineer equipment and its shortcomings are described. Recent trends in research, development and acquisition of engineer equipment to provide counterobstacle and countermine support on the battlefield are discussed. The inability of engineers to obtain the priorty and funds needed to modernize their equipment is attributed to a general lack of understanding and appreciation for the necessity of engineer support in the offense. To counter this condition the need to retain the initiative in the offense, the nature of the Soviet threat, and weaknesses in realistic combat engineer combined arms training are cited. The conclusion is that weaknesses in combat engineer equipment can be overcome only with support of the other combat arms who must carefully weigh the risks incurred during offensive operations if engineer equipment does not complement the modernized systems of the combined arms team.

Major General Forrester was pleased. The division was moving to the attack--finally. The three unbelievably long days of sitting idle while World War III erupted across the Central Front had been psychologically taxing and unnerving to him and, as he well realized, to the soldiers under his command. In spite of U.S. and NATO mobilization, the Soviets and Warsaw Pact forces had attacked on 25 August, the result of years of growing world tension and of the inevitable economic disaster which was evolving in the Eastern Bloc. The violence and frightful battles of modern war had proven every bit as terrifying as predicted. Initial NATO losses were great, but the attackers had suffered even more. Thousands of dead and dying were strewn across battlefields from the North Sea to the Alps and for all that General Forrester knew, probably in Scandanavia, Italy and Turkey as well.

It was not easy being held back from battle as part of the Army Group's reserve, but it was absolutely necessary. General Forrester knew that in order for NATO to decisively blunt the Soviet's attack a strong force was needed to be held in reserve until the main enemy thrust was identified, his airpower dissipated and his supply lines and follow-on echelons exposed and vulnerable. Then NATO could strike with audacity and violently wrest the initiative from the enemy. At least that

was what Airland Battle, or more acceptably in NATO, Follow-on Forces Attack, was all about. Well, mused the general to himself, now was the time to see if the doctrine could indeed work on the battlefield.

The time was ripe. NATO had given ground but had not broken. The main Soviet attack had been identified from Goettingen north, coming across the North German Plain. Although it had succeeded in pushing nearly ninety kilometers at its deepest penetration into West Germany, Hamburg, Bremen and Hannover were still in NATO hands. Soviet pressure was still intense, but their heavy losses were measureably slowing their rate of advance. The second echelon armies had not yet impacted on the battle. Enemy holding attacks south of Goettingen along the East German and Czechoslovakian borders had made less than twenty-five kilometers progress in most areas, but they had succeeded in fully occupying the front line units of CENTAG's three southern corps. The Allied air forces had fought a formidable air campaign against tremendous odds. The effectiveness of allied air defense coordination and the thorough counter-air campaign had cleared the skies of nearly eighty percent of the enemy's aircraft. The price had been high, but Allied air bases were still at above sixty percent capability and the air forces were beginning to direct

attention to battlefield and deep interdiction, critical to AirLand Battle's success. General Forrester knew the time was propitious for NATO's counterattack. The Soviets were preparing to strike with their second echelon armies, hopefully to break through to the Ruhr, the Rhein, and the Benelux ports. NATO needed to attack now to sieze the initiative and disrupt the plans of its superior foe. With luck the Inner-German Border could be restored and a halt to the war brought with conventional forces alone.

General Forrester's division was the northernmost division of a combined corps attack. The division's mission was to pass through friendly lines west of Fulda, to penetrate the attacking forces and to secure the attacking corps' left flank along the axis Eisenach, Nordhausen, Magdeburg. The corps' mission was to strike the rear of the Soviet's second echelon and to sever its supply lines from the East. Air interdiction missions would be cutting the Soviet lines of communication and disrupting troop and support concentrations throughout East Germany, Czechoslovakia and Western Poland. The probability of success was fair, but it depended upon rapid progress to keep the enemy off balance and to maximize the advantage gained by surprise.

As General Forrester awaited the first reports from his attacking brigades it occurred to him that his division was in the same left flank position and following the same route as Marshal Soult had nearly two hundred years previously with his IV Corps during Napoleon's famous pursuit and destruction of the Prussian Army after defeating it at the Battles of Jena and Auerstadt. There was a difference, however. This enemy had not yet been defeated and the battlefield was a hundred times more lethal. He prayed that the attack would succeed.

