

Integration of Armored Forces in the U.S. Army

Infantry Division

A Monograph

by

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Armor



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The integration of armored units within the U.S. Army's infantry divisions has historically been pivotal to the success of the infantry division in combat. Currently, none of the Army's tank or mechanized infantry battalions are organized or trained to directly support the Army's light, air assault or airborne infantry divisions. The 10th Mountain Division, the 25th Infantry Division, the 101st Air Assault Division and the 82nd Airborne Division currently have to draw armored support from the Army's armored or mechanized infantry divisions. This organizational shortfall is compounded by training and doctrinal issues. The most important of which is that the tank and mechanized infantry battalions within the Army's heavy divisions do not routinely train in the role of providing support to the Army's light, air assault or airborne infantry divisions. The monograph initially examines the period from 1940 until 1947, which was characterized by increasing integration of the two arms. This provides a basis for comparison with the current Army in terms of organization, doctrine and training. Subsequently, the monograph examines the changes associated with the Army's adoption of the Army of Excellence in the 1980s. This examination provides insight into how the Army currently achieves integration of its armored units and infantry divisions with respect to organization, doctrine and training. The monograph then evaluates the Army's current level of integration largely based on the Army's lessons from the Second World War. This study recommends that the Army re-allocate armored forces to directly support the Army's infantry divisions, even if this must be done at the expense of existing heavy forces. The study further recommends changes to the Army's current armored-infantry training model in order to establish habitual relationships between supporting armored units and supported infantry divisions. Finally, the study recommends limited changes to the current U.S. Army doctrine concerning armored-infantry integration.

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ABSTRACT

INTEGRATION OF ARMORED FORCES IN THE U.S. ARMY INFANTRY DIVISION by
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The integration of armored units within the U.S. Army's infantry divisions has historically been pivotal to the success of the infantry division in combat. Currently, none of the Army's tank or mechanized infantry battalions are organized or trained to directly support the Army's light, air assault or airborne infantry divisions. The 10th Mountain Division, the 25th Infantry Division, the 101st Air Assault Division and the 82nd Airborne Division currently have to draw armored support from the Army's armored or mechanized infantry divisions. This organizational shortfall is compounded by training and doctrinal issues. The most important of which is that the tank and mechanized infantry battalions within the Army's heavy divisions do not routinely train in the role of providing support to the Army's light, air assault or airborne infantry divisions.

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CHAPTER ONE

INTRODUCTION

Arguments and counter-arguments about the superiority of infantry and tanks, or vice versa, are essentially futile, for the two arms are complementary and the real problem is not to decide between them but to effectively combine them together. ¹

FM 3-0 Operations, the Army's capstone doctrinal manual, states that combined arms is "the synchronization or simultaneous application of several arms--such as infantry, armor, field artillery, engineers, air defense, and aviation--to achieve an effect on the enemy that is greater than if each was used against the enemy in sequence." ² The use of combined arms creates dilemmas for the enemy force. Often what the enemy force must do to protect itself from the effects of one arm will make it vulnerable to the effects of another. ³ For example, in a combined arms assault of a prepared position conducted by tanks, infantry and supporting artillery, the enemy infantry and vehicles could remain in their dug in positions in order to protect themselves from the supporting tank and artillery fires. This would, however, leave the enemy force vulnerable to the attacking infantry. Conversely, if the enemy infantrymen and vehicles moved out of their prepared positions in order to protect themselves from the attacking infantry, they would then be exposed to the effects of the tank and artillery fires. ⁴ The concept of combined arms is a cornerstone of U.S. Army doctrine and is deemed critical to the success any tactical operation.

The Army's integration of its armored and infantry units has been a critical component of its combined arms concept since before World War II. Since that time, the Army has devised various methods of integrating armored units with infantry divisions. Some of the Army's methods have

¹ R.M. Ogorkjewicz, *Armoured Forces: A History of Armoured Forces and Their Vehicles*, (New York: Arco Publishing Company Inc., 1960), page 385.

² U.S. Department of the Army, *FM 3-0 Operations (DRAG Edition)*, (Washington D.C.: Department of the Army, 15 June 2000), page 4-27.

³ *Ibid*, pages 4-30 and 4-31.

⁴ U.S. Department of the Army, *FM 71-1 The Tank and Mechanized Infantry Company Team*, (Washington D.C.: Department of the Army, 1998), page 3-60.

been more successful than others. The purpose of this monograph is to evaluate the Army's current method of integration.

In 1943, Lieutenant General McNair, the Commander of U.S. Army Ground Forces, wrote a memorandum to the Chief of the Armored Force about the use of armored forces. In that memorandum Lieutenant General McNair identified two distinct roles for armored forces on the battlefield:

The Battle of El Alamein demonstrated the correct employment of armor, which was held in reserve until the infantry, artillery and air had opened a hole. The British armor then exploited the success and destroyed the German force. Thus, we need large armor units to exploit the success of our infantry. We need small armored units also, in order to assist the infantry locally.⁵

The first role mentioned in the memorandum, the role of exploitation by large armored units, has historically been filled by the armored or heavy division. The armor force has at times dedicated too great a portion of its assets towards supporting this role. The second role mentioned by Lieutenant General McNair, the role of infantry support, has been conducted by small armored units organic or attached to infantry divisions. The armor force has at times dedicated too small a portion of its resources to performing this role. The thesis argued in this monograph is that the U.S. Army's armor force is currently out of balance because it is providing too few resources towards supporting the Army's infantry divisions.

METHODOLOGY

This monograph examines the organizational, doctrinal and training issues associated with armored force integration with infantry divisions in the U.S. Army. The first chapter of the monograph describes, in very broad terms, combined arms integration of armored units with infantry. The second chapter examines the period between 1940 and 1947 in which the Army increased integration between its armored and infantry units in order to provide a basis for

⁵ Kent Roberts Greenfield, Robert R. Palmer and Bell I. Wiley, *The Organization of Ground Combat Troops*, (Washington D.C.: Historical Division United States Army, 1947), page 325.

comparison with the Army's current method of integration. The third chapter explores the changes in the U.S. Army from the 1980s to the present in order to provide an understanding of how the U.S. Army currently integrates armored and infantry forces. The fourth chapter of the monograph evaluates the effectiveness of the Army's current method of integrating armored and infantry forces and the fifth chapter provides recommendations based on the previous four chapters.

INTEGRATION DEFINED

Commanders can integrate armored and infantry units in a myriad of combinations. In order to provide focus, this monograph examines the integration of armored units within the U.S. Army's basic large fighting unit: the infantry division. Since there have been several types of infantry divisions and several types of armored units that have organized with them, some further discussion is required.

During World War II, the measure of the Army's ability to integrate armored units with infantry divisions was fairly simple to define. The line between armored units and infantry units was clear. The Army fielded sixty-six standard infantry divisions, five airborne-infantry divisions and one mountain infantry division. During World War II, armored forces included both armored infantry and tank units. Any attachment of armored forces to a standard, airborne or mountain division constituted integration. In practice, however, only tank battalions (as opposed to armored infantry battalions) were attached to infantry divisions. Consequently, the measure of integration of armored units with infantry divisions during World War II was almost wholly defined by the Army's ability to attach tank battalions to infantry divisions.⁶ This continued to be the primary measure of integration up until the Army of Excellence changes of the 1980s.

⁶ Shelby L. Stanton, *Order of Battle U.S. Army World War II*, (Novato CA: Presidio Press, 1984), pages 75-186.

Currently there are four types of U.S. Army infantry divisions: mechanized infantry, airborne infantry, air assault infantry and light infantry. The U.S. Army's current mechanized infantry division contains a combination of mechanized infantry and tank battalions. This makes the mechanized infantry division far more similar, organizationally, to the World War II armored division than to the World War II standard infantry division. Consequently, the mechanized infantry division cannot be used to measure the effectiveness of armored integration with an infantry division simply because it is, for all intents and purposes, an armored division. It is an infantry division, largely, in name only. In contrast, the airborne infantry, air assault infantry and light infantry divisions contain nine infantry battalions and are true infantry divisions. Any current evaluation of the Army's effectiveness in integrating armored units with infantry divisions must then be limited to the evaluation of integration with respect to these three types of divisions.

Because the Army has expanded the role of mechanized infantry since the end of World War II, it has more options in the organization of armored forces with infantry divisions. During World War II, commanders achieved integration through the attachment of tank battalions to infantry divisions. Currently, with the expanded role of the mechanized infantry, a commander can organize tank or mechanized infantry forces to infantry divisions in a number of different ways. These options include the attachment of tank battalions, mechanized infantry battalions or task forces composed of both tank and mechanized infantry companies. Consequently, the organization of tank or mechanized infantry battalion task forces with airborne, air assault, and light infantry divisions constitutes integration in today's Army.

CHAPTER TWO

THE ORIGIN OF THE GHQ TANK BATTALION

Of special importance has been the work of the tank battalions attached to infantry divisions...Throughout the entire campaign the infantry has been the major decisive element in the advance...It is team play which has assured success.¹

Lieutenant General Jacob Devers

During 1940, General Headquarters (GHQ) U.S. Army made three critical organizational decisions that would shape the initial development of the armored-infantry integration in the U.S. Army during World War II.

Firstly, GHQ adopted the triangular infantry division in June 1940 as the standard U.S. Army infantry division (Refer to figure 2-1).² The division was streamlined and strategically deployable. The division's combat power lay in its three infantry regiments and its supporting divisional artillery. GHQ judged that these two components would be required in all types of terrain and in all types of tactical situations. GHQ deliberately left additional combat and combat support assets out of the divisional structure reasoning that these non-organic elements would only be required for specific circumstances.

Secondly, GHQ established the "pooling" system in order to complement the triangular division. The pooling system, whose main proponent was the GHQ chief of staff, Brigadier General Lesley McNair, established separate units above the division level. Field army or corps headquarters would normally retain these units. The pooled units included those specialized combat, combat support and combat service support units that were not organic to the divisions. These units included armor, anti-tank, air defense, engineers and others. Based on a specific battlefield requirement these pooled units could be attached to divisions on a temporary basis.

¹ Kent Roberts Greenfield, Robert R. Palmer and Bell I. Wiley, *The Organization of Ground Combat Troops*, (Washington D.C.: Historical Division United States Army, 1947), page 323.

² Jonathon M. House, *Towards Combined Arms Warfare: A Survey of 20th Century Doctrine and Organization*, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, August 1984), page 74.

