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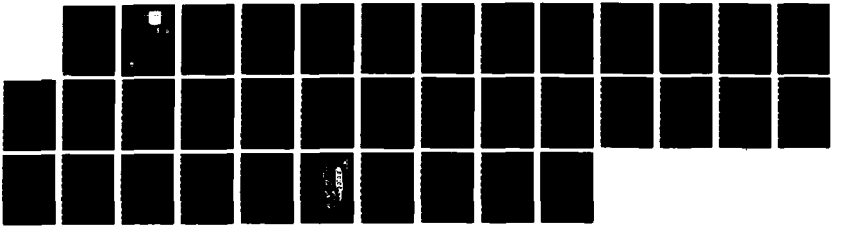

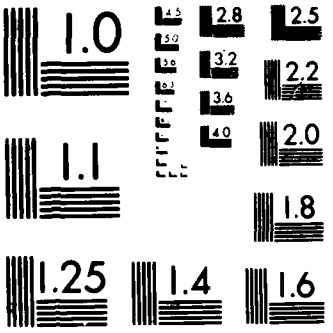

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STUDENT ESSAY

THE ACE - TOO LITTLE, TOO LATE

BY

COLONEL PHILIP H. SHOEMAKER

15 MARCH 1987

US ARMY WAR COLLEGE, CARLISLE BARRACKS, PENNSYLVANIA

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USAWC MILITARY STUDIES PROGRAM PAPER

THE ACE - TOO LITTLE, TOO LATE

INDIVIDUAL ESSAY

by

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US Army War College
Carlisle Barracks, Pennsylvania 17013
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ABSTRACT

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The basic thrust of this essay is making the reader aware of the long delays and frustrations experienced by the engineer community in fielding a much needed combat engineer vehicle, the M-9 Armored Combat Earthmover(ACE). The essay explains the capabilities of the ACE, describes its history and development and the need and impact for such an engineer vehicle in the field today to support armor/infantry teams on the highly lethal and fluid battlefields envisioned in the next war. The bottom line is that hopefully we are not fielding too few of them too late. The ACE is now fielded in only one unit but it has already proven its effectiveness. Basically I am suggesting that the Army and Congress fully support the fielding of the ACE now without any further delays.

THE ACE - TOO LITTLE, TOO LATE

Colonel Barlow was not pleased! His 3rd Brigade had made a successful night attack across the Fulda River, but now the attack was bogged down. The operations plan had called for a Corps wide counterattack with a frontal assault all along the Corps front. Colonel Barlow's 3rd Brigade had been given the mission of spearheading the 50 KM deep attack of the division to capture the Soviet's logistical center at Eisennach, East Germany. His mechanized brigade had been reinforced with an extra armored battalion so that at the time of the attack he had one armored and two mechanized infantry battalions conducting the river crossing. Once these forces had secured several bridge heads south of Bebra, West Germany, the brigade's reserve armored battalion was to conduct a passage of lines and capture the key road junction at Honebach on the German border before proceeding on with the attack into the Soviet's logistical rear.

The terrain was not very conducive for tanks, but the surprise attack had been successful for several hours and the lead armored battalion had been able to make excellent progress over the small road network and the few open fields in the area. Colonel Barlow had hoped that the

Soviet forces, who had been on the offensive all along, would not be able to switch into a defensive posture and set up any anti-armor obstacles in their rear that could stop the US fast moving armored task force from reaching Hönebach before nightfall. However, the Soviets proved to be a capable adversary in this battle as they stopped the US armored column one mile west of Hönebach. With the assistance of Soviet engineers and several BAT-M tracked dozers, the Soviet forces had destroyed a small bridge on the main avenue of attack into Honebach. In addition, the two BAT-M dozers had cut several hundred meters of very effective tank ditches on both sides of the blown bridge to preclude bypassing the obstacle. The US deep attack was hopelessly bogged down.

Colonel Barlow was informed by the stopped armored battalion commander that he needed heavy engineer equipment immediately as his Armored Vehicle Launch Bridge (AVLB) was unoperable and the combat engineer platoon he had assigned to his task force had no other mobility equipment other than their organic M113 prime movers. Colonel Barlow called his brigade engineer and told him to get at least one engineer bulldozer to the forward deployed armored battalion as soon as possible. Unfortunately, the bulldozers were all in the Division rear (west of the Fulda River) loaded on wheeled transporters and it would take several hours to move these road bound pieces of equipment

to the site of the tank ditch obstacles.