Shortly after noon reports started filtering in. The passage of lines had gone well and the surprise of the attack had allowed penetration of the enemy's lines with minimum friendly losses. Apparently the adjacent divisions were experiencing similar success. The question now was whether or not the momentum could be maintained long enough to reach and pass through the hills of the Thuringian Forest and shift northeast toward Magdeburg. Unfortunately, the answer was not long in coming.

The lead brigades had been able to force crossings of the Fulda River using Armored Vehicle Launched Bridges (AVLBs) and the only Medium Girder Bridge (MGB) received from corps. Engineer reconnaissance had allowed them to bypass minefields

placed in what had been the covering force area a few days before. About nine hours into the attack the first signs of serious trouble appeared. Reconnaissance units had been unable to find any quick crossing opportunity of the Werra River. The Soviets had destroyed the few bridges that remained even though it had isolated their own divisions west of the river. The width of the river was too great for AVLBs and the only fords known were found to have been mined by the Soviets, with the loss of several M-3 Reconnaissance Vehicles. What was worse it seems that Soviet Mobile Obstacle Units had planted mines in the path of First Brigade, stalling them completely. Strong anti-tank fires had hit the brigade as it hesitated in front of the obstacles. The two mine rollers available were far to the rear because of their slow rate of movement. The engineers had only bangalor torpedoes of World War II vintage and no way to breach the minefields except by doing it exposed using hand probes and the bangalors. The countermine vehicles asked for by the engineers had long ago lost in the scurrying for procurement dollars.

The cavalry squadron reported a short time later that the banks on the far shore of the Werra had been cut with a vertical face one to two meters high. There was no way for M-2 Bradleys to swim the river and get out on the other side. The

M-9 Armored Combat Earthmover had not yet been issued to the division, and there was no way to get an exposed bulldozer on its unprotected tractor and trailer close enough to assist. A Combat Engineer Vehicle (CEV) might be able to knock down the far bank with a round from its demolition gun, but the division had only eight CEVs to begin with. Three had been destroyed making the initial breakthrough and two more had mechanical problems, not a surprise due to their age and the fact that AVLBs and CEVs had the only M-60 chassis in the division. Corps had never been authorized CEVs and the counter-obstacle vehicle vehicle proposed by Israel and the engineer community had been dropped back in 1986.

General Forrester knew that every minute's delay gave the Soviets a better chance to regain their balance and to direct forces against his counterattack. Loss of the initiative would doom the attack. He ordered the First Brigade to bull through the minefield and to keep moving. To get across the river he directed his engineers to move up a World War II Baily Bridge in their dumptrucks and to build it under fire. With luck it would be completed in six hours. The casualties would be great, but they had to cross the river. If only they had another MGB or some of the division's ribbon bridge which had to be committed on the Main River to keep the MSR open.

The three remaining CEVs would have to assist in reducing any Soviet strongpoints that might have been established on the far shore. Hopefully, he could hang on to all three until they reached the Thuringian Forest where he knew they would be the only combat vehicles with blades to push through road blocks and fill in craters. He did not know what to do to counter the mines he knew the Soviets would plant in his path. Bulling through was just too costly. He knew the German division on his right flank had armored engineer vehicles and blades on a number of their tanks. Somehow their country had balanced its modernization efforts to provide the optimum combined arms team. Well, it was far too late to think about that.

The optimism of early that morning was gone. General Forrester knew his division's momentum was being lost with each moment it delayed at a natural or Soviet-placed obstacle. The corps' whole venture was in jeopardy and perhaps with it any hope of NATO's success.