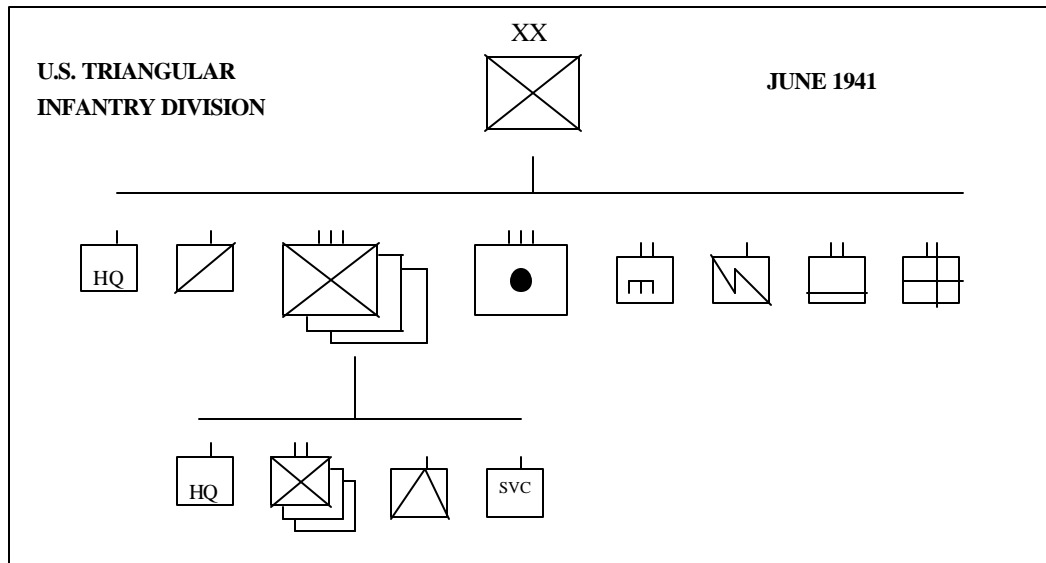


FIGURE 2-1

Thirdly, GHQ established the Armored Force in July of 1940. This decision eliminated the dual control of tank and mechanized forces in the Army. Formerly, the Infantry Branch had controlled all tank forces and the Cavalry Branch had controlled all mechanized forces. This decision made the Armored Force, under the leadership of its first chief, Brigadier General Adna Chaffee, responsible for the development of all armored forces in the Army. Gathering the scattered tank and mechanized forces Brigadier General Chaffee quickly organized the 1st and 2nd Armored Divisions and the 70th GHQ tank battalion. The 70th GHQ tank battalion was the Armored Force's first separate tank battalion and was the first one specifically designed to support the pooling system and the triangular infantry division.

Brigadier Generals McNair and Chaffee each understood that the Army needed GHQ tank battalions to support the infantry divisions and armored divisions to specialize in exploitation and pursuit. Since these organizations would compete for the same resources, GHQ and the Armored Force had to strike a balance between these two types of units in terms of allocation of tank battalions. GHQ could authorize the mobilization a large number of armored divisions, which would require a large proportion of the available battalions. This would leave fewer battalions available for the GHQ pool to support the infantry divisions. Conversely, GHQ could authorize

fewer armored divisions allocating more tank battalions to the GHQ pool. Another determining factor in the availability of GHQ tank battalions was the size of the armored divisions. Simply stated, larger armored divisions requiring more armored battalions would leave fewer battalions available for the GHQ pool. In July 1940, the initial priority went towards the mobilization of the armored divisions.

The preponderance of resources went towards the development of armored divisions for two reasons. Firstly, GHQ War Plans Division was projecting a requirement for an extraordinarily large number of armored divisions to prosecute the war. As late as the beginning of 1942 this figure stood at sixty-seven.³ Secondly, the Armored Force, influenced by the success of the panzer divisions in Poland and France, was convinced of the primacy of large, tank-heavy formations. Therefore, the Armored Force began building five immense armored divisions in 1940 and 1941. The new armored division's major subordinate element was a tank brigade that consisted of two light tank regiments and one medium tank regiment. The division contained a whopping eight tank battalions. Because of the massive resources required for the new divisions, the mobilization of the GHQ tank battalions suffered. By February 1941, GHQ had mobilized two armored divisions equipped with sixteen tank battalions but had only mobilized one light and three medium GHQ tank battalions.⁴

As part of the pooling system, the GHQ and the Armored Force activated an armored group headquarters to control the four mobilized GHQ battalions. In concept, the armored group headquarters was to supervise and train three to five GHQ battalions (See Figure 2-2).⁵ The armored group would also serve as a tactical headquarters that would be retained in the field by either a field army or corps headquarters. This organization would provide the army or corps

³ Elberton R. Smith, *The Army and Economic Mobilization*, (Washington: Office of the Chief of Military History, 1959), page 178.

⁴ Shelby L. Stanton, *Order of Battle U.S. Army World War II*, (Novato CA: Presidio Press, 1984), pages 297-302.

⁵ War Department, *FM 17-36 Employment of Tanks with Infantry (Tentative)*, (Washington D.C.: Government Printing Office, 1944), pages 3-4.

commander with the maximum latitude to weight the main effort. The commander would even have the option to employ the entire group as a tactical unit if the situation dictated. The Armored Force would eventually mobilize twenty armored groups.

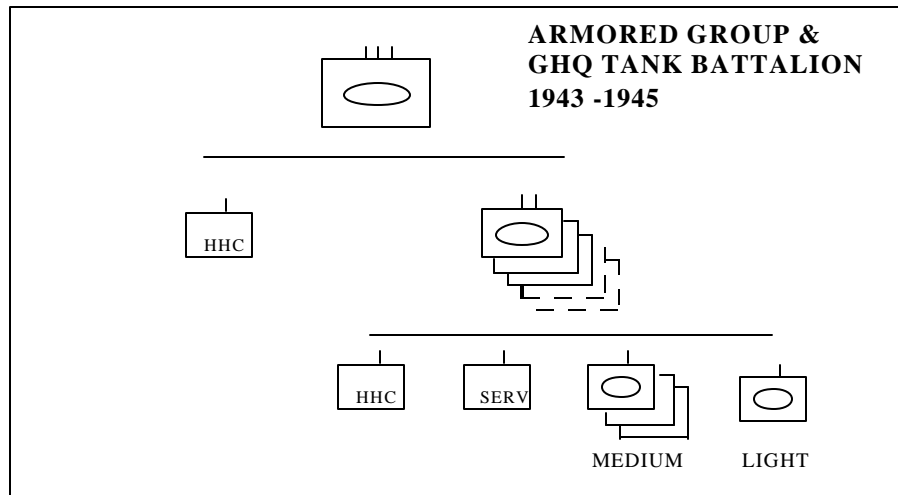


FIGURE 2-2

Both the doctrine associated with armored-infantry integration and the combined arms training of these types of units were completely inadequate in 1940. At the time of the mobilization of the first GHQ tank battalion, there was neither a doctrinal manual for the tank battalion or doctrinal concepts for the employment of tanks within infantry divisions. The Armored Force and the Infantry Branch, which shared responsibility for the development of the doctrine for the GHQ tank battalions, would spend 1940 and 1941 developing the basic doctrine required for the employment of their primary organizations.⁶ In terms of training, both the newly formed infantry divisions and the newly formed tank battalions were completely consumed with the rigors of their own mobilization and initial training. The Infantry Branch trained the

⁶ U.S. Army Ground Forces, *The Armored Force Command and Center Study No. 27*, (Washington D.C.: Historical Section Army Ground Forces, 1946), pages 44-45.

infantry divisions and the Armored Force trained the tank battalions. Combined tank-infantry training generally had to wait.⁷

SLOW PROGRESS IN INTEGRATION

Because of the emphasis on the development of the armored divisions, the mobilization of the GHQ tank battalions continued to lag throughout 1941. By the end of that year, GHQ had only mobilized fifteen GHQ tank battalions to support the Army's twenty-nine infantry divisions. In contrast, the Armored Force had forty tank battalions within its five armored divisions.⁸ The increasing vulnerability of the tank in 1941, however, laid the groundwork for a more equitable distribution of tanks in the U.S. Army. The 1941 Louisiana and Carolina maneuvers and recent combat actions in the Soviet Union and North Africa provided the Army's leadership prime examples of the growing vulnerability of the tank. During the 1941 GHQ maneuvers, anti-tank gun positions repeatedly stopped the two participating armored divisions. The divisions proved to be unbalanced; they had too many tank battalions and too few infantry battalions to overcome combined arms defenses.⁹ Concurrently in Europe and Africa the British, German and Soviet armies were demonstrating an increasingly lethal anti-tank capability with improved anti-tank guns and anti-tank mines.¹⁰

As a result of the tank's increasing vulnerability, GHQ directed the reorganization of the armored division and began to reconsider the number of armored divisions it would need to prosecute the war. The biggest change to the armored division's structure was the decrease of the tank to infantry ratio within the armored division. The new divisional tables had three armored infantry battalions instead of two and had only two armored regiments instead of the original

⁷ U.S. Army Ground Forces, *The Armored Force Command and Center Study No. 27*, page 52 and Bell I. Wiley, *The Building and Training of the Infantry Division Army Ground Forces Study No. 12*, (Washington D.C. Army Ground Forces Historical Section, 1946), pages 7-11.

⁸ Stanton, *Order of Battle U.S. Army World War II*, pages 297-302.

⁹ Christopher R. Gabel, *The U.S. Army GHQ Maneuvers of 1941*, (Washington D.C.: Center of Military History United States Army, 1992), page 177.

¹⁰ Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, page 322.

three. GHQ formalized the new divisional structure under the March 1942 Tables of Organization. In addition, by the end of 1942 GHQ had reduced the number armored divisions it intended on mobilizing from sixty-seven to thirty-five.¹¹ The loss of prestige for the armored division did not, however, immediately translate into the ascendancy of the GHQ tank battalions. GHQ mobilized a mere thirteen GHQ tank battalions and an impressive nine armored divisions in 1942.

The doctrine for tank-infantry integration improved, though not greatly, in 1942 with the publication of *FM 17-10 The Armored Force*. *FM 17-10* included chapters on the employment of the GHQ tank battalion and armored group, which described their basic command and control, tactical and logistical considerations. The manual's descriptions of the operations of the GHQ tank battalion were, however, almost identical to the descriptions of similar operations conducted by armored battalions within the Army's armored divisions. The Armored Force doctrine had failed to capture the unique elements of the GHQ tank battalion's role. The 1942 doctrine did not describe a unit optimized to provide close tank support to infantry formations. It described a unit, like the armored division, which was optimized for the conduct of penetration attacks, exploitations, pursuits and counterattacks. *FM 17-10* strongly discouraged any organization of the GHQ tank battalion, which either prevented it from fighting as a massed battalion, or prevented it from fighting under direct divisional control.¹² The doctrine of 1942 limited the integration of tanks and infantry at the division level.

