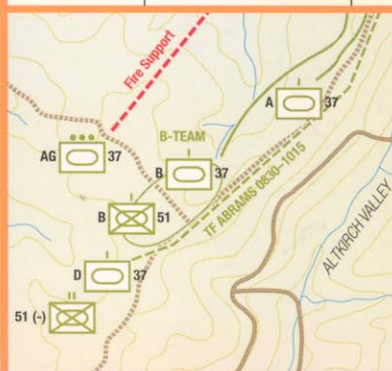
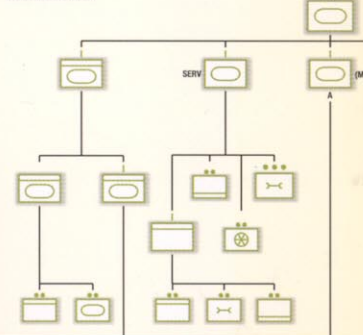


US Armored Divisions

The European Theater of Operations, 1944–45



Tank Battalion





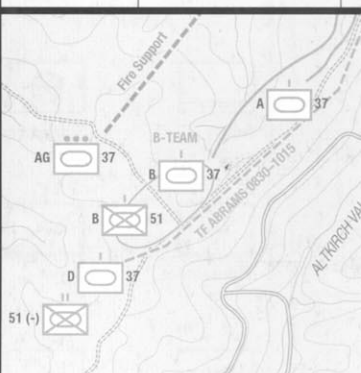
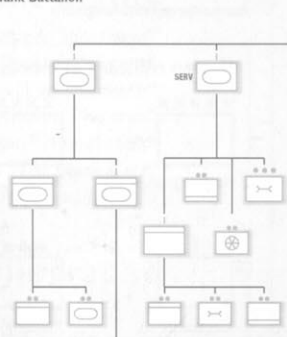
STEVEN J ZALOGA received his BA in history from Union College and his MA from Columbia University. He is a senior analyst with Teal Group Corp. covering missile technology and arms export issues. He also serves as adjunct staff with the Strategy, Forces, and Resources Division of the Institute for Defense Analyses. He is the author of many books on military technology and military history and has written widely for Osprey.

US Armored Divisions

The European Theater of Operations,
1944–45



Tank Battalion



Steven J Zaloga • Consultant editor Dr Duncan Anderson

Series editors Marcus Cowper and Nikolai Bogdanovic

First published in Great Britain in 2004 by Osprey Publishing, Elms Court, Chapel Way, Botley, Oxford OX2 9LP, United Kingdom.
 Email: info@ospreypublishing.com

© 2004 Osprey Publishing Ltd.

All rights reserved. Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the Copyright, Designs and Patents Act, 1988, no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrical, chemical, mechanical, optical, photocopying, recording or otherwise, without the prior written permission of the copyright owner. Enquiries should be addressed to the Publishers.

ISBN 1 84176 564 3

Editorial by Ilios Publishing, Oxford, UK (www.iliospublishing.com)

Design: Bounford.com, Royston, UK

Maps by Bounford.com, Royston, UK

Index by David Worthington

Originated by The Electronic Page Company, Cwmbran, UK

Printed and bound by L-Rex Printing Company Ltd.

04 05 06 07 08 10 9 8 7 6 5 4 3 2 1

A CIP catalog record for this book is available from the British Library.

For a catalog of all books published by Osprey Military and Aviation please contact:

Osprey Direct UK, P.O. Box 140, Wellingborough, Northants, NN8 2FA, UK
 E-mail: info@ospreydirect.co.uk

Osprey Direct USA, c/o MBI Publishing, P.O. Box 1, 729 Prospect Ave, Osceola, WI 54020, USA
 E-mail: info@ospreydirectusa.com

www.ospreypublishing.com

Author's note

The author would like to thank the staff of the US Army's Military History Institute at the Army War College, Carlisle Barracks, PA, for their kind assistance in the preparation of this book. Thanks also go to Leland Ness for help with a number of organization issues. The author would also like to acknowledge the help of Charles Lemons and Candace Fuller of the Patton Museum at Ft. Knox. The photos in this book are primarily from the wartime US Army's Signal Corps collections, located formerly at the Pentagon and the Defense Audio-Visual Agency at Anacostia Navy Yard and now at the US National Archives in College Park, MD. Other Signal Corps photos were located at other army facilities, and the author would like to thank Randy Hackenburg of the special collections branch of the Military History Institute and Alan Aimone of the US Military Academy, West Point, New York.

Key to military symbols

XXXXXX



Army Group

XXXXX



Army

XXX



Corps

XX



Division

X



Brigade/Combat Command

III



Regiment

II



Battalion

I



Company

•••



Platoon



Infantry



Armor



Artillery



Engineer



Headquarters



Supply



Transportation



Cavalry/
Reconnaissance



Medical



Military Police



Chaplain



Band



Maintenance



Signal



Anti-tank



Assault Gun



Mortar



Machine gun



Radio

Key to unit identification

Unit identifier  Parent unit
 Commander

Contents

Introduction	4
Combat mission	6
Preparation for war: doctrine and training	10
Unit organization	17
Headquarters • Combat commands • Combat arms Supporting arms • Divisional attachments • Division comparison	
Command, control, communication and intelligence	46
Tactics	49
Offensive operations in the enemy rear • Breakthrough • Seizing key terrain Regaining the initiative • Restoring the initiative • Overcoming an unprepared defense Attack on a prepared position • Attacks on enemy armored units Counterattacks and delaying actions • Small unit tactics • Lessons learned	
Unit Status	76
2nd Armored Division "Hell on Wheels" • 3rd Armored Division "Spearhead" 4th Armored Division • 5th Armored Division "Victory" 6th Armored Division "Super Sixth" • 7th Armored Division "Lucky Seventh" 8th Armored Division "Thundering Herd" • 9th Armored Division "Phantom" 10th Armored Division "Tiger" • 11th Armored Division "Thunderbolt" 12th Armored Division "Hellcats" • 13th Armored Division "The Black Cats" 14th Armored Division "Liberator" • 16th Armored Division • 20th Armored Division	
Bibliography	93
Index	95

Introduction

Armored divisions were the mobile shock force of all modern armies during World War II. Of the 16 armored divisions formed by the US Army during the war, all but one served in the European Theater of Operations (ETO) in 1944–45. Due to the offensive orientation of Allied combat operations in France, Belgium and Germany, the US armored divisions played a central role in nearly all of the major battles.

Although armored divisions are popularly seen as tank units, this is a simplification of their actual configuration and mission. US armored divisions were combined arms formations, intended to exploit the mixed battlefield capabilities of tank, armored infantry, and armored field artillery battalions. The precise mix of armor, infantry and artillery remained the central controversy in the organization of armored divisions throughout World War II.

The US armored divisions that fought in Northwest Europe in 1944–45 were mostly organized under a revised 1943 configuration. This organization was based on US combat experience in North Africa as well as by study of other armies, especially the German panzer force. The basic combat elements of the division were three tank battalions, three armored infantry battalions and three armored field artillery battalions plus supporting units. In combat, the division was divided into three flexible groups called Combat Commands. These were generally based around one tank battalion and one armored infantry battalion with artillery, cavalry, engineer and tank destroyer units added as necessary. The

The seed of the early armored divisions was formed from the 7th Cavalry Brigade (Mechanized), formed at Ft. Knox in 1938 and 1939 by consolidating other cavalry units like the 1st Cavalry seen here in the foreground. It became the core of the 1st Armored Division. The officer to the left in this photo is Gen. Adna Chaffee, who headed the Armored Force when it was founded in 1940. The light tanks in the foreground are the new M2A4, which preceded the better known M3 light tank. (MHI)



Combat Commands were not rigidly organized; so, for example, if a combat mission required more infantry, more was provided. The Combat Commands were more formal than German *Kampfgruppe* (battle groups) but somewhat less rigid than British brigade organizations.

US armored division tactics were heavily imbued with the US cavalry tradition. The division's ideal mission was seen as the rapid exploitation of the enemy rear once a breakthrough had been achieved. In reality, the divisions were used for a much broader range of missions than this, but the accent was on mobile, offensive missions, and not on static, defensive missions. In contrast to British armoured doctrine, US doctrine did not see the defeat of German panzer formations as a primary role for their armored divisions. While US doctrine anticipated the likely encounter with German panzer units during their conduct of operations, large-scale tank-versus-tank combat was not expected to be the most frequent combat experience of the division.

The success or failure of the armored divisions often hinged on the abilities of the corps commander to skillfully use a combination of infantry and armored divisions to carry out combat operations. At the operational level, the army commander's ability to exploit the mobile potential of the armored division strongly influenced the outcome of campaigns. George S. Patton, commander of the US Third Army, is widely regarded as the finest US practitioner of armored warfare in the 1944–45 campaigns in Europe. Patton's cavalry background, his command of US tank units in World War I and in the early years of World War II, and his bold tactical style were ideally suited to the execution of mobile offensive tactics by his armored divisions.

Although the armored divisions were the most prominent type of armored formation during World War II, the US Army deployed two other types of armored units. Separate tank battalions were attached to infantry divisions to provide direct armored support during offensive and defensive missions; more than half of US tank battalions were assigned to this role during World War II, the remainder serving in the armored divisions. Tank destroyer battalions were equipped with vehicles similar to tanks, but with lighter armor and more powerful guns. Their primary mission was the defeat of German tank formations. Their tactics and mission were quite controversial during the war and the US Army disbanded the tank destroyer force after the war. Infantry divisions often had a tank destroyer battalion attached during most campaigns, and many armored divisions had a tank destroyer battalion semi-permanently attached during the course of the fighting.

Combat mission

Prior to World War II, the US Armored Force was smaller than that of minor European powers such as Italy and Poland. In the wake of World War I, the infant Tank Force had been disbanded and its armored equipment divided between the infantry and cavalry branches. The isolationist foreign policy of the United States suggested that the army would never again fight in a major European war and would be preoccupied with homeland defense and colonial policing in, for example, the Philippines. Given the parsimonious defense budgets of the 1920s and 1930s, tanks seemed to be a luxury for the army's very limited missions. The infantry maintained a small number of tank companies and battalions for the direct support mission, while the cavalry concentrated on its traditional scouting mission using armored cars and machine-gun-armed light tanks, euphemistically called "combat cars" to avoid Congressional restrictions. The cavalry began to concentrate its armor in the 7th Cavalry Brigade (Mechanized) in 1938–39.

With war clouds brewing in Europe in 1939, the army began to reconsider the possibilities of entanglement in a major European or Pacific war and so began to take the first steps to build up its armored formations, initially by beginning the construction of modern tanks comparable to European types. There was still considerable debate within the army over the future of the tank on the battlefield, whether it would be a subsidiary arm to the infantry and cavalry, or whether it would have an independent strategic role as advocated by some theorists in Germany, the Soviet Union and Britain. The prominent role played by the panzer divisions in the unexpected defeat of France in May–June 1940 settled this issue in dramatic fashion.

The Armored Force was created at Fort Knox on July 10, 1940, and the first armored divisions began to be formed shortly afterwards. The configuration and missions of the various types of armored units were influenced by the preconceptions of the traditional branches. The formation of the Armored Force was the death knell of the horse cavalry. Most of its ambitious young commanders, such as George S. Patton, joined the Armored Force. Gen. Adna Chaffee, a cavalryman, first headed the US Armored Force, and its doctrine took on the flavor of the cavalry's traditional mission in a mechanized form. The cavalry favored a force oriented towards a strategic role: exploiting breakthroughs won by the infantry and racing deep into the enemy rear to destroy vital command posts and logistics centers, and to seize vital terrain. In contrast to British armored doctrine, the early US doctrine paid little attention to the use of armored divisions as an opponent to German panzer divisions.

Into the gap stepped the artillery. Artillery officers, led by the head of the Army Ground Forces, Gen. Lesley McNair, were convinced that anti-tank artillery was a better antidote to enemy panzer formations than US tank units. They interpreted the lessons of the modern battlefield, starting with the Spanish Civil War in 1936–38, as proof that anti-tank artillery could neutralize tanks on the modern battlefield. The rest of the army was skeptical since traditional cordons of anti-tank guns had failed to stop the panzers in Poland in 1939, France in 1940 or in the Soviet Union in 1941. Nevertheless, anti-tank artillery was very effective in the 1941 GHQ maneuvers in the United States, a success that Armored Force officers attributed more to unrealistic umpire rules than actual combat potential. The 1941 maneuvers reinforced the trend to rely on anti-tank guns to fight enemy tanks. In response to critics who pointed to the failure of anti-tank guns in recent European battles, US artillery officers argued that a new tactical approach would redeem the value of the gun. Instead of a



traditional cordon of static guns, mobile anti-tank guns would be massed in reserve until the panzer divisions struck, and then be aggressively dispatched to attack them. The mobility inherent in this doctrine gradually led to the development of self-propelled anti-tank guns, tank-like vehicles with less armor but more powerful guns. A new Tank Destroyer Command was organized at Ft. Hood and began forming tank destroyer battalions and tank destroyer groups to carry out this mission.

A third type of armored formation also existed at this time, the separate tank battalions that were inherited by the Armored Force from the pre-war infantry tank units. These battalions were intended for the traditional tank role of close support of the infantry divisions. Due to the infantry's preoccupation with the formation of numerous new divisions, these units became the neglected stepchildren of the Armored Force. As a result of these trends, the US Army in the ETO in 1944-45 had three types of armored units: armored divisions, separate tank battalions and tank destroyer battalions.

The armored division was the largest and most significant of the three types of armored units, playing a central role in army doctrine. The armored division was seen as being the arm of decision, taking over the role held by cavalry in centuries past. The 1942 field manual noted that they were intended for "rapid decisive results in the area of employment. They are to be employed on decisive missions. They must not be frittered away on unimportant objectives." During offensive operations, it was the task of the infantry division to secure the breakthrough of enemy lines. Once this was accomplished and a semi-fluid battlefield situation thus reached, the armored division would be inserted into the breach, racing deep into the enemy rear, decapitating the enemy by seizing or disrupting command posts, strangling the enemy by severing logistics links and demoralizing the enemy by cutting off routes of retreat. As George Patton

The early armored divisions were based around M3 light tanks since so few medium tanks were available. This dramatic shot shows an exercise by Co. E, 34th Armored Regiment, 5th Armored Division, at the Desert Training Center in the Mojave Desert near Indio, California, in September 1942 as a tank formation is buzzed by a pair of A-20 bombers. The M3 light tanks have a white "M" for medium on their turrets since they are serving as surrogate medium tanks until the new M4 tank becomes available. (MHI)

wrote "The enemy's rear is the happy hunting ground for armor." Although similar to the traditional cavalry role, the means to accomplish this mission were considerably different due to the change in the nature of the modern battlefield.

Of the armored formations of the major powers, the US armored divisions were most strongly influenced by the German example due to its impressive battlefield record. Nevertheless, the actual organization and doctrine of the US armored division gradually diverged from the German model both because of institutional biases, such as the US tank destroyer concept and cavalry tradition, as well as different approaches to organization such as the US pattern of combat commands. The US conception of armored divisions differed significantly from the British example. British doctrine saw the defeat of enemy armored formations as a principal mission of their armored divisions, a role that was not a preoccupation of the American doctrine. In some respects, US armored division doctrine shared similarities with the tank corps of the Red Army, which also saw the primary mission being exploitation after the breakthrough. This was not the result of direct emulation of the Red Army example, but rather of the similar cavalry tradition that permeated both these two armored forces.

The US armored division was intended primarily for offensive operations and was less suited for defensive missions due to its small infantry component. The armored division could not replace the traditional infantry division, but complement it by offering an alternative with more mobility and firepower. Compared to the 16 armored divisions formed during the war, the US Army eventually deployed 89 infantry divisions.

In contrast to the armored divisions, the separate tank battalions were much more narrowly focused as infantry support units. These units were originally

The decimation of the 1st Armored Division at Kasserine Pass in February 1943 was a wake up call to the US Armored Force to adopt more realistic training and doctrine. This is "Honky-Tonk," an M4A1 medium tank of Co. H, 1st Armored Regiment, knocked out during the fighting at Sidi bou Zid on February 14-15, 1943, one of about 80 medium tanks lost during the battles around Kasserine Pass. The lessons of the Tunisian campaign led to an extensive reorganization of the armored division in the summer and autumn of 1943. (NARA)



called GHQ tank battalions, since they were first conceived as the armored reserve of the general headquarters. But in practice in 1944, their principal role was to support the infantry divisions. In most cases, an infantry division in combat would have a tank battalion attached to it to provide armored support. Often, each infantry regiment within the division would have a single tank company attached to it. Tanks from these units would accompany the infantry in combat to help overcome strongpoints and to reinforce rifle companies in both offensive and defensive missions.

Although most armies in World War II formed various types of anti-tank units, none had as prominent a role in doctrine as the tank destroyer battalions of the US Army. In practice, the US tank destroyer concept proved to be a mistake. By 1944, the US Army was on the offensive and German panzer formations were not encountered in concentrated mass attacks as in the early days of blitzkrieg in 1939–41. The tank destroyer battalions had not been conceived as offensive formations, and their defensive orientation undermined their combat value. Furthermore, artillery officers misinterpreted the lessons of the Tunisian campaign and a portion of the self-propelled battalions reverted back to towed anti-tank guns. This further undermined the value of the units in combat in the ETO, as the towed battalions were even less valuable in offensive operations. In the event, the self-propelled tank destroyer battalions were used much like separate tank battalions for infantry support, with most infantry divisions being allotted one of each. During their greatest test in the Battle of the Bulge in December 1944, the towed tank destroyer battalions performed so poorly that they were reorganized afterwards as self-propelled battalions. The US Army abandoned the tank destroyer concept after World War II with the mission being taken over by tank units.

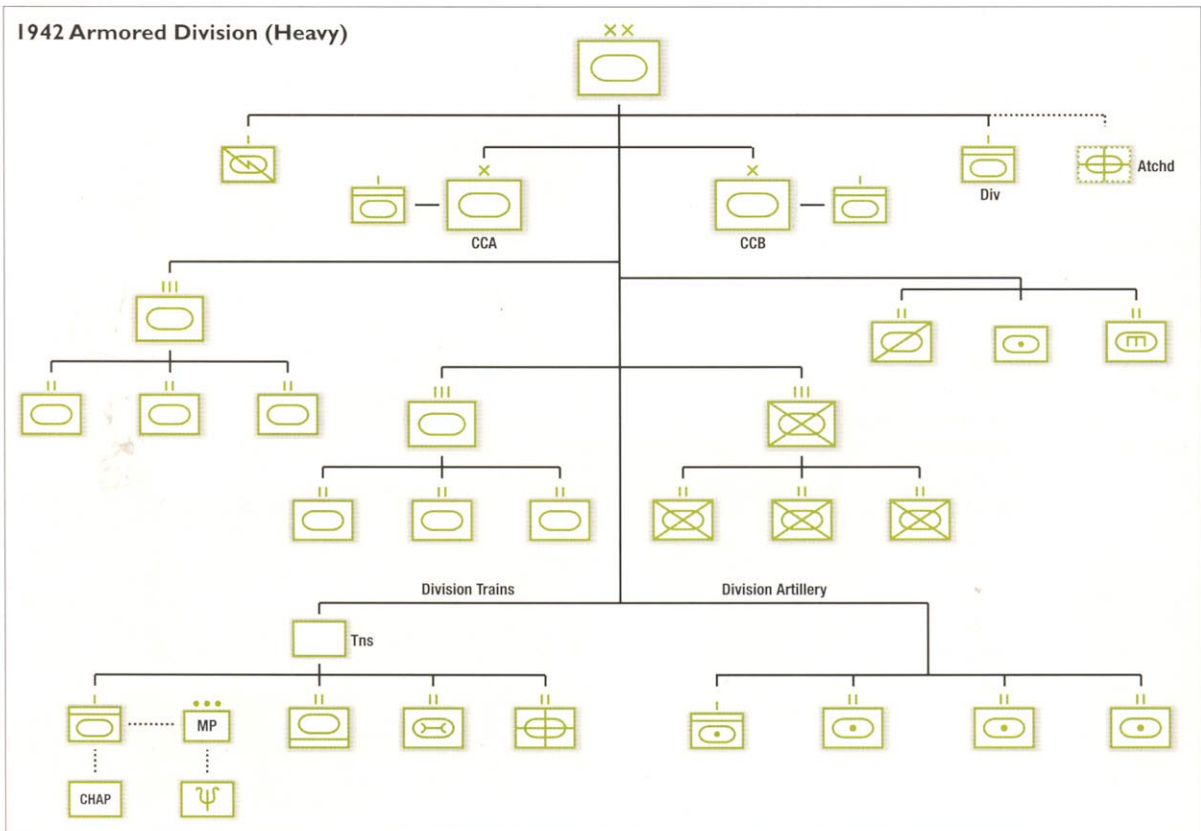
The first combat use of US armored units took place in the Philippines in December 1941–January 1942, when two National Guard tank battalions were used to form a Provisional Tank Group. The humiliating defeat by the Japanese Army had little effect on tank doctrine, in no small measure due to a lack of detailed knowledge of the actual performance of the units during the Philippines campaign. The first significant deployment of US armored units occurred in November 1942, during Operation Torch, the invasion of North Africa. Two armored divisions were committed to the campaign, the 1st and 2nd Armored Divisions. The 2nd Armored Division remained in reserve after the initial landings in French North Africa and saw no combat in the ensuing campaign in Tunisia. The inexperienced 1st Armored Division was defeated by panzer units of the veteran Afrika Korps in the battle of the Kasserine Pass in February 1943. The US Army assessments of the battle placed a greater emphasis on the general unpreparedness of its commanders and troops than on any particular flaws in the structure the armored units. However, the debacle at Kasserine Pass and the lessons from the later Tunisian campaign led to a significant reorganization of the US armored divisions in 1943, which is covered in more detail in the organization section below.

Preparation for war: doctrine and training

When the United States entered the war in December 1941, the Armored Force consisted of one armored corps, five armored divisions in various stages of organization and several GHQ tank battalions. At first, the Army planned to create an enormous force structure of 216 divisions, including 61 armored divisions, but the May 1942 plan trimmed this down to 187 divisions with 47 armored divisions. Under this plan, the Armored Force planned to create 23 armored corps, each based around two armored divisions and a motorized division with many supporting corps troops. These schemes gradually evaporated and the total number of armored divisions in army plans fell to 26 and then 20 armored divisions by the end of 1942.

The original November 1940 division was based around an armored brigade with two light and one heavy armored regiments, an artillery regiment and an armored reconnaissance battalion. Division support included an armored infantry regiment, a field artillery battalion and an engineer battalion with a total strength of 12,697 personnel. It was a very tank-heavy force, like early German panzer divisions, and not a mature combined arms formation.

The equipment and configuration of the new armored divisions were influenced both by doctrine and the available armored equipment. Prior to 1941, the US Army did not have the budget to develop or purchase a modern medium tank. The focus of inter-war tank development was in the design of



light tanks and the related cavalry cars. This suited the cavalry orientation of the early armored divisions, since the doctrine suggested that the armored division would not be used against enemy armor, and would operate primarily in the enemy rear area where anti-tank guns would be relatively rare. As a result of these two factors, the early armored divisions were based primarily around fast light tanks.

The escalation in anti-tank firepower first evident during the Spanish Civil War and the early blitzkrieg campaigns in Europe in 1939–41 suggested that the light tank was becoming obsolete both in terms of firepower and armored protection. While this was gradually recognized in the United States, US industrial potential had still not caught up to the wartime demands and so the armored divisions still relied on light tanks well into 1942. The first significant US medium tank of World War II, the M3 medium tank, was an expedient design and did not enter production until June 1941. Expanded production of this design and its evolutionary successor, the M4A1 (Sherman) medium tank, permitted the shift from light to medium tanks.

There was a gradual erosion of the influence of the cavalry in the Armored Force in 1941 starting with the retirement of the seriously ill Adna Chaffee and his replacement by an artillery officer, Jacob Devers, on August 1, 1941. Devers was determined that the overemphasis on the tank to the exclusion of the other combat arms in the armored division should be rectified, but he held off changes until after the summer maneuvers of 1941. The 1940-pattern armored division was put to the test in the Louisiana and Carolinas wargames. The maneuvers clearly revealed that the division lacked adequate infantry and artillery. On encountering hostile anti-tank forces, the tanks were obliged to charge the guns, leading to appalling losses. The 1st and 2nd Armored Divisions lost 844 tanks in the Carolinas maneuvers, 82 more than their nominal strength. To some extent this was due to unrealistic rules, with 113 tanks falling victim to .50-cal. machine-gun fire and 82 more to flour-bag grenades. Nevertheless, the artillery advocates saw this as a vindication of the power of the gun over the tank.

The lessons learned from the 1941 maneuvers led to reorganization in March 1942, with the proportion of light and medium tanks reversed. Under the new 1942 pattern, there were 232 medium and 158 light tanks in two armored regiments, each with two medium tank battalions and one light tank battalion. The armored infantry regiment was increased with another battalion and a divisional artillery headquarters was added to coordinate the unit's three armored field artillery battalions. The maneuvers also revealed the need for more extensive logistics and so the division received a supply battalion. The most significant innovation in the March 1942 reorganization was the elimination of the armored brigade structure and its replacement by two combat commands. Neither combat command had any organic units, but was intended to be a flexible tool to permit the formation of battle groups from the division's units. This was an important step away from viewing the division as a tank formation, and seeing it as a combined arms formation. A typical combat command in action would include an armored regiment, some armored infantry battalions and some armored field artillery, along with reconnaissance, engineer and other assets as required.

Doctrine lagged behind organization due to the time it took to arrive at a consensus before publishing

The long duration between their formation and their first employment in combat ensured that the troops in the US armored divisions were well trained even if not battle experienced. Here, the crew of an M4 medium tank of the 5th Armored Division loads ammunition during training at Ft. Knox, Kentucky, in the autumn of 1942. (US Army)

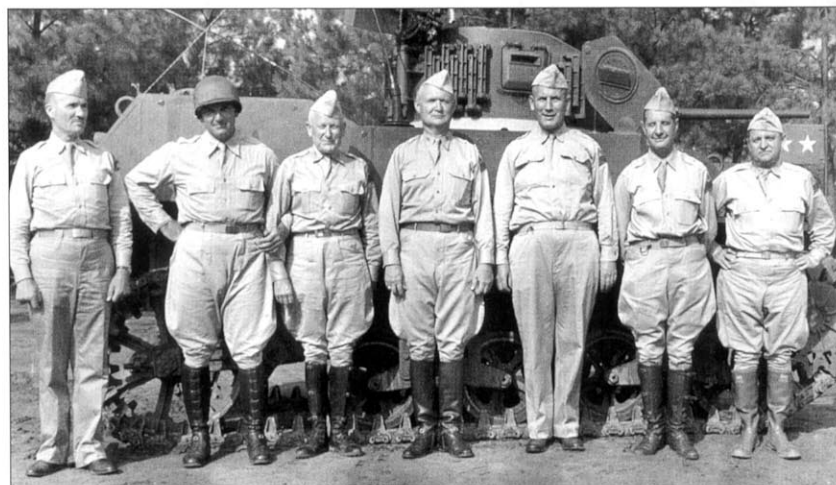


new field manuals. The *Armored Force Field Manual*, released in March 1942, continued to emphasize the central role of the light tank and the supporting role of medium tanks. Armored infantry and field artillery were given subsidiary roles – securing occupied terrain and fixing the enemy in place by fire respectively. Little attention was paid to the new combat commands and instead the focus was on achieving combined arms by attaching armored infantry battalions and field artillery directly to the armored regiments. The delay in publishing timely doctrine in the field manuals would continue through much of the war, but was overcome by incorporating the new doctrine into courses at Ft. Knox even if not yet in the manuals.

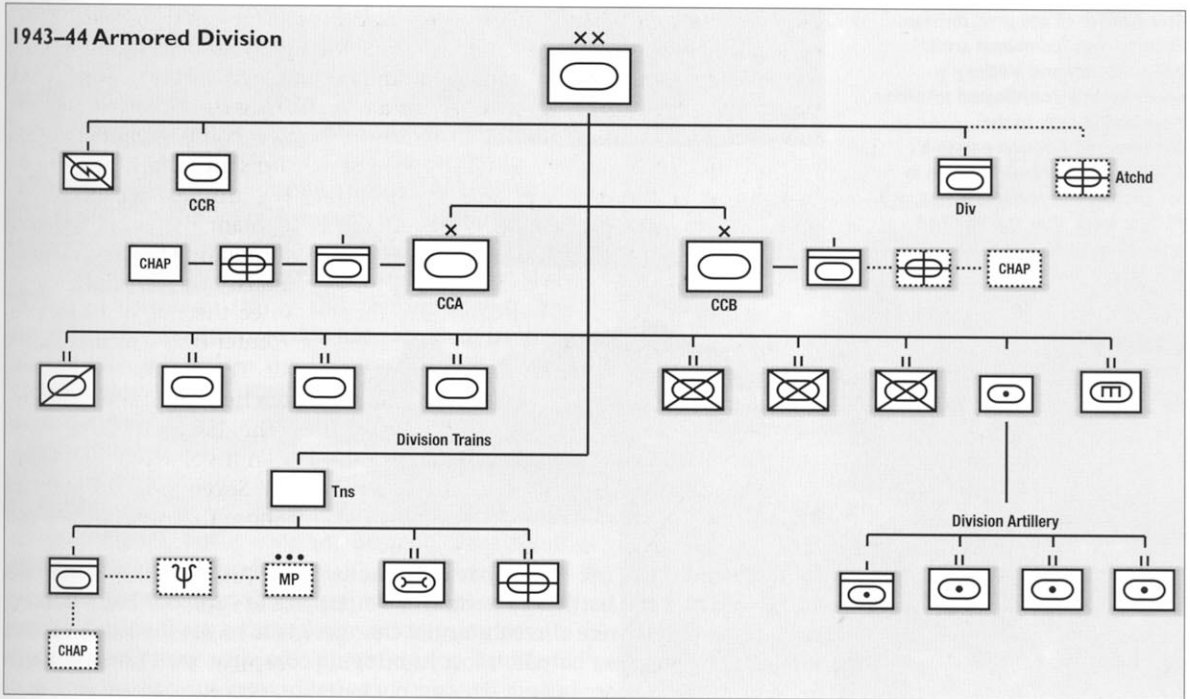
Since the armored divisions would most likely see their combat debut in North Africa, the army set up the Desert Training Center (DTC) in the Mojave Desert in southern California in the spring of 1942. This facility was so large that an entire armored corps could conduct exercises. Ironically, the two armored divisions actually sent to North Africa, the 1st and 2nd Armored Divisions, never trained at the DTC as they had been involved in more large-scale wargames in 1941–42 than any other division. Seven armored divisions trained at the DTC in 1942–43, including most of those that were to take part in the campaign in France in June–August 1944.