Does Major General Forrester's predicament seem far-fetched? It should not. Even though nearly all components of Airland Battle doctrine were in place and functioning, success was in doubt because lack of attention had been given to what became the critical combat engineer component. Combat

engineers could not adequately support the combined arms team because their equipment had not kept pace with the modernization of the Army's maneuver forces. A small number of maneuver commanders are starting to recognize this fact. Lieutenant General Robert L. "Sam" Wetzel, commander of V Corps during the 1985 winter Reforger Exercise Central Guardian, observed:

> "The need for a modernized combat engineer force was also clearly evident. Today's combat engineers lack many of the modernized systems needed to properly support tactical commanders. The engineer must be as mobile and protected as his fellow combat aarms partners....The engineers' need for fast demolitions and an expedient method of breaching obstacles was highlighted in the various counterattacks conducted during the exercise. It became quite obvious that the breaching of minefields, the rapid crossing of gaps on the battlefield and the reduction of strong points are engineer missions that can be accomplished now only with Korean War technology....The combat engineer vehicle (CEV) and armored vehicle-launched bridge (AVLB) are critical items of equipment forces trying to attack through areas containing both friendly and enemy obstacles. More of them are needed. Even more critical are the needs for

modern minefield-breaching systems and counterobstacle vehicles."[1]

Why is it that the engineers have not kept pace with the Army's modernization over the past decade? There are basically two reasons for this. First and foremost there is a lack of adequate understanding and appreciation for the need for combat engineers in the offense. Second, this lack of understanding directly impacts upon engineers lack of priority in competing for research, development and acquisition funds.

Before addressing the problem of understanding and appreciating the role of combat engineers in the offense, it would appear best to first deal with the rational for modernizing their equipment. Why do engineers need more modern equipment? What is wrong with what they have now? What is already being done to modernize them? Is the issue worth being concerned about?

In answer to these questions one must realize that combat engineers impact heavily on each of the T's in METT-T. First, ground maneuver forces are tied to the terrain. Assisting maneuver commanders to optimize use of the terrain is fundamental to each of the engineer's key battlefield missions:

mobility, countermobility and survivability. If the engineer must modify the terrain to support the maneuver commander, then the other two T's, time and troops available, are heavily impacted upon. To breach obstacles, natural or manmade, takes a great deal of time and effort. Machines and demolitions have proven the best tools of the engineer to minimize time and manpower requirements. Since speed is a key fundamental of the offense it follows that if improvements are made in the tools of the engineer, the resultant increase in capability and efficiency will reduce the time needed to breach obstacles and will enhance speed on the battlefield. The increased efficiency may also free engineer soldiers from the leading edge of the battlefield to perform often neglected engineer missions in rear areas.

Focusing on the equipment needs of engineers does not mean that force structure, training and operational concepts are not important. They certainly are if a cohesive combined arms team is to be prepared for the offense. These factors can be adjusted in the short term, however, whereas equipment changes and improvements take a much greater time.

Combat engineers today can barely support offensive combat operations. The only armored vehicles they have to support

maneuver forces with are the CEV and the AVLB, so critical to General Forrester's plan. With only eight CEVs and sixteeen AVLBs in a heavy division and none from which to be reinforced with from corps engineer units, there are simply not enough to provide proper counterobstacle and gap crossing support. The last of the Army's 291 CEVs was built in the early 1980s and the industrial capability to produce its cast turret no longer exists. In some divisions the CEV and AVLB have the only M-60 chassis in the division. Now they also will experience the longtime problems of providing repair parts for low density engineer equipment. Other than the AVLB, bridging for the offense is totally unprotected. If bridging for gaps greater than sixty feet is needed, the Medium Girder Bridge(MGB) is used, but a corps only has enough to construct four one hundred foot bridges, and only two bridges at one time. There is no additional MGB above corps level. For water gaps the ribbon bridge is available at division. Both the MGB and ribbon bridge are limited by their poor survivability. Each is carried by five-ton trucks. The older mobile assault bridge is still in the inventory, but it is being phased out by the ribbon bridge because of its complex maintenance requirements and poor survivability. Other bridging available includes the Bailey Bridge which is fine for main supply routes but inappropriate in the offense. Too much time, labor and

equipment is needed to transport and construct it. Additional bridging such as Class 60 and M4T6 is located in theater reserve but is also old and it poor condition. Furthermore, it is equipment and labor intensive.

