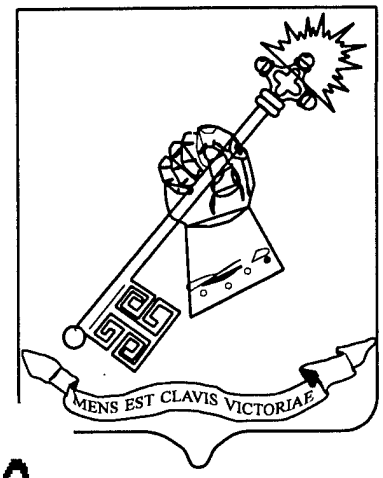
ARMOR ATTACKS IN RESTRICTIVE TERRAIN: IS CURRENT DOCTRINE ADEQUATE?

A Monograph
By
Major Mark A. Davis
Armor



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ABSTRACT

ARMOR ATTACKS IN RESTRICTIVE TERRAIN: IS CURRENT U.S. ARMY DOCTRINE ADEQUATE? by Major Mark A. Davis, USA, 78 pages.

This monograph seeks to determine the adequacy of current U.S. Army doctrine as it pertains to the planning and execution of attacks by an armored force in restrictive terrain. Many circumstances and possible threats will require the use of a mounted force in offensive operations in less than favorable terrain. Therefore, it is important to assess pertinent doctrine.

The monograph begins with a discussion of restrictive terrain as defined in doctrinal publications. The paper then evaluates doctrine concerning offensive armor operations in restrictive terrain. Following the doctrinal review, three historical examples related to armor attacks in restrictive terrain are examined: Kampfgruppe Peiper's attack through the Ardennes in 1944, Task Force Crombez' attack to linkup with encircled forces at Chip'yong-ni in Korea in 1951, and Operation Lam Son 719 in Vietnam and Laos in 1971. The study then develops key considerations from the historical examples. The key considerations become the standard by which doctrine is measured.

The monograph concludes that current U.S. Army doctrine is inadequate because it does not effectively address planning and executing armor attacks in restrictive terrain.

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INTRODUCTION

The U.S. Army is designed to meet the challenges of combat in all types of terrain and climatic conditions. This monograph addresses the subject of conducting offensive operations at the brigade level and below by armored forces in restrictive terrain. The speed and mobility of mounted units are reduced in restrictive terrain. However, armor's protection, firepower, shock effect, and speed relative to dismounted forces in the same terrain make it extremely useful. These qualities and the abundance of restrictive terrain in the world dictate that armored forces must be prepared to fight in these conditions.

Given the need to fight effectively with armored forces in restrictive terrain, one would expect doctrine to address adequately the major considerations in planning and executing these operations. The purpose of this monograph is to determine if current doctrine adequately addresses the key considerations for conducting attacks with armored forces in restrictive terrain. The key considerations for these operations, highlighted by three historical examples, will serve as the criteria for judging the adequacy of doctrine.

The scope of this study is at the brigade level and lower and will not discuss aspects of Operations Other Than War (OOTW). Military Operations in Urban Terrain (MOUT) will not be discussed in this monograph either. While urban terrain is considered restrictive terrain because it greatly impedes the movement of mounted forces, the complexity of these operations are beyond the scope of this paper. Finally, while training and doctrine are tied to one another in effective of combat units, this study addresses doctrine only.

METHODOLOGY

This paper will first discuss restrictive terrain to establish its characteristics and doctrinal parameters. Next, doctrine will be assessed to determine what it provides with respect to mounted attacks in restrictive terrain. The next major portion of the paper contains three historical examples of armor attacks in restrictive terrain which illustrate the difficulty of these operations and provides a basis for establishing key considerations

concerning such attacks. The key considerations are developed and discussed in terms of the historical examples and doctrine. These key considerations are used to test the adequacy of doctrine in its treatment of armor attacks in restrictive terrain. The end of the monograph offers some recommendations for improving the inadequacy of doctrine.

RESTRICTIVE TERRAIN

Before discussing the adequacy of doctrine as it addresses armor attacks in restrictive terrain, we must first define what restrictive terrain encompasses. For the purpose of this monograph, Field Manual (FM) 34-130, Intelligence Preparation of the Battlefield, provides a discussion of the term. This doctrinal manual classifies terrain in three categories: unrestricted terrain, restricted terrain, and severely restricted terrain.[1]

Unrestricted terrain possesses no characteristics that significantly impede movement. The terrain can be moderately sloping and have widely spaced trees or rocks, but not to the degree that they influence rate of march. No effort is required to enhance mobility. On the other hand, restricted terrain hinders movement to some degree. Little effort is required to enhance mobility, but formations may not be able to move at preferred speed or be able to transition to different movement techniques or formations. For mounted forces, this type of terrain may have steep slopes or moderate to densely spaced trees, rocks, or buildings. Similarly, swamps, or rugged terrain are considered restrictive terrain for dismounted infantry. Finally, severely restricted terrain for mounted forces is characterized by steep slopes, densely spaced trees or rocks, and little or no supporting roads. This type of terrain severely hinders or slows the movement of combat formations unless effort is made to enhance mobility. Natural and man-made obstacles such as minefields, railroads, and large rivers are also designated as severely restrictive terrain.[2]

The classifications in FM 34-130 are by no means absolute. They must be considered in the context of the type of forces involved, engineer capabilities, and weather. Unrestrictive terrain in one instance can be severely restrictive terrain in other

circumstances.[3] Given the rather flexible definition and classification of terrain, this study will include all terrain that is not unrestricted since the considerations of armor attacks will be simply a matter of degree once the environment is determined to be dominated by less than favorable terrain.

CURRENT U.S. ARMY DOCTRINE

Discussion of doctrine must begin with the Army's keystone doctrinal manual Field Manual 100-5, Operations.[4] Field Manual 100-5 states the U.S. Army must be prepared to fight world-wide to accomplish any given mission.[5] This global orientation implies terrain and weather will not prevent the U.S. Army from operating in any particular location. Additionally, our doctrine calls for combined arms operations to quickly defeat the threat.[6] In its discussion of the environment of combat, FM 100-5 states that "forces must be prepared to fight . . . anywhere in the world, from blistering deserts to frigid wastelands, in rain forests, tundra, mountains, jungles and swamps, urban sprawl, and all types of terrain in between."[7]

Field Manual 100-5 devotes a single paragraph to operations in mountain, jungle, desert, cold weather, and urban areas. The discussion briefly describes the challenges associated with environment-specific operations, and, in some cases, discusses the type of units that are best suited for operations in the respective category. Armor and mechanized units are mentioned as being especially suited for desert operations, but are not mentioned in any other paragraph. FM 100-5 references a field manual for more detailed information in each of the four areas listed above.[8] These referenced manuals will be evaluated later.

Chapter two of FM 100-5 briefly addresses the capabilities and limitations of tactical units in the U.S. Army. The field manual specifically states light infantry units are

effective in restrictive terrain, but the description of mechanized infantry and armor units does not mention terrain in any way.[9]

The fundamentals of the offense described in FM 100-5 support the idea that attacking with armored forces through restrictive terrain is in keeping with the description of how U.S. Army units should attack. Our doctrine seeks to avoid direct attacks and the enemy's main strength.[10] The characteristics of the offense (especially surprise and tempo) reinforce attacking the enemy at a place where he is not prepared, attacking through "seemingly impassable terrain," and seeking a tempo that prevents the enemy "from recovering from the shock and effect of the attack."[11] An enemy force, understanding the difficulties of attacking with armor through difficult terrain, will more times than not, defend on obvious high speed avenues of approach. If the enemy then inadequately defends difficult terrain in his sector, there is a good possibility that attacking through restrictive terrain will be met with little resistance, allow a heavy force to penetrate the enemy's lines, and attack his rear areas or lines of communication.

Chapter eight of FM 100-5 covers planning and conducting offensive operations. This chapter discusses the factors of Mission, Enemy, Terrain and Weather, Troops, and Time Available (METT-T). The final two sections of this five page chapter focus on preparing for and conducting attacks. Doctrine again states that "maneuver over difficult terrain may be desirable to surprise the enemy."[12] There follows a brief discussion concerning the use of terrain. In this discussion, the manual advises that an attacker must plan to avoid (or negotiate) restrictive terrain or, perhaps, use it to protect his flanks. Light forces can use restrictive terrain to deny the enemy its use or to facilitate the maneuver of heavy forces. Finally, our fundamental doctrine stresses the need to coordinate the movement of forces to maximize cover and concealment and to quickly concentrate forces for the attack at the right time to preserve the element of surprise.[13]

While FM 100-5 does not explicitly discuss using heavy forces for offensive operations in restrictive terrain in any detail, it does imply several important concepts. First, it emphasizes a world-wide approach and the need for U.S. forces to be able to operate under any conditions and in any terrain. Second, it generally prescribes a combined arms approach to warfighting. Third, surprise, speed, shock, and firepower, are essential to our way of defeating the enemy. These concepts imply the need to conduct mounted attacks. The global span of our interests nearly guarantee that mounted operations will take place in restrictive terrain. Given our doctrinal emphasis on mobile, combined arms operations and our global interests, the failure to discuss the impact of restrictive terrain is a significant omission.

The review of current doctrine now turns to the series of field manuals which address operations in the environments of the mountains, the desert, the jungle, and cold weather regions. These manuals are not the primary doctrine for conducting heavy operations. However, they contain useful, supplemental information.

Depending on how one classifies terrain, the world's land surface is between 27 and 50 percent mountainous.[14] Field Manual 90-6, Mountain Operations, does not include any mention of armor or mechanized infantry in its discussion of how to attack in the mountains.[15] It is interesting to note, however, that the example of how the threat defends in the mountains includes both tank and mechanized units.[16] Field Manual 90-6 does mention mechanized infantry: "but it must be prepared to dismount and conduct operations on foot."[17] The employment of mechanized and armor units is mentioned once more but the manual states that the largest size unit able to be used would be a platoon and that tracked vehicles will seldom be able to accompany infantry in the assault but can provide overwatching fire.[18] This manual is of little use to any unit other than light infantry.

The desert environment, for the most part, is an unrestrictive environment.[19] The recently published Field Manual 90-3, Desert Operations, tells us that arid regions cover one third of the earth's land surface.[20] Although these regions permit the mobility required for mounted forces, they also feature dunes, wadis, sebkhas, and mountainous terrain that hinder movement.[21]

Chapter 3 of FM 90-3 more than adequately addresses the military aspects of terrain in the desert and highlights the fact that there are natural obstacles that become key to planning in an otherwise featureless area. The importance of using restrictive terrain in offensive maneuver is emphasized in only one paragraph. The field manual advises against frontal attacks, mentions the potential danger of total observation of units attacking across flat terrain, and states "It is preferable to maintain pressure on enemy units in unfavorable terrain, while other forces find enemy weakness in terrain more favorable for an attack."[22] The paragraph strings together several factors to consider for maneuver in the desert, but does not address the reasons for choosing a particular method or style. In this respect, the doctrine needs improvement. Field Manual 90-3 contains an appendix on operations in mountainous terrain that is focused on terrain such as the southern Sinai and shores of the Red Sea.[23] This annex states mountainous areas are not good for the employment of tanks and armored cavalry because they are unable to maximize their mobility and firepower.[24]

Another type of restrictive terrain is jungle. Jungle terrain is found throughout the world within approximately 20 degrees latitude of the equator. Field Manual 90-5, Jungle Operations, briefly discusses the use of armor and mechanized infantry in these conditions. All discussion of armor and mechanized infantry is in terms of supporting direct fire for dismounted infantry. During offensive operations, the role of armor is simply to remain close enough to the leading dismounted infantry to be able to support with fire if

necessary.[25] FM 90-5 briefly addresses the use of mechanized infantry to conduct route clearance and security. While this discussion is still couched in terms of armor as a supporting effort to ensure uninterrupted supply activities, it begins to address the need to integrate engineers, dismounted infantry on flanks, and identification of critical areas such as bridges and possible ambush locations.[26] The manual also devotes four sentences to explain the advantages of tank-mechanized teams and the need for dismounted infantry to protect the tanks and for each of these forces to always know the location of the other.[27]

Extreme cold weather climates often correspond with restrictive terrain. U.S. Army doctrine for these type operations is found in FM 31-70, Basic Cold Weather Manual,[28] and FM 31-71, Northern Operations.[29] Northern operations include operations in both summer and winter, in the subarctic, arctic, and polar regions and include up to 45 percent of North America and 65 percent of the Eurasian land Mass.[30]

Field Manual 31-71, Northern Operations, devotes a section of four pages to the discussion of armor units in the northern latitudes. The introductory paragraph states that the role of armor and its effect on the enemy are no different from anywhere else. The section describes the effects of deep snow, ice crossings, and summer movement as they relate to armor operations. The manual seems to be neutral as to the appropriateness of using armor in such terrain, and simply indicates the peculiar circumstances one must work around in the employment of tanks.[31] In its section on offensive operations, FM 31-71 does not address tanks at all. Mechanized infantry is mentioned once in terms of an option for movement.[32]

Field Manual 31-70, Basic Cold Weather Manual, addresses tanks only as they may be used to support movement of infantry soldiers by making trails for skiing, towing skiers, or allowing infantry to ride on the exterior of the tank.[33] This manual also

discusses the use of antitank mines and the effects of extreme cold on tank gunnery.[34] Both manuals offer some useful information for armor units but fall short of explaining the environmental impact of conducting armor attacks in cold weather or northern climates.

The environment-specific manuals prove the point that restrictive terrain is found in every part of the world. Given the world-wide focus of our doctrine, it logically follows that we must be able to operate as a combined arms team in a wide range of conditions including restrictive terrain. While the manuals discussed above give useful information for conducting operations in extreme environments, they do not provide much detailed information on synchronization of combat power and the actual conduct of attacking and defending. As will be seen below, the armor and mechanized infantry specific manuals provide detailed information on synchronizing combat power and attacking and defending, but do not address the problems associated with conducting operations in unfavorable environments. There is a noticeable gap in the information contained in these two families of field manuals. The field manuals that discuss armor and mechanized infantry operations will now be reviewed.

Our discussion of doctrine that specifically deals with mounted forces will begin with FM 71-3, Armored and Mechanized Infantry Brigade. This manual's introduction states that the heavy brigade is limited in "dense jungles and forests, steep and rugged terrain, and significant water obstacles [which] restrict mobility."[35] The chapter on offensive operations simply does not address terrain other than to say that METT-T must be considered.[36] Additionally, the manual states that "brigades require multiple routes in their zones if they are to attack effectively from columns."[37] Field Manual 71-3 contains an appendix on heavy/light operations in which we find four paragraphs devoted to offensive operations. The section states that the brigade should plan to use light forces to fix the enemy in restrictive terrain as the heavy elements attack the enemy in force.

"Conversely...the heavy brigade may fix the enemy while a light unit maneuvers...on an avenue...through restrictive terrain."[38] In this way, the manual leaves the reader with the impression that light units only fight in restrictive terrain, and heavy units only fight in unrestrictive terrain.

Field Manual 71-3 does not contain much useful information on attacks in restrictive terrain, or any terrain for that matter. The acronym METT-T is used as a catch-all solution to conducting operations is less than favorable terrain without any detailed explanation of applying concepts. The proper use and understanding of terrain is so basic to mounted forces that it must be covered in detail in these branch-specific manuals.

The review of doctrinal publications now devolves to battalion level. We begin with FM 71-2 The Tank and Mechanized Infantry Battalion Task Force. The introduction states that "the battalion task force must be prepared to fight on any type of terrain and during adverse weather conditions."[39] The introduction also contains short paragraphs on urban, desert, jungle, mountain, and cold weather operations. The passage on desert operations contains no information on restrictive terrain. The paragraph on jungle operations states that movement and operations are impeded by the jungle which is dominated by terrain with limited visibility. The jungle also creates problems with "flank coordination, mutual and adjacent support, and enemy infiltration."[40] The three sentences on mountain operations state that the "environment requires some modification of tactics and techniques" and mention is made of problems with movement and fields of fire. Finally the paragraph states that mechanized vehicles may be used by dismounted infantry to conserve the fighter's energy and decrease the time required by walking.[41] Finally, the paragraph on cold weather operations cautions that optical systems may be degraded by snow and that cold weather may alter the effectiveness of natural obstacles and reinforced

barriers.[42] No mention is made of the effects on movement--a major consideration for mounted forces.

Chapter 3, Offensive Operations, prescribes six formations available for conducting battalion task force attacks. Five of the six formations require unrestrictive terrain. Of the six, the column formation (or variations of it) is the only one suitable for attacks in restrictive terrain. This chapter also provides information on specific attacks such as night attacks, attacks against a strong point, and attacks from defensive posture, to name a few, but does not address restrictive terrain in any detail.[43] The chapter contains a sentence on the use of dismounted infantry in restrictive terrain: "dismounted infantry can maneuver on untrafficable terrain to attack from an unexpected direction to permit the resumption of mounted combat."[44]

Appendix A of FM 71-2 reminds the reader once again that light infantry forces possess the ability to operate in restrictive terrain.[45] The FM gives a short passage on safety which includes provisions for the infantry to ride on armored vehicles but cautions that they are exposed to enemy fire.[46] The section on offensive operations discusses four different techniques concerning light and mechanized forces assaulting an objective. The different methods involve which force suppresses and which force assaults based on the type of enemy involved and whether terrain allows sufficient concealment for light infantry. There is little discussion of synchronizing combat power other than the fire and movement of light infantry and armored vehicles. Finally, the manual provides a matrix which lists possible roles and missions for heavy/light and light/heavy force combinations.[47]

Field Manual 71-1, Tank and Mechanized Infantry Company Team, closely follows FM 71-2, and contains no information on conducting attacks in restrictive terrain. This field manual does, however, contain information on the characterization of terrain as it relates to intelligence preparation of the battlefield (IPB). Characteristics of mounted and

dismounted avenues of approach are described in detail.[48] These parameters describe terrain ideal for armor operations. In reality, mounted forces can operate in much less favorable terrain. However, discussions to illustrate this are not included in the manual.

A doctrinal review of mounted force manuals would be incomplete without an examination of Field Manual 71-123, Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion/Task Force, and Company/Team. This manual is a supplement to the previous three 71 series field manuals, and concentrates on *how* to conduct operations (as opposed to conceptual aspects of doctrine). The manual is written to address the planning, preparation and execution of various operations at each of the three levels of command.[49] FM 71-123 describes terrain in virtually the same terms as FM 71-1, FM 71-2, and FM 71-3. However, this manual states that "mobility corridors may be only as wide as the width of the vehicles in some conditions."[50] This distinction is important. A large column of armored vehicles, undetected, can be the difference between success and failure. Just because one small dirt trail transits otherwise impassable terrain does not mean that it can be neglected as a possible avenue. Without proper defensive force or surveillance on such a route, an armored column can quickly get in the enemy rear area. Field Manual 71-123's chapter on offensive operations is quite detailed. However, it barely mentions the terrain considerations seen in the three other 71 series manuals.

One can find some useful information in FM 71-123 as it relates to terrain considerations in offensive operations. However, the information is fragmented and does not relate specifically to conducting an attack in restrictive terrain. The brigade level discussion of conducting a movement to contact suggests that "forward and flank security forces will execute their mission in terms of both the commander's intent and the reconnaissance and security plan. It is important that all previously identified areas advantageous to the enemy be cleared to avoid ambush or flanking enemy attack."[51] The

battalion level portion on movement to contact addresses some of the characteristics associated with using a column formation in compartmentalized terrain. The field manual states that it will be hard for the battalion task force to maintain mutual support, let alone flank and rear security, if it finds itself forced to move along mobility corridors.[52] This discussion begins to address the challenges of armor attacks in restrictive terrain, but does not adequately address ways to overcome the challenges.