Several hours later, as nightfall set in, Colonel Barlow was informed that the attack had failed and the armored task force had begun to withdraw back to the Fulda River bridge head. The engineer bulldozer had not arrived until five hours after it was requested. However, by that time, the Soviet forces had reinforced the obstacle and the dozer operator was badly wounded as he attempted to fill in the tank ditch. A second operator was also wounded in a similar attempt at which time the dozer was withdrawn from the area and all the US forces withdrew.

It appears that the attack failed in part because the US combat engineers were unprepared to support the combat forces with modernized tactical engineer equipment in this scenario! Is that a fair assessment? Is it a realistic scene presented to Colonel Barlow or just a figment of this writer's imagination? I contend that it is a very possible and discouraging situation as I actually found out during the 1985 winter REFORGER exercise in which my battalion, the 39th Engineer Battalion(C), attempted to support the 4th Infantry Division in the Fulda gap area of West Germany. As a Corps engineer battalion, the 39th was placed in direct support of the division during the early offensive phase of the exercise. Unfortunately, the weather was so bad that the 39th could not bring any of its heavy equipment to include bulldozers forward into the

tactical assembly area at any time during the offensive operation. The units that the 39th supported soon learned that these road restricted items of equipment, such as the D7 dozer, could not be counted on to support an armored attack such as that planned by our ficticious Colonel Barlow. But I did recall that the engineer community had been developing a new engineer item of equipment that could have solved Colonel Barlow's dilemma. In fact, this item of engineer equipment had been designed to move and work right along side the M-1 tank in a hostile battlefield environment. It is called the M-9, ACE, the Armored Combat Earthmover. But as of the 1985 REFORGER, the ACE was still not fielded in any unit.

The Soviets do not appear to lack the modernization of their engineer equipment as much as the US Army engineers do. The Soviet BAT-M tractor dozer referred to above that created the tank ditches which stopped Colonel Barlow's task force does exist in Europe today. It is also a fact that the Soviet's engineer equipment is in its third generation of development since World War II, and it is considered the world's finest.(1) In addition to the BAT-M, within the last 5 years, the Soviets have fielded an IMR, a multipurposed armored engineer tractor; a MDK-Z, a special tracted tank ditching machine; and 20 other new engineer systems. Meanwhile, the US engineer community continues to lag further behind the Soviets in this

critical area of force modernization. This point was recently made when I attended a briefing by a senior engineer general who made the comment that today's combat engineer is the weakest link in the Army's combat team.

In late 1986 my frustrations with this lack of modernized combat engineer equipment again surfaced as I read the cover article of the 10 November 1986 Army times which proclaimed, "NEW WEAPONS GIVING ARMY MORE POTENT PUNCH IN EUROPE."(2) Commanders in Europe that were receiving the equipment stated that this new modernization program, especially the M-1 Abrams tank and the M-2 Bradley fighting vehicle, "brought major improvements in their combat capabilities, specifically in increased speed, firepower, survivability and mobility."(3) As an engineer officer I quickly scanned the article to see if the Army was planning to field any new combat engineering equipment that would compliment the new armor/infantry vehicles. As I read further, I noted the USAREUR combat engineer units were finally receiving the Ground Emplaced Scattering System (GEMSS) which dispenses anti-tank and anti-personnel mines rapidly and in various densities. But I was specifically looking to see if the Army had fielded the M-9 ACE, the Armored Combat Earthmover, that much needed combat engineer item of equipment that accomplishes the mobility, countermobility and survivability tasks that combat forces often require. I think the ACE is sorely needed because it

has the versatility to keep up with the M-1 tank and M-2 fighting vehicle on the highly fluid battlefield envisioned in the next war! However, my optimism was soon crushed as I finished the article and noted that the M-9 ACE is still not in the hands of the combat engineers in Europe. The fact that this item of equipment is still not fielded caused me to continue my research for this essay to see if I could find out why the Corps of Engineers does not have the M-9. I also wanted to reaffirm that there still is a critical need for the Engineer Corps to be able to execute its missions with the ACE on the battlefield as part of the present Air/Land Battle doctrine.

CAPABILITIES

First of all what is the M-9 ACE? Since it has only been fielded in one unit (seven refurbished low-rate initial production vehicles were issued to the 13th Engineer Battalion(C), 7th Infantry Division in early 1986), very few combat arms personnel as well as engineers have ever seen or heard about the M-9 ACE. Therefore, a brief description and history are appropriate for the reader at this point to understand the capabilities and characteristics of this new piece of engineer equipment. The ACE is a highly mobile, diesel powered, lightly armored, amphibious combat earthmover capable of performing

many mobility, countermobility, and survivability tasks in support of light or heavy forces. Specifically, it is a survivable, fast moving item of engineer equipment that was designed to assist the forward deployed forces such as the M-1 Abrams tank and the M-2 Bradley fighting vehicle. It is a light weight vehicle because the structure is made of welded and bolted aluminum. In order to give the reader a better idea of what the ACE actually looks like, a picture of the latest model is shown at Figure 1. In addition the specific physical characteristics of the vehicle are listed at Figure 2.

