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STUDY PROJECT

MISSION AREA ANALYSIS UPDATE ENGINEERS AS INFANTRY

BY

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7 MAY 1985

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This is an assessment of the capability of combat engineer units to perform their secondary mission on the future battlefield: to fight as infantry when required. It critiques, updates and expands a 1983 Mission Area Analysis (MAA) conducted by the US Army Engineer School. As such, it requires that the reader have the original MAA available. The overall conclusion is that combat engineer units do have the capability to perform a limited infantry mission. This limited mission is identified by specific tasks. Since these

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USAWC MILITARY STUDIES PROGRAM PAPER

MISSION AREA ANALYSIS UPDATE
ENGINEERS AS INFANTRY

INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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This is an assessment of the capability of combat engineer units to perform their secondary mission on the future battlefield: to fight as infantry when required. It critiques, updates and expands a 1983 Mission Area Analysis (MAA) conducted by the US Army Engineer School. As such, it requires that the reader have the original MAA available. The overall conclusion is that combat engineer units do have the capability to perform a limited infantry mission. This limited mission is identified by specific tasks. Since these same tasks can also be expected of units performing combat engineer tasks on the battlefield, unit proficiency is critical. This overall conclusion is further refined by addressing the question: "Where on the battlefield and what type engineer units should be used for the infantry mission?" Specific deficiencies in doctrine, training, organization and materiel currently hindering the capability of combat engineer units to perform the infantry mission are identified.

PREFACE

This analysis critiques, updates and expands Chapter 10, Engineers as Infantry, of the 1983 Combat Support, Engineering and Mine Warfare Mission Area Analysis (CSEMW MAA). This paper has been produced at the request of the Director, Combat Developments, US Army Engineer School (USAES), Fort Belvoir, Virginia.

In order to be of maximum benefit to the requestor, this study will sequentially review Chapter 10 of the 1983 MAA. Comments will be directed to the specific paragraphs in that document. It is therefore not a stand-alone document, and requires that the reader have the original MAA available. Elements of analysis not addressed in the 1983 MAA will be inserted where deemed most appropriate.

TABLE OF CONTENTS

INTRODUCTION AND OVERVIEW

PURPOSE

This analysis is being conducted to assess the capability of combat engineer units to perform an infantry mission on the battlefield. It will build on Chapter 10, Engineers as Infantry, of the 1983 Combat Support, Engineering and Mine Warfare Mission Area Analysis (CSEMW MAA) produced by the US Army Engineer School.

This analysis is designed to discover deficiencies in doctrine, organizations, training and materiel and to identify means of correcting these deficiencies; stressing first doctrinal solutions, then training solutions, then organizational solutions and lastly, materiel solutions.

METHODOLOGY

This MAA update is being conducted in accordance with TRADOC Regulation 11-7, Operational Concepts and Army Doctrine, 16 July 1982, and TRADOC Pamphlet 11-8, Appendix C, Handbook: Mission Area Analysis (DRAFT), 19 January 1984.

ORGANIZATION OF THE PAPER

Chapter I is an update of "Section I-General" of the 1983 MAA.

Chapter II is an update of "Section II-2-Historical Perspectives" of the 1983 MAA which addresses the question: Historically, under what circumstances did different type US engineer units perform as infantry?

Chapter III is a new area of inquiry which addresses the question: Do other other than US Army combat engineers have a secondary mission to fight as infantry?

Chapter IV is an update of "Section II-3-Tasks" of the 1983 MAA which addresses the question: What are the appropriate infantry tasks for engineers?

Chapter V is an update of "Section II-4-A.-Organizational Analysis (Units)" of the 1983 MAA which addresses the question: Which engineer units have an infantry mission?

Chapter VI is an update of "Section II-4-B-Organizational Analysis (Resources)" of the 1983 MAA which addresses the question: What equipment will be required to perform this mission?

Chapter VII is an update of "Section II-4-C-Organizational Analysis (Training)" of the 1983 MAA which addresses the question: What is the training program to perform this mission?

Chapter VIII is an update of "Section II-5-E-Cost Analysis" of the 1983 MAA which addresses the question: What is the cost of conducting maneuver operations versus Mobility, Countermobility and Survivability operations?

Chapter IX is a new area of inquiry which addresses the question: Are there lessons to be learned from recent conflicts concerning the use of engineers as infantry?

Chapter X is an update of "Section III-Trends and Opportunities" of the 1983 MAA which addresses the question: Should engineer units be given an infantry mission in the Airland Battle concept?

Chapter XI is a new area of inquiry which addresses the question: Where on the battlefield and what type engineer units can realistically be used for the infantry mission?

Chapter XII is an update of corrective actions taken regarding the 1983 MAA recommendations found in "Section IV-Summary" and "Section II-5-Deficiencies and Corrective Action Analysis."

Chapter XIII is a summary of the findings of this update.

Annex A, End Notes, updates and adds to the references contained in the 1983 MAA.

Annex B, Bibliography, lists documents reviewed for this update which were not beneficial to the inquiry.

CHAPTER I

SECTION I-GENERAL

10-I-3 DEFINITION

Delete paragraph 10-I-3 DEFINITION. The infantry mission used in the 1983 MAA was incorrect. It is found in the various Infantry TOEs and is consistent with AR 10-6 (p. 2-6) for infantry units. However, AR 10-6 states a limited infantry mission for engineer units by eliminating the requirement for close combat and counterattack (p. 2-4). Therefore, this paragraph is not needed since the infantry mission for engineer units was already defined in paragraph 10-I-1.

10-I-4 SCOPE

Revise paragraph 10-I-4 SCOPE to reflect the TOEs used for this update and the 1984 edition of FM 5-100.

B. (U) Specific.

1 (U)

TOE 5-25H3-ENGINEER BN, Airborne Division

TOE 5-35H5-ENGINEER COMBAT BN, Corps

TOE 5-45H-ENGINEER COMBAT BN (Mechanized) Corps

TOE 5-107J2-ENGINEER CO, Separate Infantry Brigade

TOE 5-108J3-ENGINEER CO, Armored Cavalry Regiment

TOE 5-115H3-ENGINEER COMBAT BN, Heavy

TOE 5-127J4-ENGINEER CO, Heavy Separate Brigade

TOE 5-137J-ENGINEER CO, Separate Airborne Brigade

TOE 5-145J4-ENGINEER BN, Heavy Division

TOE 5-155H7-ENGINEER BN, Infantry Division

TOE 5-155J-ENGINEER BN, Infantry Division (Light)

TOE 5-195H5-ENGINEER COMBAT BN, Airborne

TOE 5-207H4-ENGINEER CO, Separate Light Infantry Brigade

TOE 5-215J5-ENGINEER BN, Air Assault Division

TOE 5-255D9-ENGINEER BN, Infantry Division (Motorized)

2. (U) "If engineers fight as infantry, their units should stay intact. They should be reinforced with infantry heavy weapons, artillery liaison, antitank teams, and communications support as necessary." (REF 2 p. 3-4) "Division engineer battalions reorganized as infantry are best employed through attachment to an existing infantry battalion. Company sized engineer units, usually in close proximity to infantry elements, can quickly reorganize and augment the infantry's combat power. By employing the engineers attached to an infantry battalion, the engineer battalion staff is left intact to manage existing engineer assets and to continue engineer planning for future operations. Nondivision engineer battalions working in rear areas are usually in direct control of their companies. These battalions can be quickly reorganized and employed as infantry battalions in rear area combat operations." (REF 2 p. 14-9) Therefore, this analysis assumed that when engineers fight as infantry they do so as coherent, company or battalion sized units.

10-I-6 THREAT CONSIDERATIONS

Rewrite paragraph 10-I-6 THREAT CONSIDERATIONS to focus the discussion on the engineers as infantry mission.

A. (U) General.

A detailed threat is discussed in volume II, Chapter 2; however, the following comments are appropriate for the engineers as infantry mission. The

Warsaw Pact has the most mobile and one of the most lethal forces in military history. Soviet equipment or copies are prevalent in other areas of potential hostilities.

B. (U) Offensive Operations.

Soviet forces are expected to continue to operate in the traditional echelon-type arrangement designed to allow the freedom of action necessary to bypass pockets of resistance and exploit successes when and where they develop. The Soviets can be expected to mass forces and fires in the decisive direction and continually develop the attack by intense combat, day and night, in any weather. Strategic missions are conducted against deep targets by heliborne, airborne, Special Operations Forces, and Operational Maneuver Group forces. In addition to seizing key terrain and facilities, these strategic attacks are conducted to block or delay friendly deployments and logistic operations, as well as creating panic in the rear areas.