The defeat of the 1st Armored Division at Kasserine Pass in February 1943 was a rude awakening for the Armored Force. The reasons for the defeat are too complicated to be easily summarized here but several lessons were very clear. The division was poorly deployed, being split into four combat commands scattered over an excessive 60-mile front and under the disjointed command of the division, US II Corps and the British First Army. The Afrika Korps counter-offensive through the Kasserine Pass crushed one isolated combat command near Sidi bou Zid on February 14, 1943. Another combat command was sent to relieve it, charging in textbook cavalry formation into the teeth of two veteran panzer divisions. Not surprisingly, it too was decimated and both the divisional commander and the corps commander were later sacked. The Kasserine Pass battle emphasized the need for true combined arms tactics and not cavalry tactics in a mechanized disguise. The Tunisian fighting reinforced the cause of reformers in the field artillery, clearly demonstrating the advantages of the new 1941 fire direction center in massing artillery fire. It was the success of the field artillery that stopped the German attack at Kasserine and played such a prominent role in many of the subsequent victories in Tunisia, including El Guettar. The Tunisian fighting also demonstrated the value of forward artillery observers, both on the ground and in light aircraft, and the need for robust radio communication between the observers and the fire direction center.

An interesting group portrait of many of the early commanders of the armored divisions taken at Ft. Knox in 1943 standing in front of an M5 light tank. From left to right: Maj. Gen. E. H. Brooks (11th AD); Maj. Gen. J. Wood (4th AD); Maj. Gen. W. H. Grimes (8th AD); Maj. Gen. W. D. Crittenger (2nd AD); Maj. Gen. L. M. Silvester (7th AD); Maj. Gen. G. Keyes (9th AD); Maj. Gen. W. Walker (3rd AD). Two of these commanders, Crittenger and Walker, were booted upstairs to become corps commanders in Europe and only two, Wood and Silvester, commanded their armored divisions when committed to combat in the ETO in 1944. (MHI)



1943-44 Armored Division



While the first battles were being fought in Tunisia, there was considerable debate in Washington about reorganizing the armored divisions. There was a general recognition that the current 1942 division was poorly balanced with too many tanks and not enough infantry. The head of the Armored Force, Lt. Gen. Jacob Devers, wanted to obtain a better balance at corps level by deploying armored corps with two armored and one motorized division. Armored officers with combat experience, such as Maj. Gen. Ernest Harmon of the 2nd Armored Division, thought reorganization was premature and that if done, it should add infantry rather than subtract tanks. The head of the Army Ground Forces, Lt. Gen. Lesley McNair, felt that the 1942-pattern division was too big and unwieldy, and was not enthusiastic about armored corps anyway.

Devers was transferred from command of the Armored Force on May 11, 1943, becoming the commander of US forces in the European Theater. His replacement, Maj. Gen. Alvan Gillem Jr., was an infantry officer, less enthusiastic about sparring with McNair and the Army Ground Forces' bureaucracy. A new armored division structure was formally adopted on September 15, 1943. The tank-centered armored division of 1940-42 gave way to a smaller, leaner, more balanced division with three battalions each of tanks, armored infantry and armored field artillery. The armored regiment was dropped as a reflection of this change. Gillem's most important influence on the reorganization was his insistence on shifting the division towards medium tanks and away from the light tanks so long favored by the cavalry. The North African fighting had clearly demonstrated that the day of the light tank had passed. Instead of light and medium tank battalions, all tank battalions were organized in the same fashion, being based around three medium tank companies and a single light tank company. This reduced the tank strength of the division by nearly 40 percent from 390 tanks (158 light, 232 medium) to 245 tanks (77 light, 168 medium). With the armored regiment headquarters gone, greater emphasis was placed on the combat commands. These were increased in number to three, usually called CCA, CCB and CCR (Combat Command Reserve). Divisional reconnaissance was reorganized, the armored reconnaissance battalion giving way to a renamed and smaller cavalry reconnaissance squadron.

The essence of armored division doctrine was "combined arms:" tanks, infantry and artillery operating in a coordinated mission. Here an M4 tank of the 4th Armored Division passes a .30-cal. light machine-gun team in the Bastogne corridor on January 3, 1945, a week after the unit had relieved the besieged town. (US Army)



In addition, the use of combat commands as the focal point of combined arms tactics on the battlefield became a centerpiece of Armored Force training at Ft. Knox. There were also substantial changes made to the division's combat support. The engineer battalion lost its bridging company, with bridging needs to be provided by corps assets. The supply battalion was eliminated, with each unit being made responsible for its own supplies. An attempt was also made to reduce the many different types of vehicles in use and motorcycles were eliminated due to their maintenance burden.

There were exceptions to this reorganization. By the time that the new tables came into effect, the 1st Armored Division was deployed in Italy, while the 2nd and 3rd Armored Divisions were already in Britain in anticipation of the invasion of France. Gen. Jacob Devers, who had adamantly opposed McNair's reorganization plan, had been shifted from command of the Armored Force to command of the European Theater of Operations. Devers decided that it was too late to change the two divisions in England to the new configuration, so they remained under a modified March 1942 organization. They gradually had their tank battalions reorganized from the mixed light and medium types to the new standard battalion, but otherwise retained the six tank battalions of the 1942 tables of organization and equipment (TO&E) instead of the three battalions under the new tables. As a result, this organization was often called "tank division (heavy)." This division lacked a third combat command on paper, so in practice, the headquarters of the armored infantry regiment was often used as the headquarters of the third combat command. The 1st Armored Division delayed converting to the new pattern until it was pulled out of the line in July 1944 for refitting after the Anzio and Rome campaigns. After Dwight Eisenhower replaced Devers in April 1944, Army Ground Forces in Washington again tried to have the two armored divisions in the UK reorganized, but with the invasion of France imminent Ike backed his armor officers and refused to permit such a disruption.

The other change introduced in 1943 was the abandonment of the armored corps concept. Until 1943, the army had expected to form armored corps with two armored divisions and a motorized division. The fighting in Tunisia, and later in Italy, raised questions about the need for such a formation. The motorized division was dropped in the summer of 1943 in favor of a practice of providing additional truck companies to normal infantry divisions when the need arose. In essence, an armored corps could be formed using a normal corps headquarters when the occasion demanded, even if it did not have the distinct title.

The summer of 1943 also saw the final decisions made on the composition of the wartime army. The final size of the Armored Force was pegged at 16 armored divisions with 54 constituent tank battalions. The remaining 65 tank battalions were used as separate tank battalions. The experiences of tank units in the Mediterranean Theater from the summer of 1943 to the summer of 1944 had less impact on Armored Force organization and doctrine than the Tunisian experience. The 2nd Armored Division was deployed on Sicily as part of Operation Husky and performed well. The reconstituted 1st Armored Division landed in Italy, playing a central role in the fighting around Anzio in 1944. While these combat experiences had little organizational impact on the armored divisions, they reinforced the trend tying the separate tank battalions to the infantry divisions. The Italian fighting made it clear that tank support was not an occasional necessity for the infantry, but a constant demand. As a result, the Armored Group headquarters that had been formed to control these separate battalions underwent a gradual transformation from a tactical formation to an administrative unit responsible for supporting the battalions attached to the infantry divisions. In general, the fighting in the Italian theater suggested that the nature of armored warfare had changed since the blitzkrieg days of 1939–41 when panzer divisions could execute lightning attacks deep behind enemy lines in cavalry fashion. The response to blitzkrieg had been many tactical innovations by the infantry and artillery that made both the penetration of the main line of resistance more difficult, and the containment of an armored breakout easier. Both the Wehrmacht and Red Army began to use tank divisions as a powerful means to contain hostile armored penetrations, a role noted in later US Army field manuals.

The evolving armored doctrine was summarized by a new field manual released on January 15, 1944, *FM17-100: The Armored Division*. The manual began by emphasizing that such publications were not intended to provide cookbook solutions to all tactical problems and emphasized that procedures had to remain flexible to respond to the changing nature of the battlefield. This was a considerable shift from earlier field manuals that were far more detailed



The close coordination of infantry and tanks was especially important in urban warfare. Here an armored dough radioman with a SCR-300 walkie-talkie looks on while an M4 medium tank of the 25th Tank Battalion, 14th Armored Division, attacks targets in Oberhoffen on February 6, 1945. In the wake of the Battle of the Bulge, the Wehrmacht staged a smaller offensive, Operation Nordwind, in the Alsace region of eastern France. (US Army)



A key capability in offensive armored operations is to be able to rapidly erect bridges over rivers. The US Army relied heavily on treadway bridges like the one seen here over the river Roer during Operation Grenade on February 24, 1945. Operation Grenade finally succeeded in overwhelming the German defense along the Roer after months of bloody fighting by the Ninth Army. The tank on the bridge is an M4 fitted with a dozer blade, another innovation first introduced in the summer of 1944 to provide tank battalions with the ability to rapidly clear road obstructions and tank obstacles during offensive operations. (US Army)

and tended towards dogmatic prescriptions. The new field manual redefined the armored division as the "basic large armored unit of the combined arms." Nevertheless, its mission remained the same and stressed that the division was "organized and equipped for the performance of strategic roles, particularly for (offensive) operations in hostile rear areas."

Armored divisions began deploying to Great Britain in the autumn of 1943 for the planned invasion of France. The first two to arrive were the 2nd and 3rd Armored Divisions. The transfers to Britain changed the focus of training, since the bases in England often lacked the expanses of land available in the United States. The emphasis switched to small unit tactics and crew training, especially such subjects as gunnery training and amphibious landing techniques.

Following the commitment of the armored divisions to combat in the summer of 1944, new problems arose, especially in regards to replacement personnel. The US Army, based on its experience in Italy, had significantly underestimated the scale of replacements needed in the ETO. Some replacements in the armored divisions, such as the armored infantry, could be drawn from normal infantry pools. However, specialized positions such as tank crews posed unique problems due to the technical skills of these troops. Although there was a flow of replacements with armor training through the summer of 1944, many units found that the replacements were rusty in basic skills since they had so little opportunity to train or practice in the interlude between school and actual assignment. There was no refresher training available, and initially a course was created using a tank battalion that had not been deployed. This ended in August 1944 when the battalion was put into combat. The situation remained unsatisfactory through the war, though in December 1944 a small permanent training cadre was formed. The quality of replacements declined after most of the armored divisions were sent overseas, as it ended the practice of sending newly trained replacements to an armored division for further training after the basic course. As a result, divisions had to develop improvised methods for training new replacements. The replacement situation declined so badly after the Ardennes battles that redundant infantry and air corps personnel were transferred to the armored units. The First Army established a training center based around a tank battalion for specialized training for two to three weeks, and this considerably assisted in rejuvenating some badly mauled tank units.

The success of armored divisions frequently hinged on the ability of the corps commander to appreciate the best tactics for such a novel formation. One of the better examples was Maj. Gen. Manton S. Eddy, commander of XII Corps, part of Patton's Third Army. He is the second officer from the right. He is seen here consulting with one of his best armored division commanders, Maj. Gen. John "P" Wood, third from the left, who led the 4th Armored Division during the fighting in Lorraine around Arracourt. The other officers are Gen. Willard Paul, commander of the 26th Division, and Brig. Gen. Holmes Dager, CCB commander. (MHI)



Unit organization

The description here covers the basic September 1943-pattern armored division. There was a modest modification of the tables in February 1944, which was the standard used by divisions in the ETO at the outset of the campaign in France and it is shown in the table here. A third major amendment was published on January 24, 1945, in anticipation of redeployment to the Pacific, but it had little effect on the divisions in the ETO. The standard armored division configuration is usually referred to as the 1943-pattern in contrast to the 1942-pattern heavy armored division, even though the standard divisions were actually operating under the 1944 table in France.

The two heavy armored divisions were organized in a similar fashion, but retained the armored and armored infantry regiment structure, had three additional tank battalions and an armored reconnaissance battalion instead of a squadron. A formal table of organization and equipment for the heavy armored divisions in 1944 was never issued because the Army Ground Forces had never approved the organization. In practice, it followed the 1942 table, but with the amendments noted.

The 1943-pattern armored division was based around three tank battalions, three armored infantry battalions and three armored field artillery battalions plus the associated command and support formations.

There were some expedient tables of organization and equipment approved by various armies in the field in 1944. For example, the tank shortages in the ETO in September 1944 forced the First Army to reduce its TO&E strength from 232 to 200 medium tanks in the heavy armored divisions, 168 to 150 in the normal armored divisions and 54 to 50 medium tanks in the separate tank battalions. The Ninth Army followed suit later in the fall.

An interesting view of an armored regiment of the 2nd Armored Division at their staging location in southern England in May 1944 prior to the Normandy invasion. As can be seen to the lower right, several of the M4 medium tanks have already been fitted with wading trucks to enable them to be landed from LSTs off the coast and drive to shore. (US Army)



Armored division table of organization and equipment

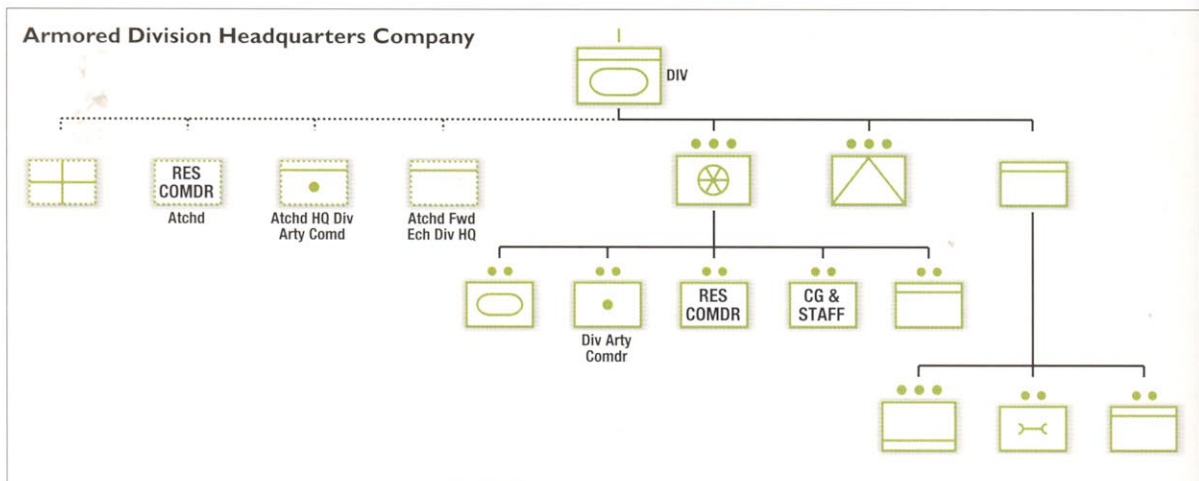
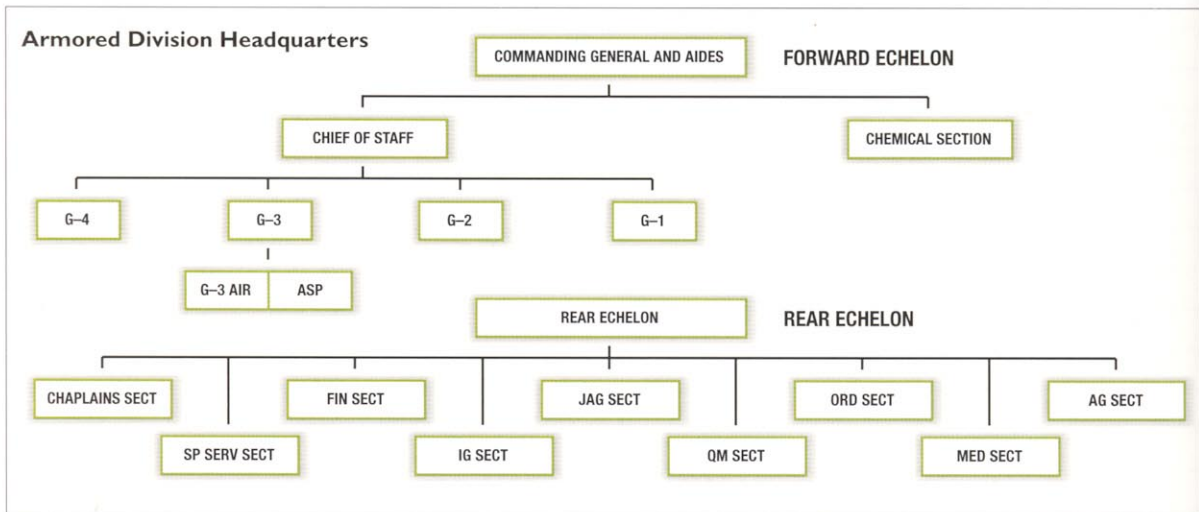
T/O&E 17					Recon	Tank Bn.	Inf. Bn.
12 Feb 44	Div. HQ	HQ Co.	CC HQs	Sig. Co.	Sq.	(x 3)	(x 3)
Officers	43	5	27	7	42	37	36
Enlisted men	168	119	194	302	931	729	1,001
.45-cal. pistol	18	1	13	1	3	3	3
.45-cal. SMG		37	56	62	238	449	126
.30-cal. carbine	138	72	123	239	570	257	394
.30-cal. M1 rifle		9			120	20	469
.30-cal. rifle M1903							9
.30-cal. LMG		7	3	13	65	17	23
.30-cal. HMG							37
.50-cal. HMG		7	4	13	26	25	43
2.36in. bazooka		10	16	24	34	34	74
60mm mortar					36		9
81mm mortar						5	1
57mm AT Gun		3					9
M5A1 light tank		3	6		20	18	
M4 tank						53	
M4 (105mm)						6	
75mm M8					8		3
105mm M7							
M8 arm. car		2			52		
81mm MMC M21						3	3
Half-track		12	7	19	32	13	72
M32 ARV						5	1
M10 ammo trailer			1		14	17	8
1/4-ton jeep		9	9	22	106	22	23
3/4-ton command car						1	1
3/4-ton WC truck		2				1	1
3/4-ton ambulance							
2-1/2-ton cargo truck		3	2	19	20	39	21
2 1/2-ton dump truck							
2 1/2-ton repair truck				2			
Wrecker truck					1	2	1
Misc. truck							
M26 tank recovery							
1/4-ton trailer		2					
1-ton trailer		3	2	10	34	26	21
Misc. trailer				6			
Liaison aircraft		2					

Div.Arty. HQ	Arty. Bn. (x 3)	Eng. Bn.	Train HQ	Ord. Maint. Bn.	Med. Bn.	MP Plat.	Total
13	31	32	7	40	33	3	564
99	534	658	95	716	382	88	10,052
9	5	3	3	5		1	90
20	116	103	37	165		23	2,814
70	413	153	56	592		67	5,272
		434	6				2,036
							27
1	22	20	2	28			328
		18					129
5	26	20	2	38		1	402
6	40	29	4	35		1	603
							63
	2						24
							30
							83
	3						168
							18
							17
	18						54
							54
							18
	30	15	2	4	4	1	448
	2						24
	33						192
6	21	25	15	23	10	19	451
	2	1	3	3	8		27
8	2	6	7	16	7	3	61
		30					30
5	25	27	9	67	17		426
		18					18
				29			31
	1	1		11			25
		19		3			25
				9			9
2	1		3				12
4	20	24	9	66	17		372
		13			6		25
	2						8

Headquarters

The division headquarters was usually organized into a forward echelon and a rear echelon. The forward echelon usually consisted of the division commander, his aides and staff, the divisional artillery and engineer commanders, and the staff of the chemical warfare section. This echelon was stationed with the division headquarters company. The division's signal company provided the necessary communication equipment. The division headquarters company provided the administration, maintenance, supply, mess and transportation needs for the forward echelon of the division. Besides their transport vehicles, the company had three M5A1 light tanks and two M8 armored cars for the use of commanders and staff. The headquarters had a defense platoon with three 57mm anti-tank guns. The divisional HQ was usually accompanied by the armored signal company which provided radio, teletype, telephone, visual and messenger communications for the HQ.

The rear echelon of the division headquarters was usually attached to the train headquarters company. This echelon included administrative elements of the headquarters such as the finance section, judge advocate section, postal section, inspector's general section, special service section and consolidated personnel sections. This echelon was typically located at the division's railhead, truckhead or other rear echelon location.



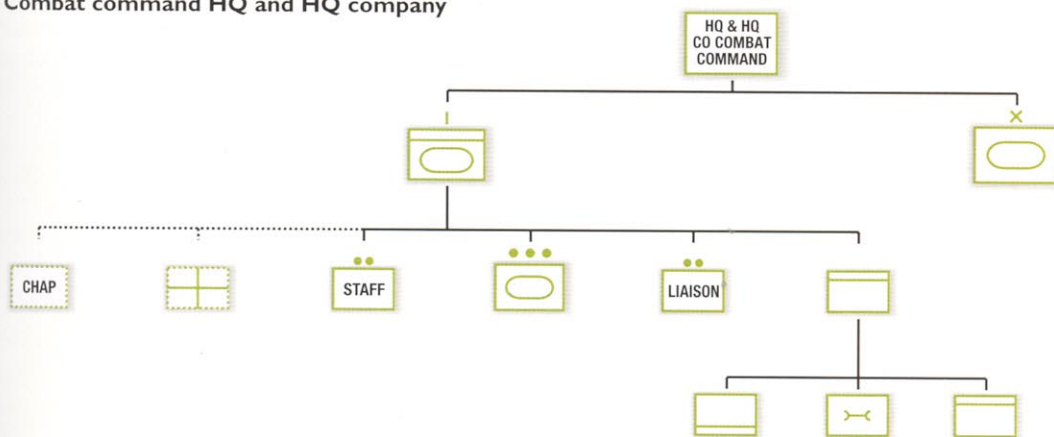
Combat commands

Two of the three combat commands (CCA, CCB) had their own headquarters that were based on the configuration used for the Armored Groups that administered the separate tank battalions. The combat command headquarters provided the necessary staff, operations, intelligence, communications and supply functions for a forward headquarters. The combat command HQ also had three M5A1 light tanks for use by the commander and his staff. On paper, one combat command would be headed by a brigadier general and the other by a colonel.

The role of the third combat command, CCR (Combat Command Reserve), was one of the basic issues that was never conclusively resolved during the war. The intention was to use the CCR to administer battalions sent to the rear to rest and recuperate, which in the meantime served as the divisional reserve. There was some debate within the divisions about whether it was better to regularly employ this as a third combat command in combat, or whether it should be held back as intended. Both approaches were employed during the war. In some cases, the issue was decided by the corps commander in handing assignments to the division. Nearly all corps commanders were infantry officers and were familiar with the usual triangular infantry formation of three regiments; or as the GIs sarcastically referred to it, "two up front shooting, and one in the rear looting." As a result, they expected the armored division to be configured the same way and would give the division's assignments that required three combat commands. A greater problem, from the standpoint of armor officers, was the tendency of some corps commanders to regard the armored divisions as simply a bigger version of the separate tank battalions for infantry support. Some corps commanders would basically break up the division into its combat commands and assign each to an infantry division to provide support. This ran against army field service regulations that stated that the division should be assigned critical missions. However, in difficult combat conditions such as in the stalemate along the Siegfried Line in the autumn of 1944, corps commanders were not about to leave armored divisions idle while awaiting a mission more in tune with doctrinal pronouncements, and used them as they saw fit.

The more vocal armor officers argued that the CCR should be used as intended. They complained that the infantry corps commanders did not appreciate the logistical and maintenance demands of mechanized units and that periodic withdrawal from the front was essential to keep the units properly functioning. The exceptions to this debate were the two heavy 1942-pattern

Combat command HQ and HQ company



divisions, which invariably fought with all three combat commands because of their larger size and more ample resources.

The CCR organization was limited to a very small headquarters staff, consisting of only three officers and five enlisted men compared to the 91–93 personnel in the other two combat commands, since it was not originally envisioned as a tactical command but simply as an administrative element for recuperating battalions. In practice, the divisions that used the CCR as a fully functioning tactical command scrounged the personnel from other units, creating a personnel problem. As a solution to this, in October 1944, the First Army began to convert some Armored Group HQs into combat command headquarters. Since the separate tank battalions were being assigned to infantry divisions there was little need for the Armored Group HQs in their intended role. This practice proved so successful that in April 1945, the 12th Army Group formally transferred these headquarters to armored divisions to staff the CCR.

The configuration of combat commands differed between the two divisions in the heavy 1942 configuration and the remaining 14 in the standard 1943 configuration. The combat commands of heavy divisions usually consisted of two tank battalions, an armored infantry battalion and company-strength attachments from a tank destroyer battalion, an engineer battalion and an anti-aircraft battalion. It was frequently the practice to attach an infantry regiment from an infantry division to each heavy armored division during offensive operations so that each combat command would receive an infantry battalion. In many cases, artillery support was not directly a part of the combat command, but was kept under divisional control with two armored field artillery battalions and an attached medium (towed) field artillery battalion assigned to provide fire support for the lead combat command. The combat commands of the heavy armored divisions usually operated in two task forces or columns. The usual organization was one tank battalion, an armored infantry or attached infantry battalion, and various tank destroyer, engineer and AAA attachments.

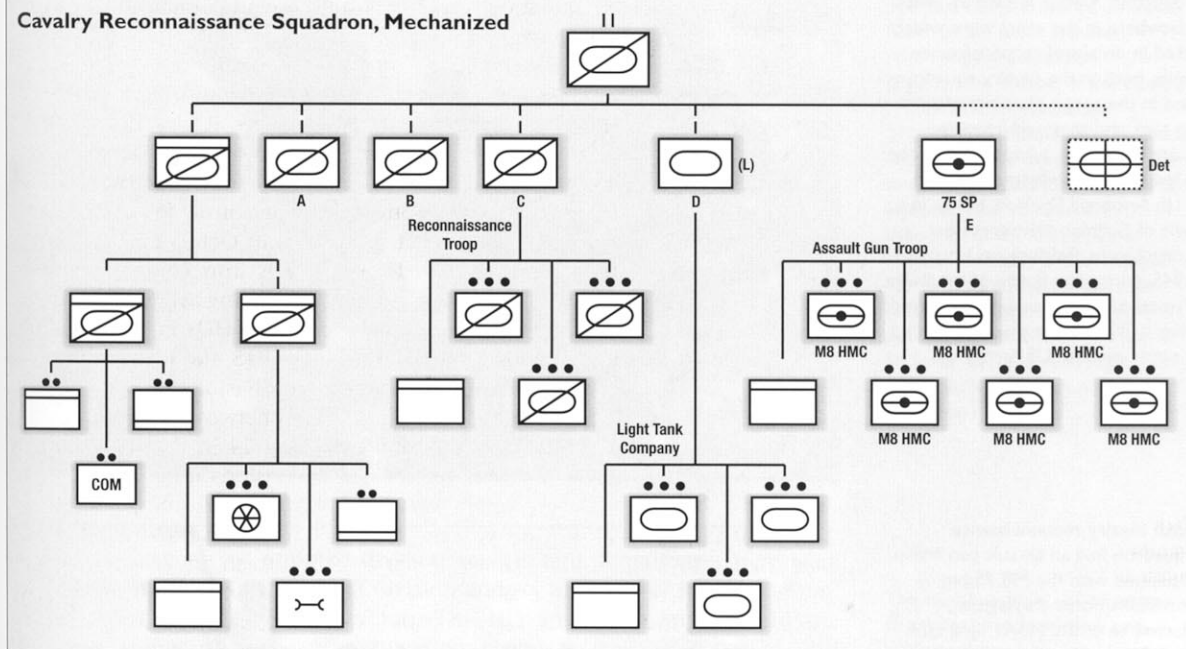
The combat commands of the standard 1943-pattern armored divisions were correspondingly lighter. Each combat command usually consisted of one tank battalion and one armored infantry battalion. In some cases, an armored field artillery battalion would be directly attached to the combat command, while on other missions all three divisional artillery battalions would remain under central divisional control, their fire being assigned where it was most needed. The assignment of the artillery to the combat commands was frequently dependent on the operational area of the division. During operations where the combat commands were strung out over large areas, the armored field artillery battalions would be assigned directly to the combat command since they would be out of range of the divisional field artillery. In cases when the division was operating in more constricted areas, the divisional artillery could be centralized since the combat commands would be within range of the divisional artillery. As was the case with the heavy divisions, the combat commands of the 1943-pattern divisions were usually organized into two task forces. One task force would consist of a tank battalion, minus one medium tank company, teamed with a rifle company. The other task force would consist of an armored infantry battalion minus one rifle company (serving with the other task force) and the medium tank company that had been detached from the other task force. As a result, one task force would be tank heavy and the other infantry heavy, so their assignments had to be tailored accordingly.

Combat arms

Cavalry reconnaissance

Mechanized cavalry provided the eyes of the armored division. Each armored division had a **cavalry reconnaissance squadron (mechanized)**. Although intended mainly for reconnaissance, in practice it was used in a much wider variety of roles. The squadron was organized into an HQ and service troop, four

Cavalry Reconnaissance Squadron, Mechanized



reconnaissance troops, an M8 75mm howitzer motor carriage (HMC) assault gun troop and a M5A1 light tank company. The reconnaissance troops were based around M8 light armored cars and quarter-ton trucks, usually called "bantams" in the cavalry rather than the usual GI nickname of "jeeps." Each squadron had three platoons each consisting of three bantams and three M8 armored cars. The M8 armored car was generally regarded as unsatisfactory due to its poor mobility. Its wheeled configuration limited it to roads or hard terrain and this gave it poor cross-country mobility except in dry summer weather. In the final months of the war, several divisions proposed substituting the M5A1 light tank for the M8 armored car as the newer M24 light tank became available. After the war, the wheeled armored car was abandoned in favor of fully tracked reconnaissance vehicles.