The training of the infantry division and the GHQ tank battalions only marginally improved in 1941 and 1942. GHQ failed to establish a comprehensive program for armored-infantry training and consequently the combined training between GHQ tank battalions and groups and supported infantry divisions and corps remained extremely limited. Recognizing this deficiency,

¹¹ Smith, *The Army and Economic Mobilization*, page 178.

¹² War Department, *FM 17-10 Armored Force Field Manual*, (Washington D.C.: Government Printing Office, 1942), pages 340-342.

the Armored Force requested and Army Ground Forces directed the conduct of additional combined training between infantry divisions and GHQ tank battalions in 1942.¹³ Despite this directive, there was no appreciable increase in combined armored-infantry training. Both types of units were still overcome by the demands of their mobilization and initial training.

ASCENDANCY OF THE GHQ TANK BATTALION

U.S. Army armored forces made their debut in combat operations in the Mediterranean Theater of Operations in 1942 and 1943. Both the armored divisions and the GHQ tank battalions had significant problems in North Africa and Sicily. It was 1943, however, that would mark the ascendancy of the GHQ tank battalion, largely at the expense of the armored division. At the end of that year, the War Department would fix the number of armored divisions to be mobilized at sixteen. This was a severe reduction from the 1942 mobilization plan, which reflected thirty-five armored divisions.¹⁴ By the end of 1943, the Army would additionally make a dramatic shift in the allocation of armored battalions from the armored divisions to the GHQ tank pool. For the remainder of the war, the majority of armored assets would support the triangular infantry divisions.

The 1st and 2nd Armored Divisions generally performed poorly in North Africa and Sicily in 1943. Several factors contributed to this central problem. The first was the ruggedness of the terrain, which often prevented the armored division from being employed as envisioned in the armored doctrine. The second factor was the lack of GHQ tank battalions deployed to the theater. This shortage of GHQ battalions forced army and corps commanders to employ elements of armored divisions to support infantry divisions that lacked tank support.¹⁵ This was a role that the armored divisions were neither designed nor trained to fulfill; the outcome was predictably poor.

¹³ U.S. Army Ground Forces, *The Armored Force Command and Center Study No. 27*, page 52.

¹⁴ Smith, *The Army and Economic Mobilization*, page 178.

¹⁵ George F. Hoffman and Donn A. Starry eds., *Camp Colt to Desert Storm: The History of the US Armored Force*, (Lexington, Kentucky: University Press of Kentucky, 1999), pages 152 and 153 and Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, page 326.

The third factor was the number of infantrymen in the armored division relative to the number of tanks. The armored division still was too tank heavy and still had problems fighting better balanced combined arms formations.

Based on a directive by Lieutenant General McNair's Army Ground Forces Headquarters, the Armored Force further reduced the number of tank battalions in the armored division from six to three in the September 1943 tables of organization.¹⁶ This reduction in the size of the armored divisions released a large number of tank battalions to the GHQ pool. At the end of 1942, there had been eighty-four tank battalions within the Army's fourteen armored divisions and only twenty-six GHQ tank battalions. By the end of 1943 there were only fifty-four tank battalions within the Army's sixteen armored divisions and a respectable sixty-five GHQ tank battalions.¹⁷

The GHQ tank battalions fared little better than the armored division in the operations in the Mediterranean Theater in 1942 and 1943. From the onset of the campaign, the lack of pre-deployment combined arms training conducted by the GHQ battalions and the supported divisions was a constant hindrance. Neither the GHQ tank battalions nor the infantry divisions were familiar with the tactics and techniques employed by the other.¹⁸ A second major problem associated with the employment of the GHQ tank battalions was unit turbulence. There were twice as many infantry divisions fighting in North Africa and Sicily, as there were GHQ tank battalions. Given the nature of the terrain and the enemy in Mediterranean Theater of Operations, the infantry divisions almost invariably needed a supporting GHQ tank battalion.¹⁹ This shortage of GHQ tank battalions coupled with the concepts of temporary attachment associated with the pooling system created a shell game with the GHQ tank battalions. Army and corps commanders

¹⁶ Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, pages 326-327.

¹⁷ Stanton, *Order of Battle U.S. Army World War II*, pages 297-302 and Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, page 333.

¹⁸ Michael E. Doubler, *Closing with the Enemy: How GIs Fought the War in Europe 1944-1945*, (Lawrence: University Press of Kansas, 1994), pages 15-17.

¹⁹ Hoffman and Starry eds., *Camp Colt to Desert Storm*, page 153 and Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, page 328.

moved GHQ tank battalions from command to command with a frequency that frustrated both the supporting tank battalions and the supported infantry divisions.²⁰ This turbulence further compounded the lack of pre-deployment training by minimizing the establishment of long-standing unit relationships.

Based on after action reports from combat operations in the Mediterranean Theater, the Armored Force began development of a doctrinal manual dedicated to the integration of the GHQ tank battalion and armored group with the infantry division and corps, respectively. The manual was considerably better than the earlier *FM 17-10. FM 17-36 Employment of Tanks With Infantry* discussed, in detail, the command and control, tactical and logistical considerations for tank-infantry integration. The manual provided additional command and control options including one in which the GHQ tank battalion would be subordinate to an infantry regiment. The manual also discussed options for the task organization of smaller armored units from the GHQ battalion with smaller infantry units within the division.²¹ The task organization of companies and platoons was, however, generally discouraged through the remainder of the manual. Although clearly a step in the right direction, the manual still clung to some tactics discredited in the Mediterranean Theater of Operations.

The failure of tank-infantry integration in 1943 was a problem that had to be solved by both the deployed units and the units awaiting deployment or still mobilizing in the United States. Deployed units from the battalion level all the way up to the U.S. 5th Army completed and disseminated after action reports often focusing on tank-infantry integration and recommending solutions to problems in training and execution. Consequently, deployed commanders directed combined tank-infantry training during lulls in the action.²² To improve the pre-deployment training, Army Ground Forces issued two documents during 1943 and 1944, which directed the

²⁰ Doubler, *Closing with the Enemy*, page 15 and Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, page 328.

²¹ War Department, *FM 17-36*, page 21.

²² Doubler, *Closing With the Enemy*, pages 16-17 and 28.

corps commanders to conduct combined training with infantry divisions and GHQ tank battalions. The GHQ tank battalions were to attach to the infantry divisions for periods not exceeding two months to accomplish this. The directive also specified that tank companies and platoons should train in close cooperation with small units of infantry.²³ Although these directives implied improvement in tank-infantry integration, the demands of the war often disrupted the training of the infantry divisions. The newly mobilized divisions were often forced to provide individual replacements to deployed units, conducted training at only partial strength and had maneuvers cancelled or shortened.²⁴ Consequently, most infantry divisions and GHQ tank battalions had to learn the hard lessons of tank-infantry integration during and after the Normandy Campaign.

FULL INTEGRATION

By the end of the Normandy Campaign, the U.S. Army began to achieve widespread and effective integration with its GHQ tank battalions and its infantry divisions. That integration was a requirement based on the complexity of the terrain and tactical skill of Normandy's German defenders. During the campaign, the U.S. divisions began to demonstrate tactical and organizational creativity. An example of this type of creativity was the small, successful, combined arms teams employed by the 29th Infantry Division. The 29th Infantry Division specifically organized these combined arms teams for fighting in Normandy's hedgerows. These small teams combined tanks, infantry and engineers at echelons far below those envisioned in the current doctrine. The 29th Infantry division's teams consisted of a single tank, an engineer team and an infantry squad.²⁵

²³ Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, pages 416-417.

²⁴ Bell I. Wiley, *The Building and Training of the Infantry Division Army Ground Forces Study No. 12*, (Washington D.C. Army Ground Forces Historical Section, 1946), pages 31-42.

²⁵ Michael E. Doubler, *Busting the Bocage: American Combined Arms Operations in France, 6 June-31 July 1944*, (Force Leavenworth, Kansas: U.S. Army Command and General Staff College, 1988), pages 39-40.

The large number of GHQ tank battalions committed to the European Theater of Operations allowed this marked improvement in tank-infantry integration by reducing unit turbulence and allowing the establishment of more permanent unit relationships. The Army eventually committed forty-two infantry divisions to the European Theater of Operations and a corresponding thirty-six GHQ tank battalions in support of those divisions.²⁶ This in turn allowed the divisions to organize tank companies with each infantry regiment, as was the general practice.²⁷ Ultimately, this allowed for the task organization of tanks to the very lowest levels. This semi-permanent attachment of the GHQ tank battalions also had the unintended consequence of decreasing the relevance of the ten armored group headquarters deployed in theater. With all their battalions task organized with infantry divisions, the armored group headquarters found themselves with no useful tactical function.²⁸

Immediately following the war, the Army conducted a series of force boards to capture lessons learned and make recommendations on organizational, equipment, training and doctrinal issues. General Boards Fifteen and Fifty focused on the infantry division and the GHQ tank battalion, respectively. Both boards concluded that tanks were crucial to infantry division operations and recommended that a tank regiment be made organic to the division. The board members reasoned that a tank regiment could perform the role filled by the single GHQ tank battalion and single tank destroyer battalion that were generally task organized with most divisions towards the end of the war. The new tables that were approved in November of 1946 varied from the recommendations of the boards by including only two tank battalion equivalents.

²⁶ Stanton, *Order of Battle U.S. Army World War II*, pages 75-185 and 297-302 and U.S. Forces European Theater, "General Reports Study No. 50: Organization, Equipment, and Tactical Employment of Separate Tank Battalions," (United States Forces, European Theater, 1946), page 4. The sources disagree on the number of GHQ battalions deployed to the European Theater. Stanton lists thirty-six GHQ tank battalions which had completed European Theater campaigns. "General Reports Board No. 50" cites only thirty battalions. This discrepancy may be because several GHQ battalions did not arrive until very late in the War and saw only limited service. Consequently, the authors of "General Reports Board No. 50" may not have considered these battalions.

²⁷ U.S. Forces European Theater, "General Reports Study No. 50," page 4.

²⁸ Greenfield, Palmer and Wiley, *The Organization of Ground Combat Troops*, page 328.