C. (U) Defensive Operations.

Soviet doctrine is expected to remain similar to that of today. The defense will be organized in successive belts designed to provide both increasing defensive ability and depth. A mobile reserve of tanks will be held at regimental level and above for the purpose of conducting counterattacks. Engineer support will be provided to assist in constructing obstacles and defensive positions. The emphasis on emplacing mines, rather than constructing obstacles, will continue.

D. (U) Implications.

Because of their responsibility to emplace and breach obstacles near or on the FLOT, US combat engineers can be expected to face the same threat as forward maneuver units. The primary conventional threat to the combined arms team will include direct fires from armored vehicles and infantry weapons,

indirect fires from tube and rocket artillery as well as air delivered weapons. Due to the Soviet intent to conduct operations in friendly rear areas, engineer units operating behind the FLOT may face a similar threat, although less frequently.

10-I-7 MAJOR ESSENTIAL ELEMENTS OF ANALYSIS

Revise paragraph 10-I-7 MAJOR ESSENTIAL ELEMENTS OF ANALYSIS (EEA) to reflect the questions asked in Chapters II through XI of this paper.

CHAPTER II

HISTORICAL PERSPECTIVES

HISTORICALLY, UNDER WHAT CIRCUMSTANCES DID DIFFERENT TYPE US ENGINEER UNITS PERFORM AS INFANTRY?

10-II-2 HISTORICAL PERSPECTIVES

For various reasons, subparagraphs of paragraph 10-II-2 HISTORICAL PERSPECTIVES should be revised.

10-II-2A1

Revise paragraph A. 1 to enhance accuracy.

In World War I, engineers were considered to be specialists too important to be employed as infantry. However, because the engineer regiment represented a large reserve of manpower in the infantry division, they were normally designated as the division reserve for operations. As reserves, the engineers were called upon to fight as infantry with an unprecedented frequency. (REF 46)

10-II-2B1b

Revise the first part of paragraph B. 1 b. to address unit training.

The Germans clarified the general mission of the engineers by stating that above all, the engineers (pioneers) were combat soldiers. The German pioneer was trained as an infantry soldier first and as an engineer technician second. His main job was to function as a member of the combined arms team. Training for pioneer units was routinely conducted with the other fighting

forces. Road building and other constructions missions were left to the quasi-military labor service. (REF 9, 49) . . . obstacles. (REF 9)

10-II-2C3f

Revise paragraph C. 3. f. The date in the first sentence and the entire last sentence are inaccurate. Change date, delete last sentence, and add a new ending.

. . . on the night of 16 June 1944.

. . . US advance. At dawn on the 17th, the 2d Engineer Battalion made a successful limited objective attack up the hill and with the aid of friendly artillery fire repulsed several counterattacks. The next day they were relieved by the 3d Battalion, 38th Infantry. The assault for hill 192 was not resumed until 11 July; when a combined arms force of infantry, tanks and engineers, organized as assault teams, attacked up the hill. Engineers guided the tanks and blasted gaps through the hedgerows to continue the attack. By nightfall, hill 192 was finally captured. Seven days later, on 18 July 1944, St. Lo was taken. (REF 17)

10-II-2C3g

Revise paragraph C. 3. g. since the second to the last sentence is inaccurate. Delete the last two sentences and insert the following.

. . . the commanding heights. From 6 to 9 January 1944 Companies A, B, and C of the 48th Engineer Combat Battalion reorganized as infantry and were attached to the 6th Armored Infantry Regiment. During the same period, the 235th Engineer Combat Battalion reorganized as infantry as a battalion to support the 6th Armored Infantry Regiment. The engineers played a decisive role in taking and holding Mt. Porcia. Both engineer battalions received a Presidential Unit Citation for their heroism in disrupting the German Winter Line. (REF 18)

10-II-2C3h

Paragraph C. 3. h. fails to accurately summarize the essence of the battle. Delete and substitute the following.

The Huertgen Forest formed part of the German Siegfried Line defenses of WW II. In this area, several engineer battalions saw action as infantry. From 6 through 16 October 1944, the 298th Engineer Battalion held a defensive sector north of Aachen to allow the infantry time to mass before assaulting that city. (REF 19) On 6 November 1944, as fighting by the 28th Infantry Division for the Kall River trail (connecting Vossenack and Kommerscheidt) reached its climax, the entire 1171st Engineer Group, attached to the division, was reorganized as infantry. The 20th and 1340th Engineer Combat Battalions reinforced the defense of the Kall river between Vossenack and Kommerscheidt to strengthen the 120th Infantry Regiment's sector. During four days of repeated German assaults, the engineers maintained their defensive positions. (REF 20) Simultaneously, the 146th Engineer Combat Battalion assaulted Vossenack to relieve the hard pressed 112th Infantry Regiment and dislodge German troops who had successfully retaken the town from the US infantry. After recapturing Vossenack, the engineers held for two days until relieved by a battalion of the 109th Infantry. The Kall river trail (Schmidt) operation was one of the most costly division actions of WW II. The Germans suffered over 3000 casualties while US forces suffered over 6000. (REF 21, 22, 23)

10-II-2C3i

Revise the last sentence of paragraph C. 3. i. Various locations are mentioned and it would be appropriate to mention the corresponding engineer units.

. . . in the zone. At St. Vith, Bullingen, Bastogne, Stavelot, Trois-Points, Malmedy, and many other locations, units such as the 81st, 158th, 168th, 254th and the 291st Engineer Combat Battalions fought heroic struggles as infantry and helped hold the line until theater reserves could be brought into play. (REF 24, 25, 26, 27, 28, 29, 30, 31)

10-II-2D

Rewrite paragraph D. to reflect additional references.

Vietnam found engineers playing a dominant role as construction specialists. (REF 37) However, both combat and construction engineer units were routinely responsible for self-defense of their job sites and base camps. This required an increase in the number and types of weapons authorized, as well as a reemphasis on training in small unit infantry tactics. (REF 63, 64) Only a few examples of engineer units reorganizing and fighting as infantry exist. For three days in August in 1966, the 1st Engineer Battalion secured a division MSR. (REF 35) From May to July 1969, the 19th Engineer Battalion reorganized two companies as infantry. During this period, they provided route and job site security as well as conducted combat sweeps, night ambushes and combat patrols. (REF 65)

10-II-2E

Insert a new paragraph E. Quantitative Data to reflect additional references.

The PIERS study quantitatively and qualitatively analyzed tasks performed by engineer units in major conflicts from WW II through Vietnam, utilizing unit records and reports. Although there were variations in reporting detail, the study group made an effort to refine the data based on historic narratives. Korean War data is the least reliable due to tasks frequently being reported in the "miscellaneous" category. However, the percentage of effort

expended on the engineers as infantry tasks was determined to be the following: (REF 77, Annex H)

	Divisional Units	Corps Units	Army Units	COMMZ Units
WW II, Europe	4.8%	5%	2.1%	Ø
WW II, Pacific	Ø.8%	Ø	5%	Ø
Korea	Ø	Ø	Ø	Ø
Vietnam	Ø	Ø	Ø	Ø

A review of unit histories and reports for this MAA update indicated that many of the reported WW II infantry actions were squad and platoon encounters with enemy forces in the course of performing combat engineer duties. Others, of course, were battalion size operations of the type previously described. Although the PIERS study provides valuable and unique insight, it must be remembered that the engineers as infantry mission for this analysis is defined as a company size or larger engineer unit. (REF 1983 MAA)

10-II-2F

Renumber paragraph E to be F. Lessons Learned. In addition, add a phase to the last sentence of F. 8. to better explain the actions taken.

. . . their unit integrity. In order to compensate for the lack of heavy weapons and communications, the temptation was strong for infantry commanders to use engineers as reinforcements to round out their own units, rather than employing the engineers as a fighting maneuver unit.

10-II-2G

Renumber paragraph F to be G. Conclusions. The original paragraph fails to adequately summarize the historical data. Delete and insert the following.

Other than in a self-defense role, US Army engineer units were first used as infantry during WW I. The square infantry division of that period consisted of 4 infantry regiments and 1 engineer regiment. The large engineer

regiment was primarily equipped with hand tools, and since it was a readily available source of manpower, it was normally designated as the division reserve. In the late 1930's the division was being reorganized and the organic engineer battalion was almost eliminated. However, the Chief of Engineers (MG Schley) successfully reversed this General Staff recommendation. He justified the retention by arguing that engineers were fighters as well as technicians as demonstrated by the recent combat successes of the German Army. Since then, US Army doctrine has reflected a secondary mission for combat engineers to fight as infantry.