The workhorse of the cavalry reconnaissance squadrons was the M8 light armored car. An M8 armored car troop from the 92nd CRSM, 12th Armored Division, is seen here using an abandoned fortress from the Maginot Line near Guising, France, for a bivouac on December 13, 1944. Half-tracks, like the M3A1 here, were used in the squadron's maintenance and supply sections. (US Army)

"Bantams," better known as "jeeps" elsewhere in the army, were widely used in divisional reconnaissance units, both in the cavalry squadrons and in the recon platoons organic to tank and armored infantry battalions. Here, a bantam from the 63rd Armored Infantry Battalion, 11th Armored Division, brings in a pair of German prisoners near Longchamps, Belgium, on January 13, 1945, during the Battle of the Bulge. Typical of scout bantams, it is armed with a .30-cal. light machine gun on a pintle mount. (US Army)



Each cavalry reconnaissance squadron had an assault gun troop equipped with the M8 75mm howitzer motor carriage, a derivative of the M5A1 light tank with a short-barreled 75mm howitzer in an open-topped turret. Here, a pair of M8 75mm HMCs conduct a fire mission on the outskirts of Vic-sur-Aisne in September 1944, after the US 12th Army Group had raced into Belgium in the wake of the collapse of the German army in France. (US Army)



In general, the army was not pleased with the organization and equipment of the cavalry reconnaissance squadrons. Their missions were based around "sneak and peek" tactics, presuming that information could be gained without the need for close combat. In fact, it was found that the cavalry had to fight to gain information and their light equipment was not well suited to this mission. In addition, the tasks of the unit were too narrowly defined and they were only used for scouting a small fraction of the time. In 1944-45, the squadrons were used for a wide range of traditional cavalry tasks such as screening exposed flanks, clearing out bypassed enemy forces and conducting a variety of special missions. The main shortcomings of these units were the lack of sufficient dismountable troops to conduct defensive missions and their general weakness in anti-tank weapons.

The two heavy divisions had an older configuration: the **armored reconnaissance battalion** followed the 1942 pattern but with updated equipment, using the M8 light armored car instead of the old M3A1 scout car. This battalion was organized into three recon companies and a light tank company. The recon companies each had three platoons consisting of an armored car section with four M8 armored cars, a scout section with four bantams and an assault gun section with a single M8 75mm HMC. The light tank company was similarly organized into three light tank platoons with a total of 17 M5A1 light tanks.



The two heavy armored divisions retained the older armored reconnaissance battalion organization instead of the cavalry reconnaissance squadron organization, although the missions and equipment were much the same. These battalions had 75 M8 armored cars compared to 52 in the squadrons. Here, a pair of M8 armored cars of Company C, 82nd Armored Reconnaissance Battalion, 2nd Armored Division, pass through the road junction at St. Sever Calvados on August 3, 1944, during Operation Cobra. (US Army)

Tank battalions

The strike force of the armored division was its tank battalions. There were three **tank battalions** in the 1943 division and six in the 1942 heavy division, all organized in an identical fashion. The HQ and HQ company had the necessary command and communication elements for the battalion and included a tank section for the battalion commander and staff, a battalion reconnaissance platoon, an assault gun platoon and a self-propelled 81mm mortar platoon. The assault gun platoon was supposed to be equipped with the M4 (105mm) assault, a version of the normal M4 or M4A3 tank armed with a turreted 105mm howitzer. In fact, these were slow in arriving, so some battalions in France used the M7 105mm HMC in its place until the standard assault gun

The tank battalion was organized to operate autonomously and perform its own basic maintenance. Here, an M1 heavy wrecker replaces the Continental R-975 radial engine in a M4 medium tank of the 2nd Armored Division during Operation Cobra on August 16, 1944, near Le Teilleul, France. (US Army)





The principal tank recovery vehicle of the armored divisions in the ETO was the M32, based on various versions of the M4 medium tank. This particular example is an M32B1, based on the M4A1 chassis and is seen here supporting the 6th Armored Division in operations near Bastogne on January 14, 1945. (US Army)

was available. These vehicles were used to provide indirect fire support for the tank battalion. The mortar platoon was nominally equipped with the M21 81mm mortar motor carriage (MMC), which consisted of the M3 half-track with a 81mm mortar. Since these were slow in arriving, many units still used the older M4 81mm MMC that was the M2 half-track with the same 81mm mortar. These vehicles could be used to provide fire support for the tank companies and also to deliver illumination rounds at night.

The tank battalion had four tank companies, Cos. A, B, and C being equipped with M4 medium tanks, and Co. D being equipped with M5A1 light tanks. Each medium tank company had a company HQ, three platoons with five M4 medium tanks each and a maintenance section. The company HQ had two M4 medium tanks and one M4 (105mm) assault gun. The light tank company was essentially the same except for two M5A1 light tanks in the company HQ and the absence of an assault gun. The tank battalion was supported by a service company consisting of an HQ, a battalion administrative and personnel section, an administrative, mess and supply (AM&S) section, a supply and transportation platoon, and a maintenance platoon. The maintenance platoon nominally used the M32 tank recovery vehicle, though in fact the older T2 (later M31) tank recovery was more common through late 1944 in the older divisions.

The tank equipment in the tank battalions shifted through the course of the European campaign. During the initial fighting in Normandy, nearly all the medium tanks were the M4 and M4A1 armed with the 75mm gun. These tanks were near identical, the only significant difference being the use of a welded hull on the M4 and the use of a cast hull on the M4A1. The US Army had shipped the first M4A1 medium tanks with the new 76mm gun to depots in Britain in April 1944, but for a variety of reasons, none were deployed in combat until July 24, 1944, at the outset of Operation Cobra. Because of the frequent encounters with Panther tanks in Normandy, there was considerable

demand for these 76mm tanks, yet the supply fell far short of the demand throughout most of 1944. In January 1945, a formal request was made by Eisenhower's headquarters to Washington to halt shipment of 75mm tanks in favor of 76mm tanks.

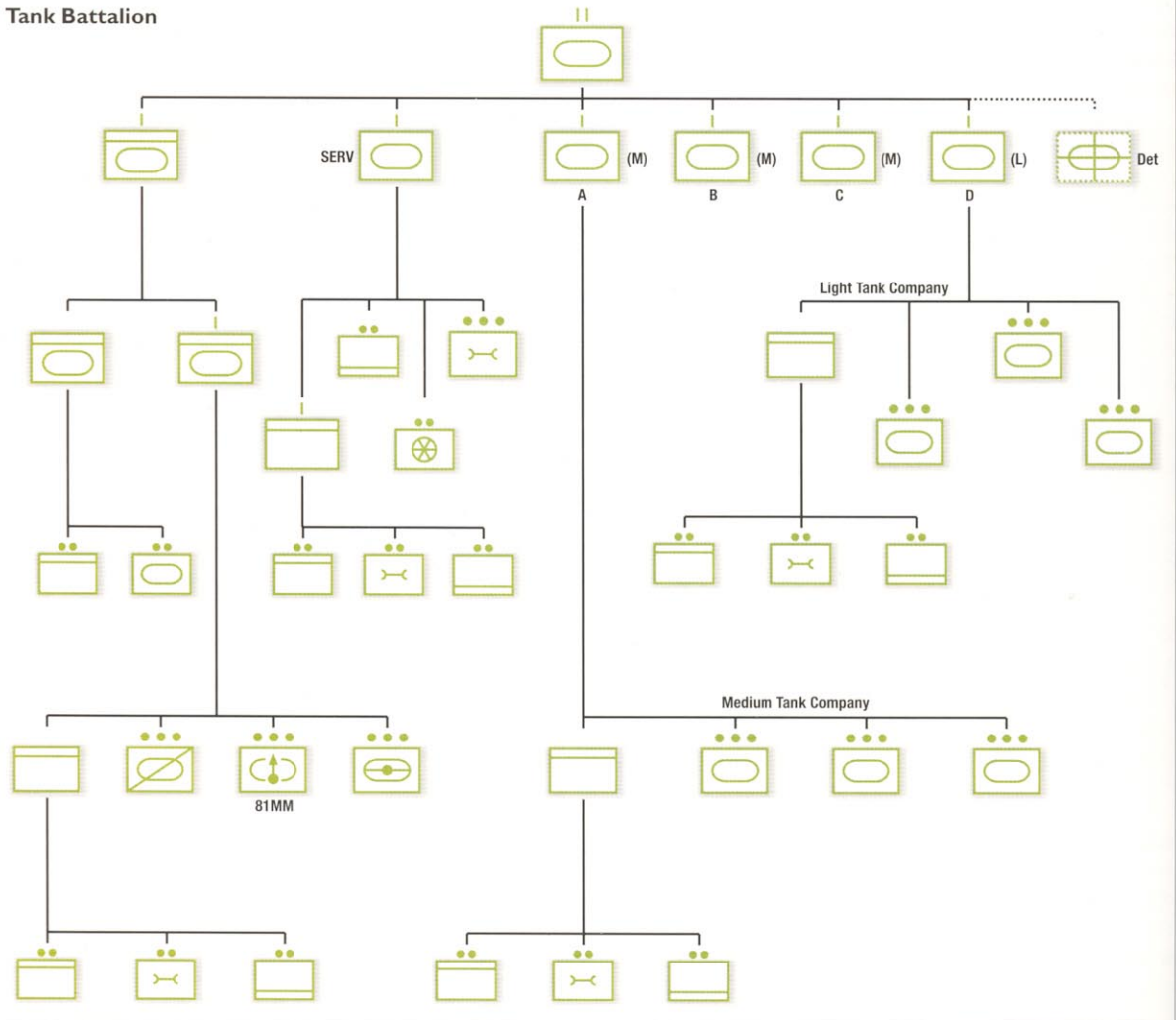
In the wake of the Battle of the Bulge, Patton's Third Army began to take steps to reequip all 75mm tanks with 76mm guns, and local ordnance units built a pilot model in February 1945. However, before the conversion program had started, the US logistics network had finally caught up to demand, and a steady flow of new tanks with 76mm guns became available. The small stockpile of 76mm guns that had been assembled were used to rearm about 100 M4A3E2 assault tanks. The table below summarizes the relative proportion of 75mm M4 medium tanks to the versions with the 76mm gun. The 76mm armed version did not become the major part of the armored division inventory until late April 1945.

The other shift in medium tank equipment was the gradual introduction of the M4A3 medium tank starting in the late summer of 1944. The M4A3 was powered by a Ford GAA gasoline engine instead of the Continental R-975 radial engine used on the M4 and M4A1 and was regarded by the US Army as automotively the best of the M4 family of tanks. There was no systematic program to introduce these tanks into service. Some of the newer divisions such as 9th Armored Division had an almost full complement of these when

Tank battalion table of organization and equipment

T/O&E 17-25 18 Nov 1944	HQ & HQ company	Medium tank company (x 3)	Light tank company	Service company	Medical detachment	Total
Officers	13	5	5	4	2	39
Enlisted men	127	112	89	108	18	678
.45-cal. pistol	3	0	0	0	0	3
.45-cal. SMG	47	92	70	44	0	437
.30-cal. carbine	70	25	24	71	0	240
.30-cal. M1 rifle	20	0	0	0	0	20
.50-cal. M2 HMG	5	1	2	10	0	20
2.36in. bazooka	12	3	2	12	0	35
M5A1 light tank	0	0	17	0	0	17
M4 medium tank	2	17	0	0	0	53
M4 (105mm)	3	1	0	0	0	6
M21 81mm MMC	3	0	0	0	0	3
Half-track	8	1	1	1	0	13
M32 TRV	0	1	0	2	0	5
Light TRV	0	0	1	0	0	1
1/4-ton jeep	11	2	2	3	4	26
3/4-ton ambulance	0	0	0	0	1	1
3/4-ton WC truck	0	0	0	2	1	3
2 1/2-ton truck	1	1	1	34	0	39
Heavy wrecking truck	0	0	0	2	0	2
M10 ammo trailer	4	0	0	13	0	17
1/4-ton trailer	11	2	2	3	4	26
1-ton trailer	2	1	1	20	0	26

Tank Battalion



Armored divisions in 1944 were supposed to be equipped with the M32 tank recovery vehicle but in fact many still used the older M31 TRV, like the one seen here named "Invader" from the maintenance section of Co. I, 66th Armored Regiment, 2nd Armored Division, towing a damaged M4 medium tank over a Bailey bridge near Palenbourg, Germany, on October 15, 1944. (USMA)



Tank Battalion T/O&E 17-25 15 September

Headquarters and HQ Company

Battalion HQ Section



Company HQ



Tank Section



Maintenance Section



AM&S Section



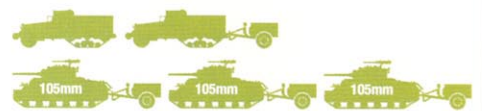
Reconnaissance Platoon



Mortar Platoon



Assault Gun Platoon



Service Company

HQ Section



HQ Maintenance Section



Battalion Maintenance Platoon



AM&S Section



Administration & Personnel Section



Battalion Supply and Transportation Platoon



Medium Tank Company A

HQ Section



Maintenance Section



AM&S Section



1st Platoon



2nd Platoon



3rd Platoon



Medium Tank Company B

HQ Section



Maintenance Section



AM&S Section



1st Platoon



2nd Platoon



3rd Platoon



Medium Tank Company C

HQ Section



Maintenance Section



AM&S Section



1st Platoon



2nd Platoon



3rd Platoon



Light Tank Company D

HQ Section



Maintenance Section



AM&S Section



1st Platoon



2nd Platoon



3rd Platoon



Armored Division medium tank strength (75mm gun vs. 76mm gun)*

Division	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 45	Feb	Mar	Apr	May
2	219/0	210/0	171/45	153/68	156/65	128/60	125/60	117/21	143/66	143/65	143/87	95/95
3	204/0	201/0	184/50	159/65	115/60	138/60	165/48	138/40	155/44	143/51	119/40	86/90
4			160/0	137/18	108/13	132/18	128/17	68/16	112/42	91/49	48/68	54/105
5			166/0	136/19	125/15	127/16	119/21	127/10	123/35	114/35	106/66	77/62
6			156/0	153/0	153/0	157/2	122/11	139/11	66/44	87/56	45/74	30/128
7				94/12	62/49	78/32	77/49	61/36	94/41	118/50	77/61	72/80
8									107/47	116/47	80/70	77/70
9						167/0	0/168	13/95	51/116	50/116	55/97	52/96
10						114/51	116/49	85/34	84/49	86/43	84/84	66/100
11								98/44	81/58	91/61	88/61	68/74
12								109/52	93/44	78/90	84/84	86/83
13												91/70
14											83/88	65/68
16											117/51	115/49
20											117/51	0/165
Percentage of 76mm	0	0	10.2	17.9	21.9	18.6	33.1	27.3	34.5	37.2	44.0	56.3

*Data as of beginning of each month

first deployed in combat, while other units gradually received M4A3s as replacement tanks. The army did not keep records of the proportion of M4A3 to M4/M4A1 in US Army service by unit, but ordnance reports would indicate that by the end of the war, the M4A3 variants amounted to about 44 percent of US Army tank strength in the ETO. The other two versions of the M4 series tank, the diesel-powered M4A2 and the M4A4 with a multi-bank Chrysler bus engine, were not regularly issued to US units in the ETO. However, in the wake of the heavy losses in the Ardennes in December 1944, the US Army requested the transfer of tanks from British theater reserves. Of the 351 supplied, 74 were

Immediate fire support for the tank battalion was provided by the M4 (105mm) assault gun, a normal M4 or M4A3 tank but fitted with a 105mm howitzer instead of a 75mm gun. There was a platoon of these in the battalion headquarters for fire support. This assault gun is providing fire for 3rd Armored Division operations against the Sixth Panzer Army near Manhay, Belgium on December 30, 1944, during the Battle of the Bulge. (US Army)



M4A2 and M4A4 types and these were issued mainly to armored units of Patton's Third Army.

As the chart on divisional tank strength indicates, US armored divisions frequently fought below authorized strength. This was due to a serious underestimation of the likely pace of tank casualties in the spring of 1944 when theater reserve stocks in Britain were being assembled. The US Army used the combat experience in Italy to estimate that monthly attrition would be about 7 percent, and so stocks were built up accordingly. However, losses in Normandy were significantly higher and, even though they decreased in the autumn, the number of available medium tanks did not meet the equipment needs of the divisions. It is worth noting that British theater reserves for medium tanks were pegged at 128 percent with 28 percent on hand in army depots, while at the same time the US reserve was only 27.5 percent of tables of equipment and only 9 percent in reserve in army depots. The replacement factor was increased to 11 percent in October 1944, and 14 percent in December, but heavy losses during the Battle of the Bulge in December 1944–January 1945 again put the US theater tank stocks in deficit and they did not recover until the early spring, by which time the reserve had been increased again to 20 percent.

By the end of 1944, US tank units were becoming increasingly critical of the poor combat performance of their tanks against German types. The muddy autumn weather led to complaints about the poor mobility of the narrow-tracked US M4 tank compared to the wide-tracked German Panther. At first, this led to field expedients such as the use of “duck-bill” extended end connectors on the tracks that began to be issued in large numbers in October–November 1944. The more satisfactory solution was the introduction of the new horizontal volute suspension (HVSS) on the M4A3 tank, which was fitted with a 23in.-wide track offering much better mobility in mud and snow. The first of these M4A3E8 tanks became available in late December 1944 and they made up an increasing proportion of the armored divisions as the war drew to a close.

The poor armor protection of the M4 medium tanks as compared to the German Panther was also widely criticized. The only significant improvement in this regard was the gradual introduction of wet ammunition stowage racks in late-production M4 and M4A3 tanks, which reduced the hazard of ammunition fires. But short of a new tank design with better armor, the army was largely left to field improvisations. Some units began placing sandbags on the front glacis plate and sometimes on the side and on the turret. They were usually filled with dirt, but in some cases they were filled with concrete. The main aim of these efforts was to increase protection against the German infantry anti-tank rockets, such as the panzerfaust, which was becoming ubiquitous by the autumn of 1944. Ordnance generally disapproved of this effort, arguing that the sandbags did not in fact offer any additional protection against shaped charge warheads like those on the German anti-tank rockets, whilst their weight degraded the automotive performance of the tank. Whether effective or not, this practice became widespread by 1945 and some units had a systematic process for mounting the sandbags. The sole exception was Patton's Third Army. His ordnance officers convinced Patton that sandbag armor was a bad idea and armored units in the Third Army were forbidden from using it. This created a problem when divisions were temporarily shifted



The ultimate version of the Sherman tank in US Army service during the war was the M4A3E8 which began appearing in combat in late December 1944. It introduced a new suspension system and wider tracks, giving the tank better mobility in muddy conditions. This example is with the 21st Tank Battalion, serving with CCA, 10th Armored Division, during the fighting in Rosswalden, Germany, on April 20, 1945.

from First or Ninth Army where such sandbag armor was tolerated. In the wake of the heavy tank casualties in the Ardennes in 1945, Patton approved an ordnance effort to strip armor plate off destroyed US and German tanks and weld it to M4 tanks, especially to the better-armed M4A3 (76mm). This was systematically applied to Third Army tanks starting in February 1945, and is most commonly seen on tanks in units usually under Third Army control such as the 4th and 6th Armored Divisions.

The exception to the protection problem was the M4A3E2 assault tank. In January 1944, Armored Force officers at the US Army headquarters in the European Theater submitted an urgent requirement to Washington for 250 heavy tanks for the upcoming campaign in France. They anticipated the need for tanks with thicker armor when confronting the German Siegfried Line defenses. Since the new T26E2 (Pershing) heavy tank was not expected to be ready for many months, an expedient design based around an uparmored M4A3 medium tank entered development in March 1944. A total of 250 M4A3E2 assault tanks were released to the ETO on August 29, 1944. They began arriving in France in September and the first batch of 54 was issued to the US First Army, arriving in mid-October. As of late October 1944, 105 were destined for First Army, 90 to Third Army, and 60 to Ninth Army. In fact, delivery was much slower than expected and at the end of November there had been only 140 issued to units. The remainder were delivered gradually and a small number were diverted for the US Seventh Army in Alsace. There was no tactical doctrine for assault tanks in the US Army and the armor officers in the ETO headquarters concluded that such tanks would be more useful in the separate tank battalions attached to infantry divisions. So for example in Patton's Third Army in late November 1944, there were only five with the 10th Armored Division, but 35 with the separate tank battalions. At first, several of Patton's armored division commanders didn't see any need for an assault tank, including respected tank commanders like John "P" Wood of 4th Armored Division and R. W. Grow of 6th Armored Division. But as the battlefield became soaked by autumn rains, the soggy terrain "narrowed the front to a width only one tank wide." As a result, the armored division commanders changed their minds and began pleading for the assault tanks. In December, the late-arriving assault tanks were issued to armored divisions in small numbers.



A small number of the new T26E3 heavy tanks arrived in the ETO and saw combat starting in March 1945. This is a pair from the 2nd Armored Division passing through Magdeburg after the intense fighting for the city in the middle of April 1945. (US Army)

Although the M4 medium tank had many shortcomings by 1945, its greatest advantage was its sound automotive design and its excellent reliability, especially as compared to German tanks of the period. When in combat, German tank units typically had a third or more of their tanks under repair because of durability problems and shortages of spare parts, while it was unusual for US tank battalions to have even a tenth of their tanks sidelined under most circumstances. The exceptional mobility and striking power of the US armored divisions during the 1944 race across France and the 1945 race across Germany would not have been possible except for the automotive durability of the M4 medium tank.

The demand for a "killer tank" led to an acceleration in the deployment of the new T26E3 (Pershing) heavy tank. The first trial batch of 20 tanks arrived in February 1945 and were deployed with the 3rd and 9th Armored Divisions. The T26E3 (Pershing) was a completely new design with better armor and firepower than the M4 tank. Supply of these tanks was slow and, though 300 arrived in theater prior to the end of the war, few were actually deployed in time to see combat. It was comparable to the German Panther tank in weight and performance, but arrived too late and in too small a quantity to have much impact. A postwar report concluded that "Unfortunately for this test, the German armor had been so crippled as to present a very poor opponent and the cessation of hostilities so soon after forming these (T26E3) companies precluded the gaining of any real experience." The table below summarizes their deployment.

T26E3 heavy tank strength in the ETO 1945

Division	Mar	Apr	May
2		19	21
3	10	10	18
5			17
9	10	10	17
11			32
Total	20	39	105

The standard light tank in US Army service in the ETO was the M5A1 light tank. The M5A1 was widely disparaged by US tank crews and there had been complaints that it was obsolete even in 1943 in Tunisia where it debuted. Its 37mm gun was not able to penetrate German tank armor of the day and was too small to make it effective as an infantry support weapon against field fortifications or buildings. The poor armor protection of the M5A1 resulted in a higher rate of crew casualties than medium tanks, with a medium tank crew having about a one-in-five chance of becoming a casualty when their tank was knocked out, compared to a one-in-three chance in light tanks. Division commanders had not anticipated the vulnerability of these tanks, and this was reflected in very high casualties in the Normandy fighting in the summer of 1944. For example, Patton's Third Army lost 308 M5A1 tanks during the entire 1944-45 campaign, of which nearly half were lost in August and September 1944 alone. Nearly the same pattern was repeated in Hodge's First Army, which suffered the majority of its light tank casualties in June-September 1944. The heavy casualties in the light tank companies led tank battalion commanders to be more careful in employing the M5A1 light tank after the summer of 1944, and the diminishing casualties in later months was due in no small measure to restricting the missions of the light tanks to reduce their vulnerability. Most battalion commanders used it for secondary missions such as scouting, flank security or mopping-up operations. One commander grimly noted that he

sometimes used his light tanks as "tank bait" to help discover German tank or anti-tank positions, which could then be dealt with using the M4 medium tanks. A report to Gen. Dwight Eisenhower from the 2nd Armored Division in January 1945 concluded: "The M5 light tank is obsolete in every respect as a fighting tank ... The light tank is being used for working with the infantry. We subject it to direct fire just as little as we can, for it is realized that the armor will not turn the German fire or the 37mm gun damage the German tanks or SP guns."

The new M24 light tank, armed with a 75mm gun, began to arrive around Christmas, 1944. Priority was given to cavalry reconnaissance squadrons which were more handicapped by their dependence on the M5A1 light tank than the tank battalions. They were slowly deployed with armored divisions as well, and some divisions newly arrived from the United States such as the 8th, 13th, 16th and 20th Armored Divisions were fully equipped with the type. The M24 proved a very popular design compared to the outdated M5A1 light tank.

M24 light tank strength in armored divisions in the ETO 1945

Division	Feb	Mar	Apr	May
2		17	17	33
3		13	17	46
4			17	24
5		17	17	17
6				20
7		17	30	51
8	82	82	79	82
9			16	51
11				18
13				79
14				5
16			83	83
20			83	83
Sub-total armored div.	82	146	359	592
Other units	46	268	325	384
Total	128	414	684	976

Armored infantry battalions

The armored infantry provided the offensive and defensive backbone of the armored division. As in the case of the tank battalions, there were three **armored infantry battalions** in each division. A 1943-pattern armored infantry battalion consisted of five companies: an HQ company, three rifle companies and a service company. The battalion HQ included a company HQ, reconnaissance platoon, three M8 75mm HMC, three self-propelled 81mm mortars on halftracks, a heavy machine-gun platoon and a maintenance section.

There had been steady improvements in the structure of these units since they were first formed in 1940. The 1942 armored infantry company had a towed 37mm anti-tank gun in each rifle platoon but the new 1943-pattern companies added an anti-tank platoon with towed 57mm anti-tank guns. Raising the squad size from 11 to 12 men and adding a M1 2.36in. rocket launcher (bazooka) to each squad strengthened the infantry platoons. So a 1943 company had 251 troops and 20 half-tracks while the 1941-42 company had 178 men and 17 half-tracks.

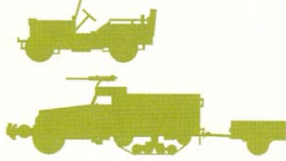
Rifle Company, Armored Infantry Battalion (1943)

Company HQ Platoon

HQ Section



Maintenance Section



Administrative, Mess & Supply Section



Rifle Platoon

Platoon HQ & Rifle Squad



Rifle Squad



Rifle Squad



Mortar Squad (60mm)



Light Machine-Gun Squad



Rifle Platoon

Platoon HQ & Rifle Squad



Rifle Squad



Rifle Squad



Mortar Squad (60mm)



Light Machine-Gun Squad



Rifle Platoon

Platoon HQ & Rifle Squad



Rifle Squad



Rifle Squad



Mortar Squad (60mm)



Light Machine-Gun Squad



Anti-tank Platoon

Platoon HQ



Anti-tank Squad



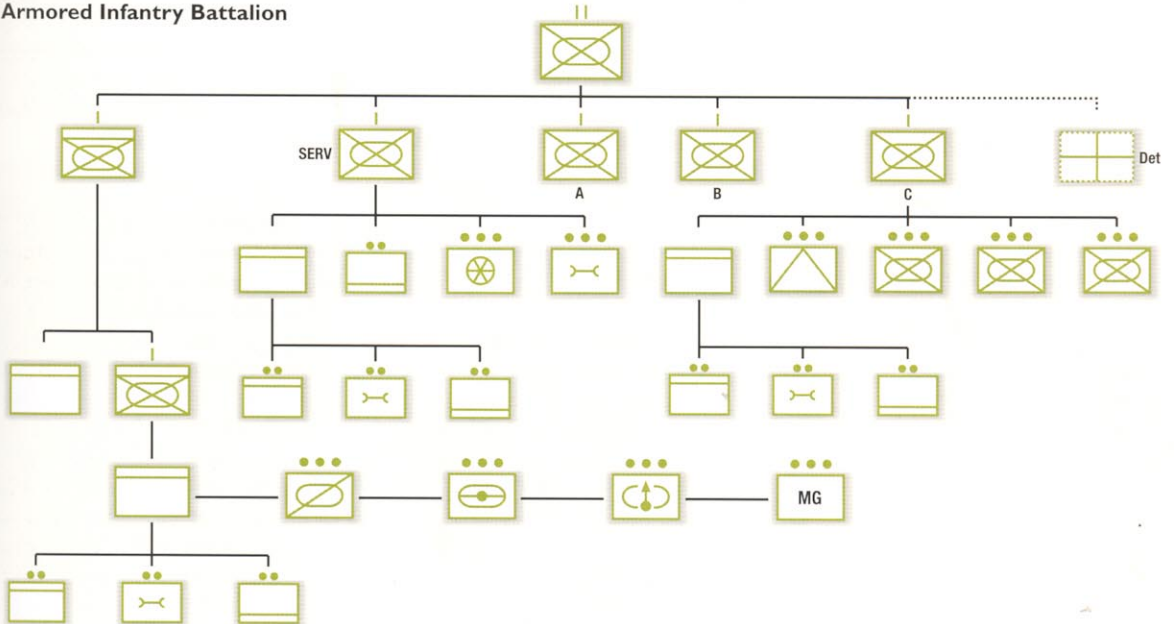
Anti-tank Squad



Anti-tank Squad



Armored Infantry Battalion



An M3 half-track nicknamed "Copenhagen" of Co. C, 46th Armored Infantry Battalion, 5th Armored Division, passes a burning barn during the fighting for Wittenmore, Germany, on April 12, 1945. Like most armored infantry vehicles in combat, it is laden with its squad's gear including an ample supply of K-rations and .50-cal. ammo boxes on the hull side, and tarps and bed-rolls on the fenders and rear stowage racks. (US Army)



Each rifle platoon had five half-tracks, each half-track carrying a squad. There were three rifle squads in M3 half-tracks, a light machine-gun squad in an M2 half-track car and a mortar squad with two 60mm mortars. The M2 and M3 half-tracks were automotively the same, but used different body designs. The M3 had a larger rear compartment. The M2 had a shorter rear compartment that was interrupted in the center by a pair of large stowage bins. On the M3 half-track, the vehicle's machine gun armament was fitted to a pintle mount behind the driver's compartment, while on the M2 half-track car, it was on a skate rail. Neither approach was particularly effective and in May 1943 a new ring-mount was approved which was added over the right side seat in the driving compartment. Half-tracks with this feature were redesignated as M2A1 and M3A1 half-tracks. This mount was usually fitted with a .30-cal. machine gun except for the platoon leaders' vehicle, which was authorized a .50-cal. heavy machine gun. Once in combat, squads usually augmented this armament and many squads ended up with .50-cal. heavy machine guns whether authorized or not. By 1943, it was becoming evident that the M3 was the more effective of the two half-track designs and that there was no need for two separate types. A universal type, the M3A2 half-track, was standardized in October 1943, but so many half-tracks had already been manufactured that no series production of the M3A2 took place.

An M3A1 half-track passes the smoldering wreck of an M4A3 (76mm) medium tank of the 48th Tank Battalion, 14th Armored Division, during the fighting for Barre in Alsace on November 29, 1944. The 14th Armored Division was one of two armored divisions usually attached to the 6th Army Group which fought in Alsace throughout February 1945. (US Army)



During the war, armored infantry soldiers were nicknamed “armored doughs,” or “blitz doughs” based on the nickname “doughboys” for US infantry in World War I. Life in the armored infantry battalions was different than in “straight-leg” infantry units. Because of their half-tracks, armored infantry could carry far more equipment with them into combat and this tended to include a heavier assortment of weapons than was the case with regular infantry. Armored infantry were notorious for pilfering gear, since they could carry it with them in the half-tracks. Half-tracks often became covered with additional tarps, bags, stoves, brooms, washbasins, pails and other amenities. Some divisional commanders complained that their armored infantry columns resembled “gypsy caravans,” and the commander of the 2nd Armored Division actually tried to ban the half-track in favor of normal trucks.