Current mine breaching capability is even in a worse state. The long development of track-width mine rollers is just now providing for M-60 tanks. An M-1 adapter kit is still well over a year away if it remains funded. Plows to breach minefields have not been fielded making the CEV the only combat vehicle with a blade on it in M-1 equipped divisions. The M173 Demolition Kit, fielded in the early 1960s is no longer in production. The device with its rocket-projected demolition line charge is not highly mobile, is not safe because of fuze problems and is forward deployed in only limited numbers. The bangalor torpedo, used by General Forrester, is of limited effectiveness in clearing track-width lanes. It was developed in World War II for breaching wire obstacles and anti-personnel minefields. It must be assembled and installed by soldiers on the edge of the minefield. Training use of bangalors will exhaust supplies in FY 91 unless a rebuy is funded.

Detection of mines in the offense must be done today visually or by vehicles detonating them. The Army's two mine detectors are fifteen and twenty-five years old respectively

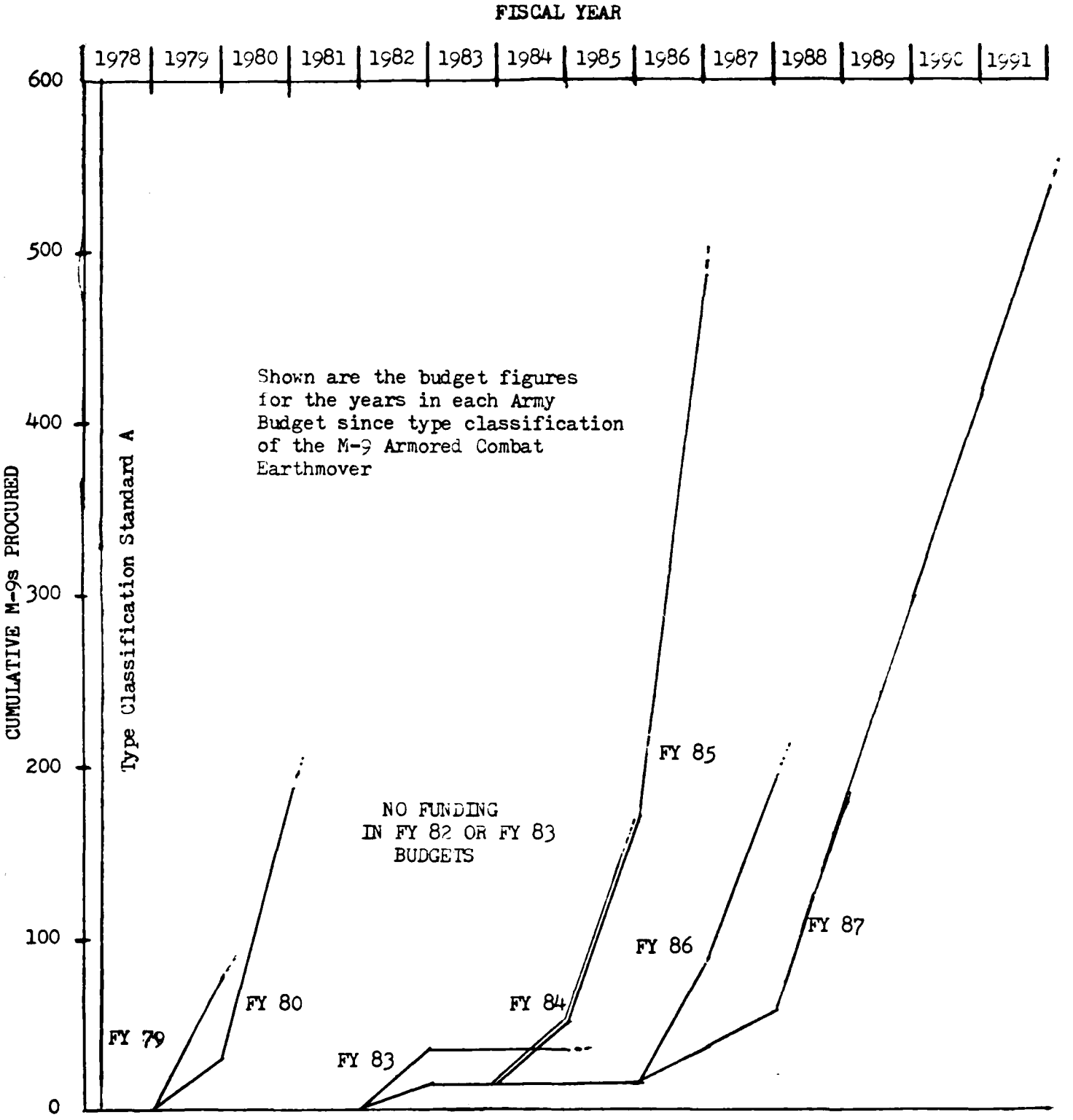
and must be used by an unprotected soldier on foot. Hand probing, again by exposed soldiers, is the only other method to detect mines. None of these methods is acceptable for use by an attacking force either because of the loss of time or the undesired risk to personnel and equipment.