Historically, engineer units have normally been committed as infantry as a last resort measure when the tactical situation has been desperate. Engineer units have enjoyed a certain amount of success while being employed as infantry for short periods of time in both offensive and defensive operations. Since WW I, the infantry mission has been primarily performed by nondivisional engineer units in defensive operations. In these examples, we find the engineer unit being given an infantry mission with little time to reorganize or prepare defensive positions. However, we also find that once the crisis was over, the engineer unit quickly reverted to the traditional combat engineer role of multiplying the combat power of the other arms.

CHAPTER III

OTHER COMBAT ENGINEERS

DO OTHER COMBAT ENGINEERS HAVE A DOCTRINAL MISSION TO FIGHT AS INFANTRY?

It was considered appropriate to investigate the answer to this question for this update. While other forces don't have the same potential for world-wide commitment as the US Army, most have the potential for commitment on the modern, high lethality battlefield. The following discussion summarizes the appropriate doctrine, equipment and training utilized by selected combat engineer forces.

USMC

United States Marine Corps doctrine for landing force engineers includes employment as infantry as a specified task. However, this task is to be performed only in an emergency situation and it is considered abnormal and undesirable. Limitations that must be considered before engineers are employed as infantry include: the cessation of engineer work; the limited number of crew-served weapons; the engineer organization differing from infantry units; the lack of communication personnel and equipment; and the lack of advanced infantry training conducted by engineer units. Engineer units are expected to train in infantry unit tactics and techniques in addition to engineer skills and techniques. However, the armament of the USMC engineer units is considerably less than the infantry units and consists of individual weapons, machineguns, and LAW's. [REF 66] Upon commissioning, USMC engineer officers receive considerably more infantry training than US Army engineer

officers. All USMC 2 LT's attend a 23 week basic infantry course prior to attending their branch school and assignment to their first unit. Enlisted cobat engineer basic and advanced individual training is similar to the US Army. [REF 67a]

United Kingdom

UK Army doctrine is much less prescriptive than US Army doctrine. As a result, unit SOP's are relied on to detail operational and tactical procedures. The use of engineer units in an infantry role is not specified in UK doctrine; however, it is generally accepted as a mission to be performed during extreme tactical situations. Most UK engineer units conduct a limited amount of infantry training each year, concentrating on defensive operations. Armament of engineer units is considerably less than comparable infantry units. The primary antitank weapon for engineers is the Carl Gustav 84 mm MAW. The Young Officers Course for newly commissioned engineers includes some infantry training similar to the EOBC. UK enlisted combat engineers only receive infantry training during the Recruit Training phase, which is comparable to Basic Training for the US Army. [REF 67b]

Australia

Australian Army doctrine states that "Engineers are also required to be able to fight in the role of infantry." There is no further expansion or clarification of this statement. However, when discussing the principles of employing engineers, doctrine cautions that it is uneconomical to employ engineers on other than technical tasks as well as stating that engineers should be furnished protection by other forces whenever possible. Australian engineer units conduct a limited amount of infantry training, normally at

platoon level and concentrate on defensive operations. Armament of engineer units as well as officer and enlisted training is similar to the United Kingdom. [REF 67c]

Canada

Doctrine for the Canadian Armed Forces is undergoing a major revision. Current engineer doctrine does not mention an EAI mission. However, interim doctrine calls for engineers to be employed as infantry during an emergency. This appears to be in the process of being refined to qualify the use of engineers as infantry for defensive operations only. Armament of engineer units is similar to that found in the United Kingdom and Australian Armies. Basic military training for engineer officers and enlisted personnel now stresses defensive operations for infantry skills. Whereas, Infantry and Armored personnel attend a different course of instruction that includes all infantry skills. [REF 67d]

France

French Army doctrine treats the use of engineer units as infantry on an exception basis. In describing engineer combat mission, the following infantry type missions are listed as possibilities.

- using engineer units as infantry to be integrated in the overall defensive line.

- using engineer units to ambush a smaller enemy force.

- using engineer units to conduct a small raid.

- employing engineer units as infantry in special operations if the safety of the force is in danger.

Armament of engineer units includes individual weapons, machineguns, and a MAW in each squad. Heavy machineguns for air defense are found at battalion

level. Engineer officers and enlisted personnel do not receive extensive training in infantry skills prior to their first assignment. Most French engineer units conduct a limited amount of infantry training each year, concentrating on defensive operations. [REF 67e]

FRG

Army pioneer units in the Federal Republic of Germany do not have a doctrinal infantry mission. Doctrine clearly states that the accomplishment of the engineer task has priority over security measures. Pioneer units are responsible for securing tactical bridging crossing sites, self-defense of work and bivouac sites, and securing prepared but unexecuted demolition obstacles. However, maneuver units may be used to provide security for engineer work sites on unexecuted demolition obstacles of special importance to the tactical plan. Pioneer units do not train for an infantry mission, only for self-defense. Armament of pioneer units is considerably less than comparable infantry units and consists of individual weapons, machineguns, and a shoulder fired MAW. [REF 67f, 71]

USSR

Of the various Soviet combat engineer (sapper) units, only the divisional engineer battalion appears to have a doctrinal mission to fight as infantry when required. Even the sapper company organic to a regiment does not have this mission. (REF 68) The antitank capability of the regimental and divisional sapper units is limited to the RPG-16. (REF 69) Sappers were not viewed as "assault infantry" in WW II nor are they now. All writings stress the need for infantry, artillery, and tank support of assault engineers at all times. (REF 70)

CONCLUSIONS

Combat engineer units for the USMC, UK, Australia, Canada, France and USSR have a limited engineer as infantry mission. The FRG only expects the pioneers to fight as infantry for self-defense. Except for France which authorizes a MAW at squad level, and the USMC that only authorizes a LAW, the other combat engineer units have a medium antitank weapon at platoon level. Initial entry training for engineer officers and enlisted personnel is similar to the US Army, except for the USMC which provides considerably more infantry skills training to the newly commissioned 2 LT. Most combat engineer units appear to conduct some infantry training each year.

CHAPTER IV

APPROPRIATE INFANTRY TASKS

WHAT ARE THE APPROPRIATE INFANTRY TASKS FOR ENGINEERS?

Since the 1983 MAA was written, FM 5-100 has been revised. This update compares that revision with other current doctrinal references, rather than commenting on the specifics contained in paragraph "10-II-3-Tasks" of the 1983 MAA.

TASKS

The doctrinal basis for employing engineers as infantry is found in the Army's keystone How to Fight manual, FM 100-5, Operations. Specifics for the employment of engineers as infantry are found in FM 5-100, Engineer Combat Operations.

FM 100-5.

In addition to contributing to the combined arms team by performing mobility, countermobility, and survivability missions, FM 100-5 states that combat engineer units are organized, equipped, and trained to fight as infantry in tactical emergencies. (REF 54, p. 7-6)

FM 5-100.

The infantry tasks to be performed by combat engineer units described in FM 5-100 reflect the recommendations of the 1983 MAA. (REF 2, Chap. 14) These tasks are also consistent with the CSEMW MAA task list. These tasks are listed below:

Fight As Infantry

Reorganize as Infantry*

Coordinate with Supported Unit/Tactical Headquarters
Inform Subordinate Units

Tactical Movement*

Conduct Mounted Tactical Movement
Conduct Dismounted Tactical Movement
Conduct Tactical Road Marches

Conduct Offensive Operations*

Hasty Attack
Bypass

Conduct Defensive Operations*

Defend
Withdrawal

Conduct Specialized Operations*

Ambush
Rear Area Combat Operations
Defend An Urbanized Area
Reconnaissance

Zone
Area
Route
Point

*Common Infantry Subtasks

Survive
Defeat the Enemy
Communicate
Command and Control
Maneuver
Sustain
Control Terrain

TASK ANALYSIS

An analysis of the infantry tasks found in FM 5-100 results in the following comments.

Reorganize as Infantry

Discussion is adequate and consistent. However, to amplify what subtasks need to be performed upon receipt of a warning order and what subtasks need to be performed upon receipt of an order to reorganize, this should be divided into two tasks: "Reorganize as Infantry" and "Organize for Combat."

Tactical Movement

The subtasks in FM 5-100 are more detailed than normal for a doctrinal publication, but they are consistent with ARTEP 71-2. (REF 72) This should be titled "Move" to describe the major task, however.

Conduct Offensive Operations

Bypass is not classified as an offensive operation in FM 100-5 and should be eliminated from FM 5-100. (REF 54, p. 9-1, 9-2) FM 100-5 states that the hasty attack depends on rapid and decisive action which requires simpler schemes and greater reliance on SOPs and independent execution. In addition, battle drill at company level and below often serves to launch hasty attacks. (REF 54, p. 9-2) Since the same requirement exists for the Prepare for Enemy Contact, and React to Enemy Contact subtasks in conducting a tactical movement, proficiency in conducting a tactical movement would also support the ability to conduct a hasty attack.