Even though the half-track relieved the armored infantry from the footslogging misery of the normal infantry, it was not easy duty. Armored infantry suffered some of the highest casualties of any single combat arm during the war in Europe. The usual high infantry casualty rates were exacerbated because the battalion’s mobility led commanders to use them in attacks more often than the average foot infantry battalion. A formerly secret army medical report concluded that:

In armored divisions, with too few armored infantry, the infantry contributes from 80 to 90 percent of the combat exhaustion casualties, rates becoming extremely high after the third to fifth days of action. In hard, continued action, armored infantry companies may be down to 40–50 men [out of a strength of 245], with [all] three company commanders casualties in the process. One unit had 150–180 percent replacements in 200 days; another had 100 percent turnover in 60–70 days.

The US Army preferred its half-tracks to comparable vehicles such as the German SdKfz 251 half-track and the British Universal Carrier. The SdKfz 251 had marginally better armor protection due to its use of sloped sides, but this reduced its internal carrying capacity by 20 percent. Unlike the US half-tracks, the German half-track was not fitted with a powered front axle, had about 25 percent less horsepower, required a higher level of maintenance and had problems with its interleaved wheels becoming impacted with mud that could lead to tracks being shed. However, most armored infantry commanders wanted a fully tracked vehicle capable of traversing the same terrain as tanks, with full armor protection and an enclosed roof. The half-track was an inexpensive wartime expedient and after the war it gave way to fully tracked, fully armored infantry transporters.



Anti-tank defense in the armored infantry companies was provided by the M1 57mm anti-tank gun, a license-built version of the British 6-pdr. With the advent of more heavily armored German tanks like the Panther, this gun was obsolete. Each armored infantry company had an anti-tank platoon with three of these guns, usually towed by the M2A1 half-track car. Here, a gun crew is seen unlimbering a 57mm gun from its half-track during the fighting in Aachen on October 15, 1944. (US Army)

Armored Infantry Battalion Table of Organization and Equipment

T/O&E 7-25 15 Sep 1943	HQ & HQ company	Rifle company (x 3)	Service company	Medical detachment	Total
Officers	14	6	4	3	39
Enlisted men	159	251	75	36	1,023
.45-cal. pistol	3	0	0	0	3
.30-cal. carbine	107	78	53	0	394
.30-cal. M1 rifle	34	145	0	0	469
.30-cal. M1903 rifle	0	3	0	0	9
.45-cal. SMG	29	25	22	0	126
.30-cal. LMG	0	6	5	0	23
.30-cal. HMG	7	10	0	0	37
.50-cal. HMG	7	10	6	0	43
2.36in. bazooka	14	18	6	0	74
M8 75mm HMC	3	0	0	0	3
M21 81mm MMC	3	0	0	0	3
M3 HT ambulance	0	0	0	3	3
M3A1 half-track	11	20	1	0	72
M32 ARV	0	0	1	0	1
57mm AT gun	0	3	0	0	9
60mm mortar	0	3	0	0	9
81mm mortar	0	0	1	0	1
1/4-ton jeep	11	3	3	1	24
3/4-ton command car	0	0	1	0	1
3/4-ton WC truck	0	0	1	0	1
Heavy wrecker truck	0	0	1	0	1
M10 ammo trailer	4	0	4	0	8
1-ton trailer	2	3	10	1	22

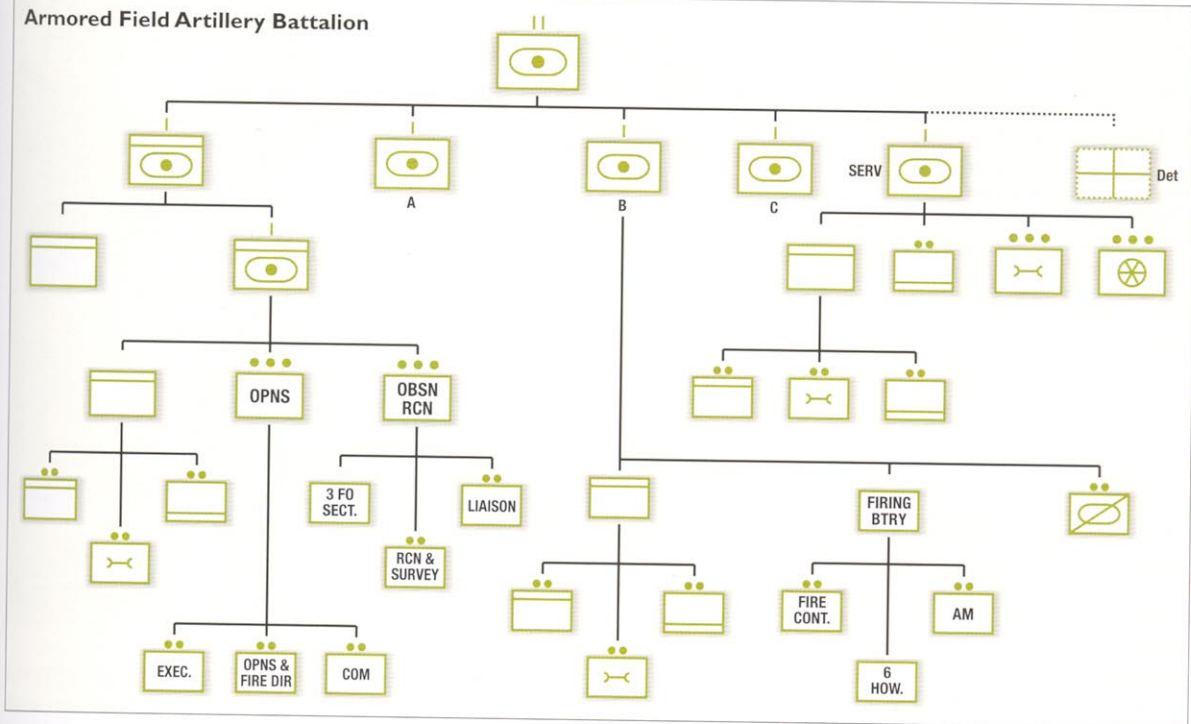
Armored field artillery battalions

The one US combat arm that the Germans willingly acknowledged was better than their own was the field artillery. The armored field artillery was the killing arm of the division, possessing its greatest firepower. Of the ammunition used daily by the armored divisions, the field artillery accounted for 60 of the 80 tons fired in combat and generally accounted for the majority of enemy casualties. The field artillery in the US armored division was entirely self-propelled while in the German panzer division only a single battalion was self-propelled. This permitted the armored field artillery to move with the tanks, accompanying them if need be.

Unlike the other two combat arms, the field artillery arm had a divisional artillery commander and headquarters because of the need to coordinate divisional artillery fire. The divisional artillery commander had a small staff and was located with the divisional HQ's forward echelon. In the event that other field artillery battalions were attached to the division, they would be subordinate to this command. The field artillery commander had two light aircraft at his disposal for liaison, reconnaissance and fire control.

There were three field artillery battalions in the division. The battalion HQ and headquarters battery included the basic command, maintenance,

Armored Field Artillery Battalion



communication, reconnaissance, liaison, observation and survey personnel, as well as a battalion fire direction center (FDC). These HQ batteries included two light aircraft for liaison, reconnaissance and observation. Because of the need for an airfield, it was not unusual for all divisional aircraft to be operated from a single location since the majority were operated by the divisional artillery. The battalion HQ also included a small number of tanks fitted out with radios for forward observer teams, two per battalion. The only difference between these and normal M4 tanks was the use of a radio in the SCR-600 series that could be tuned to the artillery radio nets.

There were three batteries of M7 105mm howitzer motor carriages (HMC) in each battalion. This vehicle was based on the standard medium tank chassis and was armed with the same 105mm howitzer used in a towed form by other field artillery battalions. It was a very successful design combining an excellent field piece with a very durable and dependable chassis.



The workhorse of the armored field artillery battalions was the M7 105mm howitzer motor carriage. The crew of an M7 105mm HMC of Battery C, 274th Armored Field Artillery Battalion, prepare to conduct a fire mission in support of Patton's Third Army near Bastogne on January 1, 1945. The side armored flap is folded down, showing the tops of the fiberboard ammunition canisters in the ammunition racks along the side of the vehicle. (US Army)

One of the innovations introduced after the Tunisian campaign was the allocation of a pair of tanks to each armored field artillery battalion to provide mobility and protection for their forward observation teams. This is a forward observer tank of the 440th Armored Field Artillery Battalion. As the lead element in Patton's northern thrust into Lorraine, the 7th Armored Division was the first to reach the fortress city of Metz in September 1944. (Patton Museum)



Each armored division operated their own air element, primarily for artillery spotting. Each armored field artillery battalion was allotted two light liaison aircraft, though in practice the division's aircraft often operated out of a single field. These are Piper L-4 Grasshoppers of the 2nd Armored Division on December 11, 1944, evident from their divisional code of "49" on the fuselage side. The Grasshopper in the background with the code "63" is from the artillery headquarters of the Ninth Army to which the 2nd Armored Division was attached in the weeks prior to the Ardennes counterattack. (US Army)

The howitzer battery consisted of a battery HQ, a firing battery with six M7 105mm HMCs and a reconnaissance section. A fire control section and ammunition section were attached to the firing battery. The battalion also had a service battery performing administrative, supply, transport and maintenance functions for the unit.

The firepower of the field artillery units could also be augmented by supplementing their fire with the 105mm howitzers mounted on the assault tanks in the tank battalion headquarters companies. This was done by linking the assault guns into the artillery net by wire and to the forward deployed tanks through the usual radio channels.



Armored field artillery battalion table of organization and equipment

T/O&E 6-165 15 Sep 1943	HQ & HQ company	Firing battery (x 3)	Service battery	Medical detachment	Total
Officers	14	4	5	1	32
Enlisted men	97	106	86	10	511
.45-cal. pistol	5	0	0	0	5
.30-cal. carbine	71	93	63	0	413
.45-cal. SMG	35	17	30	0	116
.30-cal. LMG	4	4	6	0	22
.50-cal. HMG	6	4	8	0	26
2.36in. bazooka	11	7	8	0	40
81mm mortar	0	0	2	0	2
M7 105mm HMC	0	6	0	0	18
M4 medium tank	3	0	0	0	3
M3 HT ambulance	0	0	0	1	1
M3A1 half-track	10	7	0	0	31
M32 ARV	0	0	2	0	2
1/4-ton jeep	9	3	3	1	22
3/4-ton command car	0	0	2	0	2
3/4-ton WC truck	0	0	1	0	1
2 1/2-ton truck	1	1	21	0	25
Heavy wrecker truck	0	0	1	0	1
M10 ammo trailer	0	8	9	0	33
1-ton trailer	2	2	12	1	21
Liaison aircraft	2	0	0	0	2

Supporting arms

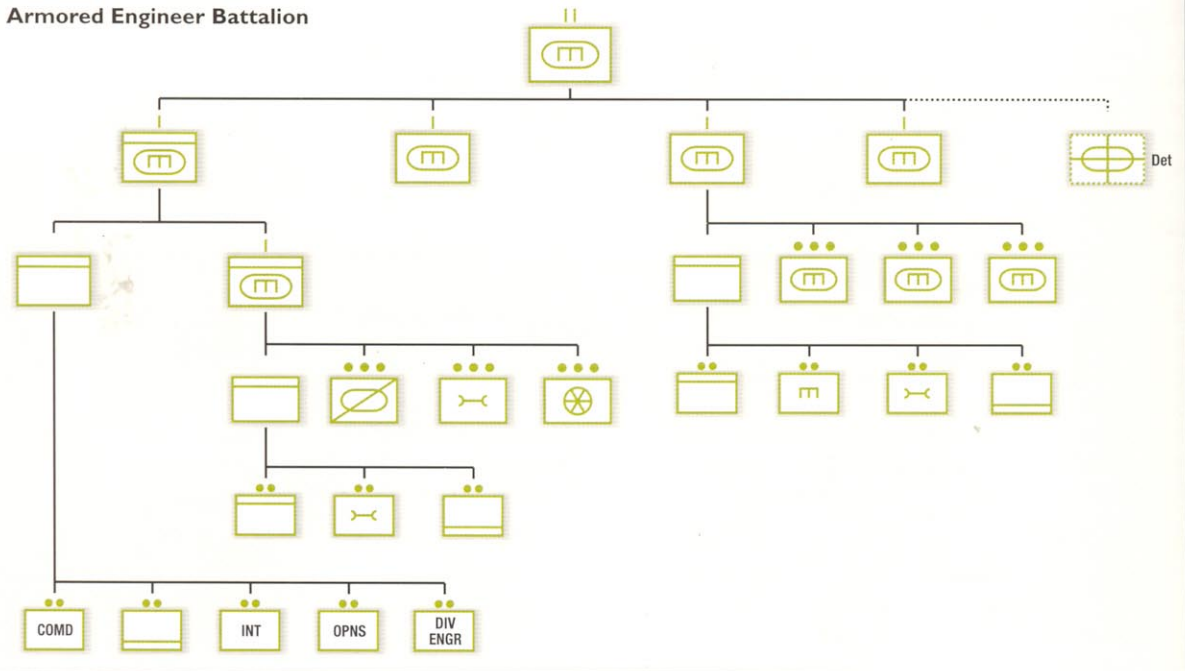
Each armored division had an armored engineer battalion. This unit was similar to standard combat engineer battalions except that one platoon in each of the lettered companies was mounted in armored half-tracks. The battalion was organized into an HQ and HQ company and three engineer companies. It was frequently the practice to divide up the engineer headquarters into a forward echelon which directed the missions, a rear echelon which managed the supply, administration and technical support of the battalion, and a divisional engineer section which consisted of the battalion staff located at the divisional forward echelon HQ to coordinate engineer activities with the division commander. The engineer battalion was a "jack-of-all trades" unit with a wide range of responsibilities. It was responsible for laying mines as well as clearing minefields, various types of construction work including road repair, removal of terrain obstructions, breaching tank traps and other natural obstructions, and many other functions. Each engineer battalion usually maintained a ready stock of 72ft of treadway bridge, though more would be stockpiled for certain operations. In many cases, the division had additional engineer units attached for specific operations, such as engineer bridge battalions, and the divisional engineer would direct these units.

The rear support units in the US Army in World War II were called the division trains. These units were coordinated by a division trains' HQ and HQ company. The rear echelon of the division HQ, the military police platoon and the division band were attached to this HQ. The essential elements of the division train were

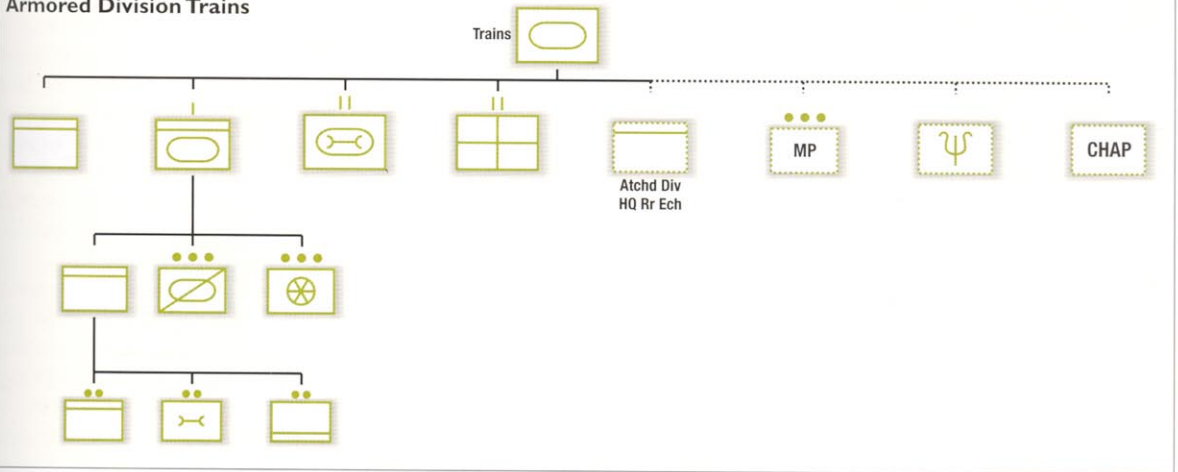
The tasks of the armored engineer battalions were diverse. Here, a couple of engineers of the 6th Armored Division conduct mine clearing on a road near Luppy, France, on November 15, 1944. The GI in the center is operating a SCR-625 mine detector with the associated electronics in the pack strapped behind him. The GI to the left in the greatcoat is carrying a bayonet to probe for the mine once it is found. (US Army)



Armored Engineer Battalion

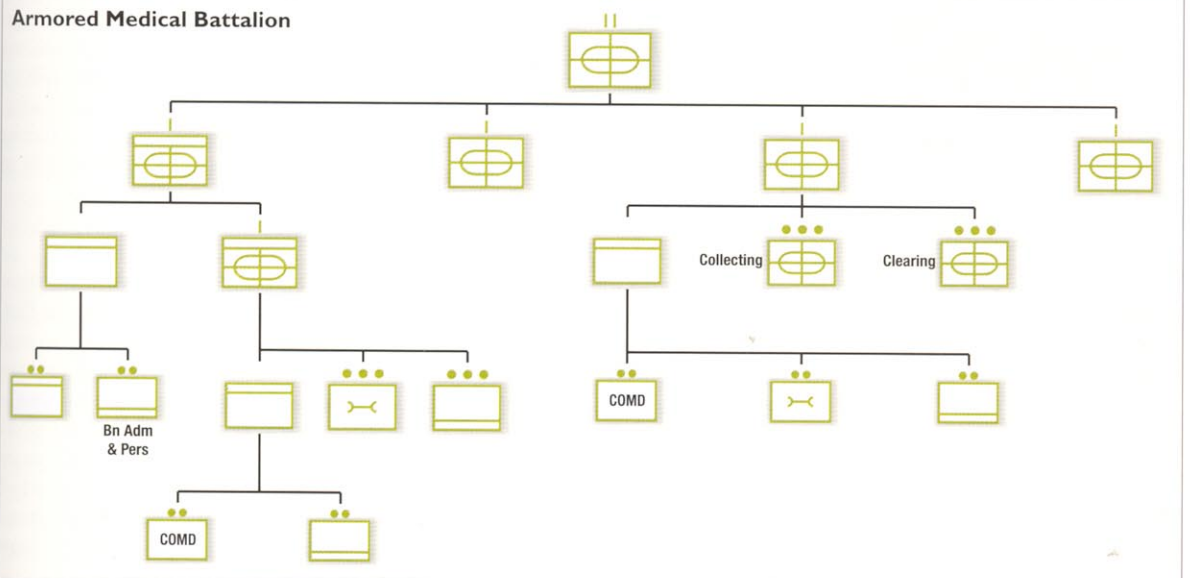


Armored Division Trains

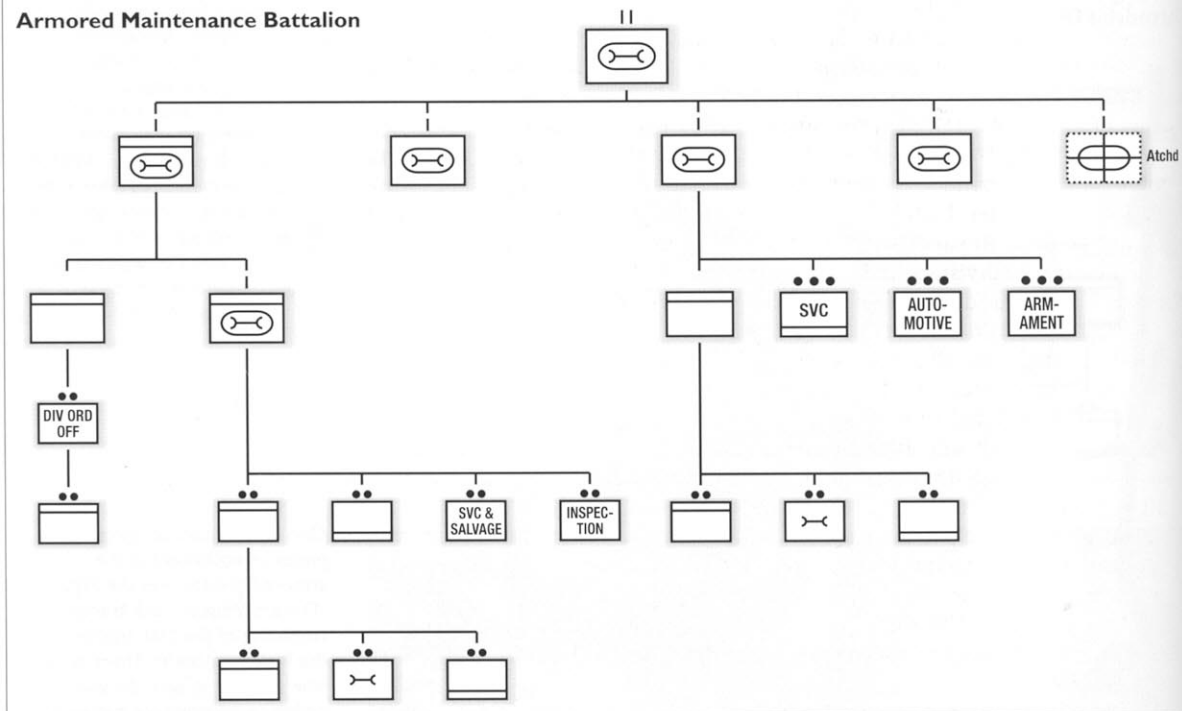


One of the more conspicuous pieces of equipment in the armored division was the M25 "Dragon-Wagon" tank transporter consisting of the M26 tractor and the M15 semi-trailer. There were nine of these in each division's ordnance maintenance battalion. The powered winch assembly behind the cab allowed them to retrieve damaged medium tanks as seen here as a knocked-out 4th Armored Division M4A3 tank is recovered near Bastogne on January 6, 1945, ten days after the division relieved the besieged town. (US Army)

Armored Medical Battalion



Armored Maintenance Battalion



Tank destroyers were not organic to armored divisions, but most armored divisions had at least one tank destroyer battalion attached during the fighting in the ETO. This is one of the new M36 90mm GMC of the 703rd Tank Destroyer Battalion supporting the 3rd Armored Division near Malempre, Belgium, on December 16, 1944, during the opening phase of the Battle of the Bulge. (US Army)

an armored medical battalion and an armored maintenance battalion. The armored medical battalion had an HQ company and three armored medical companies. Each armored medical company included an HQ, a collecting platoon and a clearing platoon. The armored maintenance battalion had an HQ company and three maintenance companies. Each of the maintenance companies included an HQ, a service and supply platoon, an automotive platoon and a reclamation and evacuation section.

The logistical demands of an armored division were formidable. A First Army report concluded that on average, an armored division consumed 14,750 gallons of 80-octane gasoline per day, as well as 310 gallons of engine oil and 215 gallons of other lubricants.

The average daily consumption of ammunition was 80 tons including 60,000 rounds of small arms and machine-gun ammunition, 420 rounds of tank gun ammunition, and 2,100 rounds of artillery ammunition.

Divisional attachments

Although the armored division was intended to be a self-contained unit, there had always been plans to temporarily attach battalions to it as needed. In fact, it was quickly apparent that it lacked certain types of capabilities and it became commonplace in the ETO to semi-permanently attach certain types of units to each division. This usually included an anti-aircraft artillery automatic weapons battalion and a self-propelled tank destroyer battalion. Other units that were often attached included quartermaster truck companies, ordnance evacuation companies and engineer bridge companies. The division lacked a medium field artillery battalion with its more powerful 155mm howitzers and it was common to attach one or more of these battalions to the division when it was in combat.

Division comparison

It is worthwhile to compare the US armored division to other similar organizations, especially the German panzer divisions. The comparison here is between a standard US division on the 1944 TO&E and a German formation on the August 1944 TO&E. The panzer division had fewer tank battalions but more infantry than its American counterpart. There was a single panzer regiment with two battalions, compared to three battalions in the US division. However, the German battalions were significantly larger than the American battalions, at least on paper, with 80 vs. 53 medium tanks. In terms of medium tanks, the panzer division had 162 compared to 168 in a US division. The Wehrmacht panzer divisions had four battalions of panzergrenadiers and the Waffen-SS divisions a total of six, compared to only three battalions of armored infantry in the US division. However, only half the German battalions were allotted half-tracks and the rest were theoretically motorized so there were 448 half-tracks in a US division but only 237 in a panzer division. Both the US and Wehrmacht divisions had three artillery battalions though the Waffen-SS divisions had four. However, only one battalion in each German division was self-propelled compared to all three US battalions. Curiously enough, the panzer division had considerably more motor transport on paper, 2,538 vehicles versus only 1,103 in a US division. In total manpower, the German division was significantly larger than the US division (14,727 vs. 10,616). The discrepancy is even greater when comparing the US division to a Waffen-SS panzer division which had a nominal strength of 17,809 troops.

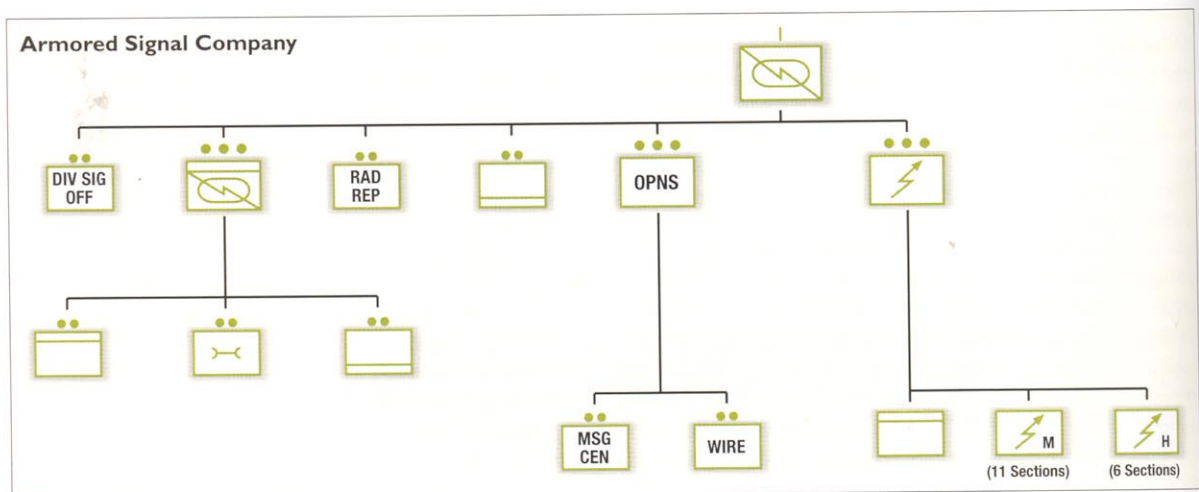
However, there are some distinct problems in making comparisons between these divisions, especially when making a sterile comparison between the paper strengths of their relevant tables of organization and equipment. This is due to two factors. The German panzer division contained many of the units that were not organic to the US armored division, but which were usually attached in practice. So for example, the panzer division TO&E includes an anti-aircraft battalion and a tank destroyer battalion, while the US armored division did not have these as part of its TO&E strength even though they were usually present in combat. The more significant problem was the difference in the way that German and American divisions were actually deployed and supported in combat. US armored divisions fought very near to their TO&E strength, while German divisions seldom, if ever, did. So for example, at the outset of the Battle of the Bulge on December 15, 1944, the 2nd Panzer Division had 92 tanks (57 percent of TO&E) while the US 2nd Armored Division had 203 medium tanks (87 percent of TO&E). This even affected Waffen-SS units, which had priority in equipment for offensive operations such as the Ardennes offensive. So for example, the two spearhead divisions of Sixth Panzer Army, the 1st SS-Panzer Division *Liebstandarte*, and the 12th SS-Panzer Division *Hitlerjugend* had only 101 and 77 tanks respectively, or only about half their nominal paper strength at the beginning of the offensive. In addition, the US Army made every effort to keep units in combat as near to authorized strength as possible, while it was the German practice to allow units to become worn down in combat, and then pulled out and refitted. Once again using the two same units as examples, on January 1, 1945, the 2nd Panzer Division had been reduced to only 26 medium tanks (16 percent of TO&E) as it received few replacement tanks, while the 2nd Armored Division had 199 medium tanks (86 percent TO&E) having replaced most of its losses with new tanks. As a result, some caution must be exercised in comparing these units in combat. German panzer divisions were formidable when close to their TO&E strength such as at the outset of the Normandy campaign, but after the summer of 1944, they were only a shadow of their intended configuration, frequently reduced in strength to that of a weak infantry division with modest tank support.

Command, control, communication and intelligence

Compared to 19th-century armies, which fought in tight formations, the growing lethality of modern weapons, especially artillery, led to the greater dispersion of armies in 20th-century warfare. This led to what some observers called the "empty battlefield" where a division would have its forces scattered over a front several miles wide. While this reduced vulnerability to artillery fire, it caused significant problems for the command and control of units that were no longer within eye-sight of the divisional commander. This problem was further exacerbated by the mobility of units such as armored divisions, which not only were widely dispersed, but which also moved rapidly in combat. As a result, modern means of communication were essential to the successful employment of armored divisions. While many of these technologies seem quaint and old-fashioned today, devices such as FM radios and teletype printers were the cutting edge of electronics technology in 1944.

Communications for the divisional headquarters was the responsibility of the armored signal company. The US armored division made use of the full range of traditional means of military communication, including messengers and signal flags, but relied especially on radio for tactical communications because of the mobility of the units. The most common means of communication between the division headquarters and the field commands was the field telephone. The main advantage of the field telephone was that it allowed secure voice communication and was not easily jammed. Its disadvantages for an armored division were many. To begin with, it required that wire be strung between the headquarters and sub-units. This was certainly more practical when the division was relatively static, but during mobile operations it could prove extremely difficult or even impossible. Field telephone communication was widely used by the division's rear elements such as links between the headquarters and the divisional railhead and rear supply echelons.

In addition, the division usually had a teletype link to higher headquarters that was used extensively for the transmission of reports and other detailed



messages. The teletype was first introduced by the US Army in 1942 and was a major innovation in expanding the volume of communication traffic compared to normal voice or telegraph messages. These telephone and teletype links within the division were set up by the wire section of the signal company's operations platoon. The wire section had three 2½-ton trucks to carry the necessary supplies, as well as five jeeps and two half-tracks used to lay the wire. Many units had their own signals units that used field telephones for internal communication nets. For example, the field artillery battalion usually linked the M7 105mm HMC in the fire battery to the fire direction center by means of wire. Wire links to higher commands, such as between division and corps, were the responsibility of the corps' signal battalion.