Discussion at the battalion level also includes techniques for tank and infantry teamwork during the approach to an objective in a deliberate attack. The infantry should remain mounted as long as possible and should dismount only if necessary. Dismounts may need to: "lead an attack through heavily wooded areas or over very rough terrain," or "lead an attack across defended rivers that cannot be crossed by armored vehicles."[53] Field Manual 71-123 also indicates that tanks revert to a support by fire role if terrain, obstacles, or enemy antitank (AT) weapons restrict or stop their movement. However, as the problems are overcome, the tanks should pass through the infantry and continue on to assault the objective.[54]

The discussion in the company/team portion of the offensive operations chapter of FM 71-123 continues with the same type of information that, if pieced together, may form some vague idea of how to prepare for operations in restrictive terrain. The movement to contact section tells the company/team commander to avoid open areas, obvious avenues of approach, and routes dominated by key terrain.[55] This again reinforces the assertion that the manual does not effectively deal with the aspects of terrain.

Field Manual 71-123 discusses considerations for operations with light forces in good detail in the 24 page Appendix B, Integration of Heavy, Light, and Special Operation Forces. This appendix concentrates on capabilities, limitations, and considerations in general terms. The only specific operation listed in this section is MOUT. The

introduction to this appendix begins with a limiting view on the use of light and heavy forces. Field Manual 71-123 maintains that in the spectrum of terrain and enemy there is an overlap of environment where heavy and light force operate. The use of task organized forces in this overlap takes advantage of the strengths of both kinds of units and offsets their weaknesses.[56] This statement accompanies a diagram which does not consider the enemy and delimits the use of light forces in plains and desert terrain and heavy forces in forests, jungles and mountains. See diagram.[57] Taken literally, this diagram and characterization of when heavy and light forces operate together is too limiting.

The appendix of FM 71-123 also establishes a rule of thumb for the task organization (given a decision to use such combinations) of forces by size: a light company is normally allocated to an armor/mech brigade, a heavy company to a light brigade, a heavy platoon to a light battalion and finally a heavy section to a light company.[58] Again, this rule of thumb does not seem to be based on a careful analysis of terrain, mission, and enemy, but more from tradition.[59]

The section on light heavy operations is introduced by a paragraph which states that such teams have played a key role in supporting light infantry in theaters initially assumed too restrictive for the use of heavy forces including Korea, Europe in World War II, and Vietnam.[60] This section of the field manual has a great deal of information on the employment of tanks to support light infantry. There is a concise discussion of the considerations of mobility, safety, and mutual support that must exist anytime tanks and light infantry are combined.[61] The field manual also cautions against employing tanks as individual vehicles (versus by sections which would deny the crews the ability to fire and maneuver).[62]

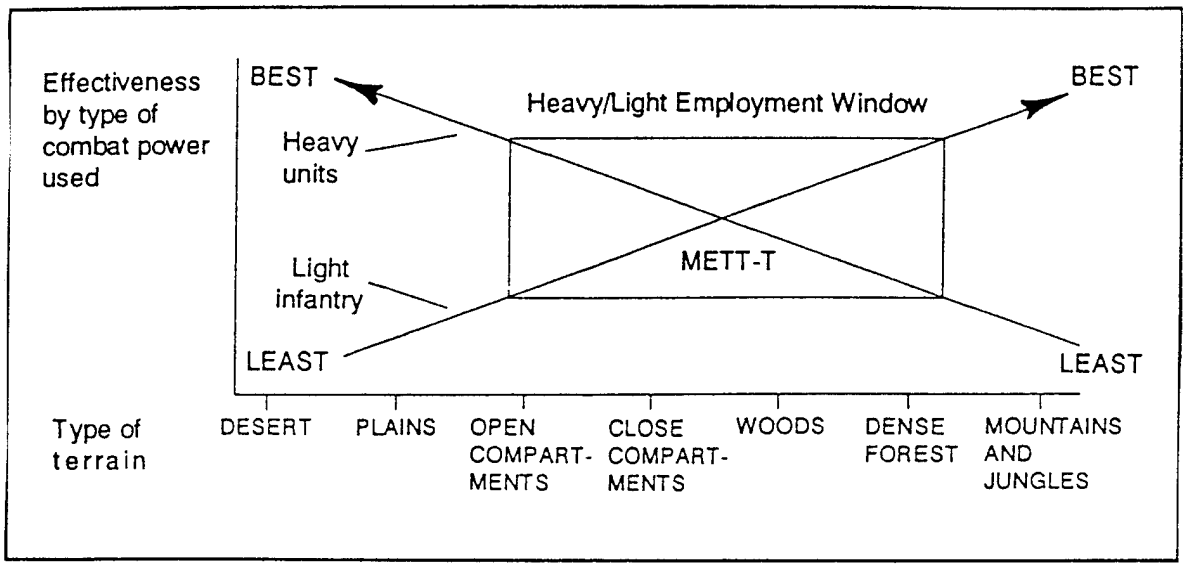


Figure B-1. Strengths and weaknesses of heavy/light forces.

The doctrinal manuals send mixed signals concerning the employment of armor in restrictive terrain. On one hand FM 100-5 emphasizes the need for a global perspective, prescribes combined arms operations, and encourages the use of the indirect approach and surprise in offensive operations. The other field manuals echo the global focus and the fundamentals of offense but discourage the use of armor in restrictive terrain. The discussions of heavy light and light heavy forces give the impression that the tanks will fight in open terrain and the light infantry will fight in the restrictive terrain but both cannot be effective together. The truth of the matter is there are numerous examples of armor working together with light infantry in restrictive terrain.

The doctrinal manuals cover a great deal of information, but they relate few procedures or operations to terrain or weather. The field manuals that deal specifically with the different environments of combat fall short in providing analysis on how the environments affect specific armor operations. Furthermore they are weak in demonstrating the impact of terrain on mounted operations in general. The branch specific manuals offer a variety of methods for conducting offensive operations, but do not explain why, and in what circumstances, a particular method should be chosen over another. With respect to armor operations in restrictive terrain, there needs to be a synthesis of terrain, doctrine, and tactical missions. The historical case studies that follow will make the challenges of attacking in unfavorable terrain more apparent. One will see that a comprehensive doctrine on these types of operations would have greatly increased these units' chances of success.

HISTORICAL EXAMPLES OF ARMOR ATTACKS IN RESTRICTIVE TERRAIN

Having established what current doctrine says about conducting armor attacks in restrictive terrain, this section develops historical examples to illustrate the unique problems that arise in these kinds of operations. While there are numerous examples available, this study will look at three, each from a different war and each from a different geographical

location: 1st SS Panzer Division's Kampfgruppe Peiper's attack through the Ardennes in 1944 during World War II, Task Force Crombez' attack to link up with encircled U.N. forces at Chip'yong-ni, Korea in 1951, and Operation Lam Son 719 in Laos and Vietnam in 1971. The reason these examples were selected is they cover a wide range of restrictive terrain from the heavily forested mountains and steep river banks in the Ardennes, to the bare mountains and rice paddies in Korea, to the thick jungle in Vietnam and Laos. The three examples also allow us to look at three different armies and a wide range of time and experience in the conduct of such armored attacks. The accounts of these actions are well documented and are rich with lessons for the armor leader. In this regard, the challenges common to all three operations may begin to develop threads of continuity. These historical examples will aid in establishing key considerations for conducting these operations and also show armor forces effectiveness in restrictive terrain.

KAMPFGRUPPE PEIPER

Hitler's decision on September 16, 1944, to go on the offensive resulted in what is now called The Battle of the Bulge. "I have just made a momentous decision. I shall go over to the counter-attack...here, out of the Ardennes with the objective Antwerp."[63] The aim was to strike a blow to the Allies in hopes they would be too slow to coordinate a response. The Germans assumed that such a failure would cause the coalition to collapse.[64]

Hitler's decision was based on: thin defenses by Allied forces in the Ardennes, the presence of a U.S.-British boundary, a short distance to the objective, terrain and weather that would provide concealment from Allied air, and an attack that would nullify the Allied threat to the Ruhr. Hitler may have been thinking about the 1940 "lightning thrust" through the Ardennes believing that the "Allies had learned nothing from the experience of 1940" following a conservative line of military thought "which deemed the Ardennes impossible for armor."[65]

The Ardennes "leads inevitably to the channelization of large troop movements east to west," offers few cross country alternatives once routes are selected, and is characterized by roads running along valley floors. Between the German front lines and Meuse River were the Our, Sauer, Ourthe, Salm, and Ambleve Rivers which indicate the importance of bridging assets for any attack through the area.[66] The Germans were well aware of the challenges of this terrain having attacked through it twice in the lives of many senior Nazi officers (1914 and 1940) as well as in their recent history during the Franco-Prussian War (1870).[67] Because the difficulties of the terrain decrease from east to west, speed is essential in the early stages of such an attack.[68]

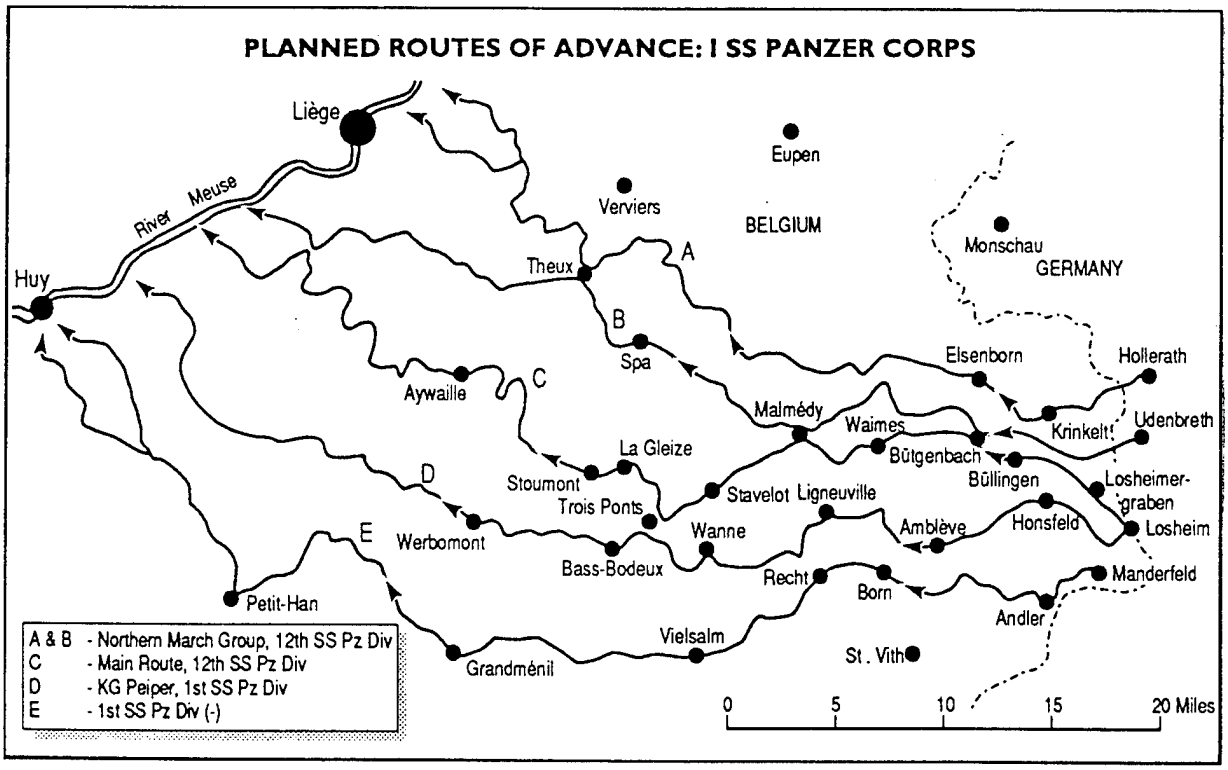
A small but important part of the counteroffensive belonged to Kampfgruppe Peiper, a brigade-sized armor task force from the 1st SS Panzer division under the command of SS Lieutenant Colonel Joachim Peiper.[69] Peiper's task was to "drive rapidly to the Meuse River" without concern for his flanks in order to facilitate the attack of the 1st SS Panzer Division.[70] By clearing a route to the Meuse the Kampfgruppe would allow the Sixth Panzer Army to quickly transit the difficult terrain of the Ardennes and then encircle the Allied Forces west of the Meuse.[71] Kampfgruppe Peiper, which began its attack early on December 17, 1944, consisted of about 4000 men and 72 tanks. Also supporting the column were five flak tanks, a light flak battalion with multiple 20mm guns, 25 assault guns and tank destroyers, a 105mm towed artillery battalion, a battalion of SS-Panzergrenadiers, 80 half tracks, a few reconnaissance troops, and two companies of engineers which lacked bridge construction equipment.[72] Peiper never made it to the Meuse River; his forward progress was halted on December 19, 1944 at Stoumont.[73]

The terrain through which the 15 mile long column was to attack was sharply compartmentalized, involved multiple river crossings, and allowed for little maneuver off

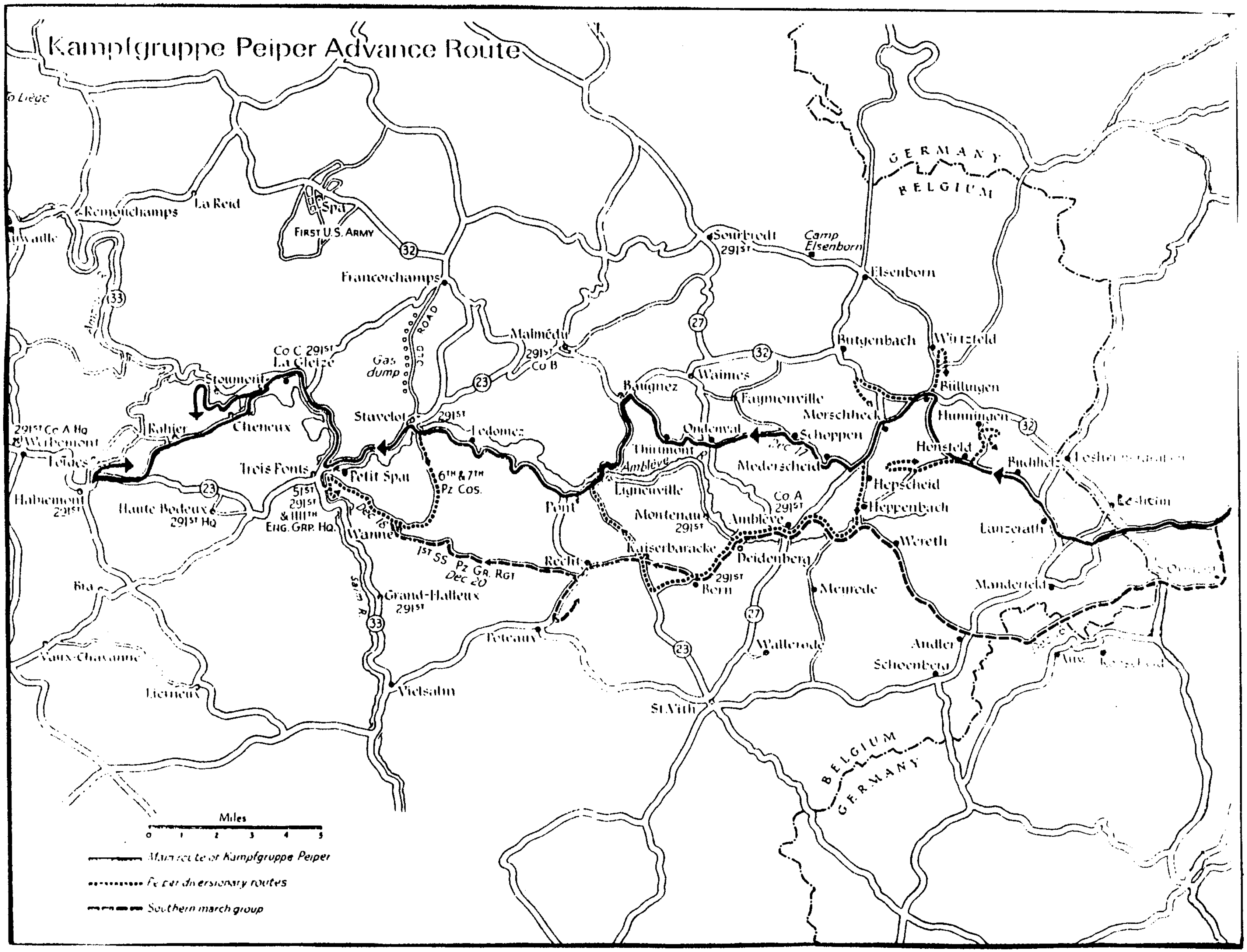
the winding roads.[74] Peiper complained about his route, saying that it was more suited for bicycles than tanks, but Hitler had ordered that units must remain on their assigned routes.[75] See map 1.[76] Peiper was forced to alter his march column near Honsfeld as warming temperatures made his original route unusable for tracked vehicles.[77] Peiper was also concerned about fuel; he wanted to take advantage of fuel depots he believed were near the cities of Bullingen, Stavelot, and Spa.[78] He continued to send out reconnaissance to ensure his route was passable, and he was continuously disappointed by poor road conditions and blown bridges.

Peiper's first contact was made at 0500 hours on December 17th, in the woods near Honsfeld. See map 2.[79] Here, Peiper was using a company of paratroopers to provide flank protection. The kampfgruppe quickly defeated elements of the 394th (U.S.) Infantry with quad 20mm guns as the column made its way towards Honsfeld. The Germans were somewhat surprised they had encountered no mines up to this point. In Honsfeld, elements of the 394th Infantry and the 612th (U.S.) Tank Destroyer Battalion were surprised, and unable to slow Peiper's column. There were places where the village road curved which caused "considerable backing and filling" in order for the tanks to pass.[80] Unfortunately for the Allies, these choke points were neither mined nor covered by fire.