It is also described as a multipurpose vehicle that has the ability to dig, doze, haul, grade, scrape, and tow. The M-9 was designed with a suspension system that allows the operator to raise the front of the vehicle to permit dozing, excavating, rough grading or ditching functions. As such it can perform the engineering functions of several existing combat engineer pieces of equipment(i.e., dozer, grader, scraper, dump truck, and the bucket loader). Numerous tests have proven that the ACE has the bulldozing and earthmoving characteristics comparable to the D-7 dozer. There is also a two speed winch with 25,000 pound line pull capability located in the rear of the vehicle which can be used for self-recovery, if necessary. A self-ballasting capability is used giving the ACE earthmoving characteristics equal to an item of equipment

nearly twice its empty weight. Yet, it is also light enough with its aluminum hull that it swims itself across water obstacles at the rate of three miles per hour. In addition, the light weight (36,000 lbs) of the vehicle allows the ACE to travel at 30 miles per hour road speeds and to be transported in C-130, C-141 and C5A aircrafts along with all its components. The present D-7 bulldozer and tractor/trailer system requires three sorties for air transport (one for the dozer, the tractor and the trailer which hauls it).

The ACE is a very survivable item of equipment on the highly lethal battlefield of the future. It has armor protection from small arms fire and artillery fragmentation that surrounds the crew compartment and major engine parts. NBC protection is provided by an individual crew member protective mask. There are eight smoke grenades that can be used as a smoke obscurant that allows the vehicle to screen its movements from the enemy. Finally, it has an internal night vision capability that allows it to perform limited visibility missions which are further enhanced by its own on-board communications system. Overall, the ACE has proven in numerous operational tests that it is equal to or more effective than much of the engineer equipment now found in combat engineer battalions. A comparison of these capabilities is shown in Figure 3.

Since the ACE is expected to be employed in the

forward battle area, its priority tasks will be the excavation and preparation of obstacles, the construction of battle positions, the fortification of strong points and the protective emplacement of artillery and command and control facilities. Some typical missions are:

MOBILITY

-Fill craters and ditches

-Assist fighting vehicles - winch or tow

-Remove road blocks, trees, rubble

-Prepare/maintain combat routes

-Prepare access/egress for ford sites and river crossings

-Forward aviation (helipads, airstrips)

COUNTERMOBILITY

-Construct anti-tank obstacles

-Demolish fords and bridge by-passes

-Dig tank ditches

-Prepare strong points

-Haul obstacle material

-Cut roads and trails

SURVIVABILITY

-Dig hull defilade positions for armor

-Construct protective emplacements(c&C)

-Construct earthberms to protect equipment

-Clear fields of fire

-Dig in TOW positions

To accomplish these tasks the present Basis Of Issue(BOI

is six per engineer company in a heavy division or separate brigade, one per heavy division bridge company, and six in the engineer battalion of a light division. A Corps combat engineer battalion will have three per line company and two per headquarters company. Unfortunately, as I stated earlier, the 13th Engineer Battalion, 7th Infantry Division is the only unit to-date that has received seven M-9 ACEs and it is the first unit so equipped.

HISTORY OF DEVELOPMENT

Why are there only seven M-9s in the hands of combat engineers today? I asked that question because I have been tracking the development of the ACE since I personally saw a prototype at Fort Knox, Kentucky in the summer of 1963. Actually its development began in the early 1950's when the combat engineer community began to study the unique requirements of future Army Engineer vehicles. It was determined that combat and airborne engineer units needed an armored and air-transportable combat engineer vehicle for the conduct of future combat operations. Historically, the equipment used by Army engineers had been furnished by the construction equipment industry with "off-the-shelf" items that had been modified to meet specific military requirements. This commercial construction equipment was usually designed to reduce construction costs. In fact, the civilian community was building bigger and heavier machines

that moved dirt more cheaply. Unfortunately, this trend of bigness was exactly the opposite criteria needed by combat engineers who wanted fast, light combat support vehicles. These far thinking military engineers realized that the combat engineer of the future had to support a tank heavy task force that was more and more dependent upon speed, versatility and survival under fire. Therefore, one of the key requirements determined necessary for future combat engineer equipment was increased mobility. In 1958 the Fort Belvoir Research and Development Center, then called the Engineer Reasearch and Development Laboratory (ERDL) was tasked with the design and development of a special all purpose tractor that had the capability of performing the basic tactical tasks accomplished by airborne and ground combat engineers that were using the then present organic equipment. The original tractor developed by ERDL was first known as the ABC (All-purpose Ballastable Crawler). Since the fundamental requirements of an earthmoving machine involves horsepower and weight, the designers had to employ ballastable features in order to keep the weight low for mobility, yet add weight during the dozing phase of operations.