Modernization of combat engineers to meet the maneuver commander's needs in the offense are ongoing, but they suffer greatly in the resourcing arena. There is probably no greater example of this than the M-9 Armored Combat Earthmover (ACE). The ACE is a multi-purpose engineer vehicle which can perform each of the critical tasks of mobility, countermobility and survivability. Its primary advantages over the D-7 Caterpiller bulldozer which it will someday replace are that it is highly mobile and is armored. It can move at thirty miles-per-hour versus the three-to-five miles-per-hour of the bulldozer without its vulnerable prime mover and lowbed trailer. The ACE provides the operator small arms, artillery fragmentation and NBC protection. In offensive operations the ACE will fill ditches and craters; winch or tow other fighting vehicles; remove road blocks, trees and rubble; prepare access and egress sites for river crossings and fording sites; and build and maintain combat trails and assault landing strips. It will be the maneuver commander's only resource to dig in his combat vehicles and increase their survivability..

General Forrester really needed the ACE. Why wasn't it available? After all, development started in 1958. 1958 and it still is not fielded! Initially called the All-purpose Ballastable Crawler (ABC) it became the Universal Engineer Tractor (UET) and both Caterpiller and International Harvester built prototypes in the early 1960s. In January 1975 an additional four UETs were built by the Pacific Car and Foundry Company for testing at Fort Hood. TECOM testing was completed in August 1976 and type classification (Standard A) was approved in February 1977. Fielding, unfortunately, has been strung out over the past decade due to the imposition of additional vehicle performance criteria, the requirement for additional tests to reconfirm perforce capabilities, and the lack of consistent funding. The accompanying chart displays the funding variances since type classification. Now, when production appears probable if the ACE survives Gramm-Rudman-Hollings cuts, the total acquisition quantity programed has been reduced from 1400 to 580. A capability obtainable in the early 1960's will be fielded over twenty years later in fewer than half of the quantities initially required. There will still be no help for General Forrester since the first units to be equipped will be the light infantry divisions.

Similar problems have been experienced in the development of a countermine capability to improve upon the bangalor

ACQUISITION OF THE M-9 ARMORED COMBAT EARTHMOVER



torpedo and the M173 Demolition Kit. The Mine Clearing Line Charge (MICLIC) was developed for the Marine Corps. Although it is trailor-mounted and unprotected, the Army decided to purchase it initially in order to give a mine clearing capability to light divisions. For heavy divisions it was to be issued later with the Robatic Obstacle Breaching Assault Tank (ROBAT). The ROBAT is a remote-controllable M-60 tank chassis with a track-width mine roller or plow and two or more ballistically protected line charges mounted on the tank. The MICLIC trailers in the heavy division could be towed by ROBAT, another tank, or an engineer M113A2 Personnel Carrier. Research and development for the ROBAT have been zeroed out, and although MICLIC is being purchased, it might not meet the needs of the heavy division without ROBAT.

A track-width mine plow is under development, but it will probably not be fielded until 1990 or later. Until then the CEV will be the only mobile, armored blade in the heavy division. Efforts are also underway to develop a Heavy Assault Bridge (HAB) to supplement the AVLBs of the heavy divisions and a Light Assault Bridge (LAB) to provide a short gap crossing capability in light divisions. Neither bridge will be fielded before the 1990s even if funding is continued. The VOLCANO mine dispensing system will provide a ground mobile

countermobility system to help an attacking force secure its flanks. This system also will not be fielded until the 1990s, again if funding continues. The important need for a counterobstacle vehicle (COV) is not being met. The joint U.S.-Israeli initiative to develop the COV has lost its funding.