Peiper departed from his designated route because it would not support his heavy vehicles, thereby risking execution for disobeying the Fuhrer. His new route took him toward Bullingen where he met only light resistance. Here, Kampfgruppe Peiper availed itself of 50,000 gallons of U.S. gasoline provided by the labor of 50 U.S. prisoners. "He [Peiper] was fortunate, for the mountainous terrain around the Schnee Eifel had made him use up as much gasoline in fifteen miles as normally would have taken him thirty."[81]


PLANNED ROUTES OF ADVANCE: I SS PANZER CORPS
Liège
River Meuse
Huy
Eupen
Verviers
BELGIUM
Monschau
GERMANY
Theux
A
B
Spa
Elsenborn
Hollerath
Aywaille
C
Malmédy
Waimes
Krinkelt
Udenbreth
La Gleize
Bütgenbach
Büllingen
Losheimer-graben
Stoumont
D
Trois Ponts
Stavelot
Ligneuville
Amblève
Honsfeld
Losheim
E
Werbomont
Wanne
Bass-Bodeux
Recht
Born
Manderfeld
Petit-Han
Andler
Vielsalm
St. Vith
Grandménil
A & B - Northern March Group, 12th SS Pz Div
C - Main Route, 12th SS Pz Div
D - KG Peiper, 1st SS Pz Div
E - 1st SS Pz Div (-)
0
5
10
15
20 Miles

Map 1


Kampfgruppe Peiper Advance Route
to Liège
Remouchamps
La Reid
Spa
First U.S. Army
Francorchamps
Malmédy
291st
Co B
Gas dump
Old Road
Co C 291st
La Gleize
Stoumont
Cheneux
Rahier
291st Co A Hq
Werbomont
Habiemont
291st
Haute Bodeux
291st Hq
Trois Ponts
51st
291st
& 1111th
Eng. Grp. Hq.
Petit Spai
Stavelot
Ledomez
6th & 7th Pz Cos.
Wanne
1st SS Pz Gr. Rgt
Dec 20
Grand-Halleux
291st
Salm R.
Vielsalm
Lierneux
Vaux-Chavanne
Pont
Recht
Poteaux
Baugnez
Thirimont
Amblève
Ligneuville
Montenau
291st
Kaiserbaracke
Born
291st
Deidenberg
Amblève
Co A
291st
Ondenval
Dec 17
Schoppen
Waimes
Faymonville
Möderscheid
Morschheck
Sourbrodt
291st
Camp Elsenborn
Elsenborn
Butgenbach
Wirtzfeld
Büllingen
Honsfeld
Hepscheid
Heppenbach
Wereth
Meyrode
Wallerode
St. Vith
Andler
Schoenberg
Manderfeld
Lanzerath
Buchholz
GERMANY
BELGIUM
32
33
23
27
Miles
0 1 2 3 4 5
Main route of Kampfgruppe Peiper
Southern march group

Map 2

The column received some limited effects from Allied air, but the attack was mitigated by cloud cover and a squadron of German ME-109s which caused the Allies to jettison their bombs. Had Peiper continued north, he could have encircled the 99th and 2d Infantry Divisions. Instead, he returned to his designated route and focused on his Meuse objective.[82]

Peiper's battlegroup then proceeded through the villages of Moderscheid, Schoppen, and Ondenval. Peiper took full advantage of reconnaissance patrols and he followed less obvious dirt tracks that he believed would avoid contact and support his vehicles.[83] Just beyond the town of Thirimont, the lead tank in the column became bogged down at a ford in a small stream. This caused Peiper to swing northwest at Thirimont to get to the major north south road of N-23 which would bring him to Ligneuville. This brought Peiper's men to the small road junction near Malmedy called Baugnez. Unknown to Peiper, several units were moving in and around Malmedy, including elements of the 7th Armored Division's Combat Command Reserve.[84]

Lieutenant Colonel Pergrin, aware of the confusion in and around Malmedy and that a German force was headed west from the vicinity of Butgenbach (near Bullingen) quickly deduced the importance of blocking the routes to Spa, close to the First Army headquarters and a large fuel depot. He ordered his C Company to move from La Gleize to Malmedy and to drop off a squad at both Trois Ponts and Stavelot to set up road blocks at those locations.[85]

The German column then attacked toward Ligneuville based upon word that a command post was there. Just outside of Ligneuville, on their way to Stavelot, Kampfgruppe Peiper made contact with a security element belonging to the supply trains of the 9th Armored Division Combat Command B. Losses to Peiper were one Panther tank

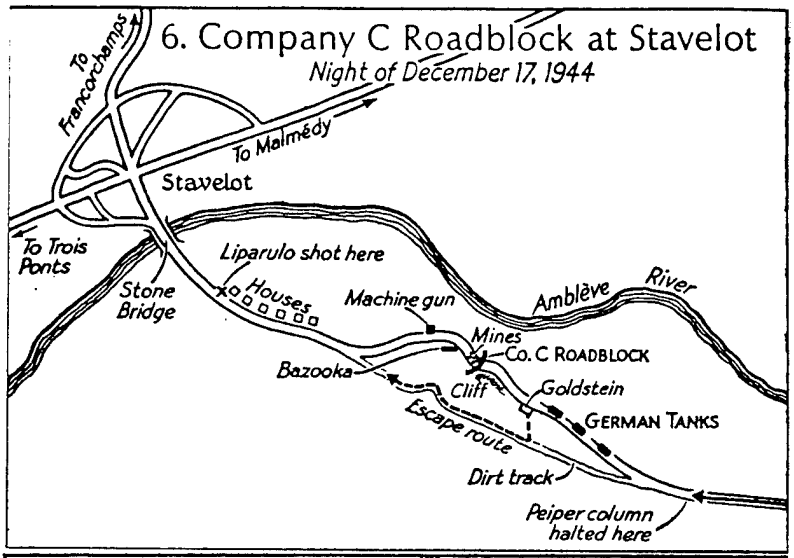
and two other armored vehicles. The Americans lost two Sherman tanks, an M-10 tank destroyer, and a few machine guns. Peiper continued at 1600 hours to Stavelot.[86]

Kampfgruppe Peiper arrived at the edge of Stavelot at dusk. See map 3.[87] A tank company was sent to reconnoiter a lateral road which proved impassable. Additionally, Peiper received word from one of the men assigned to Lieutenant Colonel Otto Skorzeny that the roads behind him, from Honsfeld to Ligneuville, were full of infantry and trucks bogged down in mud. Thus the only way to go was through Stavelot.[88]

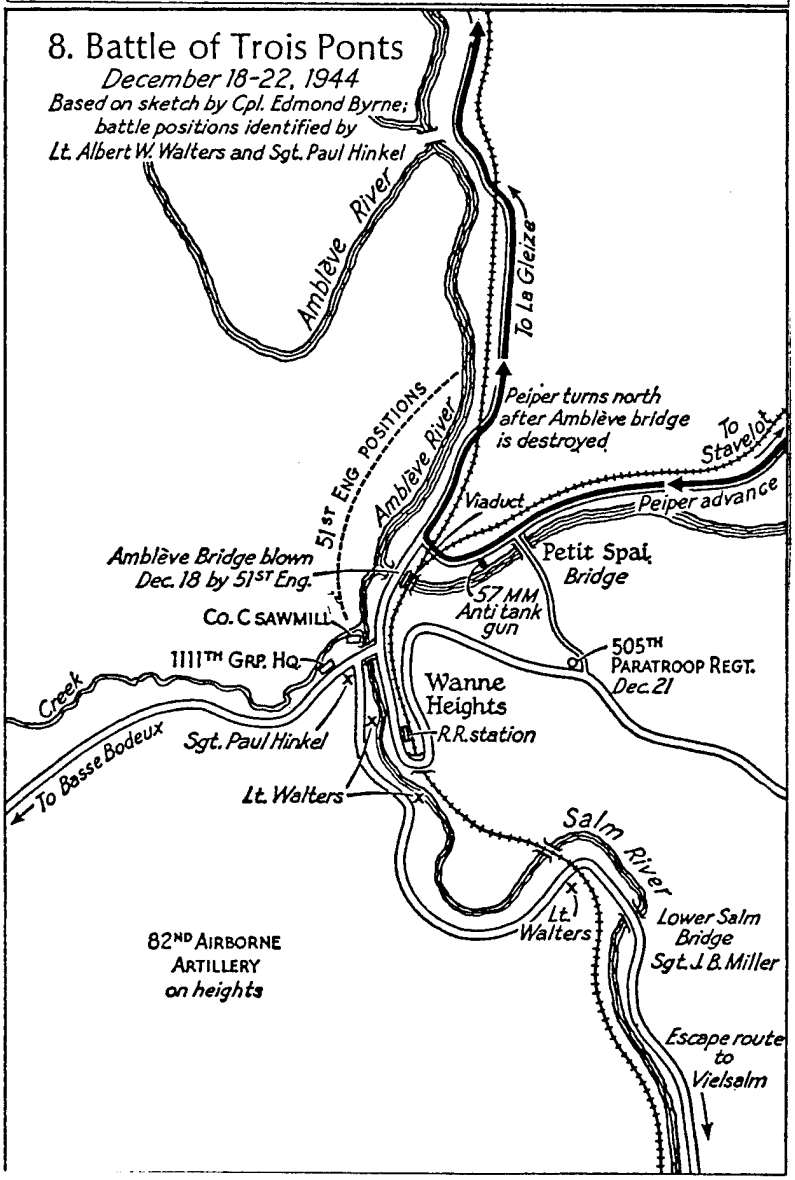
The ground near Stavelot lies in a deeply incised valley surrounded by high bluffs.[89] The approach to Stavelot is "bent around a gigantic rock and funneled into the single stone bridge over the Ambleve" river. On the road leading to the bridge, Peiper's first vehicle hit an antitank mine which blocked the vehicles behind it. Peiper sent his dismounted infantry forward to try and take the bridge. The 60 man force was repelled by antitank and sniper fire. Frustrated by the Americans defending the bridge to his front, and clogged roads to his rear, Peiper decided to rest his force and try again in the morning.[90]

Sergeant Charles Hensel and his eleven man squad from C Company, 291st Engineers, armed with a bazooka, M-1 rifles, and mines stopped Kampfgruppe Peiper for a few hours at Stavelot. This allowed a detachment commanded by Major Paul J. Solis from the 526th Armored Infantry Battalion to arrive with towed tank destroyers. It also allowed the unhindered movement of elements of the U.S. 7th Armored Division to St. Vith. Unfortunately, the bridge demolitions at Stavelot never exploded and the rested Kampfgruppe crossed the bridge by 0800 hours on the 18th losing only four tanks.[91]

Major Solis withdrew with one platoon in a half-track toward Spa while the rest of his force withdrew in confusion toward Malmedy.


6. Company C Roadblock at Stavelot
Night of December 17, 1944
To Francorchamps
To Malmédy
Stavelot
To Trois Ponts
Liparulo shot here
Houses
Stone Bridge
Machine gun
Amblève River
Mines
Co. C ROADBLOCK
Bazooka
Cliff
Goldstein
GERMAN TANKS
Escape route
Dirt track
Peiper column halted here

Map 3


8. Battle of Trois Ponts
December 18-22, 1944
Based on sketch by Cpl. Edmond Byrne; battle positions identified by Lt. Albert W. Walters and Sgt. Paul Hinkel
Amblève River
To La Gleize
Peiper turns north after Amblève bridge is destroyed
To Stavelot
Peiper advance
51ST ENG POSITIONS
Amblève River
Viaduct
Amblève Bridge blown Dec. 18 by 51ST Eng.
Petit Spai Bridge
57 MM Anti tank gun
Co. C SAWMILL
1111TH GRP. HQ
505TH PARATROOP REGT. Dec. 21
Creek
Wanne Heights
R.R. station
Sgt. Paul Hinkel
To Basse Bodeux
Lt. Walters
Salm River
Lt. Walters
Lower Salm Bridge Sgt. J. B. Miller
82ND AIRBORNE ARTILLERY on heights
Escape route to Vielsalm

Map 4

Some German tanks followed in this direction but were met by a wall of fire set ablaze by Solis to prevent the Germans from reaching the great stores of gasoline at the Francorchamps dump. The defeat of this small patrol not only denied Peiper the route but also the critically needed fuel.

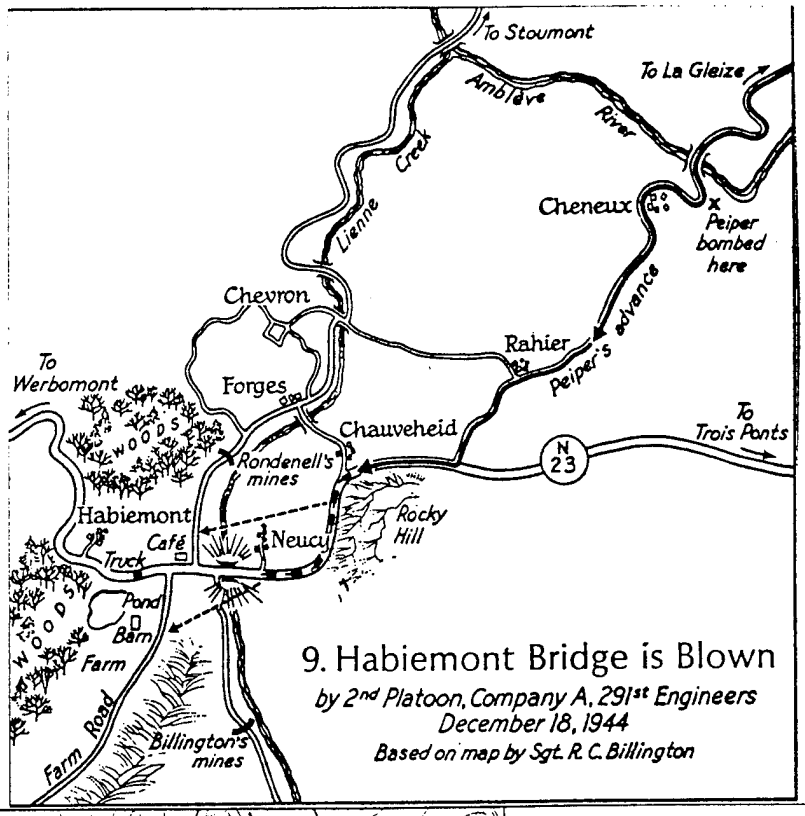
From Stavelot, Peiper sent forces on two routes toward Trois Ponts. One route followed a narrow road along the bank of the Ambleve. This route was covered by fire, and the company of Mark IV tanks had to abandoned their effort. They then rejoined the bulk of the column moving on the main highway to Trois Points (named because of the three highway bridges there, two over the Salm and one crossing the Ambleve River). See map 4.[92] Roads to Trois Ponts pass through deep recesses of the Salm and Ambleve river valleys to cliffs and hills which hide the village. They "wind for some distance through the gorges and along the tortuous valley floors." One road, Peiper's aim, leads out of Trois Ponts to Werbomont and on to Huy on the Meuse. [93] By now, the 291st Engineer Combat Battalion, and the 1111th Engineer Combat Group (whose headquarters was located near Trois Ponts) had prepared the small village for Peiper's arrival.

Responsibility for the defense at Trois Ponts fell on Major Robert B. Yates and C Company, 51st Engineer Combat Battalion, a demolition platoon from the 291st Engineer Battalion and a 57mm antitank gun crew of the 526th Armored Infantry Battalion At 1100 hours, December 18th, Kampfgruppe Peiper reached an underpass just short of the northern most bridge that spanned the Ambleve. While the Ambleve was no real obstacle to infantry, its steep banks made it an insurmountable barrier for tanks. The lone antitank gun crew immobilized the lead Panther. This provided sufficient warning for the engineers to blow the two bridges that Peiper had planned to cross. A German Company (perhaps two) had been dispatched early the morning of the 18th to move south before the attack on Stavelot. These Mark IV tanks moved through the village of Wanne and approached Trois Ponts from the south in hopes of crossing over the Salm River. Sergeant Jean B. Miller

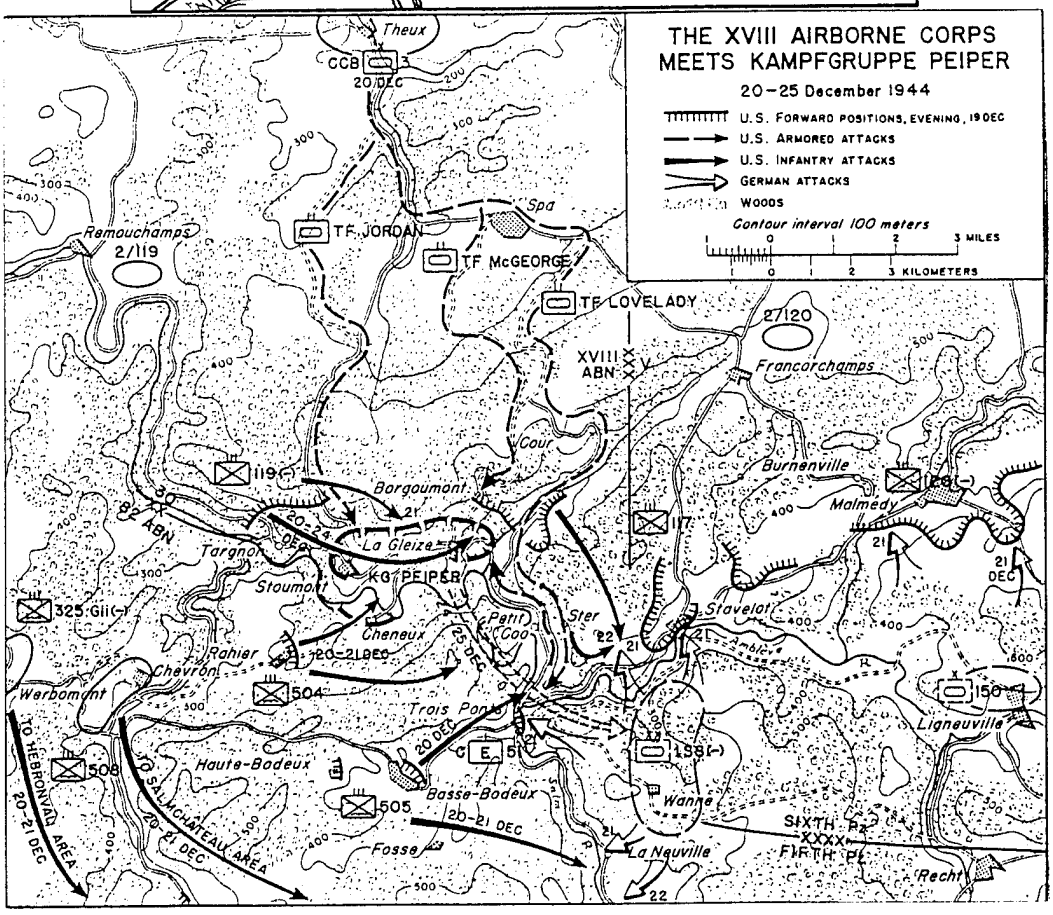
from the 291st Engineers waited until there were several members of the battlegroup on the bridge before he detonated it. As a result, Peiper was not going through Trois Ponts from any direction, and he turned north towards La Gleize.[94]

Peiper's column marched north toward La Gleize then swung south based upon information that a bridge over the Ambleve near Cheneux was undefended and that it might support tanks. See map 5.[95] This route would bring Peiper back to Werbomont and then on to Huy. Unfortunately for Peiper, the weather cleared on the afternoon of December 18th, and American fighter-bombers interdicted his column. Kampfgruppe Peiper defended itself well, accounting for three hits on U.S. aircraft with one confirmed kill. But American air had destroyed three tanks and seven half-tracks.[96] This delay was just long enough for A Company, 291st Engineers to rig the next bridge (over the Lienne Creek) at Habiemont for demolition.

At dusk, Peiper's column arrived at the bridge in Habiemont. Seeing the engineers near the bridge, the Germans opened fire but it was too late. Corporal Fred Chapin, unshaken by the Germans fire, turned the key and the bridge went up before the German's eyes. Peiper is reported to have pounded his knee and said, "The damned engineers! The damned engineers!" Peiper then sent reconnaissance elements probing to the north attempting to cross the creek on one of the smaller bridges nearby. Private Johnny Rondenell detected the half-tracks moving on his side of the creek and set up a daisy-chain of mines for them. His trap destroyed one half-track. Tank destroyers of the 823d Tank Destroyer Battalion attached to 2d Battalion, 119th Regiment of the 30th Infantry Division engaged the remainder of Peiper's light element further east towards Werbomont. The remnant of the reconnaissance element fled back across the Lienne and rejoined the main column.