Because of the inherent limitations of field telephones in mobile units, the armored division relied primarily on radio for communication both in terms of command links between higher headquarters and sub-units, and within the tactical units themselves. The division's armored signal company operated a radio platoon with two sections: a high-power radio section with six mobile radio stations and a medium-power radio section with 11 medium-power stations mounted in half-tracks. The standard high-power radio was the SCR-299, first manufactured in the spring of 1942. It was mounted in a shelter body on a 2½-ton truck that towed a semi-trailer with the associated PE-95 generator. The SCR-299 had a transmission power of 400 watts with an effective voice range of about 100 miles and a Morse code range of several hundred miles. The high-power section was used from fixed locations within the division and, as the name implies, was provided with sets of sufficient power to communicate throughout the division as well as with higher formations, such as corps headquarters. The medium-power section permitted communication within the tactical formations of the division and its SCR-506 radios were carried in half-tracks to provide the necessary mobility to move with the combat elements of the division.

The most significant tactical communication innovation by the US Army in World War II was the introduction of tactical very-high frequency FM (frequency modulation) radios starting in 1941, largely at the prompting of the new Armored Force. Until the early 1940s, most armies had relied on traditional AM (amplitude modulation) radios for their tanks. The US Army abandoned the use of AM radios on armored vehicles because of problems with static and other forms of interference, including signal noise induced by metal-on-metal contact in the vehicle itself when in motion, the need for delicate tuning controls, and their operation in the lower frequency bands that were crowded and noisy. The first sets, such as the SCR-293 and SCR-294, were conversions of commercial Link AM radios, but by March 1942, the production of the standard Western Electric SCR-500 series began and these became the standard wartime types. This provided the US armored divisions with more robust radio communication in combat than most other armies, since AM radios of the time were extremely undependable while a tank was in motion. In the US armored division, all



Each armored signal company deployed a high-powered radio section with six SCR-299 radio stations. This consisted of a 2½-ton truck with a HQ-17A shelter, and a semi-trailer carrying the PE-95 power generator. This basic configuration was used with other high-power radio stations such as the SCR-399, which shared some common components such as the BC-620 transmitter. (US Army)

The medium-power section of the armored division's armored signal company operated 11 of these radio-equipped half-tracks, which were usually deployed to keep scattered elements of the unit in contact with divisional headquarters. This particular vehicle from the 146th Armored Signal Company, 3rd Armored Division, is seen on July 31, 1944, while crossing a bridge recently erected over the river See in Normandy by the engineer bridge battalion seen in the background. (US Army)



armored vehicle radios were FM types, including those mounted in tanks, tank destroyers and cavalry vehicles such as the M8 light armored car. All of the division's tanks had an FM transceiver that could both transmit and receive voice communications. Artillery units used new FM radios of the SCR-600 series that generally had 120 crystals in the artillery channels compared to the 80 crystals for the Armored Forces' assigned channels. These radios were generally designed for tactical use within the division with appropriate ranges. The armored infantry had the most complicated radio situation since there was a mixture of types. The half-track radios used by platoon commanders and higher were FM types as was the backpack SCR-300 "walkie-talkie." However, the small hand-held SCR-536 "handie-talkie" still operated in AM. More powerful radios were provided for battalion headquarters since they needed to communicate back to the combat command headquarters.

One of the challenges posed by the fighting in Europe was the need to coordinate ground operations with air support. Tanks and aircraft did not communicate on the same frequencies, leading to significant problems. The first serious effort to develop satisfactory coordination took place in July 1944 prior to Operation Cobra. The IX Tactical Air Force in conjunction with the First Army decided to deploy VHF radios in a small number of tanks stationed with the lead combat commands, with accompanying air corps personnel to ensure proper radio procedure. In addition, specific squadrons were assigned to provide close air support. The resulting "armored column cover" tactics proved enormously successful during Operation Cobra in late July 1944, and helped to set the course for further developments in air-ground cooperation later in the war. This enhanced level of cooperation was not available on a day-to-day basis through all of the campaign in Europe, but was generally organized for specific operations, especially offensives.

Radio communications were an essential element in modern combined arms warfare. They allowed the division headquarters to coordinate units scattered over dozens of miles, even when all the units were in motion. At a tactical level, they permitted the coordination of different combat arms in real time, increasing the flexibility of units on the battlefield. Radio substantially enhanced the effectiveness of artillery since forward observers in the tank battalions and armored infantry battalions could call down fire with considerable precision precisely when it was most needed. Artillery fire is far more lethal when used in a directed fashion rather than in preplanned fire strikes, so radio was instrumental in substantially increasing the lethality of artillery. Likewise, innovations in tank-mounted radios in 1944 made it possible for armored columns to coordinate air strikes from roving fighter bombers. Radio had a much greater impact on US armored tactics than in other armies as radios were more widely distributed, and of a significantly better quality.

Tactics

The missions of the armored division were assigned by higher commands, either at the level of army or corps. (A corps consists of several divisions, while an army consists of several corps.) Since armor was a new branch with new tactics, army and corps commanders were often uncomfortable with the tactical doctrine for armored divisions. The performance of an armored division was strongly influenced by whether the missions assigned by higher headquarters were well suited to its capabilities.

Of the principal army commanders in the ETO, George S. Patton of Third Army stood out in his use of armored divisions during the war. This is not entirely surprising, as the other two army commanders of the 12th Army Group, Courtney Hodges of First Army and William Simpson of Ninth Army, were both infantry officers while Patton was a cavalry officer. Patton was a superior armor commander because of his training and temperament. He had commanded an armored division in 1941 and so he better appreciated the opportunities and limitations of these formations. He was at heart an audacious cavalry commander, willing to take risks and employ armor in a bold fashion. It is not surprising that after the war, when the General Board conducted a review of armored division performance, the armor officers repeatedly pointed to Patton's dash across France in August 1944 as the best example of the primary mission of the armored division, to conduct offensive operations in hostile rear areas. Both Hodges and Simpson had a far more conservative tactical style imbued with the infantry tradition. They tended to use their armored divisions accordingly, often assigning them a supporting role in operations.

In addition, the abilities of corps commanders could affect the performance of armored divisions as well. The corps had no prescribed size or composition, but were typically two to three divisions with additional battalions of field artillery, engineers and so on. A typical corps would be two infantry divisions and an armored division, though the mix varied enormously during the war. Some corps commanders appreciated the potential of the armored divisions. For example, Lawton "Lightning Joe" Collins of VII Corps made brilliant use of armored divisions during Operation Cobra in July 1944 and showed an able hand in later operations as well. Other corps commanders were less successful. For example, armored commanders were critical of Gen. Walton Walker of XX Corps, who had the habit of breaking up his armored divisions into three constituent combat commands and then doling them out to his infantry divisions for close support.

Tactical doctrine was an evolving process and not a static set of rules. The US Army formally described its tactics in field manuals that were periodically issued to the troops. Separate field manuals covered tactics from the level of the armored division down to company and platoon. The US Army had very modest experience in armored tactics up to 1944, limited to the Tunisian campaign and the fighting in Italy. Both campaigns were fought in peripheral theaters with neither side employing their main forces. As a result, US armored commanders also attempted to draw lessons from other armies including Germany, Britain and the Soviet Union. During 1942–43, tactical doctrine was evolving so fast that field manuals could not keep the pace. The Armored Force collected a wide range of reports from army observers sent overseas, from attachés and other sources. Some of these were distributed directly to the armored divisions to help them in their training. The lessons of the Tunisian campaign were published as *Training Memorandum No. 4* and reissued several

times. The Army Ground Forces attempted to halt this impromptu approach to tactical development in March 1943, by stopping the dissemination of foreign observer reports to divisions in an effort to promote uniformity in training and tactics. AGF insisted that proper doctrine be promulgated by itself or the War Department. In fact, AGF continued to be so slow in issuing timely field manuals and other material that informal approaches continued. The armor school at Ft. Knox used locally prepared material to train armored crews and commanders in current doctrine and tactical thinking. The army cycled veterans of the combat in Tunisia and Italy through Ft. Knox to keep the staff up to date on the latest developments.

The essential tactical doctrine for the armored division in the ETO was *FM17-100: The Armored Division*, which was released by the War Department on January 15, 1944. This manual began by noting that:

The tactical methods and procedures set forth are not to be considered inflexible. The employment of the units and weapons of the armored division in many ways and by many methods not described, foreseen, or even contemplated herein, should be sought for and encouraged if such use will be of value in causing the enemy discomfiture and defeat.

The tactics in *FM17-100* were intended to provide a flexible guide, not strict rules. The more skillful commanders quickly learned that these were recommendations, not rules. Gen. Bruce Clarke noted after the war:

There are certain basic principles which govern the employment of armor – but they are no more than guides. There is no place in the principles of armor for the words always and never. The successful application of the principles of armor employment is entirely dependent upon commanders and staffs being flexible in mind, progressive in thought, and liberal in imagination.

Following the deployment of US armored divisions to the ETO in June 1944, the focus of tactical innovation shifted to Europe. This was managed by the Armored Fighting Vehicle and Weapons (AFV&W) sections attached to Eisenhower's ETO-US Army (ETOUSA) headquarters, Bradley's 12th Army and Dever's 6th Army Group headquarters and at several of the army headquarters. These sections collected reports from the units under their command and disseminated relevant lessons back to the United States and to other units. In addition, the practice of sending observer teams to the ETO to learn of current tactical and technical trends continued in 1944–45. The reports from these teams were disseminated as well to assist in formulating tactical doctrine both in the theater and back at Ft. Knox. These reports are quite voluminous due to their anecdotal nature and cannot be easily summarized here. However, following the war the US Army organized a General Board to study the organization, equipment and tactical deployment of armored divisions in the European Theater. One of their first tasks was to determine whether the divisions were able to carry out the missions assigned them in Field Service Regulations. The concluding study used the 13 missions promoted in *FM17-100* then provided examples of how such missions had been successfully carried out. These examples are used here for the same purpose since they provide a guide of the tactics used to carry out the missions.

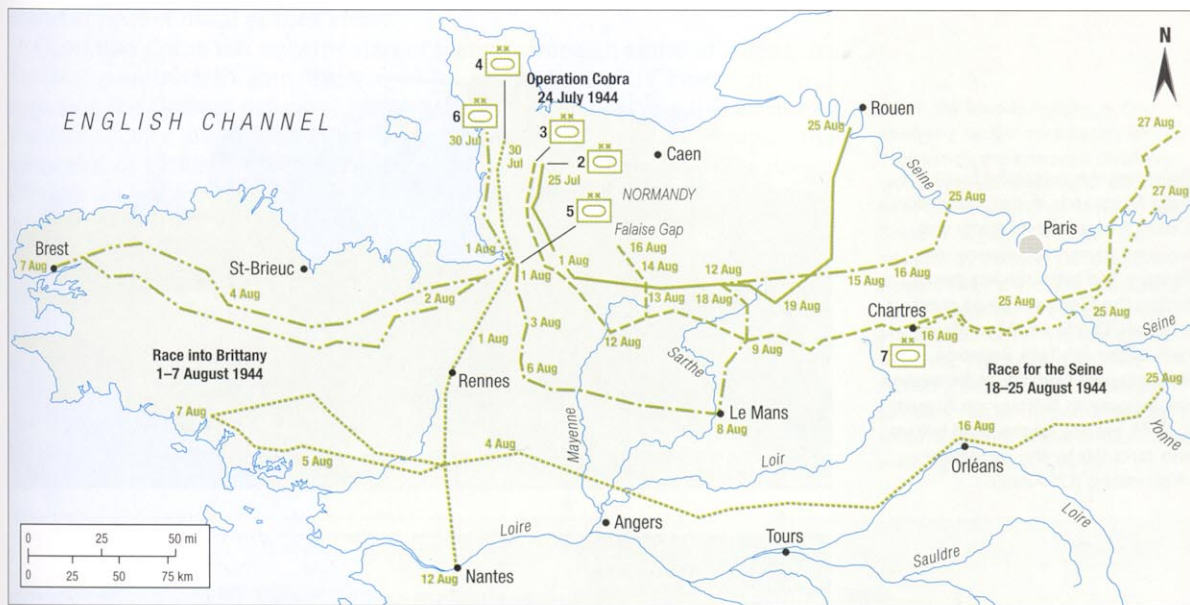
It should be noted that armored divisions were frequently used for missions that were not considered appropriate by army doctrine. The US Army was not always on the offensive in 1944–45, and during some offensive operations the terrain was poorly suited for the use of so large and cumbersome a unit as an armored division. Yet at the same time, the US Army in the ETO was very thin on reserves. So the armored divisions were committed to combat regardless of

doctrine. For example, during the operations in Normandy in late June 1944, two armored divisions were present in the beachhead. Even though the terrain was very unsuitable for their use, there were frequent attempts to employ them to secure a breakthrough, usually with poor results. Likewise, armored divisions were used in the brutal campaign along the Siegfried Line in the autumn of 1944 where the terrain did not favor their deployment. The results were modest at best.

Offensive operations in the enemy rear

The primary role of the armored divisions was to conduct offensive operations in hostile rear areas. Two campaigns were cited by the General Board as successful examples of this type of mission: the pursuit through France following the Operation Cobra breakout in late July 1944 and the drive through Germany following the Rhine crossing in 1945. The pursuit through France is an especially interesting example of armored tactics in World War II since it addresses some of the key tactical controversies in the employment of armored formations. It actually consisted of at least three distinct elements: the initial Operation Cobra, the exploitation of the breakout into Brittany and the race to the river Seine.

Breakout and pursuit.
July 25–August 25, 1944



One of the best examples of the primary exploitation mission of the armored division was Operation Cobra, which started on July 24, 1944, leading to the Allied breakout from Normandy. Here, a pair of M5A1 light tanks of Co. B, 33rd Armored Regiment, 3rd Armored Division, are seen speeding down a country road near Marigny, France, on July 26, 1944. The tank to the left is fitted with a Rhinoceros hedgerow cutter, designed to help tanks penetrate the thick "bocage" hedges typical of the Normandy countryside. (US Army)

Operation Cobra was planned in early July 1944 as a means for the US Army to breakout of the constricted hedgerow terrain along the Normandy coast and into the open country beyond. The intelligence assessment concluded that the German forces in the First US Army sector had been so exhausted that the Wehrmacht would be unable to counter a penetration since it lacked adequate reserves. As opposed to the broad front tactics used to date by the US Army in Normandy, Operation Cobra concentrated the US breakthrough in one narrow corps sector. The tactical approach for the breakthrough was a textbook example of the US doctrine, with infantry gaining the immediate breakthrough and two armored divisions (the 2nd and 3rd) conducting the follow-on exploitation. When launched on July 24, 1944, the infantry divisions failed to penetrate as deeply and quickly as expected, due in part to the lack of adequate support by the attached tank battalions. The corps commander in the breakthrough sector, Maj. Gen. J. Lawton Collins, was confronted with the dilemma in all armored operations at this stage of the war: when should he commit the armored divisions? If committed too soon before a clean breakthrough had been achieved,

Following the successful breakout from Normandy during Operation Cobra, Patton's Third Army was assigned to rapidly advance into Brittany and seize the key ports before the Germans could erect defenses. This is an M4 medium tank of the 8th Tank Battalion, 4th Armored Division, at Avranches, the gateway to Brittany on August 1, 1944, passing by the dead horses and carts left by the retreating Wehrmacht. (US Army)



An M4 (105mm) assault gun of the 8th Tank Battalion supports 4th Armored Division operations at Avranches on August 1, 1944, as the division passed through the city on its way into Brittany. (US Army)



they were liable to get bogged down in enemy infantry anti-tank defenses. If committed too late, the enemy would have time to reinforce the sector and the breakthrough would be confronted by a counterattack or second defensive line. Collins was a bold and decisive commander and noticed that the Germans had not vigorously counterattacked late on July 24. He correctly attributed this to the heavy casualties inflicted by the preliminary bombardment and the general exhaustion of German forces in this sector. Assuming his armored forces would not encounter major opposition, he ordered them to begin their movement through the infantry divisions the following day. As he anticipated, the two armored divisions encountered very modest opposition and were soon racing deep into the enemy rear. Indeed, on the first day of their attacks, they suffered greater delays from traffic jams along the narrow country roads than from German opposition. Having broken through the front, the divisions executed an envelopment movement to the west that managed to trap a substantial fraction of the German Seventh Army. The 2nd SS-Panzer Division Das Reich was trapped in a pocket around Roncey and largely destroyed in two nights of fighting as it tried to fight its way through the 2nd Armored Division. By containing the German panzer units within a narrow pocket, they became sitting ducks for tactical air attack, which destroyed most of their motor vehicles and forced the abandonment of much of their armor.

Operation Cobra was only the start of a larger campaign aimed at seizing the Brittany peninsula to gain the use of its ports. As the US First Army was rupturing the German defensive line, Patton's Third Army was activated nearer the coast. Once the German defenses around St. Lô began to collapse, the spearhead of Patton's forces, the 4th and 6th Armored Divisions, were passed through advancing US infantry troops and raced into the enemy rear. They seized the gateway to the peninsula at Avranches on August 1 before the Wehrmacht could react. The 4th Armored Division raced across the base of the peninsula, reaching Nantes on August 12. In the meantime, the 6th Armored Division advanced into Brittany, reaching the Atlantic coast at Brest on August 7 and laying siege to the city. It was one of the fastest armored assaults of the war, covering over 200 miles in less than a week.

Patton was not content to be tied down in Brittany laying siege to fortified ports, and quickly saw that the real prize was further east towards Paris. By early August, Hodge's First Army was compressing the southern flank of the German

After the bloody fighting in the confining hedgerow country of Normandy, the armored divisions were relieved to discover the rolling farm country on their drive to the Seine in August 1944. The rapid advance by Patton's Third Army in August 1944 is a classic example of the exploitation of a breakthrough. Here, a pair of M7 105mm HMCs from the 440th Armored Field Artillery Battalion, 7th Armored Division, rest in the sunshine with other elements of the division while awaiting orders. (US Army)



forces trapped in the Falaise pocket while Montgomery's 21st Army Group was collapsing the pocket from the north. The German reserves in France were very weak, and Bradley concurred with Patton's view that a bold race for the Seine would cause the total collapse of German defenses in France. The 4th Armored Division was freed from its tasks in Brittany and three more armored divisions were added to the fray: the 2nd French, 5th and 7th Armored Divisions. The drive was risky since it meant leaving the extended spearheads exposed to attack from the south. These flanks were covered in a variety of fashions, using conventional tactics such as the deployment of cavalry reconnaissance squadrons as a screen, as well as novel tactics such as the destruction of key river bridges to isolate the battlefield and the use of air patrols as an additional screen. By August 25, Paris was liberated, German forces in northern France had surrendered or been destroyed in the Falaise pocket, German garrisons in southern and central France were in headlong retreat and the retreating remnants of the Wehrmacht that had escaped the Falaise pocket were trapped again on the Seine in late August, and then again in the Mons pocket in Belgium in early September by the rapidly advancing Allied armored units. This succession of three operations: the Cobra breakthrough, the race into Brittany and the ensuing race to the Seine combined to form one of the classic examples of the US armored divisions' primary mission to conduct offensive operations in the hostile rear.

Breakthrough

US doctrine did not favor the use of armored divisions to conduct breakthrough operations since it was felt that by this stage of the war, enemy anti-tank defenses had grown so powerful that such breakthroughs were unlikely to succeed. The clearest example of a different viewpoint was the conduct of British armored operations in Normandy in June and July 1944, when a series of tank offensives were attempted against Caen and beyond. These were costly failures. In spite of the doctrinal strictures against such operations, the US Army did try such breakthroughs on a number of occasions, including the Normandy campaign. There were a number of small-scale attempts to breakthrough the stalemated front near St. Lô in late June prior to the Cobra success, using the newly arrived 3rd Armored Division. The most costly of these was on July 1, 1944, when CCB, 3rd Armored Division, was ordered to make a breakthrough near Airel. The attack was conducted through a narrow bridgehead into terrain poorly suited for armored operations and ran head on into elements of the Panzer Lehr Division, taking particularly heavy losses in its armored infantry units. The CCB commander, Brig. Gen. John Bohn, was relieved of command after the battle, even though he had opposed a plan that he considered an unsound use of armor.

US doctrine did foresee the use of armor for breakthrough in some circumstances, especially in conditions where the enemy frontline was particularly weak. For example, when enemy forces were retreating, there might only be a rearguard covering the retreat that could be vulnerable to a swift armored attack. In this case the mission was to punch through the enemy screen and make contact with the main enemy force as soon as possible. The example of this type of operation cited in the General Board study was the mission of the 9th Armored Division in early March 1945. The division was part of a general US Army push to the river Rhine aimed at trapping retreating German forces. Although the US Army hoped to capture a bridge across the Rhine intact, the Germans had been systematically destroying them after their last forces withdrew over the river. At Remagen, they waited too late. TF Engeman, CCB, 9th Armored Division, pushed through a thin German defensive screen and reached the western approach of the bridge at noon on March 7. Their mission had been to seize the town but when they saw that the bridge was still intact Company A, 27th Armored Infantry Battalion, began moving across with fire support from

On March 7, Task Force Engeman from the 9th Armored Division was surprised to discover that the Ludendorff Bridge at Remagen had not been demolished like all the other Rhine bridges. The German garrison finally detonated the demolition charges, but some failed to explode, and the low-grade commercial explosive that did detonate failed to drop the bridge. After engineers reinforced the damaged bridge, M4A3 tanks of 14th Tank Battalion were sent over to reinforce the bridgehead. This tank is seen passing by the two eastern towers that had housed machine-gun positions for the defense of the bridge. (US Army)



some of the new T26E3 heavy tanks of the 14th Tank Battalion. The Germans attempted to blow the bridge, but only managed to damage it and US armored doughs raced across the smoldering steel trestles, disabling the remaining demolition charges.

The CCB commander, Gen. William Hoge, radioed the divisional commander, Gen. John Leonard, that, unexpectedly, they had seized a bridge intact. There were no plans to conduct operations on the west bank of the Rhine and Leonard jokingly remarked, "What in the hell did you do that for? My God, if you hadn't taken that bridge, we could have sat on our butts for a whole month and really enjoyed life!" Instead, Leonard and his staff had to come up with a quick plan to ensure that they could remain in control of the bridge. The 9th Armored Division pushed out a bridgehead one mile deep and two miles wide, but was hampered by the geography that consisted of the well-known heights on either side of the river. The division's three armored infantry battalions were the primary means to conduct this operation since the bridge was too damaged to carry heavy tank traffic for a few days. The German forces in the sector were in such disarray due to the retreat that serious resistance didn't begin until March 9, when the 11th Panzer Division and Pz.Bde. 106 began attacks on the bridgehead. However, by this time the bridgehead had been so heavily reinforced that the US forces could not be dislodged. The surprise seizure of the Ludendorff Bridge at Remagen was a clear example of how the shock of an armored division could be used to penetrate a weak enemy defensive line with strategic consequences.

Seizing key terrain

A typical mission for armored divisions was to seize ground essential to the development of a higher commander's plan. An example of this was the 3rd Armored Division's capture of Paderborn on April 1, 1945. In late March, the US Ninth and First Armies were pushing east beyond the Rhine and in the process trapped most of the Army Group B in the Ruhr valley. The commander of the US 12th Army Group, Gen. Omar Bradley, wanted to link up the First and Ninth Armies and assigned the task to the 3rd Armored Division. The aim was to secure the city of Paderborn as a means to link up First and Ninth Armies and complete the encirclement of Army Group B.

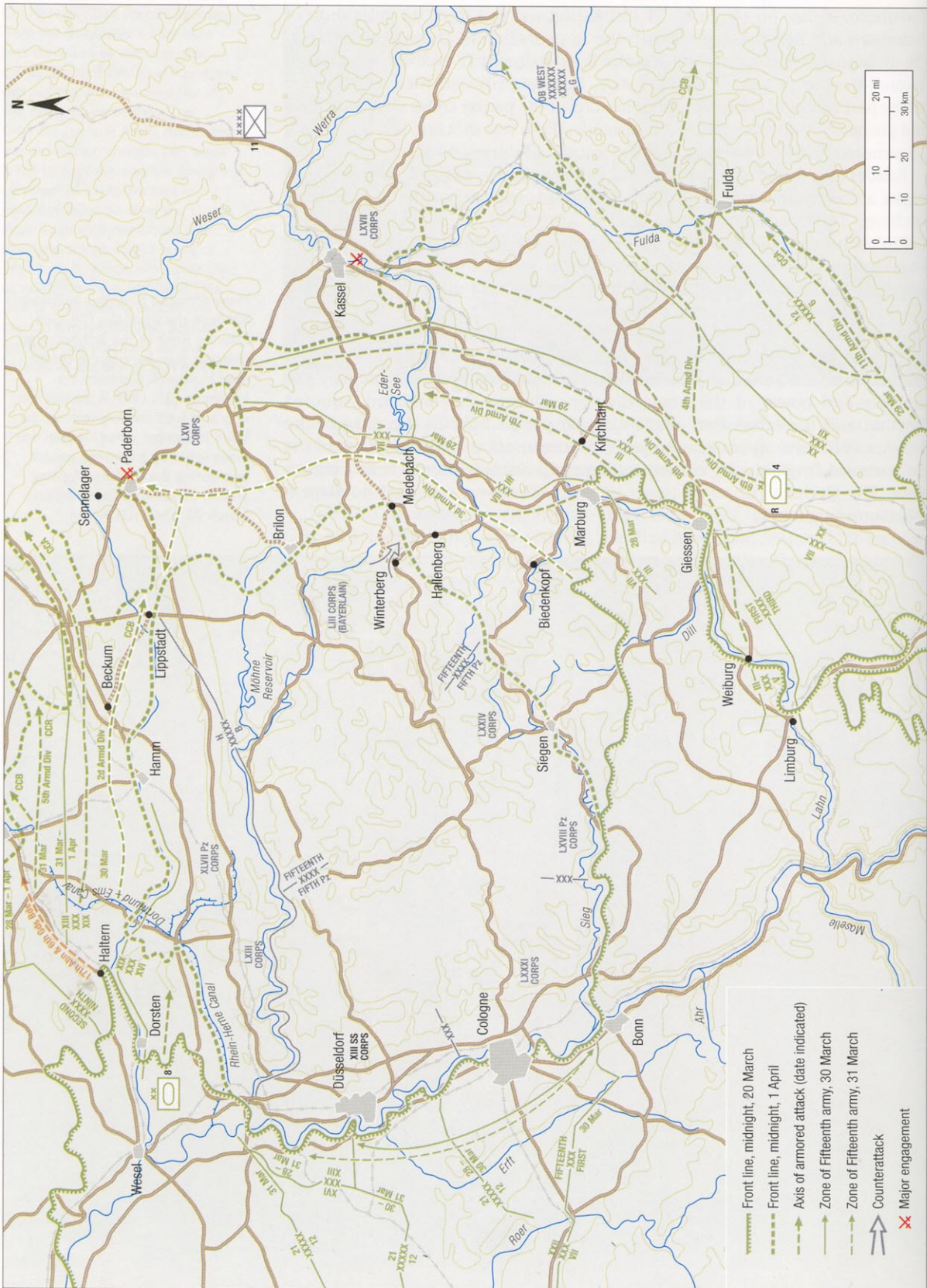
The attack was spearheaded by Task Force Richardson with Task Force Welborn to its right, and a subsidiary drive by 7th Armored Division towards Kassel to cover its right flank. During the first day of the attack on March 29, Task Force Richardson covered 45 miles against minimal opposition. In response, the Germans formed a scratch formation called SS Ersatzbrigade Westfalen from an SS panzer replacement training center at the Senne maneuver range north of

Paderborn. By late on March 30, TF Richardson was in a town six miles short of Paderborn and heavily engaged with the SS panzer units. During the fighting, the divisional commander, Gen. Maurice Rose, followed TF Welborn but his jeep became trapped in a firefight. After dark, Rose and his staff tried to escape by racing past a group of German tanks, but one of the panzer crews saw the vehicle and pinned it. While attempting to surrender, Rose was shot and killed, the only US armored division commander killed in combat during the war.

Besides the Paderborn defense, the German troops trapped in the pocket began a counterattack from Winterberg towards the rear of the 3rd Armored Division. The corps commander of First Army's VII Corps, "Lightning Joe" Collins (who also commanded the corps during the Operation Cobra breakout), asked the neighboring Ninth Army to pitch in and seal the encirclement near Lippstadt. As a result, CCB of 2nd Armored Division met up with TF Kane from the 3rd Armored Division east of Lippstadt on April 1, sealing the Germans inside the Ruhr pocket. While it would take more than two weeks to reduce the pocket, in the end some 317,000 Germans surrendered, one of the largest surrenders of the war. The race to Paderborn was made possible both by the mobility and power of the heavy divisions like the 2nd and 3rd Armored Division and the exhaustion of the German panzer force in the wake of the Ardennes offensive. German attempts to counterattack the exposed flank of the 3rd Armored Division near Winterberg were impossible without a strong panzer force. The German panzer divisions in the pocket were too weak to stage a mobile counterattack.