The foregoing discussion has been intended to illustrate the predicament that combat engineers are confronted with. The key to their successful use in the offense is equipment, yet the equipment they currently have is inadequate both in quality and quantity to assure they can succeed. The modernization necessary has not been done as the record of research, development and acquisition of engineer equipment clearly shows. Engineers cannot independently impact upon the establishment of priorities for research and development or for procurement. It obviously follows that if the situation is to be corrected then support must be obtained from other members of the combined arms team to increase the priority for engineer equipment research, development and acquisition. This can be done only by increasing understanding and appreciation of the need for combat engineers in the offense. If you a member of the armor, infantry or artillery branch and have read this far, you have completed the first step in the process. You now have an understanding of the shortcomings which exist in combat

engineer equipment for the offense. To complete your understanding and hopefully gain your appreciation for combat engineers in the offense, the following topics will be discussed:

Initiative in the offense.

The nature of the threat

Combat engineer combined arms training

"On today's battlefield the attacker must maneuver rapidly, penetrate deeply, survive powerful counterfires and countermeasures, and above all maintain momentum by maintaining the initiative."[2] If initiative is indeed the underlying base of AirLand Battle doctrine as stated in FM 100-5 then it would seem only logical to concentrate our research and development efforts on those methods and that equipment which will assure that we can seize the initiative from our opponent and maintain it until the successful conclusion of hostilities. Have we done that? Have we placed the emphasis correctly? The foregoing discussion should indicate that perhaps we have not, at least with regard to the engineer component of the combined arms team. "If the attacker loses the initiative, even temporarily or locally, he will jeopardize the success of the entire operation."[3] This was the outcome being faced by General Forrester. He simply lacked the proper equipment in adequate numbers to overcome the obstacles confronting his attack.

The momentum needed to maintain the initiative is not unlike the momentum of classic physics; it is a function of mass and velocity. If you lack the overall mass of your opponent, as is the case we face against the Soviets, you can achieve success only by concentrating your mass and increasing your velocity so that you have greater momentum at the point you apply it. The maneuver commander depends upon combat engineers to insure that the combat power of the attack (its concentrated mass) can sustain the velocity to maintain the greater momentum. Unless engineers have the tools to do this, the momentum will be lost and with it the initiative, the key to success in the offense.

What measures will the Soviets take to offset the advantage we gain by siezing the initiative and striking deep during the ground phase of AirLand Battle? They will make use of obstacles to deny our access to selected routes or terrain, hold our forces within target range of their weapons systems, economize their forces and to make our forces mass combat strength. They learned through bitter experience in World War II that they had to integrate their engineers with their maneuver forces in order to blunt the German's armored thrusts. In describing combat engineer efforts during the Battle of Kursk, the greatest tank battle of World War II, Colonel-General Alexander Tsirlin, then commander of the engineer

troops of the Soviet's Steppe Front said:

> "The Kursk defenses, as is well known, were built mainly against tanks. The system of anti-tank strong-points and tank-proof areas, the powerful obstructions and the operations of the anti-tank artillery reserves and the mobile obstacle detachments made it possible successfully to engage large numbers of German panzers....mine-fields became the basic type of obstacle, and their organization the main mission of the engineer troops in defence. Suffice it to say that in preparation for the defensive battle the sappers of the Central and Voronezh fronts planted about 500,000 anti-personnel and anti-tank mines, laid about 700 kilometres of wire entanglements, and built a large number of other anti-tank obstructions."[4]

These comments referred to the integrated prepared obstacle plan, what we might expect to encounter if the Soviets go into the defense. More important to us, however, is how they used engineers during the battle itself:

> "The following facts give a good idea about manoeuvre with engineer troops. The first-echelon divisions of the 13th Army had about 100 sapper companies in their battle formations, or close to 40 per cent of

the total at the disposal of the Central Front. In this army's sector the engineers laid 35,000 anti-tank mines in the course of the defensive fighting. A highly dynamic and effective manoeuvre was carried out with the engineer troops on the Voronezh Front, where 55,000 mines were laid in the course of the fighting. It is noteworthy that two-thirds of all enemy tanks destroyed by the obstacles blew up in the mine-fields laid during the battle."[5]

Following the battle the Soviets launched their own offensive against the Germans. After two weeks the Soviets attack slowed.