To Stoumont
To La Gleize
Amblève River
Lienne Creek
Cheneux
Peiper bombed here
Chevron
Rahier
Peiper's advance
To Werbomont
Forges
Chauveheid
To Trois Ponts
N 23
Rondenell's mines
Habiemont
Café
Truck
Neucy
Rocky Hill
Pond
Barn
Farm
Farm Road
Billington's mines
WOODS
9. Habiemont Bridge is Blown
by 2nd Platoon, Company A, 291st Engineers
December 18, 1944
Based on map by Sgt. R. C. Billington

Map 5


THE XVIII AIRBORNE CORPS
MEETS KAMPFGRUPPE PEIPER
20–25 December 1944
U.S. FORWARD POSITIONS, EVENING, 19 DEC
U.S. ARMORED ATTACKS
U.S. INFANTRY ATTACKS
GERMAN ATTACKS
WOODS
Contour interval 100 meters
3 MILES
3 KILOMETERS
Theux
CCB
20 DEC
Spa
Remouchamps
2/119
TF JORDAN
TF McGEORGE
TF LOVELADY
27/120
XVIII ABN
Francorchamps
Cour
Burnenville
Malmedy
119
Borgoumont
82 ABN
La Gleize
Targnon
Stoumont
KG PEIPER
325 Gli
Cheneux
Petit Coo
Ster
Stavelot
Rahier
Chevron
Werbomont
504
Trois Ponts
150
Ligneuville
TO HEBRONVAL AREA
20-21 DEC
TO SALMCHATEAU AREA
Haute-Bodeux
Basse-Bodeux
505
Wanne
Fosse
La Neuville
SIXTH Pz
FIFTH Pz
Recht

Map 6

Had Peiper brought heavy bridging capability, he could have reinforced any one of the light bridges crossing the Lienne. Peiper turned back toward Cheneux and attempted to continue via Stoumont.[97]

Peiper had been plagued by poor communications with his higher headquarters. The Sixth Panzer Army followed Peiper through intercepted radio messages from the Americans as they reported his progress. A UHF radio was rushed to Peiper by a liaison officer late on December 18th, and sometime that night he reestablished radio contact with the 1st Panzer Division. At this point he learned that the U.S. 30th Infantry Division was moving to check his progress.[98]

Peiper decided to wait out the night outside of Stoumont and attack the morning of December 19th. Beginning at 0700 hours a fierce battle ensued between Peiper and the 119th Infantry Regiment of the 30th Infantry Division reinforced with tanks and 90mm antiaircraft guns. By the end of the day, Peiper asked permission to try and fight back (east) to linkup with the 1st Panzer Division with the little fuel he had left. Colonel Mohnke, the division commander, denied his request and told him to remain in place. Colonel Mohnke said that the division would linkup with Peiper and they would continue the attack toward the Meuse. For the next three days, Peiper's column faced the 30th Infantry Division, the 82d Airborne Division, and 3d Armor Division's Combat Command B as they encircled his position which ended up east of Stoumont near Chateau de Froid-Cour. Peiper was out of gas.[99] See map 6.[100]

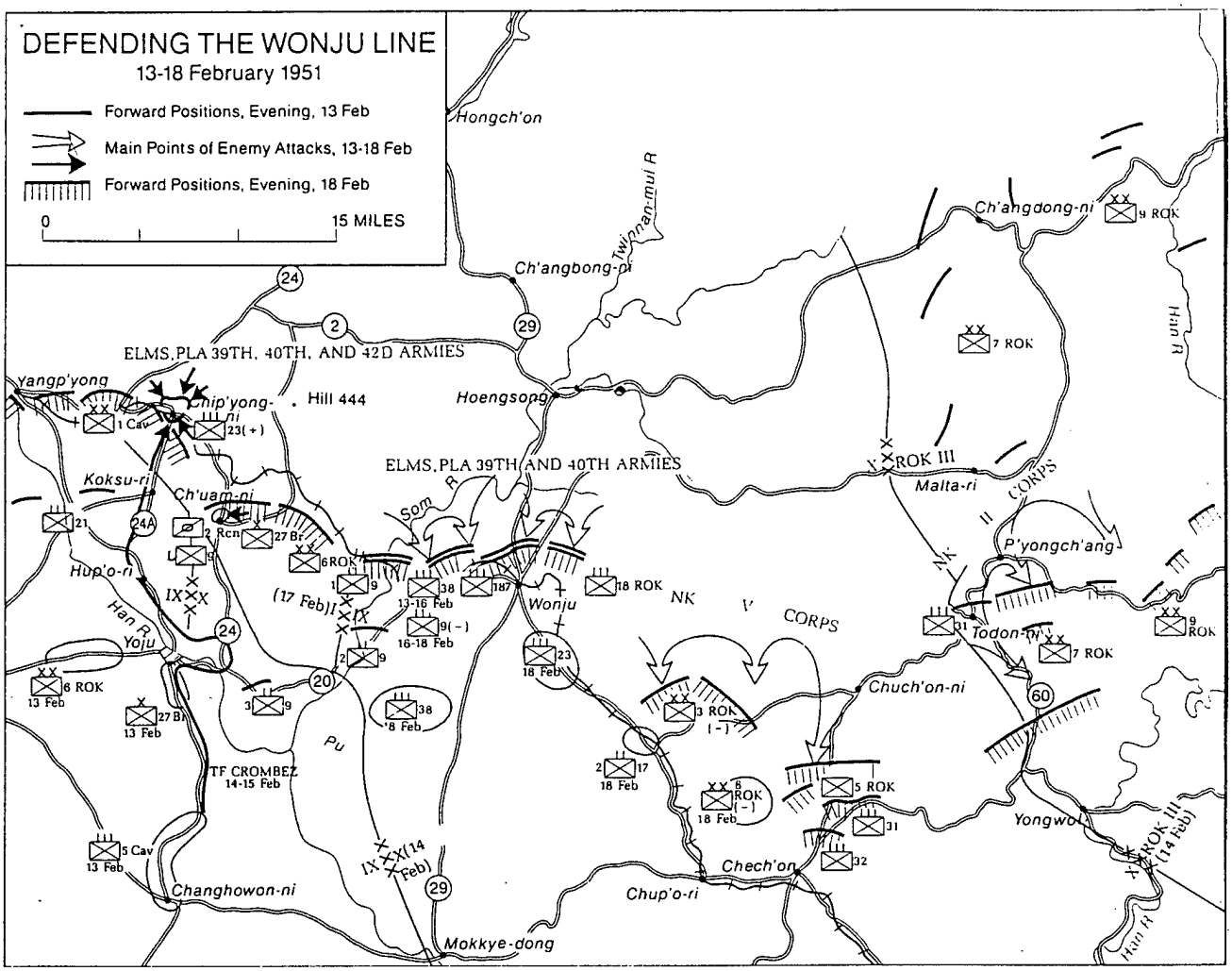
Colonel Mohnke finally gave permission for Peiper to evacuate his position. The night of December 23d, Peiper and some 800 men began their escape on foot to try and linkup with the 1st Panzer Division which was located south of Stavelot. After crossing the frigid waters of the Ambleve and the Salm Rivers, and exchanging fire with the 82d Airborne Division once more, Peiper rejoined his parent division on Christmas morning.

The Americans found 300 wounded members of Kampfgruppe Peiper, 28 tanks, 70 half tracks, and 25 artillery pieces left behind by Peiper.[101] The force which had begun with 4000 men (and increased by 1800 other German soldiers pressed into service by Peiper along the way) was now fewer than 800 and unfit to fight.[102]

As was the whole Wacht am Rhein campaign, Kampfgruppe Peiper was a desperate attack with little planning and preparation time (due in large measure to Hitler's excessive secrecy). Peiper was flexible enough to alter his route based on the enemy situation, and remained focused on his objective of Huy and the Meuse River. He made good use of small reconnaissance patrols to check forward and lateral routes prior to committing his entire column. Perhaps the biggest mistake was the lack of engineers available to the battlegroup, and the expectation that captured enemy fuel would allow the tanks to reach the Meuse. Peiper and his higher headquarters also neglected communications which, given the crucially timed developments in the action, could have made the difference between success and failure. The next historical example takes place in the Korean War, and the focus is on U.S. Army units making an armor attack in restrictive terrain.

TASK FORCE CROMBEZ

From November 1950 to February 1951, the U.S. Eighth Army had been in general retreat from the Yalu River due to the entry of the Chinese People's Liberation Army into the Korean War. General Ridgway wanted the southerly movement of the U.N. forces stopped, and needed a victory to revitalize his demoralized soldiers. Against the recommendation of his subordinates and in light of the obviously precarious position of the 23d Regimental Combat Team (RCT), Ridgway ordered the small town of Chip'yong-ni held.[103] See map 7.[104] Chip'yong-ni became a test of wills between the Chinese People's Liberation Army and Colonel Paul L. Freeman's combined force defending the small village.


DEFENDING THE WONJU LINE
13-18 February 1951
Forward Positions, Evening, 13 Feb
Main Points of Enemy Attacks, 13-18 Feb
Forward Positions, Evening, 18 Feb
0
15 MILES
Hongch'on
Ch'angbong-ni
Twinnan-mul R
Ch'angdong-ni
9 ROK
7 ROK
Han R
ELMS, PLA 39TH, 40TH, AND 42D ARMIES
Yangp'yong
Chip'yong-ni
Hill 444
Hoengsong
1 Cav
23(+)
ELMS, PLA 39TH AND 40TH ARMIES
ROK III
Malta-ri
II CORPS
Som R
Koksu-ri
Ch'uam-ni
21
24A
2 Rcn
27 Bde
6 ROK
1
9
38
187
13-16 Feb
9(-)
16-18 Feb
18 ROK
Wonju
NK
V CORPS
P'yongch'ang
Hup'o-ri
(17 Feb)
IX
Han R
Yoju
24
20
2
9
23
18 Feb
31
Todon-ni
7 ROK
9 ROK
6 ROK
13 Feb
27 Bde
13 Feb
3
9
38
18 Feb
Pu
Chuch'on-ni
60
TF CROMBEZ
14-15 Feb
3 ROK (-)
2
17
18 Feb
6 ROK (-)
18 Feb
5 ROK
31
Yongwol
5 Cav
13 Feb
Changhowon-ni
IX (14 Feb)
29
Chech'on
32
Chup'o-ri
ROK III (14 Feb)
Mokkye-dong
Han R

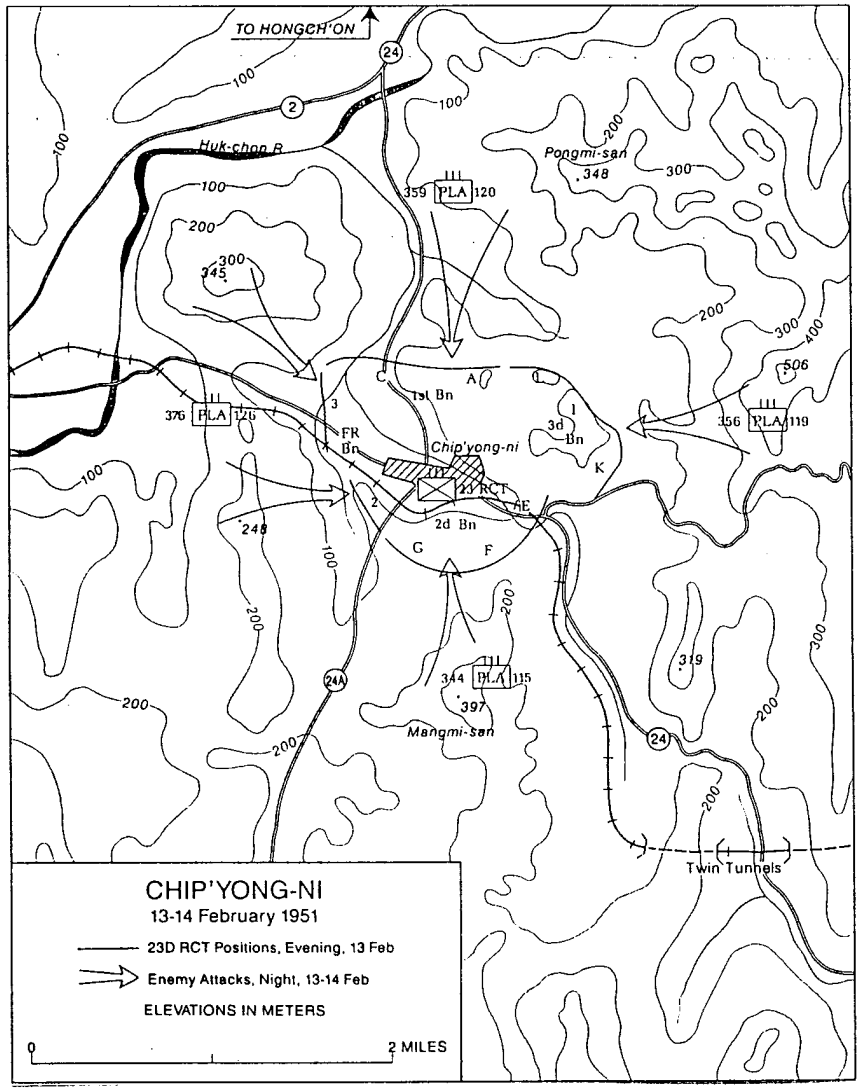
Map 7

Task Force Crombez, a brigade size armored task force, was formed and sent to attack to link up with the 23d RCT to relieve pressure on the encircled force, reopen a ground supply route, and evacuate wounded.[105] See map 8.[106]

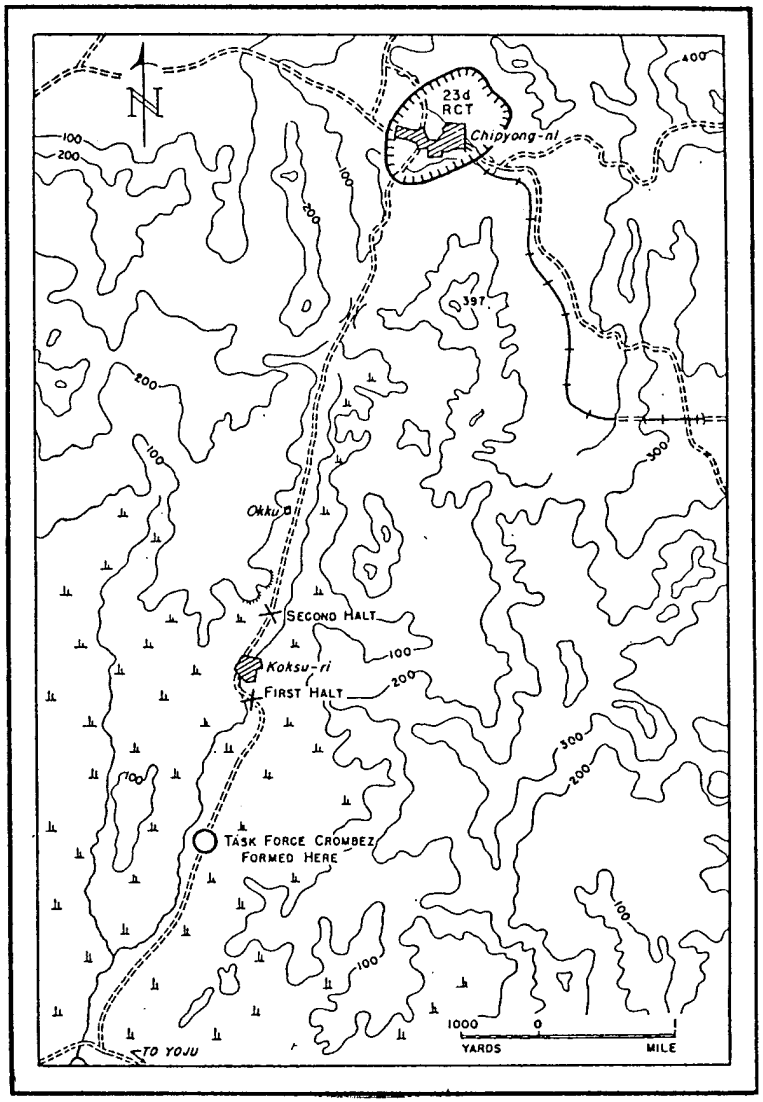
Terrain in Korea is characterized by "steep ubiquitous mountains, inferior communications system, and severe climate" which sharply inhibits military operations, especially those involving "modern, highly mechanized" forces.[107] The roads were a "primitive system of narrow, one-lane, mostly gravel-surfaced" with steep grades, sharp curves and narrow light duty bridges.[108] Photographs of the area, including one of the road which Task Force Crombez used, show the mountainous landscape which is devoid of tall trees and supports only small scrub vegetation.[109]

From where Colonel Marcel G. Crombez and his task force began his attack near Yoju along road 24A to Chip'yong-ni, there is a major river, the Han, and further north two small villages called Koksu-ri and Hup'o-ri. The road was narrow with mountain slopes on the left side and flat rice paddies on the right. One mile south of Chip'yong-ni is a road cut with sides that were 30 to 50 feet high between two of the six hills that surround Chip'yong-ni which range from 248 to 506 meters above the village. The distance from Yoju to Chip'yong-ni is approximately 15 miles.[110]

The IX Corps Commander, Major General Bryant E. Moore ordered Task Force Crombez to begin their attack on route 24A the night of February 14th.[111] Task Force Crombez consisted of the following units: 5th Cavalry Regiment, A Company, 70th Tank Battalion, equipped with 10 M4A3E8 tanks, D Company, 6th Tank Battalion, equipped with 13 M46 tanks, 61st Field Artillery Battalion, A Battery, 92d Armored Field Artillery Battalion, and 1st Squad, 1st Platoon, A Company, 8th Engineer (C) Battalion.[112]


TO HONGCH'ON
Huk-chon R
Pongmi-san
348
359 PLA 120
345
376 PLA 126
356 PLA 119
506
Tst Bn
3d Bn
FR Bn
Chip'yong-ni
23 RCT
2d Bn
A
C
I
K
G
F
248
344 PLA 115
397
Mangmi-san
319
Twin Tunnels
CHIP'YONG-NI
13-14 February 1951
23D RCT Positions, Evening, 13 Feb
Enemy Attacks, Night, 13-14 Feb
ELEVATIONS IN METERS
0
2 MILES

Map 8


N
23d RCT
Chipyong-ni
397
Okku-ri
SECOND HALT
Koksu-ri
FIRST HALT
TASK FORCE CROMBEZ FORMED HERE
TO YOJU
1000
0
YARDS
MILE

Map 9

This sizeable force assembled and moved out the night of February 14th "along the narrow, rutted road, snow covered and patched with ice." The two artillery units (one 105mm and one 155mm) remained behind the Han River while the rest of the force made it as far north as Hup'o-ri where a destroyed bridge halted its progress at midnight.[113]

Engineers constructed a bypass around the destroyed bridge during the night and at first light the 1st Battalion (infantry) 5th Cavalry made contact with Chinese soldiers of the 116th Division. Crombez ordered his 1st Battalion to attack north along the east side of the road and his 2d Battalion to attack on the west with the 3d in reserve and blocking in the rear.[114] The 5th Cavalry met strong resistance from the Chinese in the hills. It became apparent to Crombez by 1100 hours that he would never reach Chip'yong-ni by nightfall attacking with the dismounted infantry. Colonel Crombez had the good fortune to be able to borrow the helicopter of Major General Charles D. Palmer, Commander, 1st Cavalry Division, and conduct an aerial reconnaissance of the rest of the route to the 23d RCT. At this point, Crombez decided to tailor the force to speed the attack to Chip'yong-ni.[115]

Just north of Sangch'ohyon-ni, a small village along route 24A, Crombez established his armor column with 13 newer (M46) tanks of Company D, 6th Tank Battalion (Captain Johnnie M. Hiers) in the lead, followed by Company A (minus two platoons) 70th Tank Battalion and their 10 Easy Eights, Company L, 5th Cavalry, (Captain John C. Barrett) consisting of 160 men, and four engineers.[116] The four soldiers from A Company 8th Engineers were to ride on the second tank to clear any mines that may be encountered. Colonel Crombez was in the fifth tank in the column. Company L was instructed to ride on the tanks in the center of the column but not to ride on any tanks in the lead platoon. Their mission was to "protect the tanks from fanatic enemy tank hunters."[117] The company commanders agreed that if the tanks stopped, the infantry would dismount

and deploy to the sides of the road to protect the tanks and engineers. When ready to proceed, the tankers were to signal the infantry to remount.[118]

Crombez was afraid that he would be unable to get wheeled vehicles to Chip'yong-ni and decided that any resupply or evacuation of wounded would have to take place after the road was clear. Lieutenant Colonel Edgar J. Treacy, commander of 3d Battalion 5th Cavalry (L Company's parent organization) detailed one of his 2 1/2 ton trucks to follow the column to pick up any of his wounded men. Crombez had previously ordered Lieutenant Colonel Treacy to command the supply column (with two rifle platoons and two tank platoons for security) which was to follow once the road was clear.[119] Treacy decided at the last minute (against orders) to accompany the column on the attack.[120]

With the column assembled, Task Force Crombez was on the move toward Chip'yong-ni at 1545 hours February 15th. U.S. tactical air preceded the column strafing and bombing along the route as liaison planes were used to maintain contact. Within the first two miles, just outside of Koksu-ri, the column came under fire. See map 9.[121] The task force was subject to enemy mortar, small arms, and machine gun fire. The lead tank stopped to return fire which halted the entire column. The tanks opened fire on the Chinese and the infantry dismounted (many fell off) to seek protection from the enemy. Contrary to plans, when the tanks resumed the march, no signal was given (the tankers were buttoned up) to the infantry and about 30 men, some wounded, were left behind.[122]

Those men unable to remount the tanks did one of several things: at least one, Corporal Hubert M. Cobb, made it all the way to Chip'yong-ni on foot; some were able to climb into the 2 1/2 ton truck that was following the column, and others fought their way back to friendly lines in the vicinity of 2d Battalion, 5th Cavalry.[123] Task Force Crombez was able to suppress the Chinese with machine gun fire and continued on. A bit later, the Chinese were able to halt the column again, this time just beyond Koksu-ri.