Many armored division commanders led from the front like Maj. Gen. Maurice Rose of the 3rd Armored Division, seen here in the center near Hulchelm, Germany, on November 25, 1944. Rose was the only armored division commander killed in combat when his jeep was intercepted by a German panzer unit during the confused fighting around Paderborn, Germany, on March 30, 1945. (US Army)



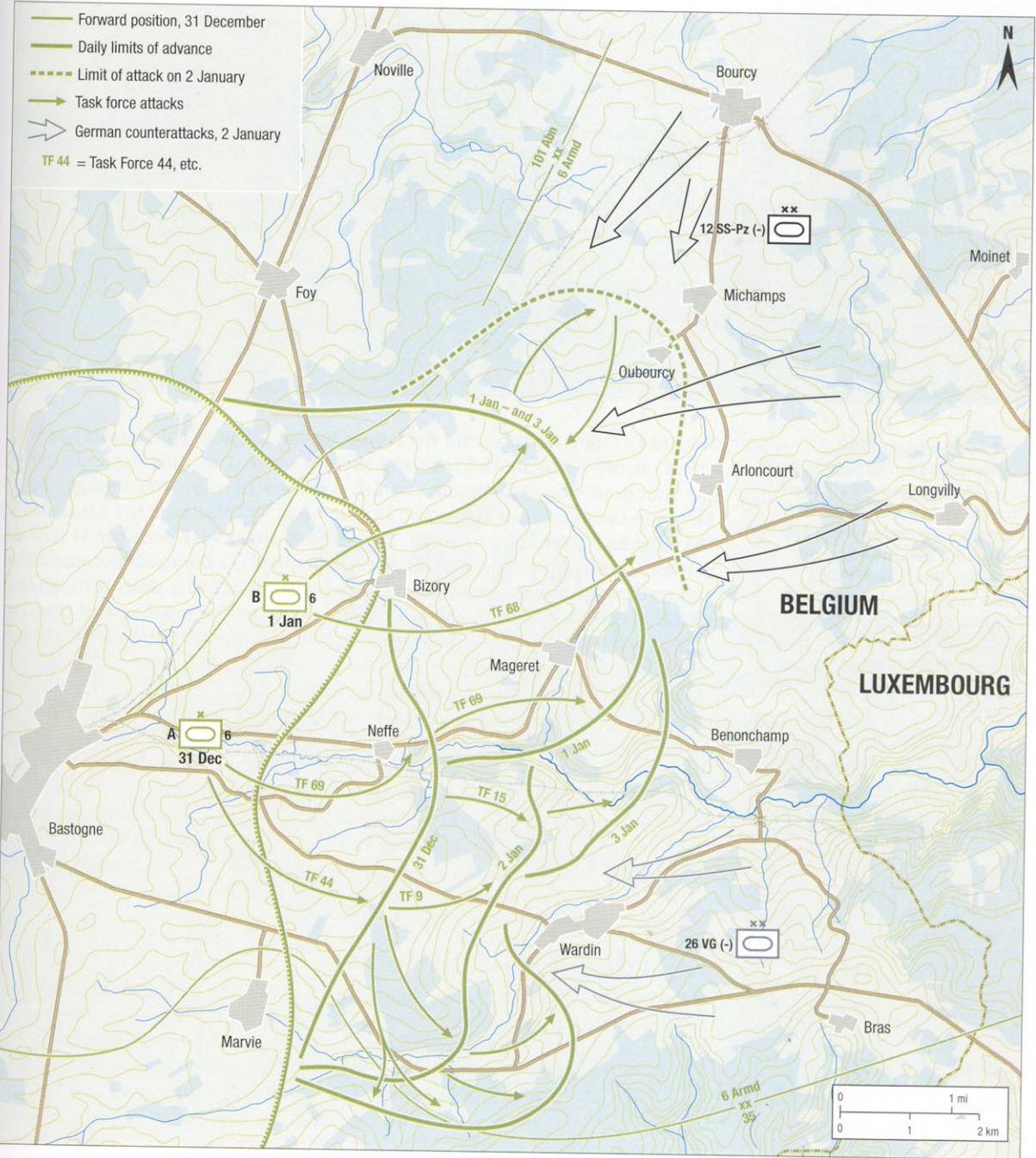


Regaining the initiative

The mobility and shock power of armored divisions led to their use in regaining the initiative in combat operations by means of a sudden surprise attack. Armored divisions could mass and attack more quickly than infantry divisions for such missions. An example of this took place on January 1, 1945, during the Ardennes campaign. Patton's Third Army had diverted its III Corps from the Saar offensive and, with 4th Armored Division in the vanguard, had relieved the encircled crossroad town of Bastogne after Christmas. However, the initiative in the German offensive had not been fully exhausted and the Germans planned another attack on December 30, 1944, spearheaded by

OPPOSITE Seizing key terrain.
3rd Armored Division at
Paderborn, April 1, 1945

BELOW Regaining the initiative.
6th Armored Division at Bastogne
January 1-3, 1945





On New Year's Day 1945, 6th Armored Division was assigned to regain the initiative for Patton's Third Army in the attempts to breakout from Bastogne and link up with the First Army around Houfallize. This is an M4A3E2 assault tank of Co. B, 68th Tank Battalion, 6th Armored Division, passing through the town of Habay-la-Neuve on December 29 on its way to this assignment. (US Army)

the 3rd Pz.Gren. Division and the Fuhrer Begleit Brigade. This assault had little effect on the Bastogne defenses and Bradley wanted to shift the initiative to the American side. As a result, the 6th Armored Division was brought up to Bastogne because the 4th Armored Division had suffered so many casualties in the relief and defense of the town. The planned attack on December 31 faltered when CCB/6th Armored Division. became trapped on the roads because of ice and traffic jams caused by the unexpected transfer of other units through this sector. Started a day later, the aim was to strike to the northeast of the city, cutting the German supply roads running to the contested Lutrebois sector and starting the process of reducing the bulge. The battle was fought mainly against entrenched German infantry by two combat commands attacking abreast, but the defense was stubborn enough that by late afternoon the division committed its CCR as well. By the end of the day, the 6th Armored Division held the village of Mageret and had pushed into the German defense line. Like many of these skirmishes in the Ardennes campaign, the brunt of the battle by the CCA was borne by its armored infantry fighting house to house and trench to trench, with fire support coming from the tanks. While the attacks in the first days of January did not result in any grand victory, it preempted planned German attacks, and thereby shifted the offensive momentum in the southern sector of the Ardennes from the German to the American side.

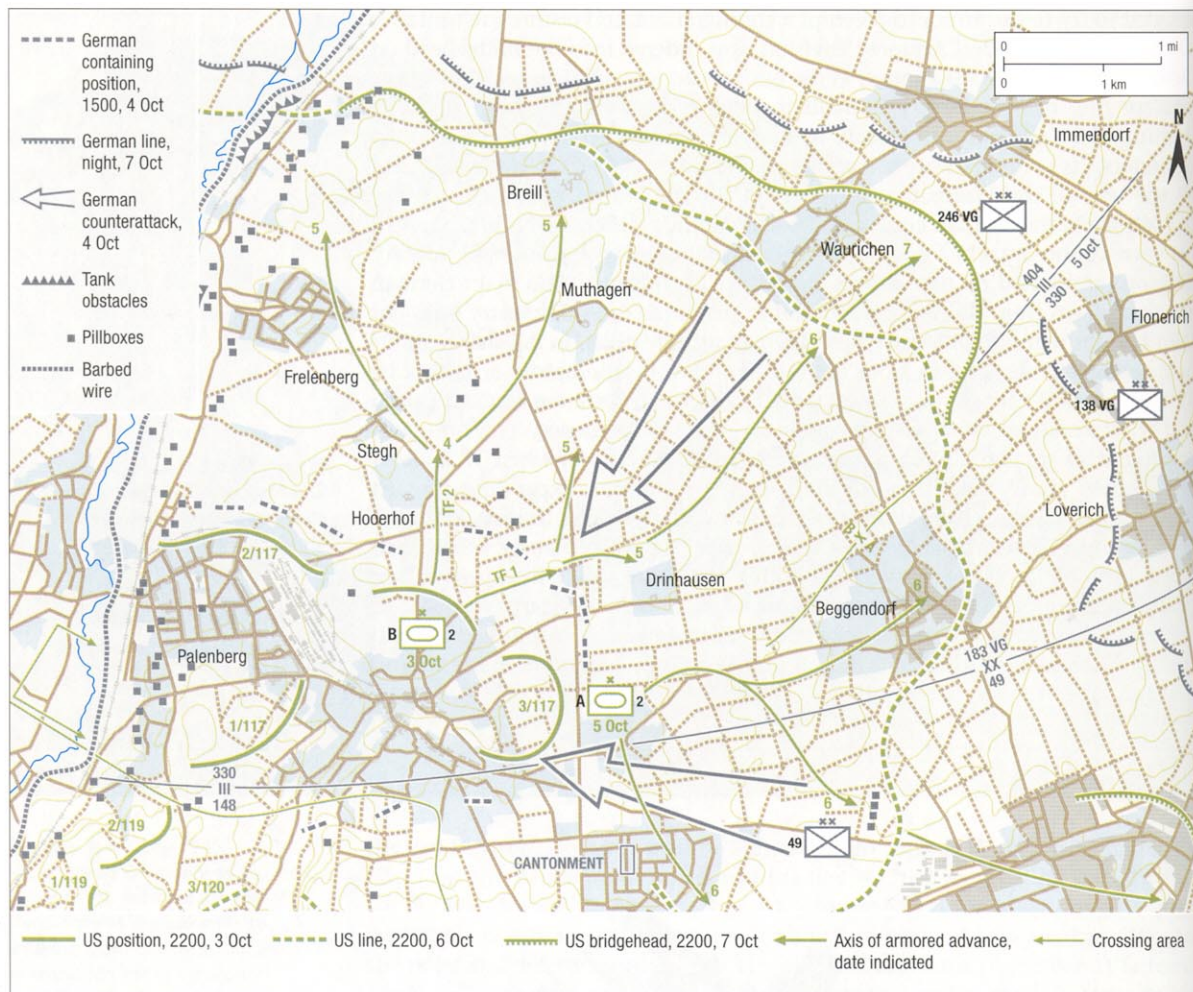
Restoring the initiative

Armored divisions were also assigned to reinvigorate attacks after they had lost momentum. An example of this took place in early October 1944, during the fighting for the Siegfried Line in Germany north of Aachen. On October 2, the 30th Infantry Division pushed across the river Wurm and through the Siegfried Line north of Rimburg and into the town of Palenberg. The area was a built-up urban area, leading to intense close combat. Heavy German artillery fire brought the infantry assault to a halt. The corps commander, Maj. Gen. Charles Corlett,

decided to try to use armor to preempt a counterattack and restore the initiative to the attack. CCB, 2nd Armored Division, was ordered into the bridgehead on October 3. This was a risky move, as the bridgehead was small and under intense artillery fire, making it very difficult to deploy the armor to best effect. By evening, the CCB was into Ubach, making little headway against the German defenders. Its columns were a lucrative artillery target since they snaked back all the way to the Wurm bridges. As the CCB was planning to fight its way out of Ubach, the German corps commander, Gen. Friedrich Koechling, planned his own counterattacks for the following morning consisting of two infantry divisions supported by two assault gun (StuG III) brigades. The main German attack at dawn from the southeast began to penetrate the US infantry lines but then was thrown into disarray when German artillery began to fall short into its own ranks. The next attack from the northeast ran headlong into an attack by TF 1 of the CCB and was decimated. Only one German battalion reached Ubach and it was crushed with only 25 soldiers surviving the melee. The American counterattack finally picked up momentum in the afternoon when TF 2 under Col. Sidney Hinds pushed north along the river Wurm, expanding the left shoulder of the bridgehead. With the German counterattacks thwarted and the momentum restored, over the next several days the 30th Infantry was able to expand the bridgehead into the neighboring towns creating a firm penetration of the Siegfried Line. On October 6, a M5A1 light tank company was able to maneuver across a muddy field that had bogged down the medium tanks and rapidly race through fortifications and gun positions, taking the high ground that contained the last fringe of the Siegfried Line in this sector.

In early October 1944, the 2nd Armored Division was used to enlarge a gap in the Westwall around Ubach. This shows an M4 medium tank of 3/67th Armored Regiment, 2nd Armored Division, on October 10, 1944, after the division had completed its mission and set up defensive positions. (US Army)





Restoring the initiative.
2nd Armored Division at Ubach
October 3-7, 1944

Overcoming an unprepared defense

Although US doctrine was wary of using armored divisions against well-prepared enemy infantry positions, a more acceptable use was to spearhead attacks against unprepared defenses. One of the more spectacular examples of this started on March 16, 1945, during Patton's campaign in the Palatinate. Although the German resistance had been stubborn on the first day of the American offensive on March 12, 1945, by the 14th both corps were advancing over the Moselle against decreasing opposition. The 90th Infantry Division and 5th Infantry Division advanced six miles beyond the Moselle by March 15, prompting Patton to push the two combat commands of the 4th Armored Division through them to exploit what appeared to be a yawning gap developing in the German line. Supported by intensive air operations by the XIX Tactical Air Command, the CCB/4th Armored Division raced 16 miles in five hours, half the way to their objective, the Nahe River. The roving US fighter-bombers kept the German corps commander from moving reinforcements into the sector. The situation became even more precarious for the Wehrmacht when on March 16, the neighboring corps began passing the 10th Armored Division through the 80th and 94th Divisions. The attack was building up so much momentum that Eisenhower agreed to give Patton another armored division, the 12th, to bolster the attack. The 4th Armored Division raced 48 miles in two days, reaching the banks of the Rhine near Worms and presaging the total collapse of German defense in the Saar-Palatinate triangle in a short one-week campaign.



Following its lightning advance through the Saar–Palatinate triangle in mid-March, the 4th Armored Division spearheaded the attacks that seized the city of Frankfurt. Here, an M4 of Co. C, 35th Tank Battalion, is seen advancing through the city on March 24, 1945. (US Army)

Overcoming an unprepared defense. 4th Armored Division in the Saar–Palatinate Triangle, March 12–21, 1945

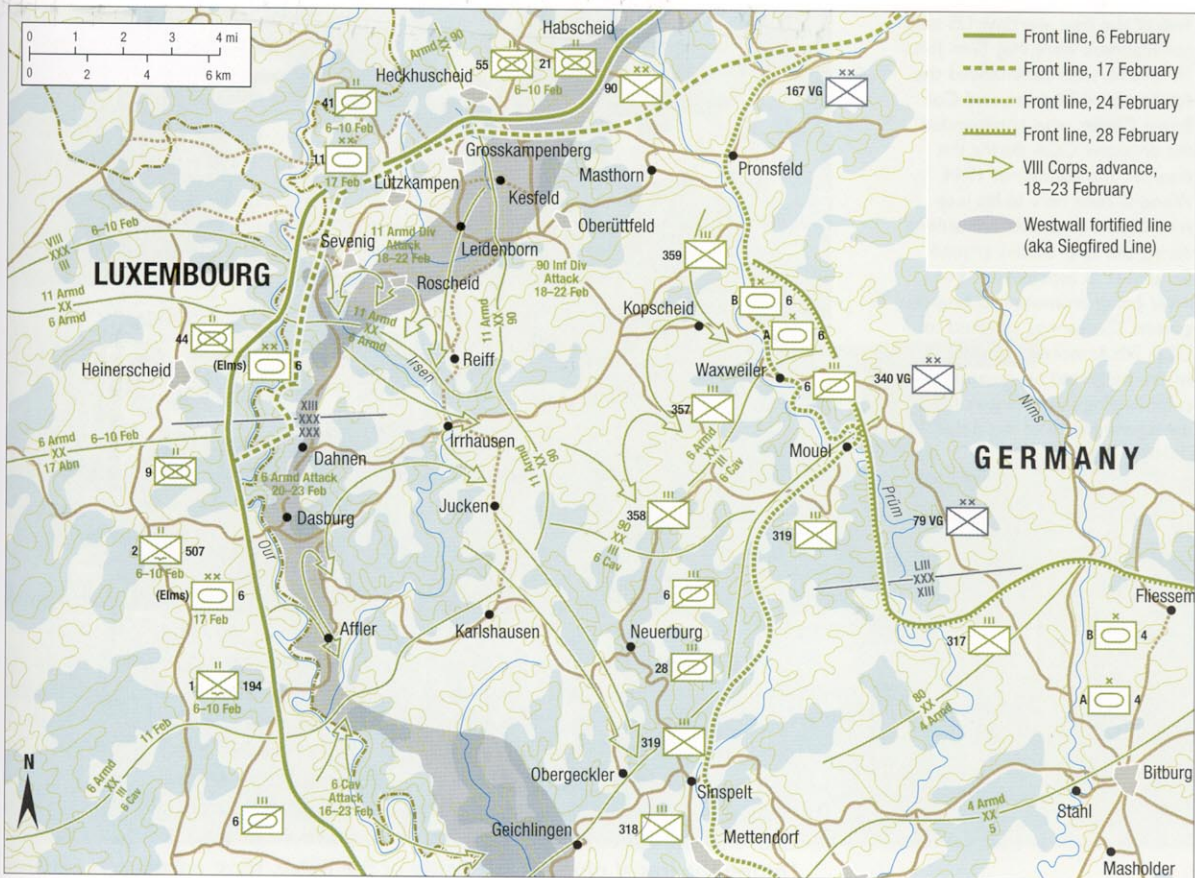


Attack on a prepared position

Another exception to the general dictum against attacks against prepared positions was in circumstances where the armored division could be concentrated sufficiently to overwhelm the objective. An example of this took place on February 20, 1945, near Dasburg, Germany. The aim was to break through a portion of the Siegfried Line by concentrating elements of the 6th Armored Division on a narrow front only about 4,000yds wide. Parts of the division were occupying a small bridgehead on the east bank of the river Our that had been secured earlier in the month as a diversionary attack for a corps assault further along the river. The brunt of the attack was borne by CCB on the east bank of the Our, while CCA staged a mock amphibious attack further down the river opposite Dahnen. The attack began with a 20-minute artillery bombardment at 0645hrs. The barrage lifted for ten minutes in the hope that the Germans would follow their usual practice of exiting their bunkers and reoccupying their field fortifications. After this interlude, all available artillery fired a "time-on-target" strike calculated to impact simultaneously on the initial objective, a hill a mile and a half north of Dahnen. The attack was made by the armored doughs organized into pillbox assault teams. Platoons were divided in half, one half forming an assault team with wire cutters, bazookas and demolition charges, and the other half forming a fire support team assigned to fire at embrasures and firing pits to suppress the German fire. By noon, 17 pillboxes were cleared at a cost of five dead and 66 wounded, mostly mine casualties – a tribute to sound tactics. The following day, CCB pushed down the east bank of the Our to help clear a bridgehead for CCA on the west bank. By February 24, German defenses in the Vianden bulge were collapsing and the 6th Armored Division had pushed 20 miles past the Siegfried Line. This operation was hardly typical of armored division missions since fortified positions were usually left to infantry formations with tank support from the separate tank battalions. But in some circumstances, they could succeed with careful tactics.

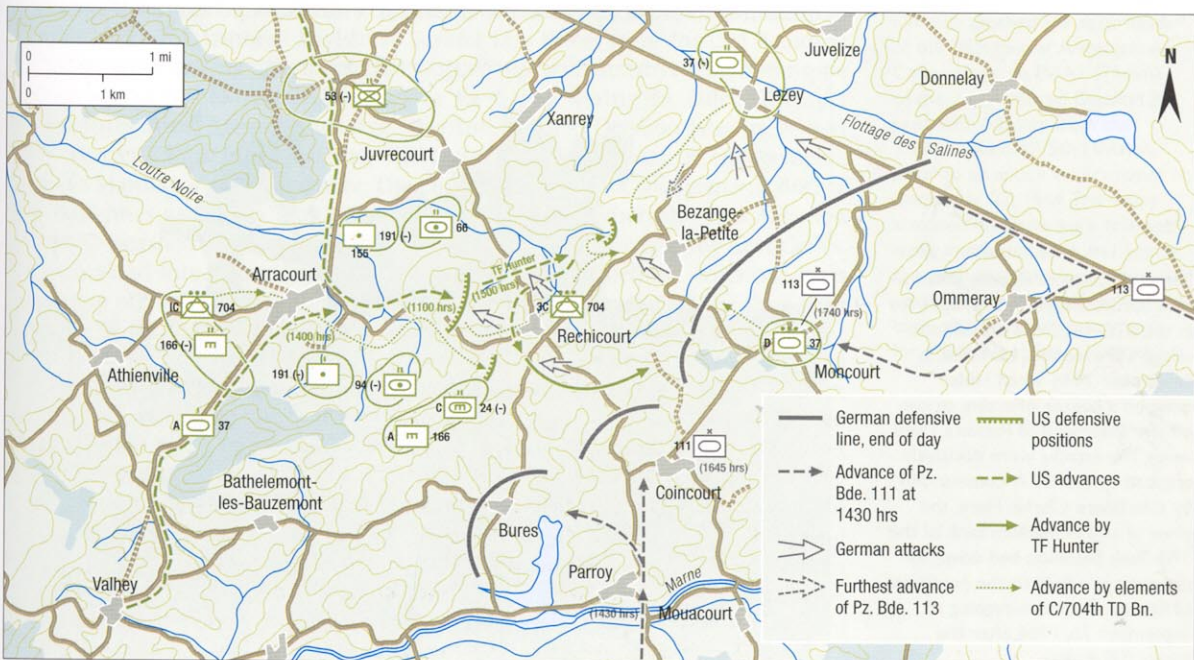
Attacks on enemy armored units

It was not US army doctrine to use armored divisions to combat German tank units since this was nominally the role of the tank destroyer force. During 1944, US armored divisions seldom encountered German panzer divisions except in small-scale engagements seldom larger than a few companies on both sides. There were some exceptions such as the 2nd Armored Division's defeat of 2nd SS-Panzer Division Das Reich in the Roncey pocket in late July 1944, and the envelopment and destruction of much of 9th Panzer Division in the Foret d'Écouves on August 12–13, 1944, by the 5th Armored Division and the 2nd French Armored Division. Following the Normandy fighting, the next large encounter between US and German panzer formations took place in the Lorraine campaign when Hitler ordered a panzer offensive hoping to cut off and destroy Patton's Third Army. The main elements of the attack force were several of the new and inexperienced panzer brigades, and the counter-offensive began in a disjointed and uncoordinated fashion, seriously undermining its potential effect. Panzer Brigade 106 was decimated in a botched night attack on the 90th Infantry Division near Mairy on September 8, 1944, and Panzer Brigade 112 suffered heavy losses in a one-sided engagement with the 2nd French Armored Division near Dompaigne on September 13. The main attack formed up a few days later, directed against Patton's spearhead, the 4th Armored Division, around Arracourt. The ensuing battle was a classic meeting engagement with both sides in an offensive posture. In a week of fighting in late September, both panzer brigades were shattered, losing 86 tanks and over 100 more rendered inoperable; US losses were a fraction the size. These lopsided results were evidence of the stunning decline in the training and experience of the German panzer force after the enormous losses earlier in the summer. Large-scale tank-



ABOVE Attack on a prepared position. 6th Armored Division at the Vianden Bulge, February 20–23, 1945

BELOW Attacks on enemy armored units. 4th Armored Division at Arracourt, September 19, 1944



Two of the best wartime US tank commanders were Maj. Gen. John "P" Wood, who commanded the 4th Armored Division, and Col. Bruce Clarke, who commanded the division's CCA during the summer and autumn of 1944. Wood is seen here in his jeep with Clarke to the left consulting during the tank battles around Arracourt in September 1944. After being promoted to brigadier general, Clarke was assigned to CCB, 7th Armored Division, where he gained his greatest fame, commanding the defense of St. Vith during the Battle of the Bulge. (MHI)



vs.-tank engagements between US and German units were relatively rare during the remainder of the war. A postwar study of 129 identifiable skirmishes fought between the US 3rd and 4th Armored Divisions and German panzer units, determined that about half were fought by units platoon sized or smaller, and only about a tenth of the actions involved units larger than a company. The final series of major armor battles started in mid-December with the German offensive in the Ardennes.

During the initial phase of the Battle of the Bulge, most encounters between German panzers and US tanks involved skirmishes with the separate tank battalions attached to infantry divisions. The commitment of US armored divisions to the Ardennes fighting began a few days after the German offensive when CCB/9th Armored Division and CCB/7th Armored Division were committed to the northern sector around St. Vith. This operation will be covered

Some of the most intense tank-vs.-tank battles fought by the US Army in the ETO occurred around the village of Arracourt, Lorraine, in September 1944 when Hitler ordered a panzer offensive to cut off the spearhead of Patton's Third Army. The attacks were decisively crushed by the CCA commanded by Col. Bruce Clarke. Here, the crew of an M4 medium tank of the 37th Tank Battalion bed down for the night in a field to the northeast of Arracourt on the evening of September 26, 1944, after the battle. (US Army)





in more detail below. In the ensuing weeks, more armored divisions were gradually shifted into the Ardennes. Although US doctrine did not foresee combating enemy armor as a major role, it did contemplate the use of armor divisions to counterattack enemy armor penetrations. The first two armored divisions to engage in large-scale encounters with German panzer divisions were the 2nd and 3rd Armored Divisions. Several task forces from the 3rd Armored Division were among the units that bottled up and destroyed Kampfgruppe Peiper of the 1st SS-Panzer Division in La Gleize during its failed attempts to reach the River Meuse near Liege. The 3rd Armored Division later prevented II SS-Panzer Corps from reaching the Meuse during a series of engagements around Manhay in late December. The largest tank-vs.-tank engagements during the Ardennes campaign took place around Christmas when the 2nd Armored Division smashed into the flanks of the advancing Fifth Panzer Army near Celles. The 2nd and 9th Panzer Divisions had reached deeper behind American lines than any other German unit, almost reaching the Meuse. But by the time they approached the river near Dinant they were critically short of fuel and supplies. The 2nd Armored Division struck their forward spearheads before they reached the river, and by Christmas evening, the fields north of Celles were littered with 40 German tanks and more than 840 other vehicles. Over the next few days of fighting, the German advance was decisively contained at a cost of 82 tanks compared to 27 M4 and M5A1 tanks of the 2nd Armored Division. Fighting continued between the 9th Panzer Division and the 2nd Armored Division around Humain after Christmas, but the tide had turned in the Ardennes and the Germans had lost all hope of ever crossing the Meuse. As the German historian and diarist of the Wehrmacht High Command P. E. Schramm later noted, "The abortive (Ardennes) offensive had made it clear not only the aerial but the armored superiority of the enemy."

Some of the largest tank-vs.-tank battles fought by the US Army in World War II took place on the approaches to Dinant on the river Meuse when the 2nd Armored Division crushed the spearheads of the Fifth Panzer Army around Celles. Here, an M4A1 (76mm) of the 2nd Armored Division is seen with infantry from the 2/291st Infantry, 75th Division, prior to an attack on Frandeux on December 27, 1944. The heavy armored divisions were relatively weak in infantry, so it was common to attach an infantry regiment for certain types of missions. In these cases, they often rode on tanks for greater mobility. (US Army)



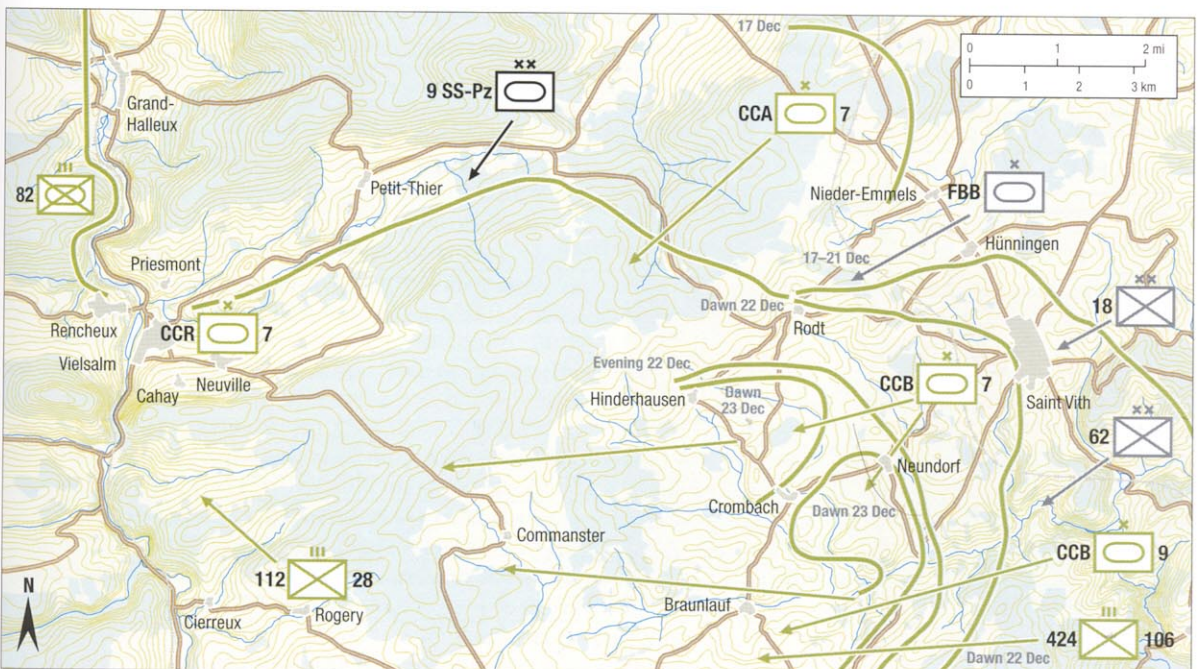
The defense of St. Vith during the Battle of the Bulge in December 1944 by CCB of the 7th Armored Division is widely regarded as a classic example of an armored division conducting a mobile defense. Here, some M4 tanks of the 40th Tank Battalion, 7th Armored Division, are seen in the fields outside St. Vith when the town was recaptured in late January 1945. (US Army)

Division to the fray on December 22, threatening to cut off the St. Vith defenders from the American defensive line along the river Salm. Having fulfilled their mission of delaying the German advance, the defenders were ordered to withdraw from the salient on the morning of December 23, 1944. Manteuffel wrote to Clarke after the war:

The outstanding delaying actions around St. Vith were decisive for the drive of my troops [Fifth Panzer Army] and for the Sixth SS-Panzer Army too! In that respect, the battle of St. Vith was of greatest consequence for the two armies – and the whole German offensive. In the end, St. Vith fell, but the momentum of the 58. Panzer Corps in the south had been destroyed and that influenced the southern [47th Panzer] corps too!

The conclusion of the commander of CCB/7th Armored Division, Gen. Bruce Clarke, after this action was that armored defensive action must be elastic and in depth to succeed and that a thin brittle linear defense would not work.

Armor in the defense.
7th Armored Division at St. Vith
December 17–23, 1945



Small unit tactics

The examples presented above provide some samples of the use of armored divisions performing different types of missions. It is instructive to examine the small unit tactics of an armored division during a typical mission to see how the sub-units were actually deployed in combat. This particular example was also selected by the postwar General Board study as a useful case study of force composition, showing how the combat commands used their task forces.

During early April 1945, 6th Armored Division was directed to seize the city of Mulhausen as part of a broader offensive started on March 28 to link up with the Red Army near Dresden. US Army tactical doctrine was wary of the use of armor in urban areas, but in this case it was expected that a rapid encirclement of the city by an overwhelming force would rout the defenders before they could adequately prepare. A bridge over the river Werba was seized intact on the night of April 3/4 and the division began to move into position. CCA was ordered to close on the city from the north and northwest, while CCB was ordered to close from the south and southwest. As detailed in the chart below, both of the combat commands were broken down into three task forces. CCA was the tank-heavy element based around two tank battalions and a single armored infantry battalion while CCB had the proportions in reverse. Each Task Force was based around a single tank or armored infantry battalion, minus one company, which was swapped, with a supporting company from one of the other battalions to provide a combined arms mix. Four of the six task forces also had an attached armored field artillery battalion with 18 M7 105mm HMCs in direct support.