Conduct Defensive Operations

Withdrawal is classified as a retrograde operation, not a defensive operation in FM 100-5 and FM 71-100. (REF 54, p. 12-1, REF 76, p. 7-1) A delay, withdrawal and retirement are retrograde operations conducted as organized movements away from the enemy. They differ from each other based on friendly intent and enemy capability. In conducting a retrograde operation, mobility and countermobility are major considerations. According to FM 71-

100, the larger the mobility differential achieved by the retrograding force over an enemy, the greater will be the probability of a successful retrograde. (REF 76, p. 7-2) As such, the contributions of the engineers in the traditional role would be more valuable than in an infantry role. Unless precluded from performing mobility and countermobility missions by the tactical situation, lack of equipment, or lack of supplies, engineer units should be employed in the traditional role for retrograde operations. Figure 14-1 and the text of FM 5-100 should eliminate the use of engineers as infantry during retrograde operations.

Conduct Specialized Operations

FM 71-100 does not use this term. Instead, other tactical operations is used to encompass a wide range of special operations. (REF 76) In addition, Defend an Urban Area is no longer highlighted as a special (other tactical) operation, but is included as a defensive task in ARTEP 71-2 and 7-15. (REF 72, 73)

Reconnaissance

Area, route and zone are the types of reconnaissance found in current doctrine. (REF 74, 76) Figure 14-1 and the text of FM 5-100 incorrectly lists point reconnaissance, which should be eliminated. The skills required of infantry units in performing reconnaissance missions was investigated. ARTEP 7-15 lists area and zone reconnaissance patrols as a mission for infantry platoons, while all three reconnaissance missions are appropriate for scout platoons. Infantry companies are not expected to perform reconnaissance missions. (REF 73, P. i-iii) The tasks to be performed and the skills needed for the reconnaissance missions are similar to those required to perform engineer reconnaissance. In addition, reconnaissance patrols are inherent missions when defending or conducting a hasty attack. Therefore, these

missions are considered appropriate for engineer units reorganized as infantry. However, to clarify the fact that engineer platoons would normally be the largest unit to conduct reconnaissance missions, figure 14-1 and page 14-8 of FM 5-100 should be changed to "Reconnaissance patrols."

RACO

Chapters 8 and 14 of FM5-100 propose the use of engineers as infantry, in other than a self-defense role, for Rear Area Combat Operations (RACO). This is inconsistent with FM 100-5, FM 90-14 and FM 71-100. (REF 54, 75, 76) These three publications are consistent in stating that enemy attacks in the rear area are countered by unit and base defense measures, quick reaction MP forces, and combat units. In describing rear area protection techniques, FM 71-100 recognizes that engineer units are often more combat-capable for self-defense than other rear area units, and recommends considering this factor when positioning units in base clusters. (REF 76, p. 4-124) In discussing the use of combat units, FM 71-100 states that mechanized infantry, armored cavalry, and armor forces can perform the primary ground RACO mission. It recommends that combat support forces, such as engineer units, be considered for on-order missions to support the commitment of RACO forces. (REF 76, p. 4-126) All four manuals are consistent in describing Rear Area Protection command and control measures. An appropriate MP command coordinates RACO, while an appropriate engineer command coordinates Area Damage Control (ADC) operations. In describing the rear area responsibility of engineer units, FM 90-14 states that engineer units will provide critical ADC support. But because of possible commitment to other engineer missions, they must not be relied upon as a sole source of ADC. (REF 75, p. 3-40) In summary,, rear battle doctrine expects engineer units to provide for their self-defense, coordinate ADC operations, perform ADC tasks, and to provide traditional

support to RACO forces. Although not precluded, employment of engineers as infantry for RACO is no longer a doctrinal mission. This probably recognizes the fact that engineer units will have an abundance of traditional missions in addition to ADC operations. Therefore figure 14-1 and the text of FM 5-100 should eliminate RACO as an infantry mission.

RECOMMENDATIONS

The text and figure 14-1 of FM 5-100 should be changed to reflect the tasks in Figure IV-1 as being appropriate infantry missions for combat engineer units. Since these tasks are also required for survival of combat engineer units conducting primary mission operations on a battlefield, unit proficiency is doubly important.

Reorganize as Infantry

Organize for Combat

Move

Offensive Operations	Defensive Operations	Other Tactical Operations
o Hasty Attack	o Defend	o Ambush Patrols
	o Defend Urban Area	o Reconnaissance Patrols - Area - Zone - Route

Figure IV-1 Engineers as Infantry

CHAPTER V

ORGANIZATIONAL ANALYSIS (UNITS)

WHICH ENGINEER UNITS HAVE AN INFANTRY MISSION?

The engineer units with an infantry mission, and their appropriate TOE, were listed in Chapter I of this paper and need not be repeated here.

CHAPTER VI

ORGANIZATIONAL ANALYSIS (RESOURCES)

WHAT EQUIPMENT WILL BE REQUIRED TO PERFORM THIS MISSION?

UPDATE OF 1983 MAA

The relative quantities of equipment for engineer and infantry units contained in the 1983 MAA remain basically the same today. There are some mathematical errors in the 1983 tables and some weapons have been increased and others decreased by new authorization documents. The 90 mm recoilless rifle has replaced the DRAGON in 6 engineer units, and USAES has proposed in April 1984 that this same change take place for the remainder of the engineer units. It should be noted that TOE 5-155J, Engr Bn, Inf Div (Light), and TOE 5-255D9, Engr Bn, Inf Div (MTZ), do not authorize any medium antitank weapons. In addition, TOE 5-195H5, Engr Cbt Bn (Abn), now authorizes a squad radio (AN/PRC-19). Furthermore, the 1983 MAA recommendations concerning the employment of divisional engineers as infantry by company augmenting an infantry battalion, and non-divisional engineers by battalion when companies are employed in close proximity to each other, has been incorporated in FM 5-100. (REF 2, p. 14-9) Similarly, the need to add weapons systems to engineer units employed as infantry has also been incorporated in FM 5-100. (REF 2, p. 14-10)

ADDITIONAL ANALYSIS

Recognizing the fact that engineer units have a limited infantry mission, it can be expected that weapons authorizations would be somewhat different than infantry units. However, due to similarity in missions and vehicles, one

would also expect that similar type engineer units have similar weapons authorizations when compared at company level. This is not the situation today. For example, when mechanized engineer units are compared, the divisional engineer companies (TOE 5-147J) do not have any 40 mm grenade launchers authorized while the other mechanized engineer companies have these weapons authorized at squad and platoon level. Likewise, a comparison of motorized engineer units shows that the companies of the infantry division and the separate infantry brigades (TOEs 5-155H7 and 5-107J2) lack 7.62 mm machinegun authorizations when compared to the non-divisional companies. A similar situation exists for the engineer company, light infantry brigade (TOE 5-155J), when compared to the airborne and air assault engineer companies.

RECOMMENDATIONS

All combat engineer units be authorized medium antitank weapons for survival on the battlefield.

Engineer units with similar mobility should be equipped with similar weapons by number and type at the company level.

CHAPTER VII

ORGANIZATIONAL ANALYSIS (TRAINING)

WHAT IS THE TRAINING PROGRAM TO PERFORM THIS MISSION?

TRAINING MANAGEMENT

In order to address the question of this chapter, one must first address the process of establishing a unit training program. An excellent summary of the methodology is found in FM 25-1:

> Unit training is driven by mission. Careful mission analysis yields the key tasks that a unit must perform. These tasks and associated standards are contained in Army training evaluation programs (ARTEPs) and soldier's manuals. Some tasks may also be peculiar to a unit's missions, circumstances, and capabilities. Once tasks, conditions, standards, and training objectives have been identified and tailored to a unit's unique requirements, all training must focus on them. Everything the unit does must relate to its combat mission. (REF 98, p. 7)

An amplification of this process is found in FM 25-2. (REF 99) The following summaries are presented to highlight the resources available to a unit training manager.

> The first step in designing a training program is to identify unit missions. Each unit has mission statements in its TOE or TDA. Most of these missions are further described in field manuals, ARTEPs and other publications. However, specific wartime missions are not always addressed because theater contingency plans vary. Therefore, other sources must be consulted to complete the mission list. (REF 99, p. 26)

> The ARTEP provides those training objectives and those collective tasks which a unit must perform to accomplish its mission and to survive on the battlefield. (REF 99, p. 14)

> Since collective tasks and missions are made up of individual, leader, and team tasks, these subordinate tasks can often be emphasized during longer collective training exercises. (REF 99, p. 34)
>
> MOS-specific soldiers manuals contain standardized training objectives for critical individual tasks in a given MOS and skill level. The soldiers manuals of common tasks contain standardized training objectives that apply to all soldiers. (REF 99, p. 14)

It is apparent that the process for establishing a unit training program depends on a consistency between doctrinal mission, TOE mission, ARTEP collective tasks, and critical individual tasks found in soldier's manuals. The consistency of these documents will be reviewed for the engineers as infantry mission. Since the training of some individual skills is the responsibility of the training base, the courses of instruction presented to engineer officers and NCOs will also be reviewed.