"The powerful counter-attacks launched by the Germans in the Bogodukhov and Akhtyrka areas in the week ending August 17 were all beaten back with the active assistance of engineer troops. These engagements gave further proof of the growing importance of wide manoeuvring with engineer troops against the counter-attacking enemy groups. The 6th and 14th assault engineer-sapper brigades laid mine-fields, holding back the enemy panzers and slowing down their advance, and thus won time and space for manoeuvre with reserves. The Soviet engineer troops' skilfull employment of obstacles

was recognised even by the enemy. Assessing their operations in a directive to Army Group South, Manstein wrote: 'The Russians use mines skilfully and effectively. In going over from the offensive to the defensive, the enemy sappers lay the mine-fields in the penetration areas within a short period. Even at the height of the fighting, in the last few seconds, the enemy plants anti-tank mines from sheltered positions. Flame-throwers and mines have often been responsible for the failure of our counter-attacks.'"[6]

In Tsirlin's summary of the battle he stated: "The Battle of Kursk showed that the best way to fight the enemy tanks which had penetrated the defences was by the joint action of the mobile obstacle-setting teams and anti-tank artillery reserves. The method was immediately generalised and brought to the knowledge of all engineer troops."[7]

The lessons of this great tank battle evolved into the creation of the Podvizhnoy Otriad Zagrazhdeniya (POZ). The POZ is a mobile obstacle detachment formed of engineer and combined arms elements task-organized according to the tactical situation. The POZs mission is generally to block armored counterattacks. It is deployed along the flanks in the

offense. A POZ is equipped with a mixture of GMZ tracked mine layers each carrying 208 mines, MDK tracked ditching machines, PZM wheeled ditching machines, BAT-M tracked bulldozers, BTRs and mine resupply vehicles. The Soviets also have the ability to deliver scatterable mines on the battlefield, probably by aircraft, helicopters or multiple rocket launchers. We can expect to see these POZs supported by anti-tank systems confronting our counterattacks and attempting to delay, deny or disrupt our attack until they can regain the initiative with their maneuver forces. The lessons they learned at Kursk are fully integrated into their doctrine and we can expect to see obstacles quickly placed in front of our counterattacks.

Lack of realistic combined arms training hinders maneuver unit appreciation for engineer systems. Only the National Training Center offers engineers an opportunity to practice their art. The days are past during which engineers could cut a tank ditch across most of Fort Bragg and crater the roads in every stream valley. Environmental concerns have preempted realism in the employment of engineers. The loser has been the maneuver commander and his soldiers. A TOW gunner who sees a road crater hold up a tank column to give him time to for a maximum range shot learns to appreciate what an obstacle can do for him, a far better confidence builder than watching tanks

run through engineer tape obstacles and overrun his position. Conversely, the tank commander who encounters an unpassable tank ditch in the midst of his attack learns the importance of having engineer breaching and gap crossing equipment near at hand, especially when he realizes that he is being taken under fire by that TOW gunner just described.

The problem with realism in engineeer play during an exercise is that it works--it really does delay and stop an attacker, causing him to pile up in front of an obstacle and mill around figuring out what to do next. Although this is exactly what maneuver units should encounter and should learn to deal with, many commanders have preferred not to allow real obstacles because they hinder free play and impact adversely upon limited field training time. Such was the case during Joint Exercise "Bold Eagle" at Eglin Air Force Base, Florida, in 1977 when the defending brigade of the 82d Airborne Division dug a tank ditch in front of the main attack of the brigade from the 5th Mechanized Infantry Division. The exercise had called for tape obstacles, but permission had been obtained from Eglin's base engineer to dig the ditch. The confusion and delay which resulted rose to the four star level before being resolved. The ditch had to be filled in. Play was resumed without the benefit of realistically-played obstacles.