During the period 1958 through 1969, four different generations of the tractor were constructed. These first ten years were difficult development years as many mechanical problems had to be resolved. It was also during

this period that it underwent its second name change and it was renamed the Universal Engineer Tractor or the UET. In the early developmental stages, the four test vehicles were plagued with numerous random failures, the most persistent being the failure of the hydraulic systems. However, these early tests did indicate that under certain circumstance these protypes could out-perform a standard bulldozer, a 7.2 cubic yard scraper and a standard 5-ton dump truck. Testing proved so successful in the late 1960's that by 1970 the Army Scientific Advisory Panel recommended that the Army should contract for redesign to correct earlier discovered deficiencies and for first production. In 1971 two contracts were awarded to two new firms for competitive design evaluation of the UET. In December 1971 an Advanced Production Engineering contract was awarded to Pacific Car and Foundry Company(PCF) to fabricate four new fifth generation prototypes. On 3 January 1972, an AMC Product Manager(PM) was charted to provide centralized control and direction to ensure success of the program development.(4) The PCF completed fabrication of the four new vehicles in January 1975 and they were tested in the 1975-1976 time frame. During September-December 1975 two of the vehicles underwent specific field evaluation tests at Fort Hood, Texas. The test results confirmed that the deficiencies of previous models/prototypes had been corrected and indicated that the UET was superior to any other military construction equipment available for support of armored

units. In spite of a few minor deficiencies and shortcomings, a Development Acceptance In-Process Review(DEVA IPR) was held on 26 January 1977 and this group recommended that the UET be type classified, Standard A.

Even though the UET was now type classified, it did not mean that the system had been sold to the Army decision makers or Congress. Figure 4 shows the problems that the ACE encountered in gaining acceptance to the point that Congress would provide large sums of dollars for full scale production. As the figures show, in January 1978 the Comptroller of the Army recommended the purchase of 75 vehicles at an estimated cost of $21.2 million in its FY79 budget request. By the time this request went through the congressional budget process, Congress only approved the construction of 29 vehicles at a cost of $10.6 million. Thus began the first of a long list of cuts and delays that hampers the production of the ACE to this day. Basically, Congress was not convinced at that time that there was a need for such a vehicle. Congress was also not satisfied with the reliability and maintainability reports and they believed that the cost for construction of this vehicle was excessive. When the Army received the authorization to build only 29 vehicles in FY 79, the decision was then made to delay production since it was not considered economical to construct such a small number, i.e. 29! In addition the FY 80 budget submitted by the Army included $40.4 million

for 155 vehicles and it was therefore decided to hold the $10.6 million authorized by Congress for FY 79 and combine it with the $40.4 million FY 80 request in hopes of obtaining a bigger buy in FY 80. However, this proved to be a disasterous mistake as Congress failed to fund any dollars for the ACE in either FY 80 or FY 81. It appears that during the early 1980's the Army, DOD and Congress were more interested in funding two new combat systems, the M-1 tank and M-2 fighting vehicle rather than spending critical resources on a combat support system that was having cost growth and reliability problems.

It was at this time that the engineer community realized that they could no longer sell the then UET strictly as an engineer item of equipment. Therefore, in CY 1980, the Universal Engineer Tractor(UET) was re-named the M-9 Armored Combat Earthmover(ACE) to more closely reflect the wide variety of missions that it can accomplish in a combat environment. I believe that the name was changed at this time in the hope of presenting a more favorable acceptance of the ACE to the war fighters and Congress who wanted to put scarce DOD resources strictly toward combat vehicles. It was also so named because some recently incorporated design changes were approved that made it more survivable in a combat environment. The changes included a winterization kit, bottom armor plating, smoke obscurant capabilities, night vision devices, and

chemical and biological protection.

Changing the name of the ACE did not immediately sell the vehicle to Congress as shown by the testimony before the Senate Appropriation Committee on 4 March 1982. At that hearing, Senator Pryor (D-Arkansas) proposed a bill to cut $40 million from the FY 1982 program that was approved the year before. The following quote from the Congressional Record provides the sentiment of Congress toward the ACE at that time.

"I am, therefore pleased to introduce a bill that will cut some $40 million in outlays for a program that is an all too typical disappointment, the M-9 Armored Combat Earthmover, or ACE. This vehicle is essentially a high-speed bulldozer designed to go into battle with the M-1 tank. It was originally supposed to cost some $200,000; but now the price tag has risen to more than a million dollars apiece, and we plan to buy between 600 and 1400 of them.