DOCTRINAL MISSION

As previously discussed in Chapter IV of this paper, the doctrinal mission, capabilities, and tasks for combat engineers fighting as infantry are contained in FM 5-100. (REF 2, Ch. 14) Comments concerning these tasks are also in Chapter IV of this paper. However, for purposes of comparing these tasks with current training resources, the tasks contained in FM 5-100 will be used. They are Tactical Movement, Hasty Attack and Bypass as offensive operations, Defense and Withdrawal as defensive operations, and Ambush Patrol, RACO, Defend Urban Area, and four types of Reconnaissance as special operations.

TOE MISSIONS AND CAPABILITIES

The engineer units with a TOE mission to perform infantry combat missions were listed in Chapter 1 of this paper. Figure VII-1 outlines the capability

statements that pertain to this mission from the various unit TOEs. The engineer battalion, infantry division (MTZ) is operating without a TRADOC approved TOE and is omitted from this comparison.

If Figure VII-1 is compared to the doctrinal tasks previously listed, it is apparent that the TOE capabilities are far less descriptive than FM 5-100. In addition, when unit capabilities are compared, differences exist that do not seem to be explained by unit organization, equipment, personnel or mission. Comments on these differences follows.

Infantry Capability

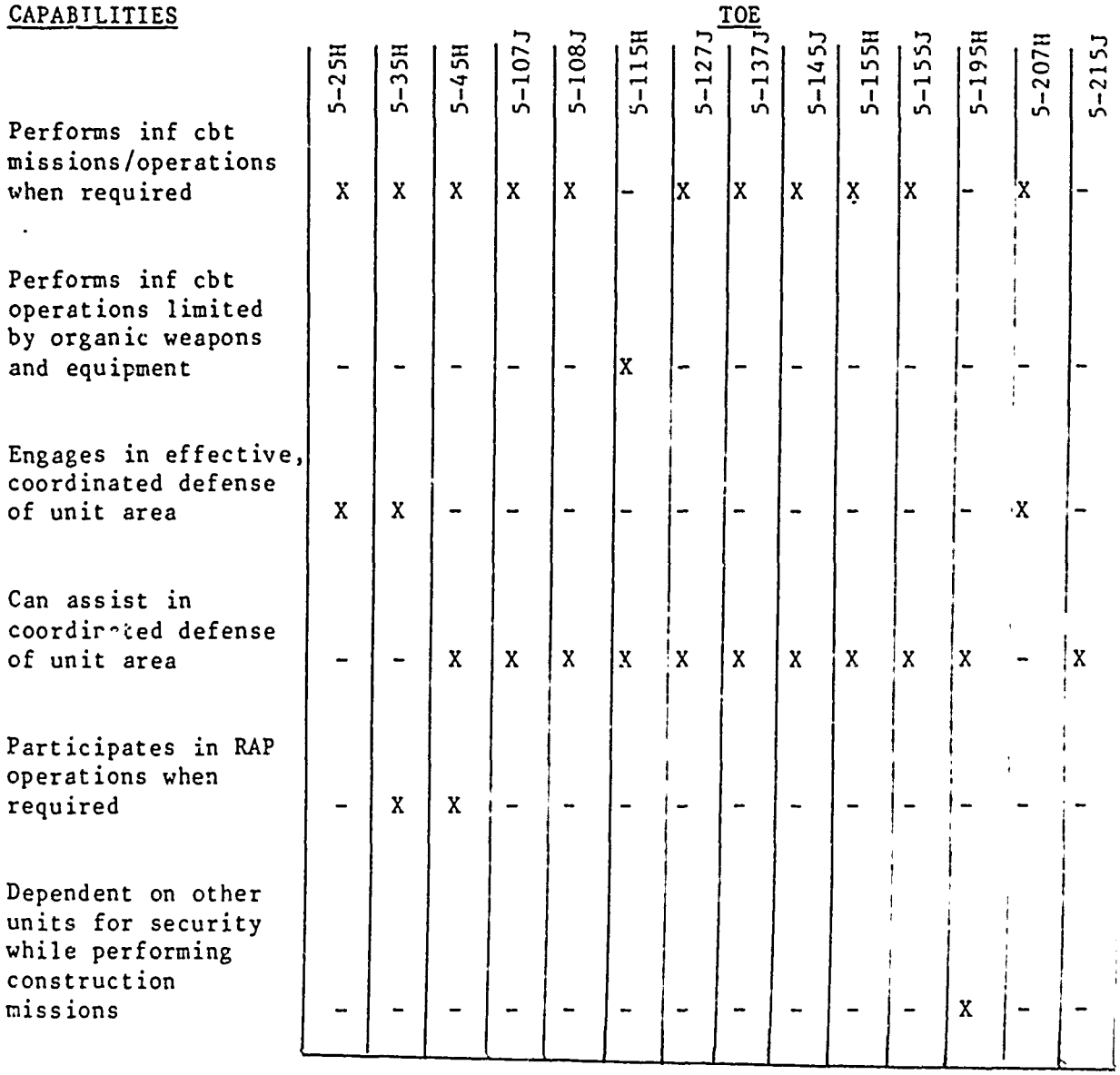
The limited infantry capability, only stated for TOE 5-115H units, appears logical considering the primary mission, organization, equipment and personnel of this battalion. However, the absence of any infantry combat capability from TOE 5-195H and 5-215J units is not consistent with having a TOE mission to fight as infantry. They must either have some capability or the mission statement should be eliminated.

Defensive Capability

No logical explanation can be found as to why the three units are fully capable of conducting an effective coordinated defense and the others are not. The dependency of the TOE 5-195H unit on others to provide security while performing a construction mission is contrary to doctrine. Furthermore, if it is in fact true, other units in Figure VII-1 should contain the same dependency.

RAP Operations

Only listing this capability for TOE 5-35 and 5-45 is inconsistent with the capabilities of the other units. However, as described in Chapter IV of this paper, this task should be eliminated for all engineer units.



CAPABILITIES	TOE													
	5-25H	5-35H	5-45H	5-107J	5-108J	5-115H	5-127J	5-137J	5-145J	5-155H	5-155J	5-195H	5-207H	5-215J
Performs inf cbt missions/operations when required	X	X	X	X	X	-	X	X	X	X	X	-	X	-
Performs inf cbt operations limited by organic weapons and equipment	-	-	-	-	-	X	-	-	-	-	-	-	-	-
Engages in effective, coordinated defense of unit area	X	X	-	-	-	-	-	-	-	-	-	-	X	-
Can assist in coordinated defense of unit area	-	-	X	X	X	X	X	X	X	X	X	X	-	X
Participates in RAP operations when required	-	X	X	-	-	-	-	-	-	-	-	-	-	-
Dependent on other units for security while performing construction missions	-	-	-	-	-	-	-	-	-	-	-	X	-	-

FIGURE VII-1 TOE CAPABILITIES

Update of 1983 MAA

Deficiency sheets 6 and 7 addressed the problems of nonrestrictive mission statements and nondescript capability statements in combat engineer TOEs. These deficiencies have not been corrected.

In addition, this update has shown that the mission and capabilities statements in combat engineer TOEs do not have a direct correlation to the doctrinal capabilities found in FM 5-100. Furthermore, they are inconsistent when compared to each other. As such, they are of little value to training managers for conducting a mission analysis.

UNIT TRAINING

Update of 1983 MAA

The engineer ARTEP manuals published after the 1983 MAA contain a revised engineers as infantry section. These sections are consistent with each other, but they differ slightly from FM 5-100. Figure VII-2 outlines the company and platoon collective training tasks for engineers as infantry as contained in the latest manuals. ARTEP 5-25 is to be published during the summer of 1985 as a coordinating draft. It uses a different task numbering sequence and will apply to the following TOE units: 5-25, 5-107, 5-155H, 5_155J, 5-195, 5-207, 5-215, 5-255. (REF 78) ARTEP 5-35 applies to TOE 5-35 units. (REF 57) ARTEP 5-115 lists engineer as infantry tasks for TOE 5-115 units. (REF 58) ARTEP 5-145 has not been revised, and ARTEP manuals have not been published for TOE 5-45 and 5-137 units.