Experience at The National Training Center (NTC) has provided an important opportunity to see the importance of engineer systems as a combat multiplier. Lessons in stopping the enemy and protecting friendly units are being relearned out of necessity because only those units which thoroughly integrate their engineers in the defense can "win". Use of engineers in the offense is not being learned as well; however, action is being taken to increase the OPFOR engineer support at the NTC which will be a step in the right direction.

Given that you have a better understanding and appreciation for the equipment needs of engineers to support the offense, where do we engineers go from here? That is really up to you, the combat arms officer. You, too, must engage in setting the priorities necessary to meet the Army's mission demands in a constrained resource arena. Do so by judging competing needs, then weighing them against a realistic awareness of what engineer support you need in view of the threat and what risk you are willing to accept.

To expound the need for combat engineer equipment on the AirLand Battlefield is certainly not done in an effort to degrade the importance of similarly pressing competing equipment needs. It is intended rather to make maneuver

commanders recognize the shortcoming and adverse consequences that not having modern combat engineer equipment will impose upon their forces. Engineers would agree with the U.S. Armor School (USAARMS) that there is a real need for an off-road, armored vehicle to rearm, refuel and repair our fast-moving M-1s, M-2s and M-3s in the attack. They would also agree with USAARMS' pressing for a Forward Area Armored Logistics System (FAALS), a vehicle mobile enough to keep up with the units it is supplying in the deep attack and survivable enough to protect its crew and cargo against small caliber weapons and ballistic fragments. In the words of the USAARMS Commanding General, Major General Frederic L. Brown, "This is a tall, expensive, but needed order....As Chief of Armor, I need to do all I can to improve combat service support for our branch...."[8]

All branches which must be forward in the proximity of units in contact would want such a vehicle. What must be remembered, however, is that such a vehicle is little help in maintaining the attack if the attacking M-1s and M-2s are delayed or halted by minefields or other obstacles. The need for combat engineer counter-obstacle and counter-mine equipment must be considered when the decision is made on where priorities for research, development and acquistion should be placed. It should be kept in mind that as equipment on the

battlefield becomes more maneuverable, it would appear that there is less need for engineer support. The opposite is actually the case. Better maneuverbility will cause attacking forces to reach obstacles even faster and therefore need more counterobstacle and countermine support.[9]

The threat is formidable in all areas. We must use the training opportunities at the National Training Center to continually evaluate how our engineer equipment matches up with the Soviets ability to counter the mobility of our fighting systems. We must insure that a future General Forrester does not find himself sacrificing momentum and the initiative because of inadequate equipment.

To properly assess risk to a course of action, a decision maker must have as many facts as possible which relate to the decision contemplated. This article should have provided the facts needed to understand the shortcomings of today's combat engineer equipment, what the needs are for the future, and why consideration should be given to supporting the prioritization effort to meet those needs.

ENDNOTES

1. Robert L. Wetzel, LTG, "Central Guardian and the Lessons Winter Taught," Army, December 1985, p. 49.

2. Field Manual(FM) 100-5, Operations, Department of the Army, Washington, D.C., 20 August 1982, p. 8-5.

3. Ibid.

4. Alexander Tsirlin, Colonel-General, "Engineer Troops," in The Battle of Kursk, ed. Ivan Parotkin, Major-General, p. 220.

5. Ibid., pp. 220-221.

6 Ibid., pp. 224-225.

7. Ibid., p. 226.

8. Frederic J. Brown, MG, "Supporting and Maintaining Armor," Armor, July-August 1985, p. 6.

9. Clair F. Gill, LTC, et al. Engineer Directions: AirLand Battle 2000, p. 20.

10. Comptroller of the Army, The Army Budget, Fiscal Years 1979-1986. This booklet is prepared by the Office of the Director of Army Budget for use by the Army leadership and members of Congress as a handy reference. The FY 87 information was obtained from DADCSRDA and DADCSOPS representatives and does not necessarily reflect the final FY 87 figures.

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