The 1947 infantry division contained a medium tank company organized with each of the division's three infantry regiments and a heavy tank battalion under divisional control (Refer to Figure 2-3).²⁹ The boards recommended no revisions to the current doctrine but General Board Fifteen recommended additional emphasis on tank-infantry training.³⁰

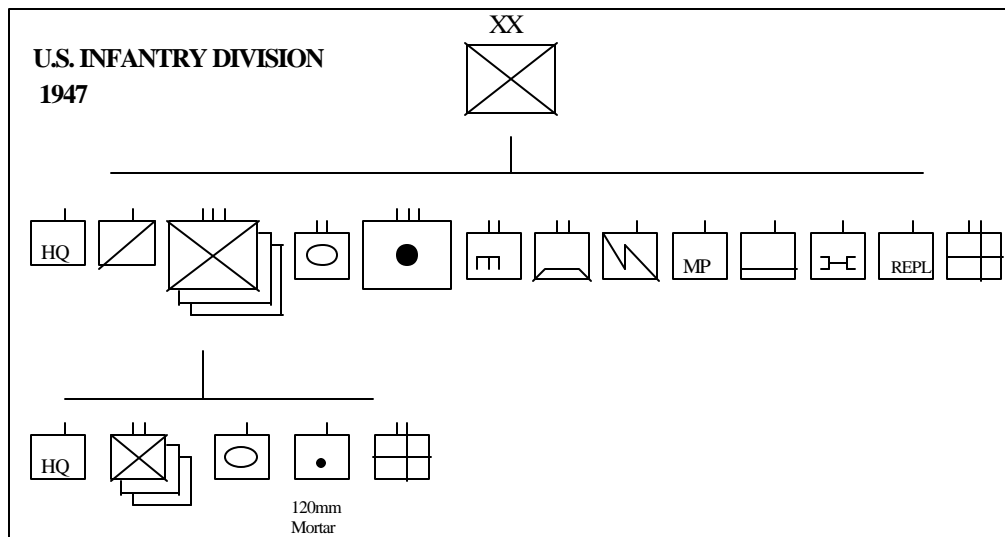


FIGURE 2-3

The integration of armored units within the U.S. Army infantry division achieved by 1947 was the natural conclusion of a process that started in 1940. By 1944, the Army had developed a solid doctrinal base for tank-infantry integration with the publication of *FM 17-36*. Additionally, the Army achieved organizational integration through the semi-permanent attachment of GHQ tank battalions during 1944 and 1945 and, subsequently, through the assignment of tank companies and battalions to the infantry division in the organizational tables of 1947. This organizational integration, in turn, allowed for combined arms training to be conducted at the divisional-level, regimental-level, and at echelons below regiment.

²⁹ House, *Towards Combined Arms Warfare*, pages 146-148.

³⁰ U.S. Forces European Theater, "General Reports Study No. 15: Organization, Equipment, and Tactical Employment of the Infantry Division," (United States Forces, European Theater, 1946), page 13.

CHAPTER THREE

PENTOMIC AND ROAD: STATUS QUO IN INTEGRATION

In an effort to address perceived changes on the battlefield in the 1950s, the Army developed a significantly different divisional structure. Searching for a viable role for its divisions and trying to account for the impact of atomic weapons on the battlefield, the Army developed the Pentomic infantry division. In order to speed information flow, the division featured an increased span of control and a flattened command and control structure. The Pentomic infantry division replaced the three infantry regiments and the associated nine infantry battalions of the 1947 infantry division with five subordinate battle groups thus eliminating one echelon of command. This increased span of control also gave the Pentomic division a greater capability to disperse in order to counter the massive firepower associated with atomic weapons. A greatly dispersed division, planners reasoned, would present a poor target for an atomic weapon.

Though the Pentomic division was in many ways a radical departure, it retained the same mechanism as the 1947 division for the organization of tanks with its subordinate units. The Pentomic infantry division contained a single tank battalion that had the capability to provide a tank company to each of the division's five battle groups.¹

The Army only retained the Pentomic divisional structure until 1962. Although the division proved to be effective in the defense, it lacked offensive capability. Also, the division proved to be hard to control.² These shortcomings forced the Army to redesign the infantry division once again.

¹ Jonathon M. House, *Towards Combined Arms Warfare: A Survey of 20th Century Doctrine and Organization*, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, August 1984), pages 154-155.

² Virgil Ney, *Evolution of the US Army Division 1939-1968*, (Fort Belvoir Virginia: Technical Operations Incorporated Combat Operations Research Group, 1969), page 74.

In the 1960s, the Army reorganized its divisions under the Reorganization Objectives Army Division (ROAD) structure (See Figure 3-1).³ In a return to a more traditional structure, planners designed the ROAD divisions with three subordinate maneuver brigades. Each ROAD division contained a standard base of combat support and combat service support units. This allowed for the flexible organization of the division's combat battalions. The ROAD armored division was normally organized with five tank battalions and four mechanized battalions, the mechanized division was normally organized with seven mechanized infantry battalions and three tank battalions and the infantry division was normally organized with eight infantry battalions and two tank battalions. The airborne and air assault divisions were normally organized with nine airborne and air assault battalions, respectively.

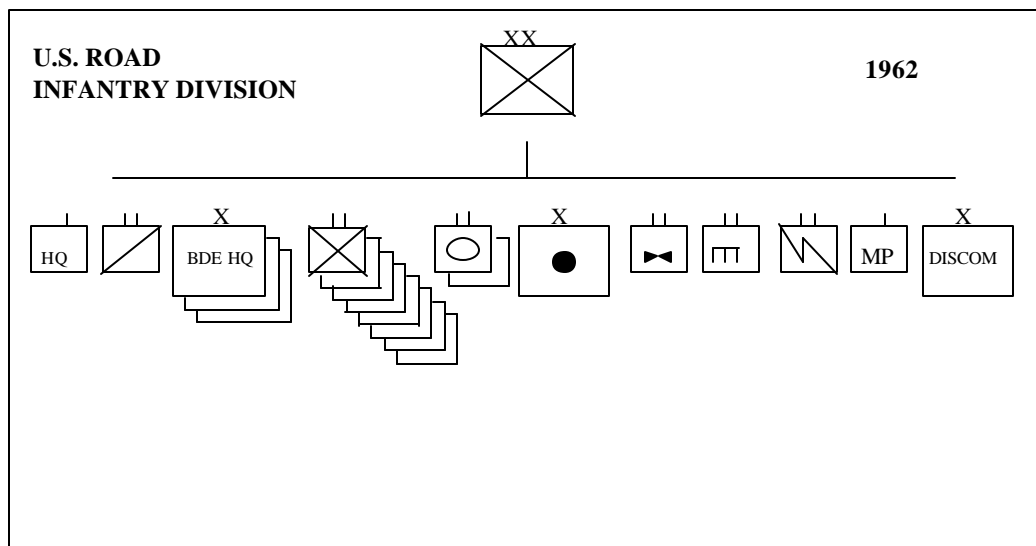


FIGURE 3-1

These divisional organizations were not fixed, however. The unique aspect of the ROAD structure was that the infantry, mechanized infantry and armored divisions could be task organized with a varying number of infantry, mechanized infantry, and tank battalions based on any given situation.⁴ This provided unit commanders great flexibility in organizing tank and

³ Ney, *Evolution of the US Army Division 1939-1968*, page 78.

⁴ *Ibid*, pages 75-79

mechanized infantry battalions with infantry divisions. These strong mechanisms for organizing tank or mechanized infantry battalions with infantry divisions would change, however, with the introduction of Army of Excellence (AOE).

THE ARMY OF EXCELLENCE

The U.S. Army largely reinvented itself during the late 1970s and the 1980s. In shambles after the Vietnam War, the Army reorganized and re-equipped its tactical units, rewrote its doctrine and invigorated its training systems. The reasons for these massive changes were twofold. Firstly, the Army had to adjust to the changes in the strategic situation in Europe. While the American Army had been focusing on Vietnam, the Soviet Union and its Warsaw Pact allies had modernized and built up their forces in Europe. By the time the American Army had returned its attention to Europe, the disparity between its forces and Soviet forces was alarming. Secondly, the Army was reacting to a decade of neglect in weapons systems development with respect to its heavy forces. The extent of this problem was demonstrated by the debut of a new generation of weapon systems during the Yom Kippur War in 1973.⁵

Any major changes in the structure of the Army's tactical units had to account for the Army's central dilemma in the 1980s. This dilemma was the requirement to be prepared to both fight a high-intensity war as part of NATO and deploy contingency forces to other regional hot spots.⁶ The Army Chief of Staff, General E.C. Meyer, emphasized this point in his 1980 White Paper:

The most demanding challenge confronting the US military in the decade of the 1980s is to develop and demonstrate the capability to successfully meet threats to vital US interests outside Europe, without compromising the decisive theater in Central Europe.⁷

In 1979, at the beginning the AOE transition, the U.S. Army had sixteen divisions organized under the ROAD tables. Ten of the divisions were "heavy." Of the heavy divisions, six were

⁵ John L. Romjue, *The Army of Excellence*, (Fort Monroe, VA: Office of the Command Historian, US Army Training and Doctrine Command, 1993), pages 1-2.

⁶ Ibid, page xiii.

⁷ E.C. Meyer, *White Paper 1980: A Framework For Molding the Army of the 1980s Into a Disciplined, Well-Trained Fighting Force*, (Washington D.C.: Department of the Army, 1980), page 1

mechanized infantry divisions and four were armored divisions. The Army's remaining six divisions were a mixed bag. Three of these were standard infantry divisions and the remaining three divisions were specialty divisions and included the 9th Infantry Division (High Technology), the 82nd Airborne Division and the 101st Air Assault Division.

The Army's Training and Doctrine Command (TRADOC) headed the AOE overhaul of the heavy division starting in 1983. This consisted of both the fielding of new equipment and the reorganization of the divisions. The purpose behind the TRADOC reorganization of the heavy division was to allow the division to employ the new equipment to maximum advantage in accordance with the Army's new doctrine.⁸ The Army converted all ten heavy divisions to the new AOE structure. The Army additionally converted one ROAD infantry division to an AOE medium division. This division was organized with a combination of tank, mechanized infantry and standard infantry battalions. TRADOC organized the new medium and heavy divisions with an aviation brigade and an improved divisional artillery. This gave them the capability to fight "deep" in accordance with the new doctrine. The new weapon systems greatly improved the firepower of the new divisions and made them more tactically mobile. There were also great improvements in the combat service support structure of the division, which made it more sustainable.⁹

The AOE transition for the contingency forces was more problematic than the conversion of the heavy force. General Starry, the TRADOC commander, had to revisit the same problem that Brigadier General McNair had to grapple with in his day. That problem was how to create a division that was strategically mobile yet lethal, tactically mobile and sustainable. In 1940, GHQ had erred on the side of strategic mobility adopting the triangular division because it could get to a combat zone with a minimal amount of sea-borne transport. Once it got to the combat zone,

⁸ Romjue, *The Army of Excellence*, pages 88-91. The Army adopted its new doctrine with TRADOC's publication of *FM 100-5* in 1982.

⁹ *Ibid*, 90-91.

however, it almost invariably needed attachment of additional combat, combat support, and combat service support units to provide it the requisite combat power, tactical mobility and sustainability. Unfortunately for the U.S. Army in the 1980s, the basic relationship between strategic mobility and combat power, tactical mobility and sustainability had not changed significantly in the intervening forty years. Gains in strategic mobility still had to be paid for with losses in combat power, tactical mobility and sustainability.