Additional Analysis

From Figure VII-2 it can be seen that the collective training requirements for TOE 5-115 units are basically self-defense tasks. This is consistent with

TASK*	ARTEP	5-25J	5-35	5-115
3-6-1	Reorganize as Light Infantry	X	X	X
3-6-2	Organize for Combat	X	X	X
3-6-8/9	Defense-Co/Plt	X	X	X
3-6-10/11	Defend Urban Area-Co/Plt	X	X	X
3-6-13	Night Withdrawal-Co	X	X	X
3-6-14/15	Movement to Contact-Co/Plt	X	X	-
3-6-17/18	Hasty Attack-Co/Plt	X	X	-
3-6-19	Ambush Patrol- Plt	X	X	5-118
3-6-21	Antiarmor Ambush-Plt	X	X	5-118
3-6-23	Zone Recon-Plt	X	X	5-118
3-6-24	Area Recon-Plt	X	X	5-118
3-6-26	Antiarmor Fire Spt (LAW)-Plt	X	-	5-118
3-6-27	Antiarmor Fire Spt (90 mm)-Plt	-	X	-

*NUMBERING SYSTEM DIFFERS IN ARTEP 5-25J

Figure VII-2 Fight as Infantry Company
and Platoon Training Tasks

the limited infantry capability statement of the TOE. However, task 3-16-19, Ambush Patrol is an exception to this capability since the ARTEP conditions envision this action forward of the FLOT. As such, it is an offensive task and inconsistent with the capability statement and other ARTEP tasks. It should be eliminated.

There is a redundancy in tasks 3-6-21, 3-6-26 and 3-6-27. They all involve employing antiarmor weapons under a defensive tactical condition. They should be combined into one task utilizing whatever antiarmor weapons a particular unit is authorized.

Task 3-6-13, Night Withdrawal, should be eliminated for the reasons stated in Chapter IV of this paper.

Although route reconnaissance is an engineer as infantry task in FM 5-100, it is not highlighted as such in the ARTEP manuals. However, route reconnaissance is treated as an engineer integral unit operation in all of the ARTEP manuals, which should be adequate.

The major engineers as infantry task contained in FM 5-100 that is omitted from the ARTEP manuals is Conduct a Tactical Movement. ARTEP 71-2 treats this as a major task "Move," that includes the following subtasks for mounted and dismounted operations: Provide Overwatch, Conduct a Tactical Road March, Conduct Tactical Movement, Conduct NBC Defense Measures. The condition includes the fact that enemy contact is possible. (REF 72) This task and subtasks should be included in all combat engineer ARTEP manuals since the proficiency is needed whether performing an engineer or an engineer as infantry mission.

INDIVIDUAL TRAINING

Update of 1983 MAA

Except for commenting on the excessive training requirements to maintain proficiency as a DRAGON gunner, individual training was ignored in the original MAA. As mentioned in Chapter VI of this paper, this problem is in the process of being corrected with the 90 mm recoilless rifle replacing the DRAGON in authorization documents.

Additional Analysis-Officer

In describing the functions and duties of engineer officers, AR 10-6 states:

> Engineer officers are responsible for training and leading troops in combat and construction engineering operations

> essential to the Army in the field; . . . and leading Engineer troops in combat operations as Infantry. To accomplish these functions, it is essential that the engineer officers be well trained and experienced in military engineering and tactics. Engineer officers are especially qualified through education, training, and experience for the following duties:
>
> * * *
>
> c. Command organizational elements, or portions thereof, whose mission is the conduct of Infantry combat operations against enemy forces. (REF 1, p. 2-4.)

In order to assess how formal military training prepares an officer for these duties, the Programs of Instruction for the Basic and the Advanced Courses were reviewed.

The newly commissioned engineer officer receives 783 hours of instruction (15 weeks) in the Engineer Officer Basic Course. Of this total, he receives 32 hours of Platoon Infantry Operations and 17 hours concerning Organizations and Weapons Employment. In addition, a 100 hour Combat Engineer FTX reinforces combat engineer and basic infantry skills. (REF 79) This appears to be adequate preparation to perform an engineers as infantry mission as a platoon leader.

During the 14 week core phase of the Engineer Officer Advanced Course, the student receives very little training to prepare him for the engineers as infantry mission. The following classroom instruction is presented: a one hour Engineers as Infantry class, a two hour Indirect Fire class, a two hour Direct Fire Weapons Employment class, and a one hour Light Infantry Operations class. However, practical exercises in defensive (C-100-227) and offensive (D-100-206) operations do reinforce some tactical principles in addition to engineer support principles. (REF 80) Although a student attending this course can be expected to have some experience in the engineers as infantry tasks from his previous assignments, some may not have had the opportunity. It would appear prudent that as a minimum, the students should be receiving

instruction, preferably practical exercises, consistent with the major infantry tasks outlined in FM 5-100 and the ARTEP manuals. This is not the situation today.

Additional Analysis-Enlisted

Individual training requirements for the high density specialties found in the engineer units with a fight as infantry mission were reviewed. This is the 12B MOS for all units except the Engineer Battalion, Combat Heavy which has the 51 series and the 62 series as the high density soldier.

NCOES

The various programs of instruction for the engineer NCOES courses were reviewed. At the E6 level, the 12B soldier attends a five week Basic noncommissioned Officer Course (BNCOC) (REF 92), the 51H soldier attends a five week three day Basic Technical Course (BTC) (REF 93), and the 62N soldier attends a seven week BTC (REF 94). Neither of the Basic Technical Courses include training on combat skills. In contrast, the 12B BNCOC contains 12 hours of instruction on Basic Tactical Principles and 50 hours on Combined Arms/Tactical Training. As a squad leader, the 12B soldier is better prepared by formal schooling to perform infantry tasks.

This is not the case for the Advanced Noncommissioned Officer Course (ANCOC) student. (REF 95, 96, 97) Although the three ANCOC courses vary in length, the instruction supporting the engineers as infantry mission is identical. All of this instruction is found in the Sergeants Major Academy Common Core (Annex A) and the Engineer Common Core (Annex B). The three courses vary in length only as a result of the MOS specific instruction. So at the platoon sergeant level, all three career fields receive identical formal instruction to perform infantry tasks.

Soldier's Manuals

What about individual tasks a soldier is expected to learn by himself or through training in a unit? To answer this question soldier's manuals for the 12B, 51H and 62N CMF as well as the soldier's manual of common tasks were reviewed for consistency with each other as well as the ARTEP tasks of Figure VII-2. (REF 86, 87, 88, 89, 90, 91)

With the exception of the defense/offense tasks at skill level 4 for the 51H and 62N MOS, no consistency in critical tasks was found to exist in the various engineer soldier's manuals. In addition, some of the tasks that were designated critical appeared to be illogical. For example, at skill level 3, a 62N soldier is required to organize a tank hunter/killer team (051-191-3392) and employ a tank hunter/killer team (051-191-3393) while the 12B and 51H soldiers are not. Yet it is the 51H soldier who is armed with the 90 mm recoilless rifle in the Engineer Battalion, Combat Heavy and not the 62N soldier.

None of the engineer ARTEP manuals reference a soldier's manual task as supporting any of the fight as infantry tasks. In spite of this lack of cross-referencing, it is apparent that some of the FM 21-3 as well as some of the engineer soldier's manuals tasks do in fact support ARTEP tasks. Evidently an effort has not been made to identify the individual tasks supporting the ARTEP tasks. Without such an effort, one wonders what criteria was used to designate the individual tasks as critical.

CONCLUSIONS

For the fight as infantry mission, engineer units cannot expect to find a consistency between doctrine, TOE missions and capabilities, ARTEP manuals, soldier's manuals, and instruction presented in the officer and noncommissioned

officer education system. Without this consistency, the establishment of a unit training program IAW FM 25-1 and FM 25-2 is unduly complicated.

Training in engineer units will always concentrate on primary mission operations. To fight as infantry is a secondary mission. However, as indicated in Chapter IV of this paper, proficiency in certain infantry tasks is also required to accomplish combat engineer missions on the battlefield. Combat engineer units deserve to have a consistency between the various training management resources for selected infantry tasks. Such consistency should enhance the unit's ability to perform both primary mission operations as well as secondary mission operations.

CHAPTER VIII

COST ANALYSIS

WHAT IS THE COST OF CONDUCTING MANEUVER OPERATIONS VERSUS MOBILITY, COUNTERMOBILITY AND SURVIVABILITY OPERATIONS?