The Chinese 116th Division used a variety of weapons against the tanks and infantry of Task Force Crombez including machine gun fire, mortars, grenades, bottles of gasoline, pole charges, satchel charges, bangelor torpedoes, and bazookas.[124] At this halt the Chinese attacked toward the tanks, and L Company dismounted and deployed some 50 to 75 yards from the road fighting (hand-to-hand in some cases) the Chinese. Colonel Crombez told the Task Force to continue to move and once again, the tankers did not signal the infantry to mount up. Approximately 60 men were either left stranded, wounded, killed, or captured by the enemy. Lieutenant Colonel Treacy was wounded and captured by the Chinese. Captain Barrett missed the tank he was riding on, but was able to climb on the sixth tank behind it. No tanks had been disabled or destroyed up to this point.[125]

For the next few miles, Task Force Crombez drew continuous fire from the Chinese. The column continued to move and engage the Chinese with machine gun fire from the tanks, while some of the infantry riding on top fired with rifles and machine guns as the tanks proceeded. The enemy decided to concentrate their effort at the cut in the road about a mile south of Chip'yong-ni. The cut is between hills 248 and 397, and forms a deadly choke point for vehicles.[126]

As the column approached the cut, the Chinese attacked with small arms and mortar fire. As the first tanks went through, the enemy threw satchel charges from the cliffs some 50 feet above. The first vehicle was hit with a rocket that wounded the tank commander and gunner, but left the driver unharmed. The tank was able to continue through the cut. The fourth tank, that of Captain Hiers, was hit by a 3.5 inch rocket through the turret which ignited the ammunition stowed in the tank. Captain Hiers and his gunner were killed. The driver, Corporal John A. Calhoun, although badly burned, had the presence of mind to speed the tank through the cut and drove it off the side of the road to keep from blocking the route. The tanks in the rear began to fire main gun high explosive rounds on

the hill tops which suppressed the Chinese and allowed the rest of the tanks to pass. The Chinese attacked the 2 1/2 ton truck and it never made it through the cut. Most soldiers in the make-shift ambulance were either killed or captured, some managed to hobble through the cut and climb aboard one of the last tanks.[127]

Task Force Crombez arrived at 1700 hours at the southern perimeter of the 23d RCT at a road junction near Masan, just outside Chip'yong-ni.[128] The combination of the four tank counterattack force belong to the 23d RCT and the arrival of Task Force Crombez, caused the Chinese to start running.[129] Both tank units exploited the enemy's confusion and destroyed a large portion of the enemy force. After this engagement, the Chinese abandoned their effort to overrun the position.

The victory came at a tremendous loss for both sides. Task Force Crombez ended up with only 23 soldiers from L Company when it arrived in Chip'yong-ni. Thirteen of these were wounded and one died that night. Many of the stranded infantry were able to fight their way back south to friendly lines. The evening of February 15th, Captain Barrett wanted to go back and collect his wounded and dead on route 24A. Colonel Crombez refused to let him go because he was afraid there were too many enemy still there. Bad weather and fear of the enemy delayed Colonel Crombez' departure to attend to the wounded until the next afternoon. Captain Barrett found four wounded still alive at Koksu-ri. Accounts indicate that the Chinese left the area soon after their crushing defeat.[130] Altogether, L Company had 12 killed, 40 wounded, and 19 missing or about half of the unit's strength. Task Force Crombez is estimated to have killed 500 Chinese. The 23d RCT is estimated to have killed 5000 Chinese at a loss to themselves of 52 killed, 259 wounded, and 42 missing.[131]

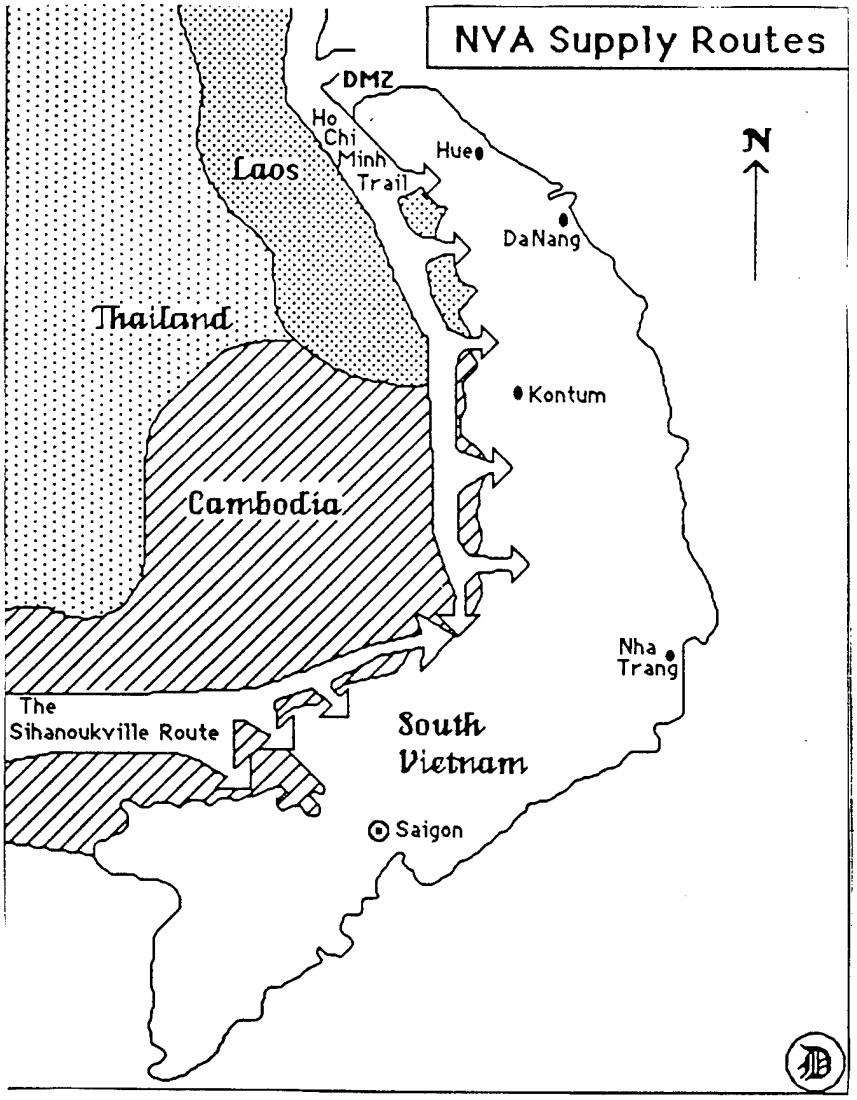
Colonel Crombez and his attack to Chip'yong-ni remain controversial to those who believe that by the time he had reached the 23d RCT, the Chinese were going to break off

their attack anyway. While Colonel Crombez accomplished part of his mission, he failed to evacuate the wounded of the 23d RCT (as well as his own) in a timely fashion which was one of his specified tasks. As the Chinese did not emplace mines along his route, Colonel Crombez was fortunate, and the four engineers he brought were unnecessary. The almost irresistible idea of putting infantry on the outside of tanks was not only deadly for those who made the attack, but would create lasting morale problems for the 5th Cavalry. One is left to wonder, if the tanks had no infantry, and had maintained a high rate of speed for their security, would the column have needed to halt at all? The stranded infantry, and the wounded left overnight along the route were inexcusable. Colonel Crombez made the right decision to create his armored thrust, but poor planning, limited rehearsals, and weak coordination greatly detracted from what could have been a much less costly attack. The discussion now turns to a larger operation, one with extensive planning and rehearsals involving both the U.S. Army and the South Vietnamese Army.

LAM SON 719

Following the controversial incursion of U.S. forces into Cambodia in June of 1970, the remainder of the year saw only small and infrequent attacks by the North Vietnam Army (PAVN). The attack into Cambodia targeted for the most part enemy logistics and training bases. Analysts attributed the decrease in enemy activity to the attacks into Cambodia. With U.S. forces being withdrawn from Vietnam, and the increased level of activity along the Ho Chi Minh Trail network in Laos, the U.S. and South Vietnamese decided to conduct an operation similar to the one in Cambodia.[132] See map 10.[133]

Operation LAM SON 719, which began in January 1971, was designed to prevent a major enemy offensive for at least another year by interdicting their logistics. An additional consideration was to take advantage of U.S. air support prior to its departure from theater.[134]


NVA Supply Routes
DMZ
Ho Chi Minh Trail
Laos
Hue
DaNang
N
Thailand
Kontum
Cambodia
Nha Trang
The Sihanoukville Route
South Vietnam
Saigon

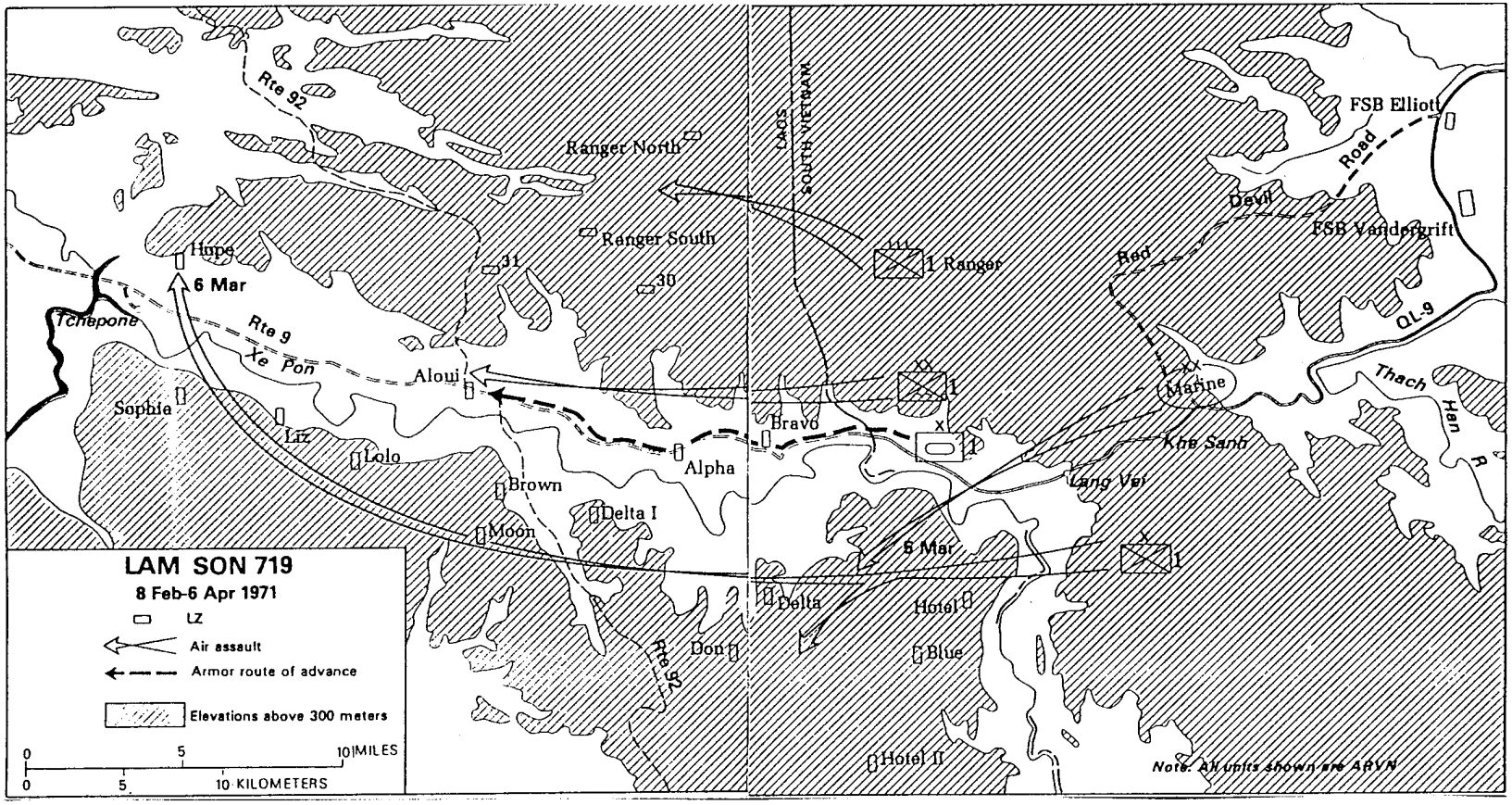
Map 10

Due to the outcry caused by U.S. operations in Cambodia, Congress passed the Cooper-Church amendment which prohibited U.S. ground troops from entering countries bordering Vietnam.[135] This meant that the South Vietnamese Army (ARVN) would have to conduct a major part of LAM SON 719 with little U.S. assistance.

The plan called for U.S. forces to secure routes up to, but not beyond the Laotian border and support the ARVN as they destroyed key PAVN logistical bases around the Ho Chi Minh trail network near Tchepone, Laos. ARVN forces would take full advantage of U.S. air support in the form of close air support (CAS), attack helicopters, lift helicopters, air cavalry units, and heliborne search and rescue. Upon completing their mission in Laos, ARVN units would withdraw back through U.S. units holding the ground along the Vietnamese border. See map 11.[136]

The terrain in the area of operations is a combination of mountains, with elevations as high as 1600 meters, and dense jungle. Highway QL-9 from Khe Sanh to Tchepone was a one lane dirt road with many destroyed bridges, a high escarpment to the north, and the Xe Pon River to the south. Vegetation was double and triple canopied with dense brushwood beneath.[137] Due to the extensive vegetation, many bomb craters along QL-9 were unseen to aerial reconnaissance prior to the commencement of LAM SON 719.[138] "The road was unused and overgrown so it was like battering down a bamboo tunnel."[139] These deep craters became significant obstacles as tanks became stuck in them.[140]

The first phase of the operation, called Dewey Canyon II, involved the westward attack of American forces from current positions in Quang Tri City to the Laotian border. Task Force 1-77, commanded by Brigadier General John G. Hill, Jr., consisted of 1-77 Armor (-), two troops from 3d Squadron, 5th Cavalry, and two infantry companies from 1-61 Infantry (Mechanized).


LAM SON 719
8 Feb-6 Apr 1971
LZ
Air assault
Armor route of advance
Elevations above 300 meters
0 5 10 MILES
0 5 10 KILOMETERS
Rte 92
Ranger North
Ranger South
LAOS
SOUTH VIETNAM
FSB Elliott
Devil Road
FSB Vandegrift
Red
QL-9
Thach Han R
Hope
6 Mar
31
30
1 Ranger
Tchepone
Rte 9
Xe Pon
Aloui
Sophia
Liz
Lolo
Brown
Moon
Alpha
Bravo
Delta I
Marine
Khe Sanh
Lang Vei
6 Mar
Delta
Hotel
Blue
Don
Rte 92
Hotel II
Note: All units shown are ARVN

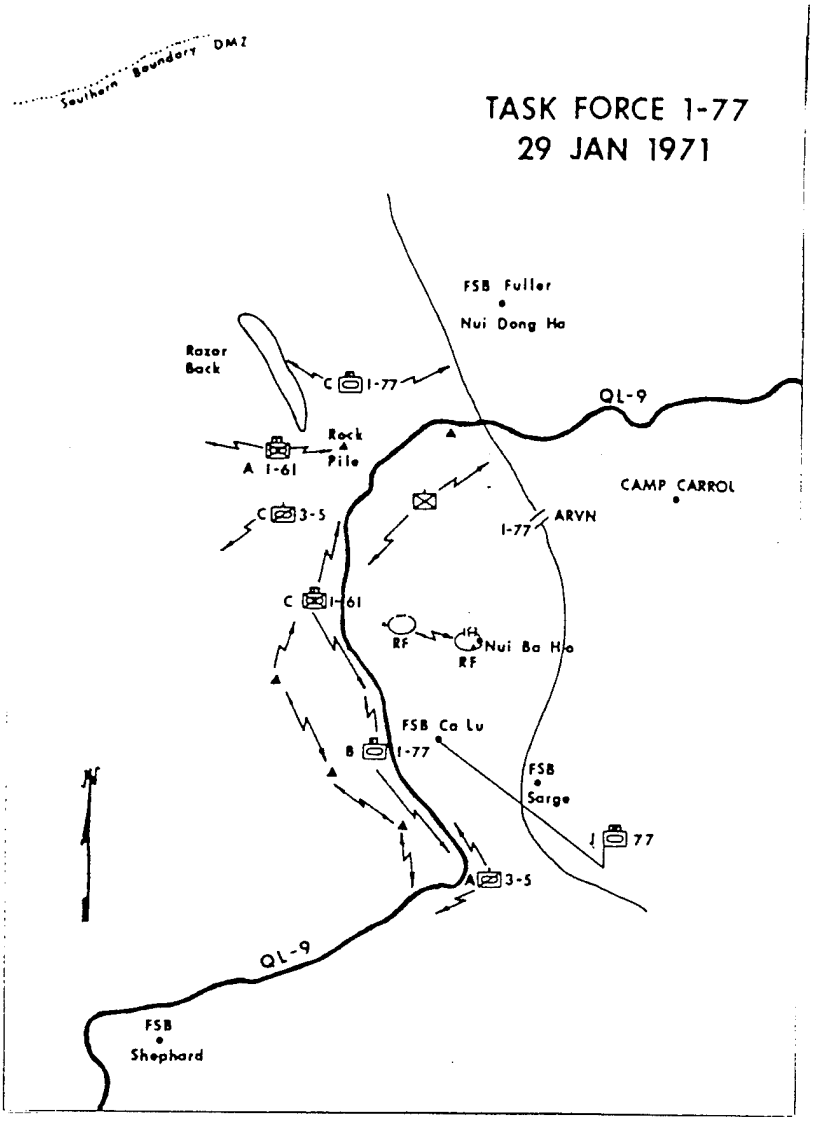
Map 11

The task force's initial mission was to establish an artillery base at Ca Lu, secure Highway QL-9 from Camp Carroll to the point where the road turns west to Khe Sanh, and position a cavalry troop to continue west.[141] See map 12.[142]

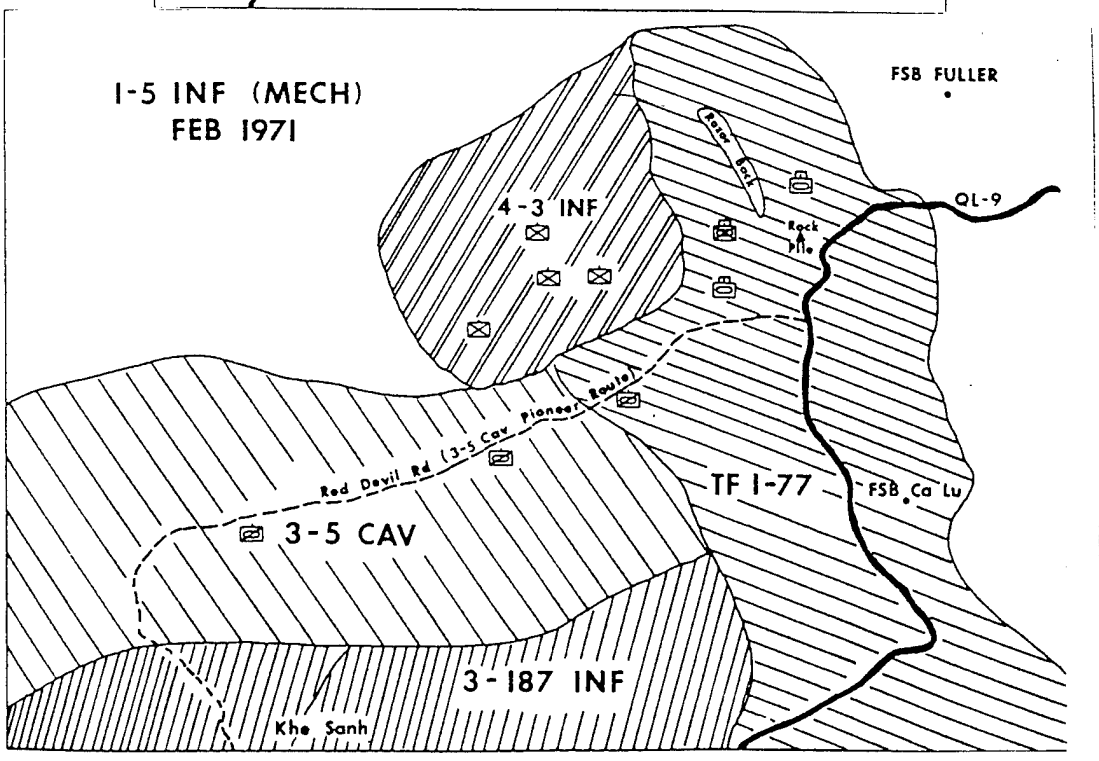
The task force began its march at 0400 hours on January 29, 1971, from Quang Tri. It reached Old FSB Vandergrift at dawn, and FSB Ca Lu by nightfall without enemy contact.[143] The responsibility to open the road from this point to Khe Sahn fell on Captain Thomas Stewart and his A Troop, 3d Squadron, 5th Cavalry. Captain Stewart started his mission around midnight on January 29th. Due to the poor condition of the road, the M551 Sheridan tanks could not negotiate the route. As a result, the unit improvised with a bulldozer providing illumination from its headlights for minesweeping operations.[144]