Once again favoring strategic mobility, the Army created the light infantry divisions as part of the AOE transition in 1983. TRADOC primarily designed the new divisions to deploy quickly to hot spots in order to deter further escalation of a situation or to operate in a low-intensity environment. Though not primarily designed to do so, TRADOC planners envisioned that the light division could also operate in the mid-intensity or high-intensity environments. To operate in these environments, however, the division would require attachment of additional forces.¹⁰

On paper the light division was a marvel of efficiency. It was deployable by air in 461 sorties and had a higher tooth to tail ratio than any other division in the Army.¹¹ Like its World War II predecessor, the new division was triangular from top to bottom containing three infantry brigades consisting of three infantry battalions each (see figure 3-2).¹² The streamlining of the ROAD infantry divisional structure came at a cost, however. The new light infantry division had a reduced divisional support command limiting significantly its sustainability and its ability accept attachment of additional forces without significant augmentation from corps assets.¹³ TRADOC planners also eliminated the tank battalions formerly associated with the ROAD infantry division from the light infantry division's structure. The shortcomings in the division's firepower were, however, mitigated by the addition of an aviation brigade.

¹⁰ Michael J. Mazarr, *Light Forces and the Future of U.S. Military Strategy*, (Washington D.C.: Brassey's (U.S.), Inc., 1990), page 48.

¹¹ Romjue, *The Army of Excellence*, page 48.

¹² U.S. Department of the Army. *FM 71-100 Division Operations*, (Washington D.C.: Department of the Army, 1996), page 1-5.

¹³ Mazarr, *Light Forces and the Future of U.S. Military Strategy*, pages 48-49.

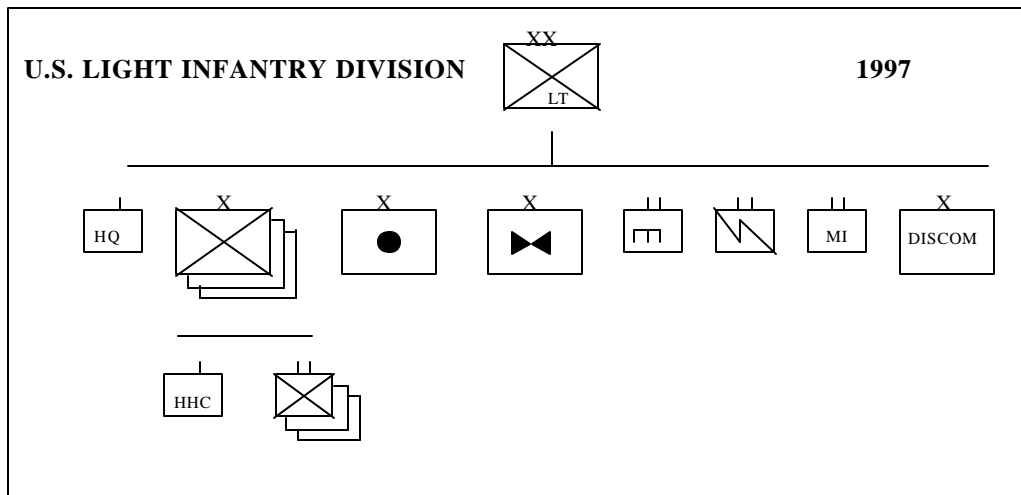


FIGURE 3-2

Because of their unique capabilities, the Army maintained the 101st Air Assault and 82nd Airborne divisions through the AOE transition. Given the scale of the Army's changes in the other divisions, the changes in the air assault and airborne division were relatively small. Both divisions retained more firepower and a slightly greater logistical capability than the light infantry divisions. The greater firepower within these divisions also made them less dependent on attachment of additional combat assets. The 82nd Airborne Division additionally retained its organic airborne tank battalion (see figure 3-3).¹⁴ This additional capability came at the cost of strategic mobility, however. The airborne and air assault divisions required more than twice the number of sorties to deploy as a light infantry division required.¹⁵

HEAVY AND LIGHT FORCE INTEGRATION

As the Army began to consider these new AOE divisional structures, its leaders quickly determined that the divisions did not operate with equal effectiveness in all types of terrain. The AOE heavy divisions lacked the infantry to effectively operate in heavily wooded, mountainous and urbanized terrain. This led to a debate among the Army's leadership and in the professional

¹⁴ U.S. Department of the Army, *FM 71-100 Division Operations*, page 1-6.

¹⁵ Romjue, *The Army of Excellence*, pages 48 and 78.

journals on the utility of combining the Army's light infantry divisions with its heavy forces in Europe and elsewhere.¹⁶ Conversely, the combining of heavy forces with the light infantry division was considered a requirement for most contingencies. With the proliferation of mechanized forces to third world nations, the light infantry division would be too light for the vast majority of situations and would almost invariably require attachment of heavy forces to operate in even the mid-intensity environment.¹⁷

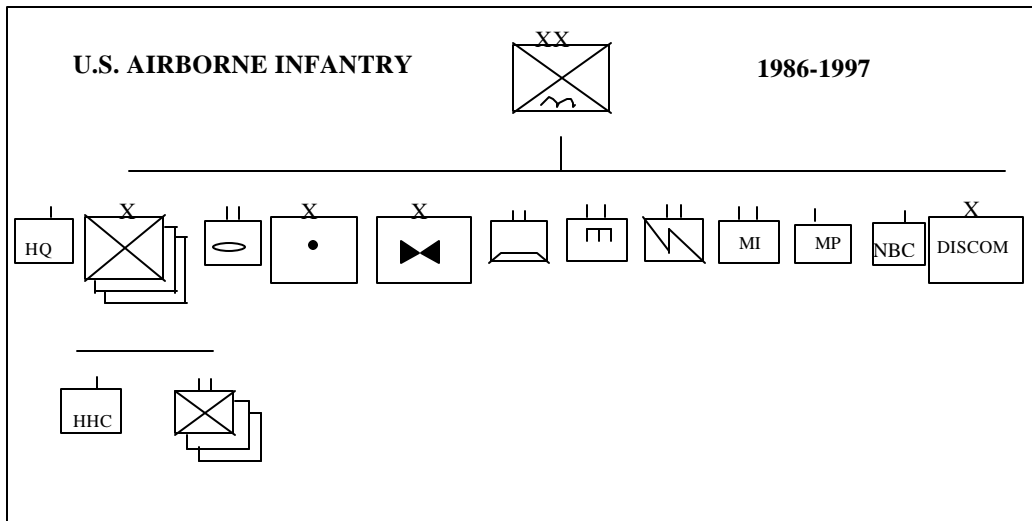


FIGURE 3-3

Organizationally, however, the Army had made it more difficult than ever to provide armored forces to its infantry divisions. The Army had eliminated both structures by which infantry divisions had historically received tank and mechanized support. Firstly, the Army had eliminated the pooling system in 1947 and with it the pool of tank or mechanized battalions specifically organized and trained to support the infantry divisions. Secondly, the AOE structure had, with the exception of the 82nd Airborne Division's tank battalion, eliminated the organic tank support from the infantry divisions.

¹⁶ Romjue, *The Army of Excellence*, pages 214-216. Romjue's bibliography contains dozens of articles on this subject from Military Review, Armed Forces Journal, Infantry Magazine, and other publications.

¹⁷ Ibid 118-119.

The only remaining option for providing mechanized infantry or tank battalion support to the light infantry, airborne or air assault divisions was to augment them with assets drawn from the Army's heavy divisions. The Army adopted two terms to describe the combination of tank and mechanized infantry units from the heavy divisions with infantry units from the light, airborne and air assault divisions. The Army used the first term, light-heavy, to describe an organization that was predominately composed of light forces but was augmented by heavy forces. The Army used the second term, heavy-light, to describe an organization that was predominately composed of heavy forces but was augmented by light forces. The most critical drawback with this combining of heavy and light forces was that the support of airborne, air assault or light infantry divisions was not the principal mission of the heavy division tank and mechanized infantry battalions. These battalions were primarily organized, trained and equipped to fight other heavy forces as part of an armored or mechanized infantry division.

The U.S. Army doctrine concerning the integration of light and heavy forces in 1986 was poor. Immediately after the AOE conversions none of the light force manuals adequately covered the subjects of light-heavy and heavy-light operations. The first series of infantry manuals after the AOE conversions focused almost exclusively on the employment of organic assets.¹⁸ The same held true for the heavy force manuals.¹⁹ It was not until the second series of manuals was published circa 1990 that the doctrine addressed heavy-light and light-heavy operations in any depth. These manuals benefited from the light-heavy and heavy-light training experience that the Army had started to accumulate in 1985. Most of the manuals published after 1990 contained a

¹⁸ U.S. Department of the Army, *FM 7-30 The Infantry Brigade*, (Washington D.C.: Department of the Army, 1984), pages 1-2 and 1-3 and *FM 71-101 Infantry, Airborne and Air Assault Division Operations*, (Washington D.C.: Department of the Army, 1977), pages 3-14 and 3-15.

¹⁹ U.S. Department of the Army, *FM 71-2 The Tank and Mechanized Infantry Battalion Task Force*, (Washington D.C.: Department of the Army, 1988), pages A-1 through A-6. In 1988, *FM 71-2* had a six-page annex on heavy-light operations. This was replaced with a thirty page annex in Change 1 to that manual (dated 1994). The 1988 version of *FM 71-1* contained no section or annex on heavy-light operations.

section or annex on light-heavy or heavy-light operations, which generally covered the subject matter adequately.²⁰

The most critical component of the Army's heavy-light and light-heavy training has been the training conducted at the Army's three Combat Training Centers (CTCs). The Joint Readiness Training Center (JRTC) routinely conducts light-heavy training normally with a tank company supporting an airborne, air assault or light infantry brigade.²¹ The National Training Center (NTC) conducts both heavy-light and light-heavy training. The heavy-light training normally has a heavy brigade minus one battalion combined with an airborne, air assault or light infantry battalion. The NTC's light-heavy training normally has an airborne, air assault, or light infantry brigade minus one battalion combined with a tank or mechanized infantry task force.²² The Combat Maneuver Training Center (CMTC) conducts light-heavy training similar to that of the NTC.²³

Although these CTC rotations represent excellent training in the integration of heavy and light forces, the effect of the training is largely lost to the Army over time because the unit relationships are not maintained. There are no long-standing relationships between the tank companies that support the airborne, air assault or light infantry brigades at the JRTC, between the airborne, air assault or light infantry battalions that support the heavy brigades at the NTC or between the tank and mechanized infantry task forces that support the infantry brigades at the NTC or CMTC.²⁴

²⁰ U.S. Department of the Army, *FM 7-30 The Infantry Brigade*, pages E-1 through E-20 and *FM 71-1*, pages H-1 through H-12 and *FM 71-2 (with change dated 1 1994)*, pages A-1 through A-30 and *FM 71-100-2 Infantry Division Tactics, Techniques and Procedures*, (Washington D.C.: Department of the Army, 1993), pages 7-63 through 7-79.