The ACE is not a weapon system. It does not destroy Warsaw Pact tanks. It does not terrorize Soviet infantry. It digs holes. The program is likely to have procurement costs of around $1 billion, at a time when the search for economies in the Defense Department might mean the usual cuts from crucial operations and maintenance accounts."(5)

The ACE was also receiving additional negative publicity at this time in several newspaper articles. The

Washington Post published an article on 3 March 1982, that indicated the cost for an M-9 had risen from $1.1 million per dozer to $1.6 million in just three months. The article also quoted Defense Secretary Weinberger's testimony before the House Appropriations Subcommittee where he said that the Army might even stop buying them altogether. After calling the ACE a "useful enough gadget," Weinberger continued to say, "We are not going to purchase any more."(6) But in spite of the negative press the ACE was receiving in the early 1980's, it did receive sufficient support from Army channels to allow an initial production contract to be awarded on 8 November 1982, for 15 vehicles. The Army promised full testing of these vehicles to document performance and operational utility prior to any further production.

As noted in Figure 4, the Army continued to experience problems getting support from DOD and Congress and thus no additional vehicles were authorized in FY 83, FY 84 and FY 85. The ACE continually lacked support at the DOD and congressional levels where it was often looked at as a bill-payer for other high dollar value/high visability programs such as the M-1 Abrams tank or the new AH-64 Apache helicopter. As an example, during the House Armed Services Subcommittee (HASC) vote in 1985, the President's Budget request for FY 86 was reduced from $65 million and 70 vehicles to $42.4 million and 34 vehicles.(7) The HASC

was also quoted as saying that the ACE still lacked current positive test results. Unfortunately, Congress was partially correct as the initial production tests(IPT) were completed in August 1984 and even though they disclosed no major deficiencies, the tests did surface concerns regarding operational effectiveness and reliability. As a result, the Army directed a Follow-on Evaluation(FOE) to be conducted before any additional vehicles could be produced. The FOE was completed in June 1985 at Fort Hood, Texas with very favorable results. Finally, the Vice Chief of Staff of the Army during the September 1985, Army Systems Acquisition Review Committee (ASARC) meeting on the M-9 approved full production of the ACE to a procurement objective of 580 vehicles. Since 14 each M-9s are already built, the Army's present program now calls for the acquisition of a total of 566 more vehicles (see Figure 4).

THE ACE - TOO LITTLE, TOO LATE

I realize that the above description of the development and history of the M-9 ACE is a very shallow and brief synopsis of years and years of hard work by the engineer community to field what I believe is a much needed combat engineer vehicle. However, it was not my intent to describe all the perturbations of the acquisition process for the ACE as such a detailed history would require at least another 100 pages. I only want to show the reader it

has been in development for at least 28 years before the first unit received seven of the low rate initial production vehicles. The production contract for the next 22 vehicles was awarded in late July 1986 with FY 86 funds. It will still be approximately one year (Feb 1988) until these vehicles start rolling off the production line. As Figure 4 shows, the remaining 544 vehicles will be phased in over the following six years and distributed throughout the Army to some (not all) active combat engineer units, training base units and prepositioned in Europe for POMCUS units. Is this enough to meet the Army's total requirements? Apparently not, as the Army programmers at one point envisioned an Initial Issue Quantity(IIQ) of more than 1300 and an Army Acquisition Objective(AAO) of more than 3700 in order to provide the ACE to all active, reserve, and guard units plus meet War Reserve, POMCUS and training base requirements. So it appears that it will be a long time (FY90) before an engineer battalion commander in Europe will be quoted in an Army Times article espousing the benefits of the M-9 ACE.

Perhaps my frustration with the slow development of the ACE stems from my actual experiences as an engineer officer for the past 22 years. My perception is that the engineers are at the bottom of the totem pole so to speak with respect to modernization. When it comes to modernization resources, it appears that the engineers as a

combat support element are second in line compared to combat equipment upgrade such as the M-1 or M-2. As noted earlier in this article in the quote by Senator Pryor, he wanted to kill the procurement of the M-9 because it "does not destroy Warsaw Pact tanks." If there are a few dollars remaining after the combat systems are procured, then the engineers and other combat support systems may receive funds to procure whatever they can justify. It always appears that the combat elements have the ear and support of Congress. As an example, a senior Army offical made this very point at a recent US Army War College briefing concerning moderization of the Army in times of short resources. He said that much of our Army equipment "is not sexy" compared to the Navy's ship or the Air Force's aircraft and so it is difficult to obtain funds for many of the Army's new developments. However, an exception to that is the M-1 Abrams tank development program which was first established in December 1971, 13 years after the M-9 ACE was conceived. By 1982, testing of the M-1 was completed and almost 1000 had been produced and fielded.(8) Congress also continues to strongly support this system and several hundred are produced each year.