Instead of working on opening the route in a serial fashion (complete the reduction of one obstacle before proceeding to the next), Captain Stewart left two to six scouts and the necessary number of engineers at each location requiring work, and moved on. This seemingly risky method allowed the engineer work to be completed much faster. Intelligence reports indicated that the enemy had been falling back into Laotian territory. Work on the route was slow. The armored vehicle launch bridges (AVLBs) had to be emplaced, and at one point, a mine immobilized a Sheridan which took five hours of engineer work to clear an area so the tank could be moved off of the road. By 1400 hours on February 1st, the 20 kilometer stretch of QL-9 to Khe Sanh was open.[145] The route was opened all the way to the Laotian border the next day by 1st Squadron, 1st Cavalry (-).[146]

Concurrent with the effort to open QL-9, Brigadier General Hill ordered an alternate route constructed to ensure LAM SON 719 was not hinging on one main supply route (MSR). The remainder of the 3d Squadron, 5th Cavalry and the 7th Engineer Battalion constructed a pioneer road, (Red Devil Road) roughly parallel to QL-9 which connected FSB Elliot to Khe Sanh.[147] See map 13.[148]


Southern Boundary DMZ
TASK FORCE 1-77
29 JAN 1971
FSB Fuller
Nui Dong Ha
Razor Back
C 1-77
QL-9
Rock Pile
A 1-61
CAMP CARROL
C 3-5
1-77 ARVN
C 1-61
RF
RF
Nui Ba Ho
FSB Ca Lu
B 1-77
FSB Sarge
1 77
A 3-5
QL-9
FSB Shephard

Map 12


1-5 INF (MECH)
FEB 1971
FSB FULLER
Razor Back
QL-9
4-3 INF
Rock Pile
Red Devil Rd (3-5 Cav Pioneer Route)
TF 1-77
FSB Ca Lu
3-5 CAV
3-187 INF
Khe Sanh

Map 13

Brigadier General Hill's plan to secure the route involved assigning sectors to the battalion-sized units, each responsible for a portion of the QL-9 or surrounding terrain.[149] During February and March, there were several attempted ambushes of supply columns along QL-9. As soon as enemy were detected, units dispatched the nearest cavalry, tank, or mechanized infantry team to destroy or capture the intruders.[150] During this period,there were no significant delays of supply columns due to enemy action.

The next phase of the operation called for the 1st (ARVN) Armored Brigade to attack from the Laotian border to landing zone (LZ) Aloui some ten miles into Laos. Airmobile attacks to the north by the 1st (ARVN) Ranger Regiment and 1st (ARVN) Infantry Division, to the south, had the task to destroy enemy logistical bases and provide security for QL-9 west of the border. The 1st (ARVN) Airborne Division was to conduct an airmobile operation to LZ Aloui prior to the arrival of the 1st Armored Brigade and linkup and continue the attack west on order.[151] Once ARVN forces had destroyed enemy logistics bases and blocked key routes on the Ho Chi Minh Trail, they were to remain in place for 90 days or until the rainy season started. Upon commencement of the rainy season, vehicles would not be practical for the PAVN over the dirt trail network.[152]

The U.S. 2d Squadron, 17th Cavalry (air) screened forward of the 1st (ARVN) Armored Brigade advance on QL-9 on the morning of February 8th. The column, which consisted of two battalions of infantry from the 1st Airborne Division, the 11th Cavalry and the 17th Cavalry (including 17 M41 tanks), was slow in its advance due to the huge bomb craters and generally poor condition of the road. It arrived at LZ Aloui on the afternoon of February 10th having been subjected to little more than sniper fire. During its screen operation, the U.S. 17th Cavalry had identified PAVN tanks, and antiaircraft guns.[153]

Poor weather turned QL-9 into a quagmire and delayed repairs to the air strip at Khe Sahn. This resulted in a long distance resupply to ARVN forces by air alone. QL-9 was

by no means secure, and PAVN forces quickly began attacking LZs to the north of QL-9. In a confusing series of orders, the 17th (ARVN) Cavalry was sent with tanks from the 11th (ARVN) Cavalry on February 19th, to reinforce LZ 31 to the north. The ARVN Rangers were attacked on February 20th at LZ Ranger North. In the first tank battle between ARVN and PAVN forces, the South Vietnamese destroyed 22 enemy tanks (six T54s and 16 PT76s) with no loss of M41s.[154]

PAVN forces continued to attack the positions in the north, and the Rangers were evacuated by February 25th. The 17th Cavalry became isolated and was nearly defeated but for U.S. tactical air strikes and attack helicopters. Only through strong and repeated recommendations from American advisors did the ARVN commanders allow the unit to delay back to LZ Aloui on March 3d. For many reasons, perhaps mostly a lack of aggressiveness on the part of ARVN senior leadership, the bulk of the 1st Armored Brigade remained stationary at LZ Aloui from its arrival on February 10th until ordered to withdraw on March 19th. PAVN forces took advantage of this stationary armored force in restrictive terrain as they continued to concentrate west of LZ Aloui.[155]

By this time PAVN forces in the area amounted to 5 divisions, 2 tank battalions, an artillery regiment, and 19 antiaircraft battalions.[156] ARVN losses were quickly mounting and the senior Vietnamese leadership wanted out. In an effort to save face and declare the operation a success, the 1st (ARVN) Infantry Division airmobiled two battalions to LZ Hope near Tchepone on March 6th. Two days later the force left LZ Hope having accomplished nothing. This was the end of the offensive character of LAM SON 719. The Vietnamese High Command had decided it was time to leave. Any further offensive action was an attempt to escape the tightening grip of the PAVN in Laos and western Vietnam.[157]

As the 1st Armored Brigade moved east on QL-9 the morning of March 19th, air strikes engaged two PAVN tanks near LZ Aluoi. Shortly thereafter, the enemy ambushed

the brigade at a small stream crossing near LZ/FSB Alpha. The lead unit lost four M41 tanks in the stream which blocked it while the enemy fired into the flanks of the halted column. The airborne soldiers would not stay and fight with the cavalry units in the brigade, and continued toward Vietnam. The commander present did not report the ambush to the Airborne Division, nor did he request any air support.[158] The ARVN finally managed to move two of the tanks and continue through the stream crossing. They abandoned their destroyed vehicles on the west side of the crossing and the PAVN quickly manned and used them as stationary machine gun positions until they were silenced by air strikes six days later.[159]

On the evening of March 21st, the ARVN armored task force commander decided that the enemy was in such force to his east that he would never make it to the border. He to turn his column off the road and into the jungle. Had he at least informed his division commander of his actions, he would have learned that the enemy was not in force on the route. Rather, ARVN engineers were conducting minesweeping operations to facilitate the battered force's withdraw. Conversely, no one from the division headquarters informed the armor brigade commander of the friendly engineer activity to the east.[160]

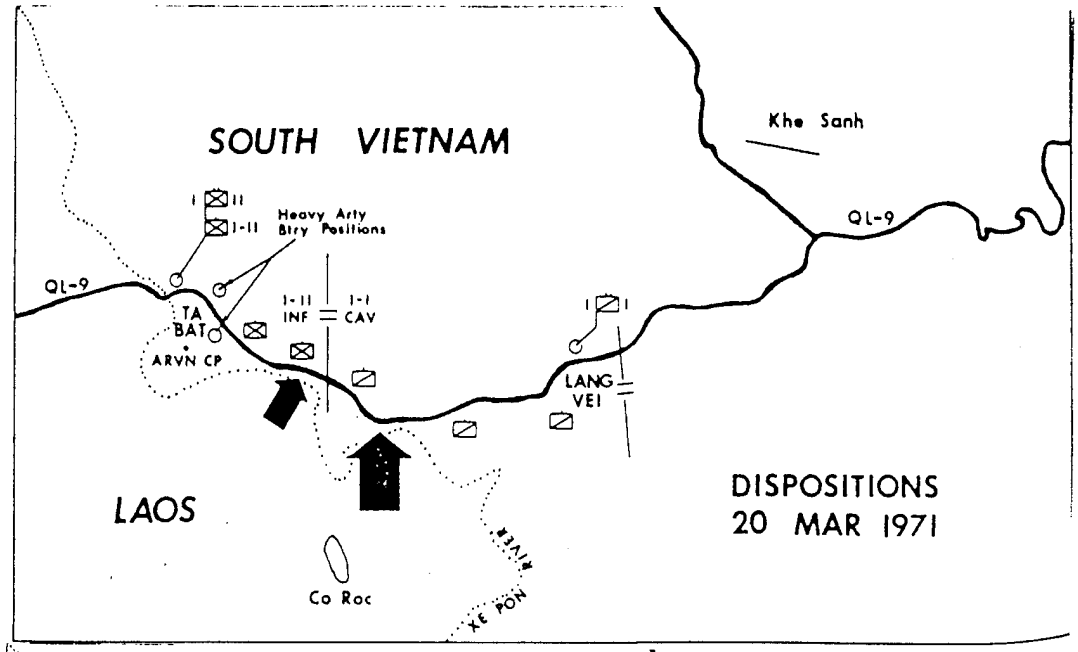
The ARVN brigade wandered through the jungle and around noon March 22d, found the Xe Pong River blocking their movement. The banks of the river were steep, and the ARVN vehicles were unable to cross. Meanwhile, the PAVN infiltrated the area and began attacking the column which could neither backtrack its route to QL-9 nor go forward. The next day, CH-54 helicopters lifted two light bulldozers to the immobilized column. As the bulldozers worked to grade the banks, the 9th (ARVN) Infantry Battalion seized the eastern side of the crossing site. The PAVN forces fixed the column while they sent a column of 20 armored vehicles along QL-9 from the west to attack. Air strikes forced the enemy tanks to seek cover and led to an end of the attack. The remnants of the ARVN column crossed the river early March 23d and crossed the border into 1st (U.S.) Brigade,

5th Infantry Division (Mechanized) AO.[161] ARVN losses were significant: 22 M41 tanks, 54 armored personnel carriers (APC) destroyed, and 21 tanks, 26 APCs, and 66 other vehicles abandoned for various reasons.[162]

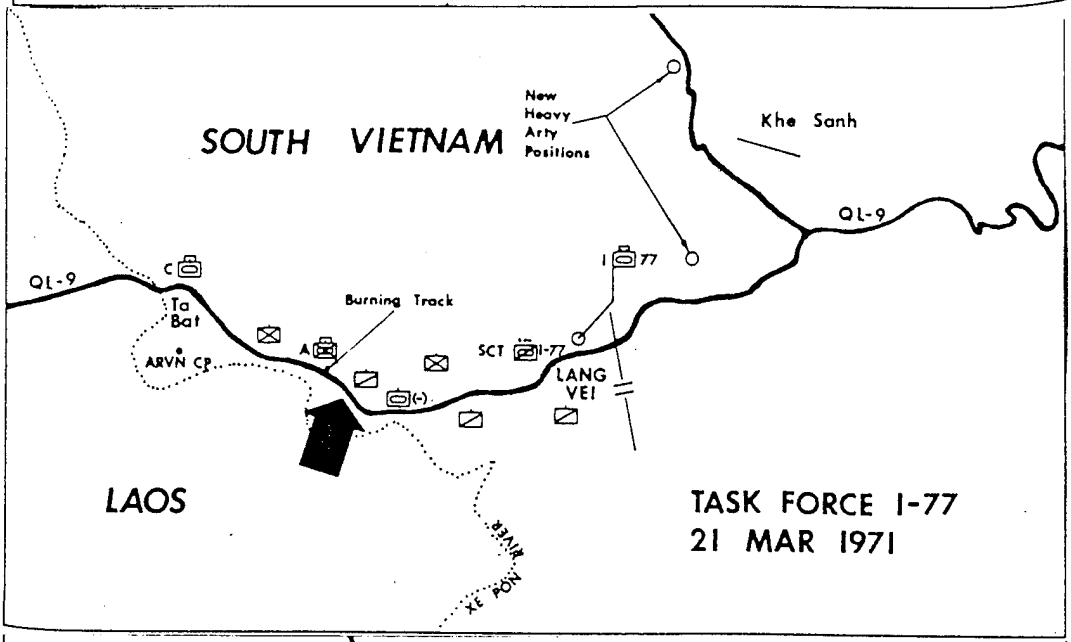
Conditions on the U.S. held portion of QL-9 worsened during the period March 20-23, 1971. PAVN forces conducted ambushes along QL-9 from Ta Bat to Lang Vei. See map 14.[163] The road became obstructed with vehicles including artillery, helicopters, APCs, and tanks. Due to heavy enemy activity along the route, field artillery units in the area had gone without resupply for three days. Facing problems, Brigadier General Hill ordered Task Force 1-77 Armor to reopen the road, evacuate two artillery batteries, recover damaged equipment, and keep the route passable until all ARVN units had withdrawn from Laos. The Task Force departed on March 21st to accomplish these tasks.[164]

Task Force 1-77 Armor moved west along QL-9 under small arms and RPG fire. As the task force moved, it made contact with elements of 1-1 Cavalry and 1-11 Infantry, and dropped off platoon and company sized elements to assist in the evacuation of these units and the two artillery batteries. Damaged vehicles, tanks getting stuck in bomb craters, mines, and enemy RPG fire periodically halted the task force. PAVN forces hampered the effort by increasing fire which now included mortars, artillery, and rocket fire.[165]

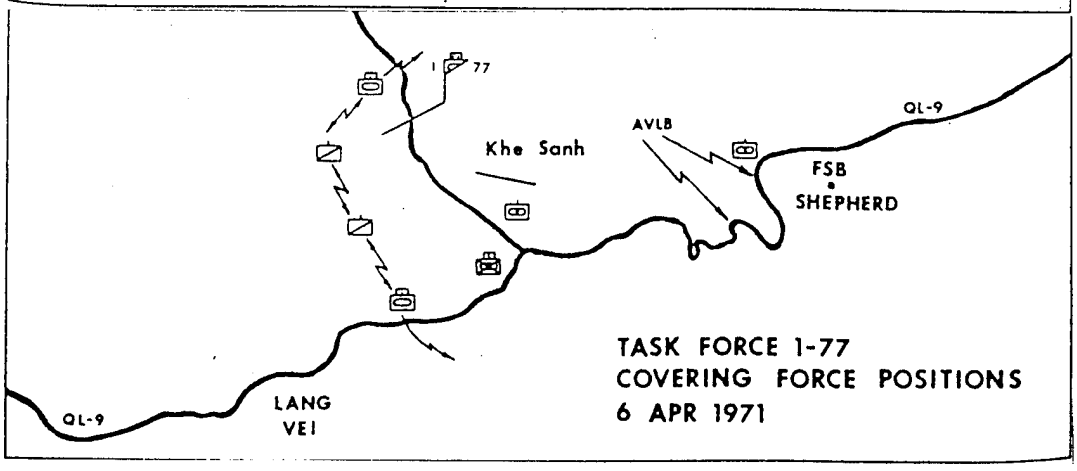
By nightfall on March 21st, Task Force 1-77 Armor had made contact with units west of Lang Vei and was in the process of evacuating them and moving damaged vehicles obstructing the route. See map 15.[166] It took two days for M88 recovery vehicles to move all of the damaged vehicles blocking the road. After ARVN units had passed through the U.S. forces, C Company, 1-77 Armor covered the area from Khe Sanh to Lang Vei. See map 16.[167] After the evacuation of Khe Sanh, C Company moved its security force to the vicinity of Ca Lu. Task Force 1-77 Armor closed on Quang Tri on April 9th.[168]



Map 14



Map 15



Map 16

Actual losses for LAM SON 719 are disputed. One report states PAVN casualties were at 19,360 killed and 57 captured. ARVN casualties were 1549 killed, 5483 wounded, and 651 missing. U. S. Losses were 215 killed, 1149 wounded, and 38 missing.[169] In any event, this large scale operations cost all participants a significant number of men and materiel, but the results were by no means decisive.

The lessons (both good and bad) are more stark in operation LAM SON 719. The initial attack along QL-9 and the plan to keep it open in the U.S. sector was well planned and executed. Brigadier General Hill showed prudent concern for the flanks of the MSR, and security of the overall area. Bad weather quickly proved the shortfall of engineer assets needed to keep the road open to allow in interrupted ground resupply of units. It is also apparent that 1-11 Infantry and 1-1 Cavalry were either too dispersed or simply not watchful of their AO and allowed PAVN infantry to infiltrate their area and PAVN artillery to fire onto the road. The complete lack of communication between the 1st (ARVN) Armored Brigade, its parent headquarters, and its attached airborne infantry, prevented any meaningful security of tanks by the infantry. ARVN units, content with their intermediate objective at LZ Aloui, remained stationary. This allowed the PAVN to plan and execute attacks against them. LAM SON 719 illustrated that the ARVN, although much improved in the aspects of conventional warfare, were not ready to conduct operations of this scale.

KEY CONSIDERATIONS

With the benefit of having examined three historical examples of armor attacks in restrictive terrain, some key considerations will now be identified and explained. Key considerations, defined for this monograph, are those critical aspects of armor attacks in restrictive terrain which must be addressed in order for an operation to be successful. Moreover, these key considerations are explained as they relate to armor attacks in restrictive terrain and not as they relate to offensive operations in general. The key considerations are the major topics one would expect to find addressed in a doctrinal

manual which deals with the subject.

In deciding what aspects of armor attacks in restrictive terrain are important, one can look to several FM 100-5 methodologies including battlefield operating systems (BOS) (intelligence, maneuver, fire support, air defense, mobility and survivability, logistics, and battle command), and the elements of combat power (maneuver, firepower, protection, and leadership). One could also look simply at METT-T to get a start at deciding the salient points of conducting an attack in close terrain. However, these methods were not used because the aim was to deduce the key considerations from the historical examples and not simply address an established framework. The method used here was to identify and consider a myriad of factors (see appendix) and to discard those common to attacks in any type of terrain and focus on those which related specifically to restrictive terrain. The next step was to look for considerations for mounted operations that can be expressed in a doctrinal framework that relate tactical effects to terrain via a methodology for maximizing armored capabilities. The key considerations were further narrowed to those of greatest importance. In this final cut, the technological capabilities of weapons systems, communications systems, and sensors were taken into account.[170] The key considerations selected were those that demonstrated enduring applicabilitiy to mounted combat.

The four key considerations identified for armor attacks in restrictive terrain are: Reconnaissance, Security, Engineer Support, and Logistics. The measure of effectiveness as to how well current doctrine addresses these key considerations is focused on three questions: Does doctrine address the consideration at all? If the consideration is addressed, does the treatment relate the problem to restrictive terrain? Last, is the information easily assimilated by a commander looking to doctrine to assist him in the conduct of an armor attack in restrictive terrain? If the answer to each of these three questions is not yes, (in all four key considerations) then doctrine does not adequately address armor attacks in restrictive terrain. Each of the four key considerations will now be addressed with respect to the historical examples.