²¹ U.S. Forces Command, "Historical Throughput Matrix: JRTC Rotations Schedule," (U.S. Forces Command, 2000).

²² U.S. Forces Command, "Historical Throughput Matrix: NTC Rotations Schedule," (U.S. Forces Command, 2000).

²³ Combat Training Centers Directorate, "Combat Training Centers: Rotation Schedule" (Available from <http://ctc.army.mil/rotations.htm>, Accessed 09/11/00).

²⁴ U.S. Forces Command, "JRTC Rotation Schedule" and "NTC Rotation Schedule."

THE 82nd AIRBORNE DIVISION AND LIGHT ARMOR

Following the AOE changes and until 1997, the integration of the 82nd Airborne Division's tank battalion was far and away the best example of armored forces being integrated with an infantry division. The tank battalion assigned to the 82nd Airborne Division, the 3rd Battalion of the 73rd Armor Regiment, trained with the Division's infantry brigades both at home station and at Combat Training Centers. This training was unlike the light-heavy training in other parts of the Army in that the habitual relationships between tank units and infantry units could be maintained.²⁵

The 82nd Airborne Division and its tank battalion also benefited from an outstanding doctrinal manual. In 1994, the Armor Center published *FM 17-18 Light Armor Operations* which was written solely to support the Army's one light tank battalion, the 3rd Battalion 73rd Armor Regiment. Similar in content and structure to *FM 17-36 Employment of Tanks With Infantry*, *FM 17-18* effectively communicated the unique aspects of operations in which tanks support larger infantry formations. *FM 17-18* discussed employment options that mirrored the employment of the GHQ tank battalions by infantry divisions later in World War II in the European Theater of Operations. According to *FM 17-18*, the division commander could retain the light armor battalion under his control or attach tank companies to the infantry brigades. The manual also discussed lower task organization options including the task organization of tank platoons to each infantry battalion.²⁶

²⁵ U.S. Forces Command, "JRTC Rotation Schedule."

²⁶ U.S. Department of the Army, *FM 17-18 Light Armor Operations*, (Washington D.C.: Department of the Army, 1994), pages 5-2 and 6-4.

AOE CHANGES IN PERSPECTIVE

The requirement to be prepared to fight two fundamentally different types of wars had a profound influence on the organizational development of the U.S. Army's divisions during the 1980s. Given the Army's commitment to both Central Europe and worldwide contingency operations, the Army of Excellence changes were appropriate. The changes provided a more capable heavy division, which accounted for the Army's commitment to NATO and a light infantry division, which provided a rapid deployment capability for contingency operations.

These changes ultimately widened the gap between the Army's "heavy" divisions and its remaining infantry divisions, however. This gap created organizational, doctrinal and training challenges for the Army, which made it more difficult for unit commanders to integrate armored units with infantry divisions. Although the AOE transition was a very positive change for the Army as a whole, it had the additional result of dismantling much of the integration of armored and infantry units forged during the 1940s and maintained through the 1970s.

CHAPTER FOUR

ORGANIZATIONAL EFFECTIVENESS

This monograph has identified three factors that are critical to measuring the effectiveness of armored integration with infantry divisions in the U.S. Army. The first is the organization of the armored units and the infantry divisions. The second is the doctrine associated with the integration of those units. The third is the level of combined arms training conducted by the supporting armored units and the supported infantry divisions.

The Army has employed four methods of organizing armored units with infantry divisions since 1940. The first method was ad hoc. The Army employed this method of organization in selected actions during World War II and reinstated it with the Army of Excellence transition in the 1980s. The second method, pooling, was the Army's primary method from 1940 until mid-1944. The Army employed the third method, semi-permanent attachment, during the second half of 1944 and during 1945. The Army employed the fourth method, organic, from 1946 until the Army of Excellence transition.

The U.S. Army employed all four of these methods of organization during World War II and immediately afterwards. That Army determined that the different methods of organization did not achieve similar outcomes with respect to the integration of armored units and infantry divisions.

The ad hoc method of organizing armored battalions with infantry divisions consisted of attaching armored units from armored divisions to infantry divisions. The Army employed this method in the Mediterranean Theater of Operations during 1943 and 1944 because of a shortage of GHQ tank battalions. There were two major disadvantages with the ad hoc method. Firstly, the method did not retain habitual relationships between the supporting armored units and the supported infantry divisions. During the fighting in the Mediterranean Theater, the infantry divisions did not retain the armored units attached from the 1st and 2nd Armored Divisions long

enough to establish standard procedures or to conduct extensive combined-arms training.¹ Secondly, this method did not employ armored units trained to provide close support to infantry divisions. The units attached from the 1st and 2nd Armored Divisions were trained to fight as part of an armored division and, consequently achieved mediocre results in the close terrain and slow pace associated with the mission of infantry support.²

The pooling method of organizing armored battalions with infantry divisions consisted of attaching tank battalions from the GHQ pool to infantry divisions requiring armored support. The major advantage of this method was that it employed armored units trained to provide close support to infantry divisions. The GHQ tank battalions did not have to be proficient at both the tasks associated with the support of an infantry division and those associated with being part of an armored division. Since no GHQ tank battalions were task organized with armored divisions during World War II, the GHQ tank battalions could devote their training time to perfecting the tasks associated with infantry support.³ The major disadvantage of this method was that it did not retain of habitual relationships between the supporting armored units and the supported infantry divisions. On that subject the Chief of the Armored Force, Lieutenant General Devers, wrote General Marshall in 1942:

Economy of force is not gained by having a lot of units in a reserve pool where they train individually, knowing little or nothing of the units they are going to fight with. It is much better to make them a part of a division or corps, even to the wearing of the same shoulder patch. If they are needed elsewhere in an emergency, they can be withdrawn easily from the division or corps and attached where they are needed. Economy of force and unity of command go together. You get little of either if you get a lot of attached units at the last moment. Team play comes only with practice.⁴

¹ George F. Hoffman and Donn A. Starry eds., *Camp Colt to Desert Storm: The History of the US Armored Force*, (Lexington, Kentucky: University Press of Kentucky, 1999), pages 152-153 and 158-160.

² Ibid, 160.

³ U.S. Forces European Theater, "General Board Reports No. 50: Organization, Equipment and Tactical Employment of Separate Tank Battalions," (United States Forces, European Theater, 1946), page 1.

⁴ Kent Roberts Greenfield, Robert R. Palmer and Bell I. Wiley, *The Organization of Ground Combat Troops*, (Washington D.C.: Historical Division, United States Army, 1947), pages 295-296.

The shortcomings in the pooling method of organization identified by Lieutenant General Devers forced field commanders to make changes to increase the level of integration of their armored and infantry units. They did this by adopting a new method of organization.

The semi-permanent attachment method of organizing armored battalions with infantry divisions also consisted of attaching tank battalions from the GHQ pool to the infantry divisions. This method, like the pooling method, retained the advantage of specialized armored battalions. The major difference between this method and the pooling method was the duration of the attachment. The availability of GHQ tank battalions after the Normandy Campaign allowed the field army and corps commanders to attach those tank battalions to the infantry divisions for extended periods. An example of the use of this method was the attachment of the 745th GHQ Tank Battalion to the 1st Infantry Division from 6 June 1944 until 8 May 1945.⁵ The duration of this type of attachment allowed for the establishment of unit procedures and unit cohesion and was the great strength of this method.

The Army adopted the organic method of organization in 1946. This method simply formalized the semi-permanent attachment method of organization in the Army and consisted of the Army modifying the infantry division's table of organization to include organic armored battalions. At the conclusion of the war, the officers that authored "General Board Reports Study No. Fifty: Organization, Equipment and Tactical Employment of Separate Tank Battalions" concluded the following in their recommendation to adopt this new method of organization:

The development of the vital coordination and mutual understanding between tanks and infantry at all levels will be the natural outcome of being part of an integrated division team from the outset. Experience in combat in this theater has proved the need for tanks in sufficient strength, properly organized and integrated within the division itself are vital to enable the division to attain its goal, of success in battle.⁶

⁵ Shelby L. Stanton, *Order of Battle U.S. Army World War II*, (Novato CA: Presidio Press, 1984), page, page 75.

⁶ U.S. Forces European Theater, "General Board Reports No. 50," page 11.

The organic method had the same advantages as the semi-permanent attachment method had. These were the employment of specialized armored units and the maintenance of habitual relationships between supporting and supported units.

Based on its own experience in World War II, the Army is currently employing the least effective method of organizing armored units and infantry divisions. The Army currently employs the ad hoc method of organizing tank or mechanized infantry battalions with the 82nd Airborne, the 101st Air Assault, the 10th Mountain (light) infantry and the 25th (light) infantry divisions. All attachment of tank or mechanized infantry battalions to these divisions must be drawn from the Army's six heavy divisions. The Army currently has approximately fifty active component, tank or mechanized infantry battalions. None of these battalions are currently organized to directly support the Army's four infantry divisions.

EFFECTIVENESS OF CURRENT DOCTRINE

The Army has written two basic types of doctrine on the employment of armored units in concert with infantry divisions since 1940. During World War II, the U.S. Army experimented with both types of doctrine and determined that the different types of doctrine were not equally effective in describing the integration of armored units and infantry divisions. The first type of doctrine was relegated to separate chapters or annexes in the existing Army field manuals. The Army used this "incorporated" doctrine from 1941 through the beginning of 1944. The second type of doctrine was written in separate combined-arms manuals. The Army used this "stand alone" doctrine during 1944 and 1945.

The incorporated doctrine varied widely in quality. The 1941 version of *FM 100-5 Operations* contained a single, three-page chapter on the integration of GHQ tank battalions and infantry divisions. The 1942 version of *FM 7-40 The Rifle Regiment* contained several references to combined tank-infantry operations. The references, however, amounted to less than two pages. Neither manual contained sufficient references to convey the complexity or the unique aspects of

combined arms operations with armored battalions and infantry divisions. The 1942 version of *FM 17-10 the Armored Force Field Manual* contained a significantly larger discussion. *FM 17-10* included a chapter on the GHQ tank battalion and a chapter on the GHQ tank group, which together totaled thirty-two pages. The discussion in *FM 17-10* was of sufficient length and detail and was clearly superior to the discussions of armored-infantry integration in the other two manuals. *FM 17-10*, however, failed to capture many of the unique command and control, logistical and tactical qualities of a formation designed to provide close support to an infantry division.⁷

The "stand-alone" doctrine was the most effective doctrine written during the Second World War with respect to armored integration with infantry divisions. The Armored Force published *FM 17-36 Employment of Tanks with Infantry* in 1944 incorporating the hard won lessons learned from the Army's combat experience in the Mediterranean Theater. This manual was over one hundred pages and captured most of the unique command and control, logistical and tactical aspects of armored-infantry combined arms operations.