The attack on Mulhausen began on April 4, 1945. The northernmost task force, TF 15, encountered anti-tank fire while moving through the villages of Bickenriede and Dachreiden but quickly overcame the defenses and continued to move east to block any escape routes out of the city. The southernmost task force, TF 69, encountered little opposition and enveloped the city from the south, finally reaching the village of Hongeda. The remaining four task forces all reached the outskirts of the city by dusk. The attack into the city began at 0700hrs on April 5 and street fighting ensued. The resistance was disorganized and about 300 prisoners were captured in the city itself. More than 1,200 prisoners were captured

Combat Command A, 6th Armored Division

TF 15	TF 68	TF 9
15th Tank Bn. (-1 M4 co.)	68th Tank Bn. (-1 M4, -1 M5 cos.)	9th Arm'd Inf. Bn. (-1 co.)
Arm'd Inf. Co.	Arm'd Inf Co.	Med. Tank Co.
Tank Destroyer Plat.	Tank Destroyer Plat.	Tank Destroyer Plat.
Arm'd Engineer Plat.	Arm'd Engineer Plat.	Arm'd Engineer Plat.
212th Arm'd Field Arty Bn.		274th Armd Field Arty Bn.

Combat Command B, 6th Armored Division

TF 50	TF 69	TF 44
50th Arm'd Inf. Bn. (-1 co.)	69th Tank Bn. (-1 M4 co.)	44th Arm'd Inf. Bn. (-1 co.)
Med. Tank Co.	Arm'd Inf. Co.	Med. Tank Co.
Tank Destroyer Plat.	Tank Destroyer Plat.	Tank Destroyer Plat.
Arm'd Engineer Plat.	Arm'd Engineer Plat.	Arm'd Engineer Plat.
231st Arm'd Field Arty. Bn.	128th Arm'd Field Arty Bn.	



A column of tanks led by an M4A3E2 assault tank of Task Force 44, 6th Armored Division, passes by a smoldering column of wrecked Wehrmacht trucks near Oberdorla during the drive on Mulhausen on April 4, 1945. The rapidity of the advance prevented the Wehrmacht from erecting an adequate defense of the town. (US Army)

by TF 15 as they attempted to retreat out of the city to the east. The city was cleared by 0930hrs and the captured German garrison commander stated that the sudden encirclement of the city on April 4 had disrupted his plan of defense and caused the rapid collapse.

To get a better sense of how a task force operated in the field, the next example takes a look at a small skirmish in Lorraine on December 6, 1944, by elements of the 4th Armored Division. It was not a particularly significant skirmish, but gives a good example of how units actually fought under typical battlefield conditions.

As part of XII Corps, the 4th Armored Division was slowly advancing through the Maginot Line towards the German frontier and the Saar. Further to the northwest, the 35th Infantry Division was attempting to secure the city of Sarreguemines and the corps commander wanted the town of Rohrbach seized since it would cut off the best escape route for the German 347th Volksgrenadier Division. During the evening of December 5/6 the basic plan was established. CCA was broken up into two task forces, TF Abrams and TF Oden, with TF Abrams being assigned the main role while TF Oden would seize the villages of Dehlingen and Rahling on the approaches to Rohrbach. TF Abrams consisted of the 37th Tank Battalion, the 51st Armored Infantry Battalion and the 94th Field Artillery Battalion along with two companies of M18 tank destroyers from the 704th Tank Destroyer Battalion. The task force commander, Col. Creighton Abrams, was familiar with the terrain on the approach to the objective, as earlier that day his tank battalion had advanced to within 1,000yds of Singling and, on cresting a ridge, had come under intense anti-tank fire. Fourteen medium tanks had been put out of action, five to German tanks and anti-tank guns and the others to the thick mud. Many of the tanks were so badly bogged down that they had to be abandoned and then they were further damaged by German artillery fire. As a result, Abrams' 37th Tank Battalion was down to only two medium tank companies at the start of the action. Due to the terrain, TF Abrams would have to pass to the south of Singling again, and then move east into Bining and Rohrbach. To avoid exposure to anti-tank fire from Singling, Abrams requested that the headquarters of CCA have all six field artillery battalions assigned to it at the time to provide a dense artillery barrage on Singling as his task force was making its turning maneuver southeast of Singling. Abrams did not know at the time that the message was not received, and in fact he would have to rely only on his organic artillery support.

A squad of armored doughs of the 44th Armored Infantry Battalion advance cautiously behind an M4A3E8 medium tank during the fighting by Task Force 44, 6th Armored Division, in Oberdorla, Germany, on April 4, 1945. After pushing through the town, the task force participated in the encirclement and capture of Muhlhausen later in the day. (US Army)

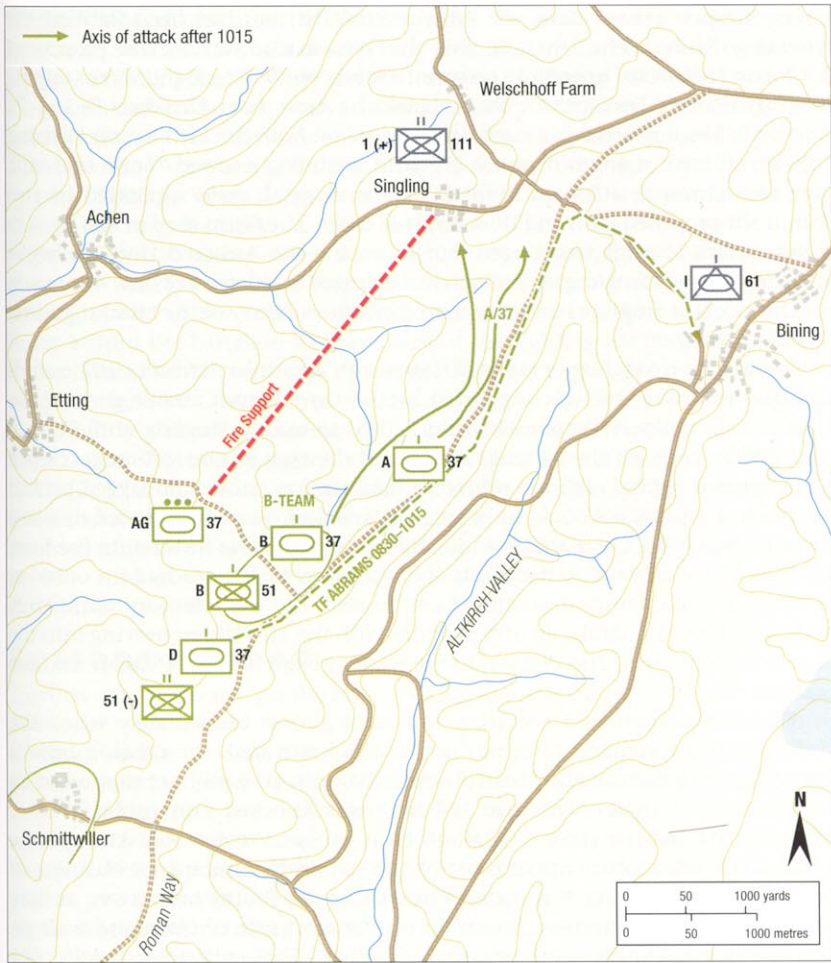




Small unit tactics.
6th Armored Division captures
Muhlhausen, April 4, 1945

In total, TF Abrams had about 30 M4 medium tanks as well as about a dozen M5A1 light tanks. The 51st Armored Infantry Battalion was significantly understrength with only about 180 combat effectives out of the usual 245. The task force was broken up into teams with the lettered companies of the tank and infantry battalions paired together.

The plan was to advance with the tanks interspersed with the M3 armored half-tracks. However, at the jump off point it became obvious that the mud was so thick that the half-tracks would have no chance to traversing the fields. So the plan was changed, and the infantry were loaded on the tanks instead. Team A reached the approaches to Singling first, and found that the anti-tank fire was every bit as heavy as the day before. The supporting artillery began on schedule at 0830hrs, but instead of the six battalions requested, only the 94th Armored Field Artillery Battalion was available. The M7 105mm howitzer motor carriages fired 131 smoke rounds on Singling in hopes of obscuring the passage of TF Abrams. However, the smoke was not entirely effective and, for the next hour, intense German anti-tank fire kept TF Abrams from moving. The two medium tank companies engaged targets in Singling with their 75mm guns, but at this range against well-positioned enemy armor, the fire was not particularly effective. Col. Abrams decided that the enemy forces in Singling could not be neutralized by a firefight with his tanks or by artillery fire alone and so he decided to rout them out using infantry. He ordered Team B to hold and seize the town. Team B consisted of Capt. James Leach's B/37th Tank Battalion and Lt. Daniel Belden's B/51st Armored Infantry Battalion, totaling 14 M4 tanks and 57 armored doughs. Capt. Leach put his 1st Platoon on the right, 2nd Platoon on the left and 3rd Platoon behind in support, with his command tank "Block-Buster" in the center. As in many infantry companies in the late autumn of 1944, casualties in B/51st Armored Infantry had been heavy. In the month before, it had lost half its men and all its officers, filling the vacancies with new replacements. The company commander had taken command less than two weeks before and the most experienced platoon leader had been in combat for three weeks. Nevertheless, the men were well trained and had some urban fighting experience prior to the day's engagement.



Small unit tactics.
TF Abrams at Singling
December 6, 1944



Small unit tactics.
4th Armored Division at Singling
December 6, 1944

For the past several days, the 4th Armored Division had been fighting the retreating Panzer Lehr Division. But the Wehrmacht was in the process of reinforcing the sector in order to carry out a local counterattack and was swapping the 11th Panzer Division for the exhausted Panzer Lehr Division. Facing TF Abrams in Singling was a panzergrenadier battalion from the 11th Panzer Division with an effective strength of about 175 men including a towed 75mm anti-tank gun, five 81mm mortars and three 20mm anti-aircraft guns supported by two 75mm self-propelled guns and three Panther tanks. The German plan had been to counterattack towards Oermingen, but when the 4th Armored Division began attacking towards Singling, its mission was changed to a defensive one. As a result, the defenders of Singling had more than triple the infantry of the attacking force, though less armor.

The attack on Singling began at 1015hrs with an artillery strike of 107 rounds of high explosive. This was supported by the two 105mm assault guns of the 37th Tank Battalion HQ company, which fired smoke on Singling until Team B reached the town. Of the 14 tanks that began the assault, one lost radio contact and remained behind and one suffered a transmission failure and lagged behind the main group since it could only move in first gear. Team B advanced in a line about 650yds wide. Compared to earlier in the day, there was little return fire from the village, probably due to the effects of the artillery. As they reached the outskirts of Singling, the infantry dismounted and moved into the town on foot. Co. B, 37th Tank Battalion, broke up into platoons with the 1st Platoon moving into the eastern edge of town, 2nd Platoon to the western edge, and 3rd Platoon into the center.

The first casualties of the attack occurred almost immediately when the 2nd Platoon's command tank ran into intense anti-tank fire coming from a towed 75mm anti-tank gun located near a Maginot Line pillbox, supported by four armored vehicles. The lead M4 tank was knocked out, probably by a Panther tank hidden next to a stone barn on the western outskirts of the village. The US infantry spent most of the day in the hazardous business of house-to-house fighting. It was a very frustrating day for the tank crews, as they were bottled up by the German armor on the west side of town and a single well-emplaced Panther tank on the east side. They played a deadly but inconclusive cat-and-mouse game with the German armor for the rest of day, finally eliminating the Panther on the eastern side of town.

By afternoon, a stalemate had ensued with the German panzergrenadiers still holding parts of the village including the main street and the western side, while Team B had a secure foothold in the southeastern side. More to the point,

Armored division task forces would usually incorporate a mixture of tanks and armored infantry, particularly in urban combat where tanks were vulnerable to German infantry with panzerfaust anti-tank rockets. Here, armored doughs of the 55th Armored Infantry Battalion are supporting an attack by M4A3 (76mm) medium tanks of the 22nd Tank Battalion, 11th Armored Division, during the fighting in Wernberg, Germany, on April 22, 1945. (US Army)



Singling was distracting TF Abrams from its main mission of securing Rohrbach, so the CCA commander, Brig. Gen. Herbert Earnest, ordered Abrams to turn over Singling to CCB and get moving to Bining and Rohrbach. CCB moved a tank company and armored infantry company into Singling at 1400hrs. Team B was not able to extract itself from the fighting until dusk, and after dark the CCB team withdrew. Singling was hit that night by a "serenade" by corps artillery when all guns are coordinated by a fire direction center so that all the rounds impact at the same time.

Casualties had been modest: six dead, 16 wounded and five M4 tanks out of action, of which a few were later recovered. German casualties are unknown, although two Panther tanks were destroyed and 56 panzergrenadiers captured, about a third the battalion in the village. If the fighting for Singling had been inconclusive, it did serve to tie down German forces in the sector while other elements of CCA reached the main objective. Bining proved to be much more lightly defended than Singling, consisting of a company of Pz.Jaeger Abt.61 with 50 men and eight StuG III assault guns. It was taken that afternoon by Co. D, 37th Tank Battalion, and 1/328th Infantry. The fighting at Singling on December 6, 1944 was typical of the fighting by armored divisions along the Siegfried Line in the wet autumn of 1944, as the US Army methodically fought its way through the defensive belts of the Westwall and the Wehrmacht stubbornly resisted.

Lessons learned

The first attempt to analyze the lessons of the war years in regards to the armored divisions' organization was conducted by Gen. Robert Grow (6th Armored Division) and Hugh Gaffey (4th Armored Division) in February 1945. This study was forwarded to George Patton who noted that he considered these officers to be two of the three best tank commanders of the war and that it should be reviewed by his other favorite, John Wood, formerly of the 4th Armored Division. Wood's comments in April 1945 concurred with the views of the other officers that the current divisions, especially those on the 1943 pattern, were too small and needed too many attachments. These three commanders preferred the 1942 organization since it was more capable of powerful, sustained action. While acknowledging that it was imbalanced with too many tank battalions and not enough infantry, they argued in favor of more infantry rather than fewer tanks. Rather than continually attaching certain types of units such as anti-aircraft battalions and medium field artillery battalions, the commanders recommended that they become organic to the division. Additional comments were solicited from other prominent armor officers in 1945, culminating in the General Board study which reiterated many of the same points of the original February 1945 report.

The reorganized armored division of 1947 took these recommendations to heart, though they did not follow them precisely. Rather than increase the division to six battalions each of tank and infantry, a compromise was reached consisting of a division with four tank battalions (including one heavy tank battalion), four armored infantry battalions and four armored field artillery battalions (including one 155mm battalion). The main problem that the US Army faced after the war was not reorganization but the catastrophic decline in its capabilities brought on by a precipitous demobilization after the fall of Japan in August 1945. When he took control of the Army in 1948, Omar Bradley lamented that it "could not fight its way out of a paper bag." The defeat of American units in the opening phase of the Korean War in the summer of 1950 forced changes, and the escalation of the Cold War in Europe forced the army to place greater emphasis on rejuvenating its armored units. New issues began to emerge, particularly the effect of nuclear weapons on the battlefield, and the armored divisions continued to evolve in the decade after the war to keep pace with the rapidly changing technology of mobile warfare.

Unit Status

Armored division (heavy) organic units

Division	2	3
Armored regiments	66, 67	32, 33
Armored infantry regiments	41	36
Armored field artillery battalions	14, 78, 92	54, 67, 391
Armored reconnaissance battalions	82	83
Armored medical battalions	48	45
Division support battalions	2	3
Ordnance maintenance battalions	2	3
Armored signal companies	142	143
Armored engineer battalions	17	23

Armored division (light) organic battalions

Division	4	5	6	7	8	9	10
Tank battalions	8, 35, 37	10, 34, 81	15, 68, 69	17, 31, 40	18, 36, 80	2, 14, 19	3, 11, 21
Armored infantry battalions	10, 51, 53	15, 46, 47	9, 44, 50	23, 38, 48	7, 49, 58	27, 52, 60	20, 54, 61
Armored field artillery battalions	22, 66, 94	47, 71, 95	128, 212, 231	434, 440, 489	398, 399, 405	3, 16, 73	419, 420, 423
Cavalry reconnaissance squadrons	25	85	86	87	88	89	90
Armored medical battalions	4	75	76	77	78	2	80
Ordnance maintenance battalions	126	127	128	129	130	131	132
Armored signal companies	144	145	146	147	148	149	150
Armored engineer battalions	24	22	25	33	53	9	55

Division	11	12	13	14	16	20
Tank battalions	22, 41, 42	23, 43, 714	24, 45, 46	25, 47, 48	5, 16, 26	9, 20, 27
Armored infantry battalions	21, 55, 63	17, 56, 66	16, 59, 67	19, 62, 68	18, 64, 69	8, 65, 70
Armored field artillery battalions	490, 491, 492	493, 494, 495	496, 497, 498	499, 500, 501	395, 396, 397	412, 413, 414
Cavalry reconnaissance squadrons	41	92	93	94	23	30
Armored medical battalions	81	82	83	84	216	220
Ordnance maintenance battalions	133	134	135	136	137	138
Armored signal companies	151	152	153	154	156	160
Armored engineer battalions	56	119	124	125	216	220

2nd Armored Division “Hell on Wheels”

The 2nd Armored Division was activated on July 15, 1940, at Ft. Benning, Georgia, on the basis of existing infantry tank units and was one of the first two armored divisions formed. It had the most varied career of any American armored division. It was first deployed in November 1942 to take part in the invasion of French North Africa. However, after the initial Operation Torch landings, it was kept in reserve and did not see extensive combat in Tunisia. The division's next mission was with Patton's Seventh Army during Operation Husky, the invasion of Sicily. The 2nd Armored Division was one of the first armored divisions sent to the UK and arrived from Sicily on November 24, 1943, with headquarters near Tidworth, England. It was one of only two to retain the heavy 1942 table of organization. It was first deployed to France on D+3, June 9, 1944. Its first elements entered combat on June 13, 1944, and the entire division was deployed by July 2, 1944. The 2nd and 3rd Armored



Insignia of 2nd and 3rd Armored Divisions. (Author)

Commanding general

November 24, 1943	Maj. Gen. Hugh J. Gaffey
March 18, 1944	Maj. Gen. Edward H. Brooks
September 12, 1944	Maj. Gen. Ernest N. Harmon
January 18, 1945	Brig. Gen. (Maj. Gen.) Isaac D. White

Assignment to higher commands

Date	Army	Corps
June 12, 1944	First	V
July 18, 1944	First	VII
August 2, 1944	First	XIX
August 7, 1944	First	VII
August 13, 1944	First	XIX
August 18, 1944	First	V
August 19, 1944	First	XIX
August 28, 1944	First	XV
August 29, 1944	First	XIX
October 22, 1944	Ninth	XIX
December 22, 1944	First	VII
February 16, 1945	Ninth	XIX
May 8, 1945	Ninth	-

Organic units

41st Armored Infantry Regiment
 66th Armored Regiment
 67th Armored Regiment
 17th Armored Engineer Battalion
 82nd Armored Reconnaissance Battalion
 142nd Armored Signal Company
 14th Armored Field Artillery Battalion
 78th Armored Field Artillery Battalion
 92nd Armored Field Artillery Battalion
 2nd Ordnance Maintenance Battalion
 48th Armored Medical Battalion

Divisions were used as the exploitation force for the initial breakout from Normandy during Operation Cobra on July 25, 1944, and the division's record in this operation is widely regarded as a textbook example of an armored division in its primary role. The division later took part in the rapid sweep into Belgium in August 1944, and, like the rest of 12th Army Group, became bogged down in the battles along the Siegfried Line in autumn 1944, especially the fighting towards the Roer dams. During the Battle of the Bulge, the 2nd Armored Division was one element of the northern counterattack force, racing southward around Christmas to stop the lead elements of the Fifth Panzer Army near Dinant. In several days of fighting in late December, the division crushed the spearheads of the 2nd and 9th Panzer Divisions in some of the largest tank battles of the war fought by US armor. The 2nd Armored Division subsequently took part in Operation Grenade, the offensive against the Roer dams in February 1945 and remained on the northern flank of the US Army's advance into Germany. Once again teamed with the 3rd Armored Division, it provided the northern spearhead that trapped Army Group B in the Ruhr pocket in March 1945.

3rd Armored Division "Spearhead"

The 3rd Armored Division was activated on April 15, 1941, at Camp Polk, Louisiana, and arrived in the ETO on September 15, 1943, being headquartered near Red Lynch and Brouton, England. It was the only division other than 2nd Armored Division to retain the heavy 1942 table of organization. It arrived in France on D+18, June 24, 1944. The first elements of the division entered combat in Normandy on June 29, 1944, and the division was fully deployed by July 9, 1944. The 3rd Armored Division took part in a number of unsuccessful

Commanding general		
September 15, 1943	Maj. Gen. Leroy H. Watson	
August 7, 1944	Brig. Gen. (Maj. Gen.) Maurice Rose	
March 21, 1945	Brig. Gen. Doyle O. Hickey	
Assignment to higher commands		
<i>Date</i>	<i>Army</i>	<i>Corps</i>
July 15, 1944	First	VII
December 19, 1944	First	XVIII Airborne
December 23, 1944	First	VII
May 1, 1945	Ninth	XIX
Organic units		
36th Armored Infantry Regiment		
32nd Armored Regiment		
33rd Armored Regiment		
23rd Armored Eng Battalion		
83rd Armored Reconnaissance Battalion		
143rd Armored Signals Company		
391st Armored Field Artillery Battalion		
67th Armored Field Artillery Battalion		
54th Armored Field Artillery Battalion		
3rd Ordnance Maintenance Battalion		
45th Armored Medical Battalion		



An armored division on the road stretched several dozen miles from its forward reconnaissance elements back through its divisional trains. Here, a column from the 15th Tank Battalion, 6th Armored Division, passes a long column of German prisoners of war walking back along the median strip of the autobahn near Giesen, Germany, on March 29, 1945, following the surrender of over 300,000 troops of Army Group B in the Ruhr pocket. The tank to the right is a new M4A3E8, which like many of the tanks in Patton's Third Army, has had additional armor plates welded to the turret and hull front. (US Army)

local attacks in Normandy, and was part of the exploitation force during Operation Cobra on July 25, 1944. The division was famous for its role in the fighting in Belgium in September 1944, and was the first US division through the Siegfried Line. During the Battle of the Bulge, it was one of the first armored divisions deployed in the counterattack. One of its combat commands took part in the isolation and elimination of Kampfgruppe Peiper around La Gleize, while its other units became heavily involved stopping the advance of II SS-Panzer Corps around Manhay. Following the Rhine operations, the division was used to complete the encirclement of Army Group B in the Ruhr pocket leading to one of the largest surrenders of German troops during the war. The division was deployed for 231 days in combat and suffered some of the heaviest casualties of any US armored division.

4th Armored Division

The 4th Armored Division was activated on April 15, 1941, at Pine Camp, New York, and arrived in the ETO on January 8, 1944, being headquartered in Chippenham, England. It arrived in France on D+37, July 13, 1944. The first elements of the division entered combat on July 17, 1944, and the division as a whole was committed to action during Operation Cobra on July 28, 1944. The 4th Armored Division was the one of the few US armored divisions during the war not to receive an official nickname, although veterans of the unit sometimes called it "Patton's Best." The division served the whole war in Patton's Third Army and was regarded as Patton's favorite unit, frequently serving as the spearhead during offensive operations. The combination of excellent training, outstanding leadership and Patton's intuitive use of armor has led historians to consider the division among the best US units during the war. The 4th Armored Division was first deployed in the rapid drive down the Atlantic coast during the Cobra offensive, finally cutting off Brittany with a rapid thrust. The division's legendary commander, John "P" Wood, urged Patton to free the division from the Breton mission in favor of more lucrative objectives to the east. As a result, the 4th Armored Division was part of the force that raced to the River Seine in August 1944. The division spearheaded the Third Army's advance into Lorraine, thereby becoming a target for Hitler's inept panzer counteroffensive in September 1944. During the raging tank battles around Arracourt, the division smashed two freshly equipped panzer brigades. The 4th Armored Division was involved in the bitter fighting along the Moselle throughout the autumn. Watching the division deploy around Singling in December 1944, Gen. Fritz Bayerlein of the Panzer Lehr Division recalled it was "an outstanding tank attack, such as I have rarely seen." During the Battle of the Bulge, the 4th Armored Division was Patton's spearhead again, leading the relief of Bastogne on

Christmas. The division took part in the campaign in Germany, ending up further east in Czechoslovakia. The 4th Armored Division was the first armored division during the war to be issued with the Presidential Unit Citation for the entire division.

Commanding general

January 11, 1944	Maj. Gen. John Wood
December 3, 1944	Maj. Gen. Hugh J Gaffey
February 21, 1945	Col. Walter A Bigby
February 25, 1945	Brig. Gen. Holmes E Dager
March 1, 1945	Maj. Gen. Hugh J Gaffey
March 21, 1945	Brig. Gen. (Maj. Gen.) William H Hoge

Assignment to higher commands

<i>Date</i>	<i>Army</i>	<i>Corps</i>
July 15, 1944	Third	VIII
August 13, 1944	Third	XII
December 19, 1944	Third	III
January 2, 1945	Third	VIII
January 12, 1945	Third	XII
April 4, 1945	Third	VIII
April 9, 1945	Third	X
April 17, 1945	Third	VIII
April 30, 1945	Third	XII

Organic units

8th Tank Battalion
 35th Tank Battalion
 37th Tank Battalion
 10th Armored Infantry Battalion
 51st Armored Infantry Battalion
 53rd Armored Infantry Battalion
 25th Cavalry Reconnaissance Squadron (Mech)
 24th Armored Engineer Battalion
 144th Armored Signal Company
 22nd Armored Field Artillery Battalion
 66th Armored Field Artillery Battalion
 94th Armored Field Artillery Battalion
 126th Ordnance Maintenance Battalion
 4th Armored Medical Battalion

5th Armored Division "Victory"

The 5th Armored Division was activated on October 10, 1941, at Ft. Knox, Kentucky, and arrived in the ETO on February 23, 1944, being headquartered in Chiseldon, England. It arrived in France on D+49, July 25, 1944, and first entered combat on August 2, 1944, during Operation Cobra, taking part in the destruction of the 9th Panzer Division. It took part in the race to the Seine in August and took part in the liberation of Luxembourg in September. It served

with First Army during the bitter fighting along the Siegfried Line in the autumn of 1944, seeing action during some of the bloody fighting in the Hurtgen Forest. It saw no fighting during the Ardennes campaign, but took part in operations during the battles from the Roer to the Rhine in February and early March 1945. It reached the river Elbe in April, and ended the war on the approaches to Berlin.

Commanding general

February 23, 1944 Maj. Gen. Lunsford E Oliver

Assignment to higher commands

Date	Army	Corps
August 1, 1944	Third	XV
August 24, 1944	Third	XV
August 26, 1944	First	XV
August 29, 1944	First	V
November 29, 1944	First	VII
December 23, 1944	First	V
January 27, 1945	Ninth	XIX
January 29, 1945	Ninth	XVI
February 1, 1945	Ninth	XIII
May 4, 1945	Ninth	XVIII Abn
May 8, 1945	Ninth	XIII

Organic Units

10th Tank Battalion
 34th Tank Battalion
 81st Tank Battalion
 15th Armored Infantry Battalion
 46th Armored Infantry Battalion
 47th Armored Infantry Battalion
 85th Cavalry Reconnaissance Squadron (Mech)
 22nd Armored Engineer Battalion
 145th Armored Signal Company
 47th Armored Field Artillery Battalion
 71st Armored Field Artillery Battalion
 95th Armored Field Artillery Battalion
 127th Ordnance Maintenance Battalion
 75th Armored Medical Battalion

6th Armored Division “Super Sixth”

The 6th Armored Division was activated on February 15, 1942 at Ft. Knox, Kentucky, and arrived in the ETO on February 25, 1944, being headquartered in Batsford, England. It arrived in France on D+42, July 18, 1944, and first entered combat during Operation Cobra on July 27, 1944. Like the 4th Armored Division, it served most of the war with Patton’s Third Army, which ensured that it saw a great deal of combat. In the wake of Operation Cobra, the division raced into Brittany, reaching the seaport of Brest, a 200-mile dash that was one of the deepest and fastest of the war for any US division. During the Battle of the Bulge, Patton brought up the 6th Armored Division after the 4th Armored Division had been worn down by the relief of Bastogne, and the 6th was used to spearhead

the drive that linked the Third Army with the northern side of the Bulge. It was heavily engaged in the fighting to reduce the German bulge. Its intensive war record meant that the division suffered heavier casualties than any other armored division in the ETO.

Commanding generals		
February 22, 1944	Maj. Gen. Robert W Grow	
April 30, 1945	Brig. Gen. George W Read Jr.	
Assignment to higher commands		
<i>Date</i>	<i>Army</i>	<i>Corps</i>
July 25, 1944	Third	VIII
September 5, 1944	Ninth	-
September 16, 1944	Third	XII
December 11, 1944	Third	III
December 18, 1944	Third	XII
December 21, 1944	Third	XX
December 25, 1944	Third	XII
December 28, 1944	Third	III
February 11, 1945	Third	VIII
March 23, 1945	Third	XX
March 24, 1945	Third	XII
March 28, 1945	Third	XX
April 17, 1945	Third	VIII
April 22, 1945	First	VIII
May 6, 1945	Ninth	VIII
Organic units		
15th Tank Battalion		
68th Tank Battalion		
69th Tank Battalion		
9th Armored Infantry Battalion		
44th Armored Infantry Battalion		
50th Armored Infantry Battalion		
86th Cavalry Reconnaissance Squadron (Mech)		
25th Armored Engineer Battalion		
146th Armored Signal Company		
128th Armored Field Artillery Battalion		
212th Armored Field Artillery Battalion		
231st Armored Field Artillery Battalion		
128th Ordnance Maintenance Battalion		
76th Armored Medical Battalion		

7th Armored Division “Lucky Seventh”

The 7th Armored Division was activated on March 1, 1942, at Camp Polk, Louisiana, and arrived in the ETO on June 13, 1944, being headquartered at Greenock, Scotland. The division arrived in France on D+65, August 10, 1944,

and first entered combat on August 13, 1944. The division was poorly handled throughout much of the autumn fighting, often being broken up into its constituent combat commands, and began to develop the reputation as the "Unlucky Seventh." The divisional commander was relieved, replaced by an able combat command leader, and Gen. Bruce Clarke was brought in from the 4th Armored Division to lead CCB. Reinvigorated, the division was hastily sent from the Netherlands to the Ardennes at the start of the Battle of the Bulge. The division's defense of St. Vith is widely regarded as a classic example of the defensive use of an armored division. The division later took part in the reduction of the Ruhr pocket in March 1945 and made contact with the Red Army along the Elbe in April.