IS THERE A NEED FOR THE ACE?

In late 1964, when I was a platoon leader in a Corps combat engineer battalion in Europe, the platoon had the

5-ton dump truck as its primary squad vehicle. The battalion also had dozers, graders and bucket loaders to augment these platoons in order to accomplish combat engineer tasks. As I stated earlier, twenty years later, in January 1985, as a battalion commander of a Corps combat engineer battalion, I participated in a winter REFORGER exercise in Europe using basically the same 5-ton dump trucks, dozers, graders and bucket loaders. So my battalion had no new modernized engineer equipment to use while participating in that 1985 REFORGER. During the fast moving offensive phase of the exercise, I found out that my units with their road bound wheeled vehicles could not keep up with the new armored vehicles. However, many of the infantry and armor units that I supported had the new M-1 tanks and the M-2 fighting vehicles and after the initial attack, they quickly outran my engineer equipment. Did I have a need for a vehicle such as the M-9 ACE during that 1985 REFORGER? As I watched the armored vehicles disappear in the distance, I certainly thought so. But I am getting ahead of the story concerning the REFORGER exercise and so I shall start at the beginning.

After the battalion arrived in Germany, we picked up the battalion's prepositioned POMCUS equipment and moved to our tactical assembly areas (TAA) near the east German border. From the very beginning I knew I would have trouble supporting any combat unit with my heavy equipment

as there was over a foot of snow in the TAA and we could not move this equipment (dozers, graders, etc) into the area because it was road bound on wheeled tractor/trailers. We had to leave all heavy equipment in the Corps rear area as each company had troubles just finding room for all their prime movers, the wheeled 5-ton dump trucks, as the wooded areas had such deep snow and it was dangerous to move the wheeled vehicles too far off of the roads. Once in the TAA, I was informed that my battalion would be put in direct support of the 4th Infantry Division. I selected Bravo Company to participate in the initial offensive attack whereby the Orange Forces, of which the battalion was a part, were attacking west to start off the exercise. Since the initial maneuver by the division was to be a night dismounted infantry attack, the engineer company was given typical engineer missions of providing mobility tasks such as clearing obstacles and securing the bridges across the Schwamm River. I was very proud of the engineer troops as the dismounted attack covered up to 10 kilometers that night and the engineers had no trouble keeping up with the dismounted infantry as all units were on foot. Because of the surprise achieved by the night dismounted forces, the attack was a success. Once the crossing sites over the river were secured, the follow-on mounted attack of tanks and fighting vehicles continued on with the cross country offense. But, they did so without the support of the 39th Engineer Battalion which was stuck to the roads because it

is a 100% wheeled unit. Throughout the remainder of the offensive part of the exercise, the battalion was able to provide only very little engineer support to the fast moving track task forces as the engineer battalion's wheeled vehicles could not keep up the same cross country pace as the supported armored task forces.

The above exercise is just one example where I personally saw the need for a vehicle such as the ACE. More importantly, during its Follow-On Evaluation 4 March through 14 June 1985 at Fort Hood, Texas, the M-9 ACE proved it could move and operate in direct support of an armored task force in the forward combat area. This test compared the effectiveness of the ACE with that of the standard D-7 dozer/trailer system in close combat support of armored and mechanized task forces during tactical field operations. I believe LTC Philip D. Riley, the battalion commander of 3-66th Armored Batalion and task force commander, best summed up the value of the ACE in his after action report. "In the opinion of the 3-66 AR, the M9 ACE earned its place within a modernized Tank Heavy Task Force. It was agile, more mobile and thus able to do what was needed, proving itself to be a direct combat multiplier."(9)

In conclusion, I must admit that my views expressed in this article are parochial from an engineer standpoint. But it is my hope that the Army or Congress will not

further delay the fielding of the ACE, nor fix its acquisition objective at a maximum of 580. My fear is that an engineer second lieutenant that was in my battalion during REFORGER 1985 will some day command a Corps combat engineer battalion which still has all wheeled vehicles and D-7 dozers in the year 2000! When his unit is called upon to support the armored task force that is stopped by an enemy tank ditch, as was Colonel Barlow's battalion, will he have the ACE? I certainly hope so. But if the ACE is not in all Corp engineer battalions by then, he will surely experience the frustration of not being able to properly support a highly modern and mobile tracked task force that the Army will have fielded in the year 2000. Hopefully, I am wrong and the story will not end as "too little, too late," but rather as one in which the Colonel Barlows of the future receive a report from their armored task force saying that they are in the town of Honebach after a minor delay in which they waited only a few minutes for the engineers with the use of the M-9 ACE to clear the tank ditch that had temporarily stopped them.