Based on the Army's World War II experience, the Army is currently using the least effective type of doctrine, the incorporated doctrine. The Army has mitigated this shortcoming, however, by having incorporated well-written doctrine into all of the pertinent manuals. This incorporated doctrine is far better than the incorporated doctrine of 1942. The current infantry manuals all include sections or annexes of appropriate length and detail on heavy-light or light-heavy operations. *FM 71-100-2 Infantry Division Operations Tactics, Techniques and Procedures* contains a seventeen page section. *FM 7-30 The Infantry Brigade* contains a twenty page section and *FM 7-20 The Infantry Battalion* contains a nineteen page section.⁸ The combined arms

⁷ Hoffman and Starry eds., *Camp Colt to Desert Storm*, page 153.

⁸ U.S. Department of the Army, *FM 7-20 The Infantry Battalion*, (Washington D.C.: Department of the Army, 1992), pages D-1 through D-19 and *FM 7-30 The Infantry Brigade*, (Washington D.C.: Department of the Army, 1995), pages E-2 thru E-20 and *FM 71-100-2 Infantry Division Operations Tactics, Techniques and Procedures*, (Washington D.C.: Department of the Army, 1993), pages 7-63 through 7-79.

manuals used by the heavy battalions also include annexes of appropriate length and detail. *FM 71-2 The Tank and Mechanized Infantry Battalion Task Force* includes a thirty page annex. *FM 71-1 The Tank and Mechanized Infantry Company Team* includes a twelve page annex on heavy-light and light-heavy operations.⁹

The best manual with respect to armored integration with infantry divisions written since the Army of Excellence transition was, however, the three hundred page *FM 17-18 Light Armor Operations*. The Armor Center wrote this manual specifically to support the 82nd Airborne Division's tank battalion. This manual discussed, in-depth, the unique aspects of tank platoons, tank companies and tank battalions that were designed to provide close support to infantry battalions, brigades and divisions. Unfortunately for the Army, this well written manual became obsolete when the Army inactivated the 82nd Airborne Division's tank battalion in 1997.

EFFECTIVENESS OF CURRENT TRAINING

Unlike the previous assessments of organization and doctrine, the U.S. Army's experience in World War II does not provide a model from which to evaluate the effectiveness of today's peacetime Army's training model. During World War II, the U.S. Army never solved its training problem with respect to armored battalions and infantry divisions prior to the deployment of those units to combat zones. Those units learned the hard lessons of combined arms operations largely in combat.

Currently, the Army trains armored units and infantry divisions largely through the conduct of light-heavy and heavy-light training rotations at its three Combat Training Centers (CTCs): the Joint Readiness Training Center (JRTC), the National Training Center (NTC) and the Combat

⁹ U.S. Department of the Army, *FM 71-2 The Tank and Mechanized Infantry Battalion Task Force*, (Washington D.C.: Department of the Army, 1988 with change 1 dated 1994), pages A-1 through A-29 and *FM 71-1 The Tank and Mechanized Infantry Company Team* (Washington D.C.: Department of the Army, 1998), pages H-1 through H-12.

Maneuver Training Center (CMTC). The effectiveness of this training with respect to the Army's training doctrine provides a basis for evaluating the Army's combined armored-infantry training.

FM 25-100 Training the Force, the Army's capstone training manual, identifies the conduct of combined arms training as one of its nine principles of training. In its description of combined arms training, *FM 25-100* states, "Combined arms proficiency develops when teams train together. Leaders must regularly practice cross attachment of the full wartime spectrum of combat, combat support, and combat service support units."¹⁰ The CTCs have generally achieved this high standard of training. Units that have trained at the CTCs have done so with the full spectrum of combat, combat support and combat service support assets. *FM 25-100* further states, "Peacetime relationships must mirror wartime task organization to the greatest extent possible."¹¹ Again, the CTCs have generally been on the mark. Most of the elements that have deployed and trained together at the CTCs have been part of the wartime organization of the training brigade. There are, however, two types of units that have not been part of the "go to war" organization of the training brigades: the light units in the heavy-light rotations and the heavy units in the light-heavy rotations.

Because the Army employs the ad hoc method of organizing armored units and infantry divisions, those units could have been part of the same wartime organization; they would not have been from different divisions. The primary consideration for the task organization of training units at the CTCs has not been the organization of forces during wartime contingencies nor has it been the maintenance of habitual relationships between supporting armored units and supported infantry divisions. The primary consideration for the organization of a CTC rotation has simply been the most efficient throughput of battalions.¹²

¹⁰ Department of the Army, *FM 25-100 Training the Force*, (Washington D.C.: Department of the Army, 1988), page 1-3.

¹¹ Ibid.

¹² U.S. Army FORSCOM, "Historical Throughput Matrix: JRTC Rotation Schedules" and "Historical Throughput Matrix: NTC Rotation Schedules," (US FORSCOM, October 2000).

An example of the impact of the ad hoc method of organization is the training conducted by the 3rd Brigade of the 82nd Airborne Division at the JRTC from 1995 through 2000. In 1995 and 1996, the 82nd Airborne Division still retained its organic tank battalion. During those two years, 3rd Brigade conducted two rotations and was supported by the division's organic tank battalion in both cases. After the Army inactivated the 82nd Airborne Division's tank battalion in 1997, the division adopted the ad hoc method of organization. Since that time, 3rd brigade has conducted three JRTC rotations and has received armored support from a different division each time.¹³

STATUS OF CURRENT INTEGRATION

The Army could clearly improve the integration of its armored units and its infantry divisions. The Army currently employs the weakest method of organizing armored units within its infantry divisions. This organizational shortcoming further degrades armored-infantry integration through its impact on the Army's current light-heavy and heavy-light training. This shortcoming prevents training infantry units from establishing habitual relationships with supporting armored units. Although the Army's current doctrine concerning the integration of armored units and infantry divisions is adequate, it could also be improved. Consequently, the Army should take some important steps towards increasing armored-infantry integration.

¹³ U.S. Army FORSCOM, "JRTC Rotation Schedules."

CHAPTER FIVE

CONCLUSIONS

It is believed that our 1943 troop basis has entirely too many armored divisions, considering their tactical employment, and too few GHQ tank battalions. It is particularly important that the latter be made available in quantities to permit all infantry divisions to work with them freely and frequently.¹

Lieutenant General Lesley McNair

Currently, none of the Army's active component tank and mechanized infantry battalions are specifically organized or trained to provide support to the Army's four infantry divisions.

Through its organizational changes of the 1980s the Army has placed itself in a situation similar to that of the U.S. Army in early 1943 when it had too many armored battalions in its armored divisions and too few armored battalions earmarked for the support of its infantry divisions.

Consequently, the U.S. Army's armored forces are out of balance.

The current ad hoc method of organizing armored battalions with infantry divisions is the central problem. This method of organization does not acknowledge that armies require both large and small armored units and that these formations have two unique and equally important roles. Armored or mechanized infantry divisions have historically filled the first role. Its missions include penetrations, exploitations, pursuits and counterattacks. The second role of armored forces is that of infantry support. Armored battalions attached to or organic to infantry divisions have historically filled this role.² The Army's current system requires the armored battalions within the heavy divisions to be proficient at tasks associated with both the armored and the infantry division. These roles are, however, fundamentally different in terms of tempo, tactics, techniques and procedures.

¹ Kent Roberts Greenfield, Robert R. Palmer and Bell I. Wiley, *The Organization of Ground Combat Troops*, (Washington D.C.: Historical Division United States Army, 1947), page 326

² Ibid, 325.

The Army needs to revert to either the organic or the semi-permanent attachment method of organizing armored units with its infantry divisions in order to allow armored units to specialize in one role or the other. The Army should do this even at the expense of the existing heavy forces.

In a clear move towards the organic method of organization, the Army has begun the development of two Initial Brigades. Although the Army will equip these brigades with armored vehicles, their character will be different than either the armored or the mechanized infantry brigade. These brigades are true infantry brigades with infantry at the heart of the organization. TRADOC has organized these brigades with three infantry battalions each composed of three infantry companies. Each company will have a platoon of medium gun systems providing armored support to the lowest level.³

Based on the lessons learned from the development of the Initial Brigades and based on the availability of newer technology, the Army will convert four additional brigades and the two Initial Brigades to Interim Brigades.⁴ If the Army fields all six Interim Brigades, it will have fifty-four medium gun system platoons that specialize in infantry support. This is the equivalent of six battalions' worth of tanks. This would be a great improvement over the Army's current organization in terms of armored and infantry integration. These developments do not, however, account for the provision of armored support to the remainder of the Army's infantry divisions.

To account for the remaining divisions, the Army would still need to adopt either the organic or semi-permanent attachment method of organization to provide adequately trained and habitually associated armored support to those divisions. Reverting to the organic method of organization would require the Army to modify the tables of organization of its remaining infantry divisions to include armored units and their associated support units. The best recent

³ US Army Infantry School Slide presentation, "Brigade Combat Team Campaign Plan," (Fort Benning GA: December, 1999).

⁴ Department of the Army, "Draft United States Army Transformation Plan," (Washington D.C.: Department of the Army, 15 June 2000), page 7 and Eric K. Shinseki, "AUSA Eisenhower Luncheon Speech Delivered 17 October 2000." (Available from <http://www.army.mil/csa/ausa%delivered%2017%20oct.doc>, Accessed 11/14/00).

example of this type of organization was the 82nd Airborne Division's light tank battalion, the 3rd Battalion 73rd Armor. Reverting to the semi-permanent attachment method of organization would require the Army to activate an armored group. This armored group would have to contain the appropriate number of armored battalions to provide support to the Army's infantry divisions. These armored battalions would then have to be habitually associated with specific infantry divisions.