CURRENT DOCTRINE

FM 5-100 summarizes this dilemma concisely:

> The decision to use engineers as infantry must be carefully weighed by the commander before authority to direct reorganization is granted. The engineers contribute far more combat power in their primary mission configuration then they do as infantry. Stopping the engineer work effort will reduce the potential combat power of the maneuver force. Long term deficiencies may result if key engineer technicians and equipment operators become casualties. (REF 2, p. 14-2)

COMMENT

History abounds with examples that support the soundness of the above doctrinal statement, many of which have been incorporated in the historical review of this MAA. The only criticism that can be directed to the previous quote from FM 5-100 is the imprecise use of "commander." Since the potential loss of engineer support may have such serious consequences, it is normal for unit SOPs to restrict the authority to commit engineers as infantry to the commander to whom the engineer unit is assigned or attached. In practice then, the division commander must normally direct reorganization for divisional engineers and the corps commander for corps engineers. FM 5-100 would be improved if this authority to direct reorganization as infantry was clarified.

CHAPTER IX

LESSONS LEARNED FROM RECENT CONFLICTS

ARE THE LESSONS TO BE LEARNED FROM RECENT CONFLICTS CONCERNING THE USE OF ENGINEERS AS INFANTRY?

INTRODUCTION

Two recent conflicts were researched, the UK-Argentina war in the Falkland Islands and the 1982 war in Lebanon. The terrain and the threat encountered by the British in the Falkland War is not consistent with the MAA assumptions, but it is reviewed nonetheless. The Israeli experience in Lebanon is worth examining. Combat engineers supported the offensive in an exemplary manner. Their employment is reminiscent of the WW II battle of St. Lo (Hill 192), discussed earlier in this paper. They were employed well forward, integrated into the combined arms team, and were instrumental in the success of the maneuver forces. Although they were frequently involved in infantry-type duties around their work sites, they were not formally employed as infantry--the subject of this paper.

THE FALKLAND WAR

On 2 April 1982, Argentine forces invaded the Falkland Islands and captured the capital, Port Stanley, along with a 79 man UK marine garrison. The war ended on 14 June 1982 with the surrender of the 10,000 man Argentine garrison at Port Stanley to British forces. The fighting was conducted over barren, rugged terrain with trafficability problems compounded by numerous peat bogs. British combat operations were conducted principally by battalion

and smaller light infantry units. During these operations, a squad of combat engineers normally supported each infantry company by breaching and clearing minefields. Engineer equipment support to units in contact with enemy forces was extremely limited, since equipment had to be either airlifted by helicopter or delivered by sea. During this conflict, engineers were not employed as infantry, except for self-defense while providing mobility support. (REF 81)

LEBANON 1982

On 6 June 1982, Israeli Defense Forces (IDF) attacked north along three axis into southern Lebanon for the stated purpose of putting all of their settlements in Galilee out of reach of terrorist artillery. Until a final cease-fire took effect on 12 August 1982, the IDF was opposed in their drive north by Palestine Liberation Organization (PLO) and Syrian military forces. An excellent classified report of the military action has been published by HQDA. (REF 82) However, an unclassified article by Richard A. Gabriel has been used for this paper. (REF 83)

Combat was characterized by fighting in rugged mountainous terrain in the east, and urban areas connected by narrow roads bordered by orchards in the west. Both sides used modern weapons and the IDF employed heavily mechanized forces.

IDF combat engineers were integrated into the combined arms teams of armor, mechanized infantry, and self-propelled artillery. This has been standard practice with the IDF since the 1973 Middle East War. Engineers were employed well forward, spearheading most of the attacks. They were principally concerned with mobility missions, being employed to counter the natural terrain obstacles, to breach minefields, as well as to support the combat in the urban areas. The IDF combat engineers suffered a significant number of casualties. They were routinely required to defend their work sites, and in

some cases to conduct a hasty attack to seize them before starting work. A shortcoming of the IDF during this conflict was their shortage of light infantry. Such forces could have been used to great advantage in the urban areas and mountainous terrain; and probably explains why the engineers were often required to perform as dismounted infantry on their work sites.

CHAPTER X

TRENDS AND OPPORTUNITIES

SHOULD ENGINEER UNITS BE GIVEN AN INFANTRY MISSION IN THE AIRLAND BATTLE CONCEPT?

UPDATE OF 1983 MAA

Figure 10-III-3, The Infantry Mission for the Combat Engineers has been incorporated in the current FM 5-100 as figure 14-1. For the reasons stated in Chapter IV of this paper, the major tasks should be modified as contained in figure IV-1.

ADDITIONAL ANALYSIS

The future battlefield, as portrayed in Chapter 1 and 2 of FM 100-5, will demand the integration of all elements of combat power. The basic tenets of Airland Battle doctrine are initiative, depth, agility and synchronization. Commanders will be required to coordinate the use of fire, maneuver, obstacles and terrain and bring all available combat power to bear on enemy weaknesses at decisive places and times.

The execution of this doctrine requires timely and responsive combat engineer support. In fact, mobility, countermobility and survivability tasks may be even more important on the future battlefield than they have been in the past. However, when the tactical situation becomes critical, and when there is a shortage of maneuver units, the employment of combat engineers as infantry will be unavoidable. Engineer units must be organized, trained and

equipped to expect this mission. The importance of this problem will be no different than that encountered in WW II:

> Normally when a commander decides to employ his Engineer Combat Battalion as infantry, he is doing so in an emergency after he has exhausted all other resources. In other words, the situation is tight and the engineers MUST be good. (REF 43)

If utilized within their capabilities, such as the limited infantry tasks of Figure IV-1, or if augmented with additional weapons systems, such employment should be worthwhile.

CHAPTER XI

WHICH ENGINEER UNITS

WHERE ON THE BATTLEFIELD AND WHAT TYPE ENGINEER UNITS CAN REALISTICALLY BE USED FOR THE INFANTRY MISSION?

ENGINEER SUPPORT

The engineer system consists of engineer units in divisions, corps, and echelons above corps areas. Engineer units are tailored to the forces they support. Normally, they support forward, committed maneuver elements, but they can be shifted to weigh the effort at critical times and places. (REF 2, p. 1-11) In essence, combat engineers will be located throughout the battlefield with a propensity to be employed forward, providing mobility, countermobility and survivability support to the maneuver units. In the brigade rear area and farther back, other engineer units will be devoting an increasing amount of effort to general engineering support to the combat support and combat service support units.

In order to envision how many engineer units can be expected to support a committed division, at least two sources are available concerning the heavy division. In the Division 86 Final Report, the concept envisioned that four corps engineer battalions support each committed division. The division engineer battalion and a corps mechanized engineer battalion are located in the main battle area (MBA) to provide direct support. Two corps combat engineer battalions (TOE 5-35), a combat heavy engineer battalion (TOE 5-115), a combat support equipment company, and two bridge companies support the division as required. (REF 84, p. 6-2) Total Army Analysis 91 (TAA 91), the army

force structure requirements for fiscal year 90/91 is consistent with this concept. It envisions two mechanized engineer battalions in the forward brigade areas (1 divisional and 1 corps battalion). Two corps combat battalions operate from the brigade rear areas to the division rear area; and a combat heavy battalion operates from the rear of the division area throughout the corps area. (REF 85)

AIRLAND BATTLE SCENERIO

Using this support concept, we can readily construct a scenerio to visualize how these engineer battalions will be dispersed on the battlefield. The two mechanized engineer battalions, supporting the maneuver units within the MBA, will be dispersed in platoon and squad sized elements. A company would be the largest unit that could be expected to have its subordinate elements in close proximity to each other. In contrast, the two corps combat engineer battalions, working throughout the division area up to the MBA, could be expected to be deployed with companies in close proximity to their platoons. In fact the work effort may even be organized to allow the battalions to operate with all companies in close proximity to each other. Operating over such a large area, the combat heavy battalion will probably be dispersed by company and concentrating on horizontal and vertical construction tasks.

The MBA engineers will be exposed to the same direct and indirect fires as the maneuver forces they are supporting. This has always been the case. However, what may be different on the future battlefield is the frequency and intensity of combat in the rear areas. This will probably be greater than we ever have experienced before. As a result, engineers will be required to move tactically, defend their areas and work sites, and conduct hasty attacks in the rear areas as well as the MBA in order to perform their engineer mission. These same tasks can be expected of engineer units reorganized as infantry.

However, dispersion on the battlefield, capability of the various type engineer units, and the cost of losing engineer support are considerations that must be examined before determining what engineer units can realistically be expected to perform an infantry mission.

The engineers operating in the MBA will routinely have to provide work site security. Hopefully, these engineer security forces will normally be augmented by maneuver forces. This augmentation will increase the effectiveness of the security as well as allowing a greater number of engineers to concentrate on engineer tasks. These engineer units can be expected to come in contact with enemy forces more frequently than the other combat engineer units. However, they probably will not reorganize as infantry as frequently as other engineer units for two reasons: dispersion and the cost of such reorganization. Since they can be expected to be so dispersed on the battlefield, they could only be reasonably expected to reorganize as infantry by platoon or possibly by a company sized element. However, these units are the most capable of providing direct support to the maneuver units when one considers their mobility, armored protection, and their normal association with maneuver units. Maneuver commanders can be expected to be extremely reluctant to give up this responsive combat engineer asset, and will probably look somewhere else for additional infantry capability.