However, I do think that the battle of full acceptance of the ACE is not yet won. It remains uncertain that the combat leaders, Army decision makers or our Congress have been sold on the outstanding combat utility of the ACE. The VCSA has only authorized the next 22 vehicles to be produced and, in these times of tight money, the follow-on

contract for the remaining 500 plus vehicles could easily be cancelled. It is my hope that the few fielded M-9s finally prove themselves worthwhile in future training exercises so that the combat arms team members see first hand the versatility of this new item of engineer equipment. And so I strongly recommend that the Army engineer community continues to support this much needed system at every opportunity. All combat engineers must do everything in their power to convince their infantry and armor counterparts that the M-9 ACE is a worthy combat multiplier of the battlefield that they, the combat forces, can not do without.

ENDNOTES

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3. Ibid.

4. Unauthored Fact Sheet, "M-9, Armored Combat Earthmover(ACE)," DARCOM, DRCPM-FM, April 1981.

5. Senate Congressional Record, Testimony of Senator Pryor, 4 March 1982, p. S1647.

6. Walter Pincus, "Recall the M1's ACE? Now Its Got A Problem," Washington Post, 3 March 1982, p. A12.

7. LTC Fred Dolder, Point Paper on M-9, ACE, DAMA-CSS-D, 16 July 1985.

8. Editorial Comment, Jane's Armour and Artillery, Sixth Edition, 1985-86, pp. 107-108.

9. LTC Philip D. Riley, "M9 ACE Test After Action Report," 6 June 1985, p. 5.

10. Comptroller of the Army, The Army Budget, Fiscal Years 1979-1986. The FY 1987 information was obtained from LTC Fred Dolder, DAMA-CSS-D, HQ US Army.

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6. Ewing, Lee. "New Weapons Giving Army More Potent Punch in Europe." Army Times, 10 November 1986, p.1.

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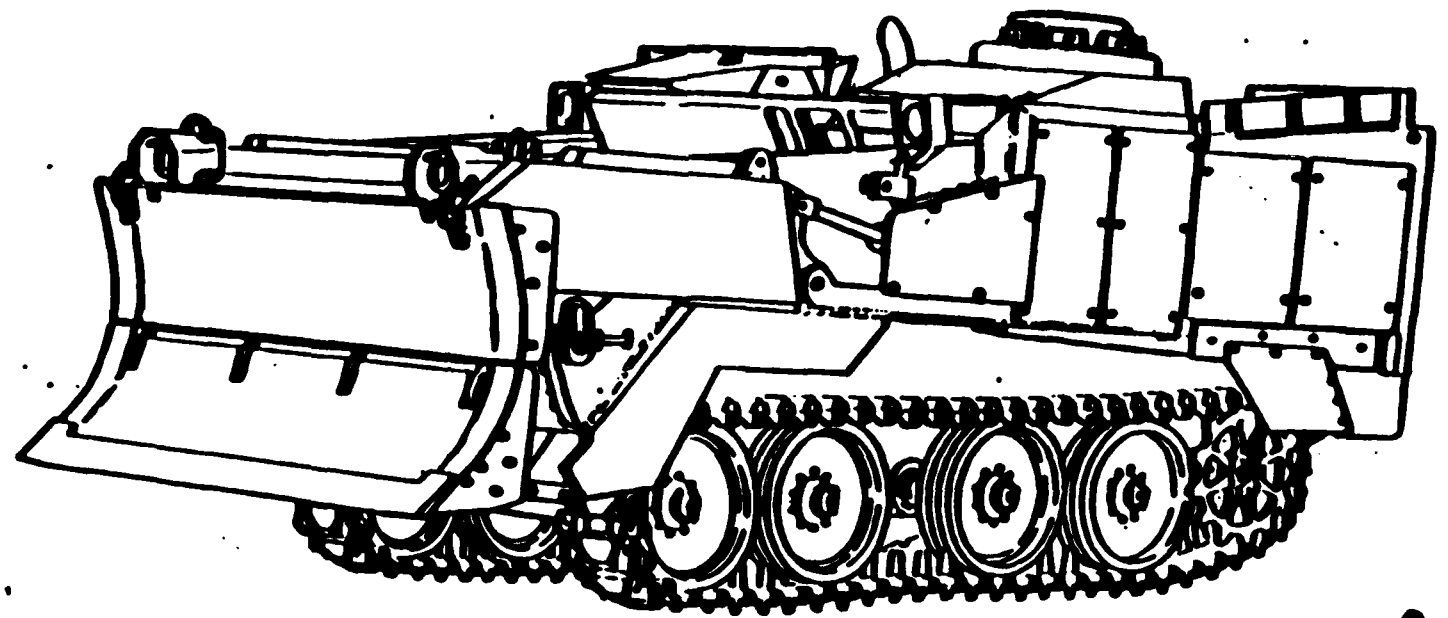
12. US Congress. Senate. Committee on Appropriations, Subcommittee on Department of Defense. Senate Congressional Record. Hearings, 97th Congress, 1st Session. Washington: Government Printing Office, 1982.