The added benefit of adopting the organic or semi-permanent attachment method of organization is that it would also overcome the central problem with the current heavy-light and light-heavy training conducted at the Army's combat training centers. That problem is the lack of habitual relationships between the supporting armored units and the supported infantry divisions. The current system organizes available armored units with the training infantry units based on the most efficient throughput of battalions.⁵ The organic and semi-permanent attachment methods of organization would provide habitual relationships and would allow the units to train according to their wartime task organization in accordance with the current training doctrine.⁶

The Army's doctrine on the employment of armored units in concert with infantry divisions is basically sound. Although the Army currently incorporates this doctrine into existing manuals, it is well written and substantive. Of the infantry manuals that are the most important for providing guidance on the employment of armored units in concert with an infantry division, *FM 71-100-2 Infantry Division Operations Tactics, Techniques and Procedures*, *FM 7-30 The Infantry Brigade* and *FM 7-20 The Infantry Battalion*, all provide discussions of appropriate length and depth. Of the combined arms manuals used by the armored and mechanized infantry units that are most important for providing guidance on the employment of armored units in concert with an infantry

⁵ U.S. Army FORSCOM, "Historical Throughput Matrix: JRTC Rotation Schedules" and "Historical Throughput Matrix: NTC Rotation Schedules," 2000.

⁶ Department of the Army, *FM 25-100 Training the Force*, (Washington D.C.: Department of the Army, 1988), page 1-3.

division, *FM 71-2 The Tank and Mechanized Infantry Battalion Task Force* and *FM 71-1 The Tank and Mechanized Infantry Company Team*, both provide excellent annexes on the subject.

Doctrinally the Army could improve, however, with the publication of a stand-alone combined arms manual that focuses primarily on the integration of armored units and infantry units. The Army could accomplish this by simply updating the recently obsolete *FM 17-18 Light Armor Operations*. This was an outstanding manual on the subject of armored-infantry integration and would serve the Army well in the future.

Although the Army is moving in the right direction with the development of the Interim Brigades, the Army could take additional steps to further improve its current method of integrating armored units and infantry divisions. These additional steps would require a more equitable allocation of armored assets within the Army. Currently the Army has allocated all of its tank and mechanized battalions to its armored and mechanized infantry divisions. This is a clear violation of the lessons of the Second World War. With the fielding of the six Interim Brigades, the Army will have the equivalent of six battalions of armor that are specifically organized and trained to support infantry formations. With the further re-allocation of just a few more armored battalions, each infantry division in the Army would have a habitually associated armored battalion that was specifically trained in the role of infantry support. This would be a very small investment given the number of armored battalions in the Army today. If the U.S. Army's experience in World War II is a clear indicator, that small investment would pay huge dividends for today's infantry divisions.

SELECTED BIBLIOGRAPHY

UNPUBLISHED GOVERNMENT SOURCES

- Department of the Army. "Draft United States Army Transformation Campaign Plan." Washington D.C.: Department of the Army, 15 June 2000.
- U.S. Army Forces Command. "Historical Throughput Matrix: JRTC Rotation Schedule." U.S. Army Forces Command, October 2000.
- _____. "Historical Throughput Matrix: NTC Rotation Schedule." U.S. Army Forces Command, October 2000.
- U.S. Army Infantry School. "Brigade Combat Team Campaign Plan Brief." Fort Benning, Georgia: U.S. Army Infantry School, December 1999.

PUBLISHED GOVERNMENT SOURCES

- Blankenship, Richard E. *Division 86 Final Report*. Fort Leavenworth, KS: U.S. Army Combined Arms Combat Development Activity, October 1981 with June 1983 Addendum.
- Meyer, E.C. *White Paper 1980: A Framework For Molding the Army of the 1980s Into A Disciplined, Well-Trained Fighting Force*. Washington D.C.: Department of the Army, 1980.
- Ney, Virgil. *Evolution of the US Army Division 1939-1968*. Fort Belvoir, Virginia: Technical Operations Incorporated Combat Operations Research Group, 1969.
- Romjue, John L. *A History of Army 86 Volume I: The Development of the Heavy Division*. Fort Monroe, VA: Historical Office U.S. Army Training and Doctrine Command, 1982.
- _____. *A History of Army 86 Volume II: The Development of the Light Division, the Corps, and Echelons above Corps*. Fort Monroe, VA: Historical Office U.S. Army Training and Doctrine Command, 1982.
- _____. *From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982*. Fort Monroe, VA: Historical Office, U.S. Army Training and Doctrine Command, June 1984.
- _____. *The Army of Excellence*. Fort Monroe, VA: Office of the Command Historian, U.S. Army Training and Doctrine Command, 1993.
- U.S. Army Ground Forces. *The Armored Force Command and Center Study No. 27*. Washington D.C.: Historical Section Army Ground Forces, 1946.
- U.S. Department of the Army. *FM 7-20 The Infantry Battalion*. Washington D.C.: Department of the Army, 1984.

- _____. *FM 7-20 The Infantry Battalion*. Washington D.C.: Department of the Army, 1992.
- _____. *FM 7-30 The Infantry Brigade*. Washington D.C.: Department of the Army, 1981.
- _____. *FM 7-30 The Infantry Brigade*. Washington D.C.: Department of the Army, 1995.
- _____. *FM 17-18 Light Armor Operations*. Washington D.C.: Department of the Army, 1994.
- _____. *FM 25-100 Training the Force*. Washington D.C.: Department of the Army, 1988.
- _____. *FM 71-1 The Tank and Mechanized Infantry Company Team*. Washington D.C.: Department of the Army, 1988.
- _____. *FM 71-1 The Tank and Mechanized Infantry Company Team*. Washington D.C.: Department of the Army, 1998.
- _____. *FM 71-2 The Tank and Mechanized Infantry Battalion Task Force*. Washington D.C.: Department of the Army, 1988 with change 1 (dated 1994).
- _____. *FM 71-3 The Heavy Brigade*. Washington D.C.: Department of the Army, 1988.
- _____. *FM 71-3 The Heavy Brigade*. Washington D.C.: Department of the Army, 1995.
- _____. *FM 71-100 Division Operations*. Washington D.C.: Department of the Army, 1978.
- _____. *FM 71-100 Division Operations*. Washington D.C.: Department of the Army, 1990.
- _____. *FM 71-100 Division Operations*. Washington D.C.: Department of the Army, 1996.
- _____. *FM 71-100-2 Infantry Division Operations Tactics, Techniques and Procedures*. Washington D.C.: Department of the Army, 1993.
- _____. *FM 71-101 Infantry, Airborne, and Air Assault Division Operations*. Washington D.C.: Department of the Army, 1977.
- _____. *FM 100-5 Operations*. Washington D.C.: Department of the Army, 1982.
- U.S. Forces European Theater. "General Board Reports Study No. 15: Organization, Equipment and Tactical Employment of the Infantry Division." United States Forces, European Theater, 1946.
- _____. "General Board Reports Study No. 48: Organization, Equipment, and Tactical Employment of the Armored Division." United States Forces, European Theater, 1945.
- _____. "General Board Reports Study No. 50: Organization, Equipment, and Tactical Employment of Separate Tank Battalions." United States Forces, European Theater, 1946.
- War Department. *FM 7-40 Infantry Field Manual: Rifle Regiment*. Washington D.C.: Government Printing Office, 1942.

- _____. *FM 17-10 Armored Force Field Manual*. Washington D.C.: Government Printing Office, 1942.
- _____. *FM 17-33 The Tank Battalion*. Washington D.C.: United States Government Printing Office, 1942.
- _____. *FM 17-36 Employment of Tanks with Infantry (Tentative)*. Washington D.C.: United States Government Printing Office, 1944.
- _____. *FM 100-5 Field Service Regulations, Operations*. Washington D.C.: United States Government Printing Office, 1941.
- _____. *Training Lessons from the Tunisian Campaign*. Washington D.C.: United States Government Printing Office, October 1943.
- Wickham, John A. *White Paper 1984: Light Infantry Divisions*. Washington D.C.: Department of the Army, 1984.
- Wiley, Bell I. *The Building and Training of the Infantry Division Army Ground Forces Study No. 12*. Washington D.C.: Army Ground Forces, Historical Section, 1946.

BOOKS AND ARTICLES

- Bacevich, A.J. *The Pentomic Era*. Washington D.C.: National Defense University Press, 1986.
- Doubler, Michael E. *Busting the Bocage: American Combined Arms Operations in France, 6 June -31 July 1944*. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1988.
- _____. *Closing With the Enemy: How GIs Fought the War in Europe 1944-1945*. Lawrence: University Press of Kansas, 1994.
- Gabel, Christopher R. *The U.S. Army GHQ Maneuvers of 1941*. Washington D.C.: Center of Military History United States Army, 1992.
- Gillie, Mildred Hanson. *Forging the Thunderbolt*. Harrisburg, PA.: Military Service Publishing Company, 1947.
- Greenfield, Kent Roberts, Robert R. Palmer and Bell I. Wiley. *The Organization of Ground Combat Troops*. Washington D.C.: Historical Division United States Army, 1947.
- Hoffman, George F. and Donn A. Starry eds. *Camp Colt to Desert Storm: The History of the US Armored Force*. Lexington, Kentucky: The University Press of Kentucky, 1999.
- House, Jonathan M. *Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine and Organization*. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, August 1984.
- Mazarr, Michael J. *Light Forces and the Future of U.S. Military Strategy*. Washington D.C.: Brassey's (U.S.), Inc., 1990.

Ogorkjewicz, R. M. *Armoured Forces: A History of Armoured Forces and Their Vehicles*. New York: Arco Publishing Company, Inc., 1960.

Smith, Elberton R. *The Army and Economic Mobilization, United States Army in World War II*. Washington: Office of the Chief of Military History, 1959.

Stanton, Shelby L. *Order of Battle U.S. Army World War II*. Novato CA: Presidio Press, 1984.

THESES

Hagen, Marshall A. *Employment of Light Infantry in Contingency Operations: What Do We Do Without Light Armor?* Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1997.

Hutcheson, John M. *Of Tank and Infantry: Lessons of Heavy-light Integration Learned, Forgotten and Relearned*. Carlisle Barracks, PA: U.S. Army War College, 1990.

Leonard, Kevin A. *Too Light to Fight? Considerations For the Fight FSB in Support of the Light-Heavy Brigade*. Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1991.

Stone, Gregory A., Daniel H. French, Davis D. Tindoll. *Tank-Light Infantry Company Operations (Draft Field Manual)*. Carlisle Barracks, PA: U.S. Army War College, 1997.

Tucker, Christopher. *Sustaining the Light-Heavy Brigade*. Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1991.

Wunderle, William D. *Forced in, Left Out: The Airborne Division in Future Forcible Entry Operations*. Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1997.

WEB SITES

Combat Training Centers Directorate. "Combat Training Centers: Rotation Schedule." Available from: <http://ctc.army.mil/rotations.htm>. Accessed 09/11/00.

Shinseki, Eric K. "AUSA Eisenhower Luncheon Speech Delivered 17 October 2000." Available from <http://www.army.mil/csa/ausa%delivered%2017%20oct.doc>. Accessed 11/14/00.