The corps engineer battalions operating in the division area (TOE 5-35) appear to be the most likely units to reorganize as infantry. This was the lesson learned from WW II (Chapter II of this paper), and it can also be expected in the future. They are capable of reorganizing as light infantry to perform the limited infantry mission previously discussed. Dispersion on work sites will not be as difficult a problem as with the engineers supporting the MBA. They should be able to relatively quickly reorganize by company, possibly

by battalion. Employment as infantry will cost the division a loss of engineer effort, however, the cost will likely be lower than stripping the engineer support from the committed maneuver units.

The combat heavy engineer battalion (TOE 5-115) provides the only heavy construction support to the division. The companies are likely to be task organized for particular horizontal or vertical construction missions. As a result, they are less likely to be employed in the squad, platoon, company configuration as the battalions previously discussed. The battalion consists of various construction and equipment specialists, not the combat engineers of the previous units. As indicated in Chapter VII of this paper, this factor accounts for a decrease in training in the infantry mission. This battalion is the least capable of any combat engineer battalion for performing an infantry mission. They are basically capable of self-defense, as they must be considering the rear area threat. Reorganizing the combat heavy engineer companies to perform even a limited infantry mission would be the least desirable of any of the previous alternatives.

CONCLUSIONS

Considering unit capabilities, dispersion on the battlefield, and the cost of losing engineer support to maneuver units, the companies of the corps combat engineer battalion (TOE 5-35) are the most likely to be reorganized as infantry in the division area. This reorganization can be expected to take place from the brigade rear to the division rear area.

Next likely to reorganize as infantry, again by company, would be the corps mechanized engineer battalion (TOE 5-45) operating in the MBA.

Third likely to reorganize as infantry, with company being the largest unit possible, would be the divisional engineer battalion.

Least likely to reorganize as infantry, and by far the least capable in performing an infantry role, would be the combat heavy engineer battalion.

CHAPTER XII

UPDATE OF 1983 MAA DEFICIENCIES

ESSENTIAL DEFICIENCIES

Lack of specific capstone and detailed doctrine for engineers fighting as infantry.

FM 5-100, May 1984, embodies the recommendations of the 1983 MAA. A separate manual, detailing how engineers are expected to fight as infantry, was determined not to be necessary and was not written.

Inconsistent combat engineer ARTEP manuals.

As indicated in Chapter VII of this paper, the ARTEP manuals published since the 1983 MAA have consistent engineers as infantry tasks. However, the tasks differ from the FM 5-100 tasks.

Lack of an acceptable intermediate range antitank capability.

As indicated in Chapter VI of this paper, the 90 mm recoilless rifle has replaced the DRAGON in six engineer TOEs and a change is pending approval at HQDA to replace DRAGON in the remaining TOEs. In addition, the newer TOEs such as TOE 5-217J5, 1 April 1985, code the 90 mm to be replaced by AWSOME when that weapon becomes available. However, the TOE 5-155J and 5-25509 engineer battalions are not authorized any intermediate range antitank weapons.

Lack of medical evacuation personnel in combat engineer battalions.

Since the 1983 MAA, medics have been deleted rather than added to combat engineer battalions.

Inability to incapacitate enemy armored fighting vehicles.

The .50 caliber machinegun remains the primary combat engineer weapon for use against enemy armored fighting vehicles. However, the Basis of Issue Plan for a developmental weapons system LIN Z 40468, Machine Gun Grenade, 40 mm, MK 19 MOD III includes combat engineer units. The basis of issue will be 1 per engineer company HQ, 1 per engineer platoon HQ, 1 per M-113, 1 per tracked recovery vehicle and 2 per bridge company.

NECESSARY DEFICIENCIES

Nonrestrictive infantry mission statement in combat engineer TOEs.

This deficiency remains. See Chapter VII of this paper.

Nondescript capability statements in combat engineer TOEs concerning the infantry role.

This deficiency remains. See Chapter VII of this paper.

Lack of an adequate number of FM radios in the Engineer Company, Engineer Combat Battalion, Airborne (TOE 5-198H).

This deficiency has been corrected with TOE 5-195 H5.

CHAPTER XIII

SUMMARY

The purpose of this paper was to assess the capability of combat engineer units to perform an infantry mission on the battlefield. In order to make this assessment, a series of questions, essential elements of analysis, were developed. These questions were designed to address the critical issues concerning the engineers as infantry capability. It appears that they have, and the overall conclusion is that combat engineer units do have the capability to perform a limited infantry mission. However, this capability can be increased if certain deficiencies are corrected.

The conclusions or recommendations concerning each essential element of analysis can be found in the corresponding chapter of this paper and need not be repeated. In this chapter, the deficiencies and corrections will be condensed and combined in order to array the corrective actions under the headings of doctrine, training, organization and materiel solutions.

DOCTRINAL DEFICIENCIES

Revise the fight as infantry tasks in FM 5-100.

The historical review of combat engineers being employed as infantry validates the current doctrine that requires combat engineer units to be prepared to be employed for limited infantry missions as a last resort measure. The historical review also indicated that this employment can be expected to be of short duration followed by the resumption of combat engineer missions. Projecting forward to an Airland Battle scenerio results in the same conclusion. In addition, it was found that other armies commonly assign

a limited infantry mission to their combat engineers and provide weapons similar to those found in US Army combat engineer units.

However, the specific infantry tasks of FM 5 100 need to be revised to be consistent with current maneuver doctrine. Figure IV-1 of this paper contains such a recommendation.

Delete the fight as infantry mission for TOE 5-115.

Engineer battlefield responsibilities are broad and varied. A multitude of skills and a broad range of equipment is required to perform the varied tasks. An all-purpose engineer unit that can perform all of these tasks does not exist in the force structure, since all of its capabilities could not be used at any one place or time. Instead, engineer units are organized to provide a primary capability such as combat support, construction, bridging, topography and equipment augmentation. Of all the combat engineer units with a fight as infantry mission, only one is not organized primarily for a combat support role—the Engineer Combat Battalion, Heavy (TOE 5-115). It is organized for a construction mission as are all of the engineer units that have CMF 51 and 62 as the high density soldier. This battalion should not have a fight as infantry mission. Doctrine should reflect its actual capability, which is self-defense in the rear areas.

Insure a consistency between mission, capabilities, and training tasks for combat engineer units.

Today, combat engineer units cannot find a consistency and a supportive relationship between the engineer as infantry doctrinal mission and the mission and capabilities statements of the various unit TOEs, ARTEP collective tasks, soldier's manual individual tasks, and the instruction presented to engineer officers and noncommissioned officers by the training base. The TRADOC school organization diffuses the responsibility to develop these

training products among various directorates. However, the consistency, or lack thereof, is quite evident to a unit training manager conducting a mission analysis and attempting to establish a training program. A common thread between these publications must be established for the fight as infantry mission.

TRAINING DEFICIENCIES

Training in selective infantry tasks requires emphasis in all combat engineer units.

The historical analysis of engineers employed as infantry, the recent Israeli experience in Lebanon, and projecting the Airland Battle concept to a future battlefield all indicate that certain infantry tasks are likely to be required of combat engineer units performing primary mission operations. These same tasks can reasonably be expected to be performed by engineer units reorganized as infantry. Figure IV-1 of this paper outlines these tasks. Engineer ARTEP and soldier's manuals need to be consistent in emphasizing these tasks as critical. This is especially important for the corps engineer combat battalions as they are the most likely to actually be reorganized as infantry.

Ensure a consistency between mission, capabilities, and training tasks for combat engineer units.

See discussion under doctrinal deficiencies.

ORGANIZATIONAL DEFICIENCIES

Authorize similar weapons at company level for similar combat engineer units.

The company is normally the smallest combat engineer unit to be employed on a semi-independent mission. It was therefore selected as the unit for comparing weapons authorizations in Chapter VI of this paper. It was found

that engineer units with similar missions and vehicles have different types of weapons authorized. In addition, two combat engineer battalions do not have any medium antitank weapons authorized. No reason could be found to explain these inconsistencies.

Ensure a consistency between mission, capabilities and training tasks for combat engineer units.

See discussion under doctrinal deficiencies.

MATERIEL DEFICIENCY

Authorize similar weapons at company level for similar combat engineer units.

See discussion under organizational deficiencies.

ANNEX A.

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