RECONNAISSANCE

Reconnaissance is defined as "a mission undertaken to obtain information by visual observation, or other detection methods, about the activities and resources of an enemy, or about the meteorologic, hydrographic, or geographic characteristics of a particular area."[171] Since the attack in restrictive terrain normally depends on limited routes, fresh knowledge of the condition of the route as well as the enemy is essential.

As the three historical examples have indicated, attacks by armored units in restrictive terrain will often be limited to one or a few routes which may be no more than one vehicle wide. These routes are subject to the effects of weather, as we saw in Kampfgruppe Peiper's attack and LAM SON 719. What may be passable while an attack is being planned, may not be passable at execution. Only recent reconnaissance by similar vehicles can truly determine the condition of a route. Also, as we saw in LAM SON 719, aerial photographs of QL-9 did not reveal the deep bomb craters which were concealed by dense vegetation. In LAM SON 719, AVLBs emplaced on the route sometimes became unusable because rain would soften the banks which supported the temporary bridges. Existing bridges on a route must be checked not only to establish if they have been destroyed or damaged by the enemy, but also to determine their load classification, and current condition. When the attack depends on one-way movement on a route, this kind of fresh information is critical.

Reconnaissance will also identify critical points where the enemy may be able to stop the column, where engineer support is needed, or where vehicles become limited in their ability to move laterally. The reconnaissance effort in advance of the main body can identify the presence of mines along the route. This is especially critical where vehicles must pass one at a time. If these obstacles exist, the attacking unit can re-sequence its assets to effect a breach, or perhaps choose another route. At critical points, the attacking force commander may want to plan targets, emplace a blocking force, reposition his security element(s), or halt indirect fire assets so they are prepared to fire. Examples of

critical points are Peiper's approach at Bullingen or Stavelot, the cut along the route of Task Force Crombez, or the stream crossing on QL-9 where the ARVN Brigade was ambushed.

Reconnaissance can also indicate where significant engineer support will be required. As the examples clearly illustrated, maps and aerial photos are insufficient--especially when the advance has no alternative bypass to a blocked route. Had reconnaissance been done properly, Peiper possibly could have sent engineers forward to reinforce the alternate bridges at Habiemont; Crombez could have begun work early on the bypass at Koksu-ri; and deep bomb craters could have been filled or bypassed in LAM SON 719. Firsthand and recent information is of greater importance in restrictive terrain.

SECURITY

Security operations are conducted to "obtain information about the enemy and provide reaction time, maneuver space, and protect the main body."[172] Security for the armor force attacking in restrictive terrain is derived in several ways, all of which must be carefully weighed with the mission and the capability of the enemy. The composition of the force, critical points along the route, and availability of multiple or mutually supporting routes should guide the commander in taking measures to protect his attacking force.

All three historical examples showed an armor task force employing infantry supporting tanks. In the case of Task Force Crombez, the lack of armored personnel carriers was disastrous. The force must be organized to provide combat power to secure the flanks of the attacking force when necessary. This capability probably should be mechanized infantry in order to match the mobility of the tanks, and provide a means of dismounting soldiers to defeat a dismounted antitank threat. Truck borne light infantry should not be discounted as an option due to the few dismounts available in Bradley units. The transition from mounted forward movement to dismounted clearing of enemy to the flanks is perhaps the most difficult aspect to synchronize as was seen in Task Force Crombez. Moreover, doctrine does not even remotely address this action.

The designation of a reconnaissance element(s), and security element(s) takes on a

new complexion when attacking in restrictive terrain. These forces could be part of the main body with specialized "be prepared" security missions if terrain prohibits them from operating an optimal distance from the main body. This enables the main body to move quickly on high speed portions of the attack and remain prepared for the slower process of dismounting and clearing enemy to the flanks. Speed provides some security against small arms, automatic weapons fire, mortar and dismounted antitank fire.

The commander should also build security into his plan by means of a thorough analysis of the axis over which he will attack and the intelligence available to him. By identifying critical points, those areas where the terrain makes the attacking force especially vulnerable to enemy action, the commander can maintain speed yet have a good idea of where to increase security to ensure he does not get ambushed or stopped by obstacles.

If there are multiple and/or mutually supporting axes, the commander must carefully weigh the advantages gained by spreading his force out and gaining more flexibility against the dissipation of combat power and specialized assets such as engineers, scouts, mortars, artillery, and CSS assets (especially, fuel, ammunition, and medical). The construction of the Red Devil Road in LAM SON 719 may seem to have been a prudent measure, but at what cost? Could those engineer and cavalry assets been better used improving and securing QL-9? Also, the new route created its own need for security in addition to QL-9. The terrain in the three historical examples offered limited opportunity to move laterally from one route to another. This must also be considered when deciding to use more than one axis. If a force makes contact, can the other come to aid of the one in contact? Again, a thorough analysis of the AO and the critical points along the way to the objective should highlight these problems.

ENGINEER SUPPORT

Attacks in restrictive terrain intuitively call attention to the need for mobility assets. As the routes available for the commander to attack are limited, it logically follows that the enemy can obstruct the attack with less effort. Redundancy and a wide range of capability

are important in allocating engineer assets to an armor task force conducting an attack in restrictive terrain. Mobility, countermobility, and survivability are all essential elements to an armor attack in restrictive terrain.

As seen in the historical examples, attacking forces need engineers to allow their attack to proceed. In the case of Kampfgruppe Peiper, there was a lack of engineers and assets to repair or reinforce bridges. In the case of Task Force Crombez, engineers were used to build a bypass at a destroyed bridge, and four engineer soldiers rode on the exterior of tanks in the event mines were encountered on the attack. Finally, operation LAM SON 719 illustrated many engineer tasks including improving QL-9, building a pioneer road, and grading the banks of the Xe Pong River in order for the 1st (ARVN) Armored Brigade to escape back to Vietnam. Clearly, a wide range of engineer capabilities are required for operations in restrictive terrain. Moreover, commanders should expect a 50 percent loss of mobility assets in breaching operations.[173] If an engineer platoon is required to make one lane in one breaching operation, more engineers will be required if more than one breach is anticipated. The nature of attacks in restrictive terrain would indicate that more than one breach will be necessary. Therefore, redundant engineer assets should be task organized to an armor force conducting such an attack.

For the most part, mobility tasks have been the emphasis of engineer effort to support attacks in restrictive terrain. One should not forget the utility of countermobility and survivability tasks as well. When Peiper abandoned his attempt to route his march though Habiemont, he should have emplaced some obstacles to the rear of his column to prevent (or disrupt) the U.S. force at Habiemont from attacking his rear. The same is true for the withdrawing ARVN force. Finally, once an attacking force reaches its objective, it should begin work to make its position survivable in preparation for a counterattack.

LOGISTICS

Terrain that constrains the movement of an attacking armor column also constrains the system which supports it. Important decisions must be made as to how an attack in

restrictive terrain is to be supported especially in terms of fuel, ammunition, medical evacuation, and vehicle recovery. Additionally, the commander must decide if he is able to devote the necessary combat power to secure his LOC as the attack progresses, or if he can (or must) risk it being temporarily cut.

In the case of Kampfgruppe Peiper, the German commander understood his predicament in terms of the assets allocated to the battlegroup. Conditions dictated using captured enemy fuel. Fortunately for Peiper, he was able to take advantage of Allied fuel once, but in the end, the lack of fuel was a major factor in his failure to reach the Meuse. Moreover, he was unable to attack back to his higher headquarters with his tanks and other combat vehicles. Task Force Crombez' attack was short enough that fuel did not become a problem. If the Chinese had managed to re-encircle Chip'yong-ni, and had more antitank assets, this could have been a problem. In operation LAM SON 719, QL-9 quickly deteriorated during a rain storm. The alternate route did not offer much relief as it was not an improved road either. The alternate plan to fly fuel into Khe Sanh was delayed because the airstrip took an inordinate amount of time to repair. The result was extensive use of helicopter support to lift fuel into the AO which barely met the needs of the maneuver forces. PAVN forces targeted the fuel stored by U.S. force in the vicinity of Khe Sanh.[174] The precarious nature of the transportation of fuel in LAM SON 719 could have easily developed into a disaster for the ARVN forces in Laos.

The bulkiness of ammunition, especially tank, artillery, and mortar ammunition, present similar problems as those of transporting fuel. There did not seem to be a similar problem with ammunition for the German column. The intent of Peiper's mission was to reach the Meuse as quickly as possible, so a large expenditure of ammunition was not a concern. Ammunition was not a critical factor in the attacks of Task Force Crombez or LAM SON 719. The commonality of captured ammunition makes this solution much more situational. Regardless of the mission, ammunition should always be a concern when a secured MSR is not assured.

Medical evacuation did not seem to be part of the plan for the German attack. U.S. prisoners and civilians tended to some of the wounded German soldiers, and assisted in the burial of the dead, but there was no indication of evacuation. One of the primary purposes of Task Force Crombez' attack was to aid and evacuate the wounded at Chip'yong-ni. Colonel Crombez put the infantry soldiers' lives at great risk by placing them on the exterior of the tanks, but he would not risk a wheeled vehicle in his column to assist in either his own casualty evacuation or that of the 23d RCT. Medical evacuation in LAM SON 719 was not a problem, as helicopter evacuation was a well established capability in the U.S. Army. Aside from the single-mindedness of the Waffen SS Commander for the evacuation of his casualties, and the poor decisions of Colonel Crombez to meet his specified tasks in this area, medical care and evacuation of wounded is a key concern. Using helicopters to do this mission is the best answer, but the commander must be prepared to evacuate casualties with ground means when the weather prohibits flying or when the air defense artillery (ADA) threat is too high. If the MSR behind the column is not secure, more capability must be present with the attacking formation to stabilize seriously wounded soldiers.

Vehicle recovery is also an important consideration for maintaining the momentum of an attack in restrictive terrain. The common problems of recovering vehicles, and repairing them are made more critical in restrictive terrain. As seen in Kampfgruppe Peiper, and LAM SON 719, one stuck tank, can hold up the progress of the entire column. Recovery vehicles must be close at hand (and redundant due to their criticality and low density) to move vehicles to enable the attack to continue. If vehicles cannot be fixed and the MSR is not secured they must be abandoned and destroyed. Otherwise the enemy will use them as seen in LAM SON 719.

Finally, if the commander decides to keep his LOC secured as he attacks, he must allocate combat power at critical points along the route, employ a unit to patrol the entire length of the route, or employ a follow and support force. Such was the case in the

employment of U.S. Army forces in LAM SON 719. Without securing the LOC the commander places his CSS assets at great risk. If the commander decides leave his LOC unguarded as he advances (Peiper, Crombez, and the ARVN attack in LAM SON 719) he must bring the essential, CSS assets with him, and hope the supplies hold out until follow-on forces secure the LOC. The most prudent course, assuming sufficient combat power is available, is to secure the LOC as the attack progresses.

DOCTRINE AND THE KEY CONSIDERATIONS

The next step in the examination of this subject is to assess how effectively doctrine addresses the key considerations discussed above. As previously shown, doctrinal manuals contain very little on armor attacks in restrictive terrain. The only way one would find doctrine on the subject would be to try to apply the generic type information from the existing manuals and experiment with what works and what does not work. The four key considerations (reconnaissance, security, engineer support, and logistics) will now be discussed in terms of how well doctrine addresses these considerations.

Reconnaissance

The subject of reconnaissance is discussed in all of the 71 series field manuals and the 17 series cavalry manuals. The company level field manual (FM 71-1) provides little more information other than advice from Patton admonishing the tank leader to look (with binoculars, or dismount and go forward) before cresting a rise.[175] Field Manual 71-2 (battalion level) offers four pages on reconnaissance, primarily focused on how it is integrated by the staff in the intelligence preparation of the battlefield (IPB) process. There is little information on how the scout platoon actually conduct their reconnaissance.

Field Manual 17-98, Scout Platoon, addresses reconnaissance in great detail.[176] This relatively new doctrinal manual addresses how and why the scout platoon conducts reconnaissance in wooded (restrictive) terrain, the importance of terrain for both concealment and survival, and the appropriate times, places, and techniques for dismounted reconnaissance operations.[177] The manual also goes into great detail concerning obstacle

and "restriction" reconnaissance. In this manual, terrain considerations are given specific sections and guidance as to how to conduct reconnaissance.[178]

The brigade level manual, FM 71-3, offers little information on the subject, due perhaps to the fact that there are no brigade scouts. Field Manual 71-123 addresses reconnaissance operations in chapter two. The four page discussion includes all of the expected information of the purpose of reconnaissance, composition of reconnaissance elements, and the importance of developing priority intelligence requirements (PIR) to focus the information collection effort.[179] There is much less information on how to actually integrate the reconnaissance into offensive operations (routes, composition, timing, etc.) then there is about integrating reconnaissance into IPB and troop leading procedures.

Field Manual 17-95, Cavalry Operations, discusses reconnaissance in more general terms, but makes some mention of restrictive terrain. Much the same as in FM 17-98, dismounted reconnaissance is necessary in restrictive terrain, at obstacles, water crossing sites, and danger areas.[180] Field Manual 17-95 also discusses the fact that the commander must consider terrain in his analysis of how far to each flank of the main body must be reconnoitered.[181] However, FM 17-95 does not specifically discuss integrating reconnaissance in armor attacks in restrictive terrain.

To test this key consideration, the first question is does doctrine addresses the consideration of reconnaissance at all? The answer here is yes. Field Manual 17-98 comes closest to taking full account of the impact of restrictive terrain on conducting reconnaissance in restrictive terrain. Other manuals mention reconnaissance, but only in general terms. The next question is does the treatment relate the problem to restrictive terrain? The answer here is no. While FM 17-98 relates the task to restrictive terrain, it is only at platoon level and the higher level manuals (up to and including brigade level) simply do not relate the task of conducting reconnaissance to armor attacks in restrictive terrain. Finally, is the information easily assimilated by the commander looking to doctrine to assist

him in the conduct of an armor attack in restrictive terrain? The answer is no. Only the scout platoon leader faced with the task of reconnaissance in restrictive terrain can rely on doctrine. At higher levels, the integration of the information in FM 17-98 is by inference alone. Since the three questions in the test for adequacy are not answered in the affirmative, doctrine does not adequately address the key consideration of reconnaissance in the planning and execution of armor attacks in restrictive terrain.

Security

Discussion of security begins with FM 71-2 (FM 71-1 does not address security operations in any meaningful way). This manual contains a separate section for the battalion to conduct guard operations for a brigade or division. The eight page discussion does a good job summarizing the key aspects of conducting a guard operation and shows how it is done with clear diagrams. The section does not address how the guard operation is conducted in restrictive terrain or with infantry that must dismount.

Field Manual 71-3 addresses covering force operations but does not deal directly with guard missions. The diagrams depicting offensive operations in the brigade level field manual show flank security in the different formations but do not discuss in any meaningful way what or how these arrows relate to a column formation attack.

Field Manual 71-123 discusses security in offensive operations also. Surprisingly, the manual shows a diagram of a division movement to contact, and states that "he must perform a risk analysis to tailor the size of the security force-he looks at the presence of friendly forces, restrictive terrain, and suspected enemy contact."[182] Who is he? The division commander? The manual says that flank security will move on a route parallel to the main body.[183] What if a parallel route is not available? The manual briefly discusses the column formation in the deliberate attack and states "Care must be taken that use of a column does not unduly emphasize security and flexibility at the cost of speed and placement of maximum firepower forward."[184] Having read the historical examples, the

shortcomings of the field manuals become more apparent. The manual touches on security and how it relates to restrictive terrain, but it does not provide clear or useful information on how flank security is integrated with the armor attack in restrictive terrain.

Field Manual 17-95 discusses security operations in chapter four. The fundamentals of security operations, screen, guard, and cover are well explained in terms of how to conduct these operations without the constraints of restrictive terrain. The fundamentals of security operations (orient on the main body, provide early warning, reaction time, and maneuver space, and maintain contact with the enemy) inform where the security force should be in relation to the main body, but do not address the problems associated with restrictive terrain, especially in circumstances of only one route.[185]

To test this key consideration, the first question is does doctrine addresses the consideration of security at all? The answer here is yes. FM 17-95 gives ample information on security operations without respect to terrain, and the battalion and brigade level manuals cover the subject as well. The next question is does the treatment relate the problem to restrictive terrain? The answer here is no. Again, looking back to historical examples, there are special problems to tackle in terms of providing security to an attacking column is restrictive terrain. Doctrine simply does not address these problems. Last, is the information easily assimilated by the commander looking to doctrine to assist him in the conduct of an armor attack in close terrain? The answer is no. Since all questions in the test for adequacy are not yes, doctrine does not adequately address the key consideration of security in the planning and execution of armor attacks in restrictive terrain.

Engineer Support

Concerning engineer support, the 71 series manuals dedicate a separate section to many of the engineer intensive tasks such as obstacles in an annex of FM 71-1, hasty water crossing, and obstacle reduction in FM 71-2, and brigade synchronization of river crossings in FM 71-3. There is also extensive detail on conducting breaching operations in the chapters covering offensive operations. The discussion and diagrams for these

missions, for the most, part assume a relatively unrestricted area from which to site the support force, assault force, and breaching force.

Field Manual 71-2 indicates that normally a platoon (now company) of engineers is attached to the battalion task force and is augmented based on the situation. The field manual also identifies the need to plan for countermobility in the attack to enhance flank security.[186] There is no direct discussion of the need for redundancy of assets or a wide range of capability. Field Manual 71-3 provides similar information except it states that normally the lead task force in an attack will be allocated a company of combat engineers. FM 71-3 discusses the need for survivability effort when consolidating on the objective.[187]

The information in the 71 series manuals addresses the important planning considerations for engineer support for offensive operations. The information does not emphasize an analysis of the axes or direction of attack in terms of what possible assets might be required during the attack. The affect of restrictive terrain on breaching operations is not adequately addressed. As far as discrete engineer missions are concerned, the doctrinal manuals provide sufficient information. As far as synchronizing the engineer effort throughout the progress of the attack, the manuals do a poor job.

To test this key consideration, the first question again is does doctrine addresses the consideration of engineer support at all? The answer here is yes. As stated earlier, the manuals generally address the discrete engineer missions concerning obstacle breaching and river crossing operations. The do not adequately address route improvement however. The next question is does the treatment relate the problem to restrictive terrain? The answer here is no. In the detailed treatment of breaching operations and river crossings, terrain is not really addressed in terms of how it limits the procedures that support overcoming the actual impediment. More importantly, the proper integration of engineers in attacks in restrictive terrain is not addressed. The third question, is the information easily assimilated by the commander looking to doctrine to assist him in the conduct of an armor attack in restrictive terrain? The answer is no. Bits and pieces are available concerning discrete

missions but not on the subject of armor attacks in restrictive terrain. Since all questions in the test for adequacy are not yes, doctrine does not adequately address the key consideration of engineer support to armor attacks in restrictive terrain.

Logistics

The logistical aspects of the doctrinal manuals focus on basic principles of CSS operations, organizations and functions, and areas of support (brigade support area, field trains, combat trains, etc.). Each of the 71 series field manuals covers approximately the same information and includes a list of planning considerations for both the offense and defense. As far as information specific to armor attacks in restrictive terrain, there is no section devoted to these special considerations.

Field Manual 71-3, contains a small section on logistically supporting deep operations.[188] The material in this section addresses all of the concerns outlined in the key considerations above. This, more than any other section in the doctrinal manuals relates directly to the subject. Aside from the heading of this section, the information provides a conceptual basis for supporting armor attacks in restrictive terrain. Again, there is no mention of the affects of terrain, and the manual does not go into any great detail on recommending a composition, or procedure for supporting armor attacks in restrictive terrain. The details and application require too much inference for a field manual. Overall, this key consideration is not effectively addressed.