M9 ARMORED COMBAT EARTHMOVER (ACE)



USAES

FIGURE 1

M9 SPECIFICATINS

WEIGHT: net	32,500	lbs
gross(ballasted)	54,000	lbs
LENGTH	246	ins
WIDTH w/DOZER WINGS	126	ins
WIDTH w/o DOZER WINGS	110	ins
HEIGHT, reducible to	90	ins
SPEED, LAND	30+	mph
SPEED, WATER	3	mph
DRAWBAR PULL	37,000	lbs
ENGINE	Diesel, 295-gross hp @ 2600	rpm
TRANSMISSION	Power shift Planetary, 6 fwd and 2 reverse	
SUSPENSION	Hydropneumatic	
WINCH, line pull	25,000	lbs
BILGE PUMP	350	gpm
ARMOR	welded aluminum plate	
BOWL CAPACITY	8	cu yd
CRUISING RANGE	200	mi
GROUND PRESSURE, empty	8	psi
gross	14.4	psi

FIGURE 2

PRESENT EARTHMOVING CAPABILITIES

VEHICLE	BATTLEFIELD USE			SYSTEM CHARACTERISTICS		
	MOBILITY TASKS	COUNTER-MOBILITY TASKS	SURVIVABILITY TASKS	TACTICAL MOBILE	ABLE TO SURVIVE	AIR DEPLOYABLE
BACKHOE	NO	NO	YES	NO	NO	YES
BUCKET LOADER	NO	NO	YES	NO	NO	YES
GRADER	YES	NO	NO	NO	NO	YES
D-7 W/ TRACTOR-TRAILER	YES	YES	YES	NO	NO	LIMITED
CEV	LIMITED	NO	LIMITED	YES	YES	LIMITED
PROPOSED CAPABILITY OF ACE						
M9 ACE	YES	YES	YES	YES	YES	YES

FIGURE 3

ACE PROCUREMENT PROGRAM
PER THE ARMY BUDGET
BY COMPTROLLER OF THE ARMY

	ACT FY 77		EST FY 78		EST FY 79	
	QUANT	$	QUANT	$	QUANT	$
JAN 78	0	0	0	0	75	21.2

	ACT FY 78		EST FY 79		EST FY 80	
	QUANT	$	QUANT	$	QUANT	$
JAN 79	0	0	29	10.6	155	40.4

	ACT FY 79		EST FY 80		EST FY 81	
	QUANT	$	QUANT	$	QUANT	$
JAN 80	0	0	0	0	0	0

	ACT FY 80		EST FY 81		EST FY 82	
	QUANT	$	QUANT	$	QUANT	$
JAN 81	0	0	0	0	0	0

	ACT FY 81		EST FY 82		EST FY 83		EST 84	
	QUANT	$	QUANT	$	QUANT	$	QUANT	$
FEB 82	0	0	36	40.4	0	0	0	0

	ACT FY 82		EST FY 83		EST FY 84		EST FY 85	
	QUANT	$	QUANT	$	QUANT	$	QUANT	$
JAN 83	15	40.6	0	0	34	24.4	119	81.1

	ACT FY 83		EST FY 84		EST FY 85		EST FY 86	
	QUANT	$	QUANT	$	QUANT	$	QUANT	$
JAN 84	0	0	34	24.4	119	81.1	376	264.5

	ACT FY 84		EST FY 85		EST FY 86		EST FY 87	
	QUANT	$	QUANT	$	QUANT	$	QUANT	$
FEB 85	0	.3	0	24.1	70	65.0	99	85.3

	ACT FY 85		EST FY 86		EST FY 87		EST FY 88	
	QUANT	$	QUANT	$	QUANT	$	QUANT	$
FEB 86	0	11.7	22	42.4	21	30.4	181	159.1

	ACT FY 86		EST FY 87		EST FY 88		EST FY 89		EST FY 90/91	
	QUANT	$	QUANT	$	QUANT	$	QUANT	$	QUANT	$
JAN 87	22	39.1	21	20.3	127	60.0	132	62.0	264	126.4

(10)

FIGURE 4

END

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