To test this key consideration, the first question again is does doctrine addresses the consideration of logistics at all? The answer here is yes. Most of the important points can be found in generic terms in FM 71-2, and FM 71-123. The deep operations section in FM 71-3 comes close to adequately addressing these concerns albeit under a heading unrelated to restrictive terrain. The next question is does the treatment relate the problem to restrictive terrain? The answer here is no. The problems are not related to restrictive terrain at all. The third question, is the information easily assimilated by the commander looking to doctrine to assist him in the conduct of an armor attack in restrictive terrain? The answer is

no. Since all questions in the test for adequacy are not yes, doctrine does not adequately address the key consideration of logistics for armor attacks in restrictive terrain.

CONCLUSION AND RECOMMENDATIONS

This monograph began with the doctrinal explanation of restrictive terrain and assessed pertinent doctrinal manuals. Doctrine emphasizes the need for the U.S. Army to be able to fight in any type terrain, prescribes using combined arms, and encourages speed and surprise in offensive operations. The environment-series manuals are convincing in terms of proving that restrictive terrain is everywhere, in every theater, including Korea, Bosnia, and Southwest Asia, but fall short in explaining the impacts of the environment on operations. Armor, mechanized infantry, and cavalry manuals discourage the use of heavy forces in restrictive terrain, but, at the same time, maintain that mounted forces can operate under any conditions. The next section of the monograph focused on three historical examples which demonstrated that armor can be effective in restrictive terrain, but such attacks are difficult. The lessons from the historical examples formed the basis for developing key considerations for attacks of this nature. The paper then examined the key considerations in terms of the historical examples and doctrine. Doctrine was then tested to see if effectively addressed the key considerations--it did not.

The final step involves what should be done to address these shortcomings. The first task is to correct the ambiguous nature of doctrine as it addresses the capabilities and limitations of the different types of maneuver forces. Because armor may be able to move faster in open terrain, and engage targets at greater range, does not make it unsuited for restrictive terrain. History provides numerous examples of armor used decisively in mountains, jungles, and other types of restrictive terrain. This correction must be made in FM 100-5, the environment-series manuals, and all of the heavy force branch manuals. Our thinking should not be limited to using light infantry in restrictive terrain and armor in open terrain--current doctrine tends to reinforce that mind set.

The next task is to develop annexes for field manuals that stress the special

conditions and unique integrative actions required of commanders fighting in restrictive terrain. One possible approach to presenting this information is by battlefield operating systems. The information presented earlier in the monograph on key considerations can be easily formatted into an annex (at least one in each of the manuals discussed in this study) which discusses how the considerations impact on each of the BOS categories. Some BOS considerations are listed in bullet format at the appendix of this monograph. The proposed annexes to our field manuals should include concise historical examples to relate the generic information on tactics, techniques, and procedures to the real world. This approach makes doctrine interesting, easier to understand, and retained longer by the reader.

Even though this monograph is focused on doctrine, a recommendation must be made in terms of training. Units must train to conduct these type of operations. The ad-hoc nature of most of the units examined in the historical examples resulted in poor performance. The lack of doctrine and training resulted in unnecessary loss of life. Training these operations will not only increase the capability and readiness of units to handle such missions, but will also aid in the development and refinement of doctrine.

The advantages of attacking in restrictive terrain, and the likelihood of employment in such terrain, indicate a need to know how to attack there. Our doctrinal based approach to warfighting should address these types of missions.

ENDNOTES

1. U.S. Department of the Army, Field Manual 34-130, Intelligence Preparation of the Battlefield (Washington, DC: U.S. Government Printing Office, July 1994), 2-14. This field manual was chosen to define terrain due primarily to the fact that neither FM 100-5, Operations, nor FM 101-5-1, Operational Terms and Symbols define terrain in what was commonly known as Go, Slow-Go, and No-Go terrain. The recent publication date of this FM also lends credibility to its definition of the terms.

2. Ibid., 2-15.

3. Ibid., 2-16.

4. U.S. Department of the Army, Field Manual 100-5, Operations (Washington, DC: U.S. Government Printing Office, June 1993). The previous FM 100-5 was published in 1986. A full discussion of the role of doctrine in the U.S. Army can be found in the preface, introduction and first chapter of this publication.

5. Ibid., 1-4.

6. Ibid., 2-3.

7. Ibid., 14-1. Chapter 14, The Environment of Combat, focuses on two dimensions: the human dimension and the physical dimension.

8. Ibid., 14-3-14-4. The FM cited for cold weather operations (FM 90-11) has not been published. Once published, it will replace FM 31-70, Basic Cold Weather Manual, 1968, and FM 31-71, Northern Operations, 1971.

9. Ibid., 2-22-2-23.

10. Ibid., 7-0.

11. Ibid., 7-1-7-3.

12. Ibid., 8-2.

13. Ibid., 8-3-8-4.

14. U.S. Department of the Army, Field Manual 90-6, Mountain Operations (Washington, DC: U.S. Government Printing Office, June 1980), 1-3.

15. Ibid., 3-15-3-27.

16. Ibid., 3-9, Two paragraphs on this page discuss the enemy employment of tanks. 3-14, 4-11.

17. Ibid., 1.

18. Ibid., 3-4.

19. U.S. Department of the Army, Field Manual 90-3, Desert Operations (Washington, DC: U.S. Government Printing Office, August 1983), 3-1.

20. Ibid., iv.

21. Ibid., 1-5-1-7, Annex F. Dunes can be up to 1000 feet high and 15 miles long. Wadis (dried water courses) can be an aid to trafficability or an obstacle depending on their orientation. Sudden, heavy rains can make wadis extremely dangerous. Salt marshes, or sebkhas, are for the most part impassable to tracks and wheels.

22. Ibid., 3-31.

23. Ibid., F-1.

24. Ibid., F-2.

25. U.S. Department of the Army, Field Manual 90-5, Jungle Operations (Washington, DC: U.S. Government Printing Office, August 1982), 6-5.

26. Ibid., 6-12-6-13.

27. Ibid., 6-14.

28. U.S. Department of the Army, Field Manual 31-70, Basic Cold Weather Manual (Washington, DC: U.S. Government Printing Office, April 1968).

29. U.S. Department of the Army, Field Manual 31-71, Northern Operations (Washington, DC: U.S. Government Printing Office, June 1971).

30. Ibid., 1-1.

31. Ibid., 3-2-3-5.

32. Ibid., 2-8.

33. FM 31-70, 117-119.

34. Ibid., 142-145; 168.

35. U.S. Department of the Army, Field Manual 71-3, Armored and Mechanized Infantry Brigade (Washington, DC: U.S. Government Printing Office, May 1988), 1-2.

36. Ibid., 3-1.

37. Ibid., 3-14.

38. Ibid., A-3.

39. U.S. Department of the Army, Field Manual 71-2, The Tank and Mechanized Infantry Battalion Task Force (Washington, DC: U.S. Government Printing Office, September 1988), 1-13.

40. Ibid., 1-14.

41. Ibid., 1-14.

42. Ibid., 1-15.

43. Ibid., 3-32, 3-58, 3-64.

44. Ibid., 3-29.

45. Ibid., A-1.

46. Ibid., A-13.

47. Ibid., A-16-A-20.

48. U.S. Department of the Army, Field Manual 71-2, Tank and Mechanized Infantry Company Team (Washington, DC: U.S. Government Printing Office, November 1988), 2-19.

49. U.S. Department of the Army, Field Manual 71-123, Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion/Task Force, and Company/Team (Washington, DC: U.S. Government Printing Office, September 1992), iii.

50. Ibid., 1-20.

51. Ibid., 3-21.

52. Ibid., 3-81.

53. Ibid., 3-106.

54. Ibid., 3-107.

55. Ibid., 3-143, 3-159.

56. Ibid., B-2.

57. FM 71-123, B-2. The distinction for heavy/light and light/heavy can be found on page B-1: heavy/light operations entail light forces reinforcing a heavy force on a heavy force battlefield against an enemy heavy force. A light/heavy force is a heavy force supporting a light force in close terrain occupied or controlled by the light force.

58. Ibid., B-8, B-13, B-18, B-20.

59. Ibid., B-13. The only explanation given for these standard groupings is the fact that "it has been the norm in the U.S. Army since World War II" at least for the light brigade, heavy company lash up. For the other levels no explanation can be found.

60. Ibid., B-13.

61. Ibid., B-16.

62. Ibid., B-21.

63. Hugh M. Cole, The Ardennes: Battle of the Bulge (Washington, D.C.: Office of the Chief of Military History, United States Army, 1965), 2.

64. James R. Arnold, Ardennes 1944: Hitler's Last Gamble in the West (London: Osprey Publishing Ltd., 1990), 7.

65. Cole, 17-18.

66. Arnold, 32.

67. Michael Howard, The Franco-Prussian War (London: Mathuen, 1961), 213.

68. Arnold, 32.

69. Charles B. MacDonald, The Battle of the Bulge (London: Weidenfeld and Nicholson, Ltd., 1984), 197.

70. John S.D. Eisenhower, The Bitter Woods (New York: G.P. Putnam's Sons, 1969), 217-219.

71. Cole, 75, 264.

72. MacDonald, 198.

73. Ibid., 442.

74. Ibid, 199.

75. Eisenhower, 219.

76. Arnold, 26.

77. MacDonald, 204-205.

78. Robert E. Merriam, Dark December (New York: Ziff Davis Publishing Co., 1947), 110. Eisenhower, 219.

79. Janice H. Giles, The Damned Engineers (Boston: Houghton Mifflin Co., 1970), inside cover.

80. MacDonald, 199-201.

81. Eisenhower, 220.

82. Cole, 91-92. Eisenhower, 220-221.

83. MacDonald, 210.

84. Ibid., 210-212, 214-217.

85. MacDonald, 233-234.

86. Eisenhower, 238.

87. Giles, 215.

88. Ibid, 238-239. LTC Otto Skorzeny was an infamous SS officer and a favorite of Hitler. He had conducted many successful special operations in the past, and his men, traveling with Peiper's column, had various missions designed to facilitate movement by capturing bridge sites as well as tasks designed to create the impression in the Allies mind that numerous German soldiers had infiltrated deep in their lines, in civilian clothes and U.S. uniforms, and were attempting to assassinate key commanders including Eisenhower and Bradley.

89. Cole, 265.

90. Eisenhower, 239.

91. MacDonald, 235-237. It is believed that one of Skorzeny's men disguised as Americans had sabotaged the demolition attempt. Giles, p 220.

92. Giles, 249.

93. Cole, 267.

94. MacDonald, 239-241. Giles asserts that two companies of tanks were sent through Wanne toward Trois Ponts, 222.

95. Giles, 259.

96. Cole, 268. MacDonald, 242.

97. Giles, 260-267.

98. Cole, 268-269.

99. MacDonald, 438-443, 462.

100. Cole, 347.

101. Cole, 376-377.

102. MacDonald, 463.

103. Billy C. Mossman, Ebb and Flow November 1950-July 1951 (Washington, D.C.: Center of Military History, United States Army, 1990), 284.

104. Mossman, 289.

105. Russell A. Gugeler, Combat Actions in Korea (Washington, D.C.: Office of the Chief of Military History, United States army, 1970), 126. The 23d RCT was attacked on February 13th and 14th by elements of four regiments each belonging to different divisions and these divisions belonging to three different armies. Although encircled, the 23d RCT received support via limited aerial resupply, and close air support. Their defense was solid against repeated attacks by the Chinese. There were casualties in the hundreds however, including Freeman, and when the unit's artillery position was lost, it seemed

questionable whether the brave Americans and Frenchmen could hold on. Mossman, 286-288. Appleman, 262, 268, 287.

106. Mossman, 286.

107. Mossman, 5-7.

108. Ibid, 5-7.

109. Roy E. Appleman, Ridgway Duels for Korea (College Station, Texas A&M University Press, 1990), 262.

110. Gugeler, 126, 128, 131. Mossman, 286, 289.

111. Ibid, 277.

112. Ibid, 277-278. George B. Pickett, Jr., "Task Force Crombez at Chip'yong-ni," Armor 61 (July-August 1952) 35.

113. Gugeler, 128.

114. Mossman, 296. Appleman, 277-278.

115. Appleman, 278

116. Clay Blair, The Forgotten War (New York: Doubleday, 1987), 707. Pickett, 35. Gugeler 129.

117. Pickett, 36.

118. Gugeler, 128-129.

119. Appleman, 279.

120. Gugeler, 129.

121. Gugeler, 127.

122. Ibid, 130.

123. Appleman, 280-281.

124. Gugeler, 131. Appleman, 281. Some of the weapons were captured U.S. And other U.N. Equipment. There is some discussion as to whether or not the Chinese employed bazookas.

125. Ibid, 130-131.

126. Appleman, 282.

127. Mossman, 297-298. Gugeler, 132.

128. Pickett, 36.

129. Gugeler, 132.

130. Appleman, 284-286.

131. Mossman, 298-300. Pickett, 37. Roy Appleman states in his book, Ridgway Duels for Korea, that 876 dead Chinese were counted along Task Force Crombez' route on February 16th.

132. Roy Richard Stephenson, Road to Downfall (Ann Arbor, Michigan: University Microfilms International, 1991), 59-60.

133. Davidson, 638.

134. Donn A. Starry, Armored Combat in Vietnam (New York: The Bob-Merrill Company, Inc., 1980) 186-187.

135. Keith Nolan, Into Laos (California: Presidio Press, 1986), 15.

136. Starry, 188-189.

137. XXIV Corps, "AAR-Lam Son 71/9," Annex C (Intelligence), C-9.

138. Starry, 191.

139. Akihiko Okamura, "Crossroads at Tchepone," Life (March 26, 1971). The author accompanied an ARVN Column as it attacked across the Laotian border.

140. Richard M. Meyer, "The Road to Laos," Armor 81 (March-April 1972) 23. LTC Meyer commanded Task Force 1-77 Armor during LAM SON 719.

141. Starry, 187. Meyer, 19.

142. Meyer, 20.

143. Ibid, 19.

144. Stephenson, 117.

145. Ibid, 118-121.

146. Starry, 187.

147. Ibid., 189-190.

148. Meyer, 21.

149. Stephenson, 115. One unit, 1-77 Armor, secured the route by continuous route surveillance and a variety of operations to the flanks of QL-9. Surveillance consisted of numerous overlapping observation posts (OPs) which covered the entire route in 1-77 Armor's area of operations (AO). The OPs were

supplemented with PPS-5 radars, TVS-4 night observation devices, and seismic intrusion devices. Companies periodically changed the location of the sensors, OPs, and night patrols. Additionally, the units conducted airmobile assaults, mounted and dismounted zone reconnaissance, and artillery raids well to the flanks of QL-9 to ensure the enemy did not come within mortar range of the MSR. The 4-3 Infantry, adjacent to 1-77 Armor, discovered company-sized enemy in their AO, and in two weeks of intense fighting, destroyed numerous enemy camps and caches. This action undoubtedly made 1-77 Armor's job of securing the MSR easier. Meyer, 21-22.

150. Ibid, 22.

151. Starry, 190-191.

152. Stephenson, 80.

153. Starry, 191-192.

154. Ibid., 192-193.

155. Ibid., 193-195.

156. Ibid, 195.

157. Ibid, 197-198, 225. The I Corps commander allocated two U.S. air cavalry troops to assist the 1st (ARVN) Armor Brigade's withdrawal from Laos. The ARVN Airborne Division commander diverted these troops to assist units elsewhere. On March 19-20, the PAVN forces attempted to cut off the ARVN column in Laotian territory and destroy it. During this time, U.S. units astride QL-9 were the subject of intense PAVN RPG, rocket, mortar, and artillery attacks. Intelligence reports indicated the North Vietnamese were planning an armored assault against LZ Aluoi. Meyer, 22.

158. Nguyen Duy Hinh, Lam Son 719, Indochina Monographs (Washington, D.C.: Offcie of the Chief of Military History, U.S. Army, 1979) 113.

159. Stephenson, 226.

160. Ibid, 231.

161. Stephenson, 232-233.

162. XXIV Corps, "AAR-Lam Son 71/9," 69.

163. Meyer, 22.

164. Ibid, 22-23.

165. Ibid, 23-24.

166. Ibid, 23.

167. Ibid, 24.

168. Ibid., 24-25.

169. XXIV Corps AAR, "Lam Son 71/9," 90-91.
Equipment losses (lost or destroyed or, if PAVN, also captured) are as follows:

	ARVN	U.S.	PAVN
Individual and Crew served weapons	2427	461	7133
Tanks	54	17	106
Artillery	93	4	13
Combat Vehicles	76	87	11
Ammunition (tons)	-	-	170,346
Rice (tons)	-	-	1250

All of this information is caveated with limitations of the number of damage assessment flights flown by the air force after bombing, and U.S. verified losses versus ARVN reported losses.

170. The U.S. has significant advantage in the areas of air power, precision munitions, communications, and intelligence. With this advantage, these considerations are not as critical since we are less vulnerable to potential threats in these areas.

171. U.S. Department of the Army, Field Manual 17-95, Cavalry Operations (Washington, D.C.: U.S. Government Printing Office, September, 1991), 3-1.

172. Ibid., 4-1.

173. U.S. Department of the Army, Field Manual 90-13-1, Combined Arms Breaching Operations (Washington, D.C.: U.S. Government Printing Office, May 1993), 2-4.

174. XXIV Corps AAR, "Lam Son 71/9," 77.

175. FM 71-1, 3-10.

176. U.S. Department of the Army, Field Manual 17-98, Scout Platoon (Washington, D.C.: U.S. Government Printing Office, September 1994), Chapter 4.

177. Ibid, 3-27, 3-2, 4-7, Appendix B.

178. Ibid, 4-11.

179. FM 71-123, 249-252.

180. FM 17-95, 3-6.

181. Ibid, 3-15.

182. FM 71-123, 3-16.

183. Ibid, 3-16.

184. Ibid, 3-30.

185. FM 17-95, 4-3.

186. FM 71-2, 3-31. The increase in engineer assets to the division force structure provides for a company of engineers per tank or mechanized infantry battalion task force.

187. FM 71-3, 3-6.

188. Ibid, 7-6.

CONSIDERATIONS FOR ARMOR ATTACKS IN RESTRICTIVE TERRAIN

Maneuver

-Reconnaissance critical points, laterals, route conditions.
-Security at critical points, flanks, front, rear.
-Tank, mech, light inf mix--order of march.
-Multiple or mutual supporting routes available?
-Air Assault units forward to seize/clear critical points/flanks.
-Detachments for supplemental , alternate routes. (For security or to speed the progress of the main body)
-Always consider clearing high ground first.

Intelligence

-Imagery, recent?, critical points?
-Positioning sensors at key locations.
-Using UAVs and other aerial reconnaissance assets.
-HUMINT.
-Natural obstacles, bridges.
-Recent threat presence/activity along route.
-Infiltrate to critical points for surveillance.
-Will terrain elevation render aspects of Quickfix or other SIGINT collectors/jammers ineffective? Alternatives?

ADA

-Patriot coverage.
-Stinger position in formation.
-Key terrain for stinger teams (infiltrate or air assault to firing positions).
-Increased vulnerability to enemy attack helicopters.
-Are early warning net comms affected by terrain?

Fire Support

-Artillery Firing Points to set up to cover critical points.
-Counterbattery radar coverage, security and positioning.
-Amount of ammunition to bring.
-Targets planned at critical points.
-Range to MLRS/ATACMS.
-CAS and attack helos to "SEAD"/"Secure" flanks by fire?, preplan employment at critical points.

Command and Control

-Position of commander, senior engineer.
-Comms to overcome mountainous terrain.
-Visual signal backup plan for marking and commo.
-Overhead command and control?
-Plan for success, linkup, objective.

Mobility, Countermobility, Survivability

-Redundant breaching and bridging capability.
-Route improvement capability.
-Repair key bridges/transportation nodes for CSS.
-Position eng. forward and with reconnaissance elements.
-Position of AVLBs, anticipate their use and plan for their slow rate of movement.
-Maneuver unit soldiers trained in hasty breaching and equipped appropriately.
-Combat loaded class IV to assist engineers

Logistics

-Keep LOCs open to the rear or not.
-Amount of Cl III,V to bring, position in column, protection.
-Increase in emergency medical capability and evac.
-Vehicle recovery capability far forward.
-Combat crew tng in BDAR and "under-fire" recovery drills; Vehicle destruction criteria.

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