Commanding generals

June 13, 1944	Maj. Gen. Lindsay M. Silvester
November 1, 1944	Brig. Gen. (Maj. Gen.) Robert W. Hasbrouck

Assignment to higher commands

<i>Date</i>	<i>Army</i>	<i>Corps</i>
August 1, 1944	First	
August 5, 1944	Third	
August 10, 1944	Third	XX
September 25, 1944	First	XIX
October 8, 1944	Ninth	VIII British
November 9, 1944	Ninth	XIII
December 16, 1944	First	VIII
December 20, 1944	First	XVIII Airborne
January 29, 1945	First	V
March 7, 1945	First	III
April 19, 1945	First	V
April 30, 1945	First	XVIII Airborne

Organic units

17th Tank Battalion
 31st Tank Battalion
 40th Tank Battalion
 23rd Armored Infantry Battalion
 38th Armored Infantry Battalion
 48th Armored Infantry Battalion
 87th Cavalry Reconnaissance Squadron (Mech)
 33rd Armored Engineer Battalion
 147th Armored Signal Company
 434th Armored Field Artillery Battalion
 440th Armored Field Artillery Battalion
 489th Armored Field Artillery Battalion
 129th Ordnance Maintenance Battalion
 77th Armored Medical Battalion

8th Armored Division "Thundering Herd"

The 8th Armored Division was activated on April 1, 1942, at Fort Knox, Kentucky, and arrived in the ETO on November 21, 1944, being headquartered at Tidworth, England. It arrived on the Continent on D+213, January 6, 1945, and was first committed to combat on January 19, 1945 during the final stage of the Battle of the Bulge in the Ardennes. It took part in the fighting on the approaches to the Rhine, and during the April advances, took part in actions in the Harz Mountains, ending up in Czechoslovakia at the end of the war.

Commanding general		
November 21, 1944	Brig. Gen. (Maj. Gen.) John M. Devine	
Assignment to higher commands		
<i>Date</i>	<i>Army</i>	<i>Corps</i>
January 12, 1945	Fifteenth	
February 1, 1945	Ninth	XVI
April 1, 1945	Ninth	XIX
April 9, 1945	Ninth	XVI
April 15, 1945	Ninth	XIX
Organic Units		
18th Tank Battalion		
36th Tank Battalion		
80th Tank Battalion		
7th Armored Infantry Battalion		
49th Armored Infantry Battalion		
58th Armored Infantry Battalion		
88th Cavalry Reconnaissance Squadron (Mech)		
53rd Armored Engineer Battalion		
148th Armored Signal Company		
398th Armored Field Artillery Battalion		
399th Armored Field Artillery Battalion		
405th Armored Field Artillery Battalion		
130th Ordnance Maintenance Battalion		
78th Armored Medical Battalion		

9th Armored Division "Phantom"

The 9th Armored Division was activated on July 15, 1942, at Ft. Riley, Kansas, and arrived in the ETO on August 27, 1944, being headquartered at Tidworth, England. It arrived in France on D+111, September 25, 1944. Although some elements of the division were committed to combat on October 23, 1944, the division as whole was not committed to combat until December 16, 1944, after being assigned to the First Army's reserve in the Ardennes. It fought during the Battle of the Bulge as separate combat commands, its CCB taking part in the legendary defense of St. Vith. The division is best known for its actions in March 1945 when one of its combat commands seized the Ludendorff Bridge over the Rhine at Remagen.

Commanding general

August 27, 1944 Maj. Gen. John W. Leonard

Assignment to higher commands

<i>Date</i>	<i>Army</i>	<i>Corps</i>
October 15, 1944	Ninth	VIII
October 22, 1944	First	VIII
December 20, 1944	Third	III
December 21, 1944	Third	VIII
December 31, 1944	SHAEF Reserve	
January 8, 1945	Fifteenth	
February 22, 1945	First	III
March 21, 1945	First	V
April 28, 1945	First	VII
April 30, 1945	First	VIII
May 4, 1945	First	V
May 6, 1945	Third	

Organic units

2nd Tank Battalion

14th Tank Battalion

19th Tank Battalion

27th Armored Infantry Battalion

52nd Armored Infantry Battalion

60th Armored Infantry Battalion

89th Cavalry Reconnaissance Squadron (Mech)

9th Armored Engineer Battalion

149th Armored Signal Company

3rd Armored Field Artillery Battalion

16th Armored Field Artillery Battalion

73rd Armored Field Artillery Battalion

131st Ordnance Maintenance Battalion

2nd Armored Medical Battalion

10th Armored Division "Tiger"

The 10th Armored Division was activated on July 15, 1942, at Ft. Benning, Georgia, and arrived in the ETO on September 23, 1944, at Cherbourg, France, directly from the US. It was first committed to combat in November 1944, taking part with Patton's Third Army in the reduction of the Metz fortress. Although slated to take part in Patton's offensive into the Saar in December 1944, the unexpected German attack in the Ardennes led to the hasty transfer of the division to Belgium. The division's CCB ended up trapped in Bastogne during the siege, playing a central role in the defense of the city. The division returned to Patton in February and was used in the assault on the Saar-Moselle triangle. The division later crossed the Rhine and Neckar, ending the war in the Bavarian Alps south of Munich.

Commanding general

September 22, 1944 Maj. Gen. William H. H. Morris, Jr.

Assignment to higher commands

<i>Date</i>	<i>Army</i>	<i>Corps</i>
October 23, 1944	Third	XX
December 17, 1944	Third	VIII
December 20, 1944	Third	III
December 21, 1944	Third	XII
December 26, 1944	Third	XX
January 17, 1945	Third	XXI
January 25, 1945	Third	XV
February 10, 1945	Third	XX
March 23, 1945	Third	XXI
April 1, 1945	Third	VI
April 8, 1945	Seventh	VI

Organic units

3rd Tank Battalion
11th Tank Battalion
21st Tank Battalion
20th Armored Infantry Battalion
54th Armored Infantry Battalion
61st Armored Infantry Battalion
90th Cavalry Reconnaissance Squadron (Mech)
55th Armored Engineer Battalion
150th Armored Signal Company
419th Armored Field Artillery Battalion
420th Armored Field Artillery Battalion
423rd Armored Field Artillery Battalion
132nd Ordnance Maintenance Battalion
80th Armored Medical Battalion



A tank company from the 9th Armored Division awaits orders in a farm field outside Westhausen, Germany, on April 10, 1945. Behind and to the right of the M4A3 is one of the new M32 armored recovery vehicles. (US Army)

11th Armored Division “Thunderbolt”

The 11th Armored Division was activated on August 15, 1942, at Camp Polk, Louisiana, and arrived in the ETO on October 5, 1944, being headquartered in Warminster, England. It arrived in the Netherlands on D+194, December 17, 1944, and was immediately sent into combat on December 23, 1944, taking part in the Battle of the Bulge. It saw considerable combat action in the Bastogne area. The division crossed the Rhine in late March 1945, advancing with Patton’s Third Army through central Germany and finally into Austria at the end of the war.

Commanding general

October 5, 1944	Brig. Gen. Charles S. Kilburn
March 21, 1945	Brig. Gen. (Maj. Gen.) Holmes E. Dager

Assignment to higher commands

<i>Date</i>	<i>Army</i>	<i>Corps</i>
December 23, 1944	Third	VIII
December 31, 1944	Third	XII
January 15, 1945	Third	VIII
March 12, 1945	Third	XX
March 16, 1945	Third	XII
March 24, 1945	Third	XX
April 1, 1945	Third	XII

Organic units

22nd Tank Battalion
 41st Tank Battalion
 42nd Tank Battalion
 21st Armored Infantry Battalion
 55th Armored Infantry Battalion
 63rd Armored Infantry Battalion
 41st Cavalry Reconnaissance Squadron (Mech)
 56th Armored Engineer Battalion
 151st Armored Signal Company
 490th Armored Field Artillery Battalion
 491st Armored Field Artillery Battalion
 492nd Armored Field Artillery Battalion
 133rd Ordnance Maintenance Battalion
 81st Armored Medical Battalion

12th Armored Division “Hellcats”

The 12th Armored Division was activated on September 15, 1942, at Camp Campbell, Kentucky, and arrived in the ETO on October 2, 1944, being headquartered at Liverpool and later Tidworth, England. It arrived in France on D+156, November 9, 1944, and was first committed to combat on December 5, 1944. It was one of two US armored divisions usually assigned in combat to the Seventh Army with Devers’ 6th Army Group, the other being the 14th Armored Division. It took part in the fighting in Alsace in the winter of 1944–45 including the repulse of the German Operation

Nordwind offensive. Along with the rest of Seventh Army, it moved into southern Germany in March, crossing the Rhine and taking part in actions south of Wurzburg. It advanced into Bavaria in April reaching the Alps, and some units reached Austria by the end of the campaign.

Commanding general		
October 1, 1944	Maj. Gen. Roderick R. Allen	
Assignment to higher commands		
<i>Date</i>	<i>Army</i>	<i>Corps</i>
December 5, 1944	Seventh	XV
December 27, 1944	Seventh	XXI
January 3, 1945	Seventh	XV
January 6, 1945	Seventh	VI
February 3, 1945	Seventh	XXI
February 11, 1945	Seventh	XV
February 28, 1945	Seventh	XXI
March 17, 1945	Seventh	XX
March 24, 1945	Seventh	XXI
March 26, 1945	Seventh	XV
March 31, 1945	Seventh	XXI
Organic units		
23rd Tank Battalion		
43rd Tank Battalion		
714th Tank Battalion		
17th Armored Infantry Battalion		
56th Armored Infantry Battalion		
66th Armored Infantry Battalion		
92nd Cavalry Reconnaissance Squadron (Mech)		
119th Armored Engineer Battalion		
152nd Armored Signal Company		
493rd Armored Field Artillery Battalion		
494th Armored Field Artillery Battalion		
495th Armored Field Artillery Battalion		
134th Ordnance Maintenance Battalion		
82nd Armored Medical Battalion		

13th Armored Division "The Black Cats"

The 13th Armored Division was activated on October 15, 1942, at Camp Beale, California, and arrived in the ETO on D+237, January 29, 1945, disembarking in France directly from the United States. Elements of the division first entered combat on March 19, 1945, and the division as a whole was committed by April 10, 1945, serving with Patton's Third Army beyond the Rhine and into Bavaria.



Armored infantry move forward with the support of an M4A3 medium tank of Co. A, 714th Tank Battalion, 12th Armored Division, during the fighting for Krautostheim, Germany, on April 11, 1945. (US Army)

Commanding general

January 29, 1945	Maj. Gen. John B. Wogan
April 17, 1945	Maj. Gen. John Millikin

Assignments to higher commands

<i>Date</i>	<i>Army</i>	<i>Corps</i>
January 21, 1945	Fifteenth	
April 8, 1945	Third	
April 10, 1945	Third	XVIII Abn
April 22, 1945	Third	XX

Organic units

- 24th Tank Battalion
- 45th Tank Battalion
- 46th Tank Battalion
- 16th Armored Infantry Battalion
- 59th Armored Infantry Battalion
- 67th Armored Infantry Battalion
- 93rd Cavalry Reconnaissance Squadron (Mech)
- 124th Armored Engineer Battalion
- 153rd Armored Signal Company
- 497th Armored Field Artillery Battalion
- 496th Armored Field Artillery Battalion
- 498th Armored Field Artillery Battalion
- 135th Ordnance Maintenance Battalion
- 83rd Armored Medical Battalion

14th Armored Division “Liberator”

The 14th Armored Division was activated on November 15, 1942, at Camp Chaffee, Arkansas, and reached the ETO on October 29, 1944, landing directly in France from the United States. The division entered combat on November 14, 1944. It was one of two armored divisions regularly committed to the US Seventh Army in Alsace, and saw heavy fighting along the Siegfried Line for much of the fall, entering German in early December. When the Germans launched Operation Nordwind in January 1945, the division played a role in the counterattack. The division took part in the fighting in southern Germany in March and April 1945.

Commanding general

November 1, 1944 Brig. Gen. (Maj. Gen.) Albert C. Smith

Assignments to higher commands

<i>Date</i>	<i>Army</i>	<i>Corps</i>
November 10, 1944	Seventh	XV
December 5, 1944	Seventh	VI
March 31, 1945	Seventh	XV
April 23, 1945	Third	III

Organic units

25th Tank Battalion
47th Tank Battalion
48th Tank Battalion
19th Armored Infantry Battalion
62nd Armored Infantry Battalion
68th Armored Infantry Battalion
94th Cavalry Reconnaissance Squadron (Mech)
125th Armored Engineer Battalion
154th Armored Signal Company
499th Armored Field Artillery Battalion
500th Armored Field Artillery Battalion
501st Armored Field Artillery Battalion
136th Ordnance Maintenance Battalion
84th Armored Medical Battalion

A column of M4 tanks from the 10th Armored Division move through the picturesque town of Garmisch-Partkirchen in the foothills of the Alps south of Munich on April 30, 1945, as part of the US 6th Army Group drive through Bavaria. The second and fourth tanks are the newer M4A3E8s with 76mm guns and the new suspension with wide track. (US Army)



16th Armored Division

The 16th Armored Division was activated on July 15, 1943, at Camp Chaffee, Arkansas, and arrived in the ETO on D+250, February 11, 1945, landing directly in France from the United States. The division first entered combat on April 28, 1945, and was in combat for only three days before the war ended.

Commanding general

February 11, 1945 Brig. Gen. John L. Pierce

Assignment to higher commands

Date	Army	Corps
January 29, 1945	Fifteenth	
April 17, 1945	Third	
May 6, 1945	Third	V

Organic units

5th Tank Battalion
16th Tank Battalion
26th Tank Battalion
18th Armored Infantry Battalion
64th Armored Infantry Battalion
69th Armored Infantry Battalion
23rd Cavalry Reconnaissance Squadron (Mech)
216th Armored Engineer Battalion
156th Armored Signal Company
393rd Armored Field Artillery Battalion
396th Armored Field Artillery Battalion
397th Armored Field Artillery Battalion
137th Ordnance Maintenance Battalion
216th Armored Medical Battalion

20th Armored Division

The 20th Armored Division was activated on March 15, 1943, at Camp Campbell, Kentucky, and arrived in the ETO on D+221, February 17, 1945, directly from the United States. It entered combat on April 24, 1945, one of the last armored divisions deployed. It took part in the advance on Munich, and ended the war in Salzburg, Austria.



An M24 light tank of the 20th Armored Division with infantry aboard rolls past the smoking wrecks of a pair of Bergepanther armored recovery vehicles in the outskirts of Salzburg, Austria, on May 4, 1945, in the Seventh Army sector. Some of the new armored divisions had their light tank companies equipped entirely with this new type when they were deployed in the ETO in spring 1945. (US Army)

Commanding general

February 17, 1945 Maj. Gen. Orlando Ward

Assignment to Higher Commands

Date	Army	Corps
April 3, 1945	Fifteenth	XXII
April 12, 1945	First	-
April 19, 1945	Third	III
April 23, 1945	Seventh	XV

Organic units

9th Tank Battalion
 20th Tank Battalion
 27th Tank Battalion
 8th Armored Infantry Battalion
 65th Armored Infantry Battalion
 70th Armored Infantry Battalion
 30th Cavalry Reconnaissance Squadron (Mech)
 220th Armored Engineer Battalion
 160th Armored Signal Company
 412th Armored Field Artillery Battalion
 413th Armored Field Artillery Battalion
 414th Armored Field Artillery Battalion
 138th Ordnance Maintenance Battalion
 220th Armored Medical Battalion

US armored divisions in the ETO 1944-45 statistics

Division	2	3	4	5	6	7	8	9	10	11	12	13	14	16	20
Days in combat	247	231	230	161	226	172	260	91	124	96	102	16	133	3	8
Killed	1,102	2,540	1,238	547	1,169	887	260	549	710	614	517	105	447	0	9
Wounded	5,331	7,331	4,246	2,768	4,198	4,174	1,015	2,198	3,400	2,562	2,257	366	1,998	12	66
Missing	253	95	503	177	152	1,050	38	1,194	586	40	659	22	422	0	1
Captured	65	139	1	62	7	39	0	11	1	0	3	0	29	0	0
Non-battle casualties	7,116	6,017	4,508	3,592	7,290	4,352	1,141	1,459	3,684	1,921	2,540	246	1,400	231	319
Casualties as percentage of T/O	95.9	111.5	98.4	67.0	120.1	98.4	23.0	50.7	78.5	48.1	56.0	6.9	40.3	2.3	3.7
Medium tanks lost	290	632	216	116	196	360	58	162	181	72	129	27	101	0	17
Light tanks lost	n/a	173	52	19	24	130	21	50	31	37	30	8	36	0	2
PoWVs taken	76,963	76,720	90,364	42,756	61,864	113,041	35,494	25,628	43,208	76,229	72,243	27,827	64,205	26,283	0

Bibliography

There has been no major study of US armored divisions during World War II, although there are many unit histories. This book was based heavily on unpublished army reports and publications, copies of which were found in US archives such as the Military History Institute (MHI) at the US Army War College, Carlisle Barracks, Pennsylvania and the US National Archives and Records Administration (NARA) at College Park, Maryland. As mentioned previously, the General Board report, *Organization, Equipment and Tactical Employment of the Armored Division*, is a particularly useful overview of armored division performance. Another very useful study is *History of the Armored Force, Command and Center*, which is study number 27 in a series prepared by the historical section of the Army Ground Forces in 1946. Contemporary documents on the armored divisions include a wide range of field manuals and TO&Es, and the author relied primarily on the collections at the MHI.

There are histories of all the divisions that served in the ETO, though they vary enormously in quality. They fall into three categories. Most divisions prepared a brief, illustrated history in the years immediately after the war which were issued to the veterans. Many of these were printed in Germany and by now are rare and expensive. Fortunately, the Battery Press in Nashville, Tennessee, has reprinted many. These usually provide an adequate if short history of the division, but are often incomplete. In recent decades, the veterans associations of the divisions have sponsored histories that often consist of excerpts from the wartime histories plus additional material on the veterans groups. Taylor Publishing of Dallas, Texas, and Turner Publishing of Paducah, Kentucky, have been responsible for most of these, but they tend to be thin on historical detail. Finally, several divisions have been treated to serious historical accounts such as the 2nd, 5th, 6th, 9th Armored Divisions. The biggest gaps are the lack of adequate histories of important units such as the 3rd and 4th Armored Divisions.

General histories

- Baily, Charles, *Faint Praise: American Tanks and Tank Destroyers during World War II*, (Archoin, 1983). The best account of the problems of US tank development during the war years, with an emphasis on equipment rather than organization and tactics.
- Gillie, Mildred H., *Forging the Thunderbolt: A History of the Development of the Armored Force*, (Military Service Publishing, 1947). This classic examines the early history of the armored force and the political infighting behind its formation.
- Johnson, David E., *Fast Tanks and Heavy Bombers: Innovation in the US Army 1917-1945*, (Cornell, 1998). An academic study focusing on tank and bomber development in the interwar years as examples of the US Army's attempts at innovation. Stronger on the pre-war period than on the war years, which are given only summary treatment.
- Odom, William, *After the Trenches: The Transformation of US Army Doctrine 1918-1939*, (Texas A&M, 1998). An academic study of the debate on army doctrine before the war which ends before the army had begun to reexamine its armored doctrine in 1940.
- Wilson, John, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades*, (US Army Center for Military History, 1998). An official history in the US Army lineage series examining the evolution of the division.

Divisional histories (in numerical order)

- Houston, Donald, *Hell on Wheels: The 2nd Armored Division*, (Presidio Press, 1977). One of the better divisional histories written by a veteran.
- Smith, J. A., *Spearhead in the West: The 3rd Armored Division In World War II*, (Original, 1946, Battery Press reprint, 1998). This is the semi-official history of the division printed immediately after the war and is adequate but far from complete.
- Koyen, Kenneth, *The 4th Armored Division: From the Beaches to Bavaria*, (Original, 1946, Battery Press reprint, 1980). This is the semi-official history of the division and, while useful, does not do the subject justice.
- Hillery, V., and Hurley, E. F., *Paths of Armor, The 5th Armored Division in World War II*, (Original, 1950, Battery Press reprint, 1985). This is another history sponsored by a veterans association, but better done than most.
- Hofmann, George, *The Super Sixth: History of the 6th Armored Division in World War II*, (Original, 1975, Battery Press reprint, 1998). Although published by the division's association, this is a serious study by a military historian and one of the best US divisional histories.
- Chapin, Neil, et. al., *The Lucky Seventh: The 7th Armored Division and Association*, (Taylor Publishing, 1982). This combines a brief history of the division with a section on the postwar veterans organizations.
- Leach, Charles, *In Tornado's Wake: A History of the 8th Armored Division*, (Original, 1956, Battery Press reprint, 1992). A short but useful history by an officer of the division.
- Reichelt, Walter, *Phantom Nine: The 9th Armored Division 1942-45*, (Presidio Press, 1987). A good history by a former armored dough of the division who became a college teacher after the war.
- Nichols, L. M., *Impact: The Battle Story of the 10th Armored Division in World War II*, (Gateway, 1954, Battery Press reprint, 1985). An adequate history of the division.
- Steward, H. D., *Thunderbolt: The History of the 11th Armored Division*, (Original, 1948, Battery Press reprint, 1981). A typical postwar semi-official history that is brief but useful.
- Hellcats: The 12th Armored Division in World War II*, (1946, Battery Press reprint, 1978). A short but useful history of the division.
- The 13th Armored Division: A History of the Black Cats*, (1947). This is mainly a unit photo album, and the history sections are fairly short.
- Carter, Joseph, *The History of the 14th Armored Division*, (1946). A typical post-war divisional history, more thorough than most.
- Armor in the ETO: The 20th Armored Division*, (1946). This is a short history of a division which saw little combat.

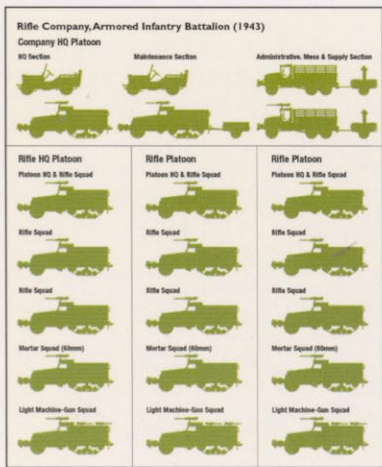
Index

Figures in **bold** refer to illustrations

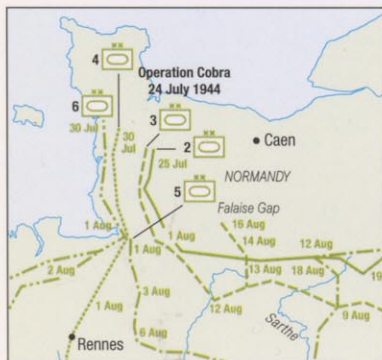
- 1st Armored Division
 - 1st Cavalry **4**
 - and Carolinas maneuvers (1941) **11**
 - in Italy **15**
 - at Kasserine Pass (February 1943) **8, 9, 12**
 - 2nd Armored Division "Hell on Wheels"
 - 77–78
 - 3/67th Armored Regiment **61**
 - 66th Armored Regiment **28**
 - 82nd Armored Reconnaissance Battalion **25**
 - and Carolinas maneuvers (1941) **11**
 - at Celles (December 1944) **67, 68**
 - in England **16, 17**
 - insignia **77**
 - at Magdeburg (April 1945) **32**
 - and Operation Torch **9, 77**
 - Piper L-4 Grasshoppers **40**
 - in Sicily **15, 77**
 - tanks **45**
 - at Ubach **61, 61, 62**
 - 3rd Armored Division "Spearhead" **78–79**
 - 33rd Armored Regiment **51**
 - 146th Armored Signal Company **48**
 - at Celles (December 1944) **67**
 - in England **16**
 - insignia **77**
 - at Paderborn **56–57, 58**
 - 4th Armored Division **79–80**
 - 8th Tank Battalion **52**
 - 35th Tank Battalion **63**
 - 37th Tank Battalion **66**
 - at Arracourt (September 1944) **64, 65, 66, 79**
 - at Bastogne (January 1945) **14, 79**
 - in the Palatinate **62, 63**
 - at Singling (December 1944) **71–72, 73, 74–75**
 - 5th Armored Division "Victory" **80–81**
 - 34th Armored Regiment **7**
 - 46th Armored Infantry Battalion **36**
 - training **11**
 - 6th Armored Division "Super Sixth" **81–82**
 - 15th Tank Battalion **79**
 - 44th Armored Infantry Battalion **71**
 - armored engineer battalions **42**
 - at Bastogne (January 1945) **26, 59–60, 60**
 - at Dasburg (February 1945) **64**
 - at Mulhausen (April 1945) **70–71, 72**
 - Task Force **44, 71**
 - 7th Armored Division "Lucky Seventh"
 - 82–83
 - 40th Tank Battalion **69**
 - 440th Armored Field Artillery Battalion **40, 53**
 - at St. Vith (December 1944) **68–69, 69, 83**
 - 7th Cavalry Brigade (Mechanized) **6**
 - 8th Armored Division "Thundering Herd"
 - 84
 - 9th Armored Division "Phantom" **84–85**
 - and M4A3 tanks **27, 30**
 - at Remagen **54, 55, 56, 84**
 - Task Force Engemen **54, 56, 56**
 - 10th Armored Division "Tiger" **85–86**
 - 21st Tank Battalion **31**
 - at Garmisch-Partkirchen **90**
 - 11th Armored Division "Thunderbolt" **87**
 - 22nd Tank Battalion **74**
 - 55th Armored Infantry Battalion **74**
 - 63rd Armored Infantry Battalion **24**
 - 12th Armored Division "Hellcats" **87–88**
 - 92nd Cavalry Reconnaissance Squadron (Mechanized) **23**
 - 714th Tank Battalion **89**
 - 13th Armored Division "The Black Cats"
 - 88–89
 - 14th Armored Division "Liberator" **89–90**
 - 48th Tank Battalion **36**
 - at Oberhoffen (February 1945) **15**
 - 16th Armored Division **90–91**
 - 20th Armored Division **91–92**
 - at Salzburg **91**
 - Aachen **37, 60–61**
 - Abrams, Col. Creighton **71–72, 75**
 - Afrika Korps **9, 12**
 - aircraft
 - in armored field artillery battalions **39**
 - Piper L-4 Grasshoppers **40**
 - Airel **54**
 - anti-tank guns **6–7, 9, 11**
 - M1 57mm **20, 34, 37**
 - armored cars: M8 light **20, 23, 23, 24, 25**
 - armored corps **14**
 - armored divisions: general
 - 1942 (heavy) **10**
 - 1943–44 **13, 17**
 - ammunition consumption **44**
 - armored division trains **41, 43, 44**
 - armored engineer battalions **41, 42**
 - armored field artillery battalions **38–41**
 - armored infantry battalions **34–38**
 - armored maintenance battalions **44, 44**
 - armored medical battalions **43, 44**
 - armored reconnaissance battalions **24**
 - armored signal companies **20, 46–48**
 - attachments **44**
 - attacks, renewing **60–61**
 - attacks, surprise **59–60**
 - attacks against armored units **64–67**
 - attacks against prepared defenses **64**
 - attacks against unprepared defenses **62–63**
 - breakthrough operations **54–56**
 - cavalry reconnaissance squadrons **22–24**
 - combat commands **4–5, 11, 13, 21–22**
 - communications **46–48**
 - comparisons with panzer divisions **45**
 - configuration **4, 6**
 - counterattacks **68–69**
 - fuel consumption **44**
 - headquarters **20, 20**
 - lessons learned in ETO **75**
 - offensive operations in enemy rear **51–54**
 - in the Philippines **9**
 - seizing key terrain **56–58**
 - small unit tactics **70–75**
 - statistics **92**
 - tactics **5, 7–8, 10–11, 49–75**
 - tank battalions **25–34**
 - tank destroyer battalions **5, 7, 9**
 - TO&E **18–19**
 - training **16**
 - unit status **76**
 - see also Armored Force; specific divisions by name
- armored division trains **41, 43, 44**
- "armored doughs" **37**
- armored engineer battalions **41, 42**
- armored field artillery battalions
 - organization **38–40**
 - TO&E **41**
- Armored Fighting Vehicles and Weapons (AFV&W) **50**
- Armored Force
 - artillery **6–7**
 - cavalry **5, 7, 11**
 - configuration **10**
 - doctrine **15–16**
 - formation **6**
 - maneuvers (1941) **11**
 - reorganization (March 1942) **11–12**
 - reorganization (September 1943) **13–14**
 - size **15**
- Armored Force Field Manual* (March 1942) **12**
- armored infantry battalions
 - casualties **37**
 - half-tracks **36, 37**
 - organization **34, 35**
 - rifle companies **35, 36**
- armored maintenance battalions **44, 44**
- armored medical battalions **43, 44**
- armored reconnaissance battalions **24**
- armored signal companies **20, 46–48**
 - half-tracks **48**
 - SCR-299 radio stations **47, 47**
- Army Ground Forces **6, 13, 14, 17, 50**
- Anzio campaign (1944) **15**
- Arracourt **64, 65, 66, 66, 79**
- assault guns: M4 (105mm) **25, 26, 30, 52**
- Avranches **52, 53**
- bantams (jeeps) **23, 24**
- Barre, Alsace **36**

- Bastogne **14, 26, 59–60, 60, 79, 85, 87**
 Bayerlein, Gen. Fritz **79**
 Belden, Lt. Daniel **72**
 blitzkrieg **11**
 Bohn, Brig. Gen. John **54**
 Bradley, Gen. Omar **50, 54, 56, 75**
 British Universal Carrier **37**
 Brooks, Maj. Gen. E. H. **12**
 Bulge, Battle of the (December 1944) **9, 31, 45, 66–67, 68, 78, 79, 81, 84, 87**
- Caen **54**
 cavalry reconnaissance squadrons **22–24**
 Celles **67, 68**
 Chaffee, Gen. Adna **4, 6, 11**
 Clarke, Brig. Gen. Bruce **50, 66, 68, 69, 83**
 Collins, Maj. Gen. Lawton J. "Lightning Joe" **49, 52–53, 57**
 Combat Command Reserve **21–2**
 combat commands **4–5**
 division of **13**
 formation **11**
 organization **21–2, 21**
 Corlett, Maj. Gen. Charles **60–61**
 Crittenberger, Maj. Gen. W. D. **12**
- Dager, Brig. Gen. Holmes **16**
 Dasburg **64**
 Desert Training Center, Mojave Desert **7, 12**
 Devers, Lt. Gen. Jacob **11, 13, 14, 50**
- Earnest, Brig. Gen. Herbert **75**
 echelons (divisional HQ) **20**
 Eddy, Maj. Gen. Manton S. **16**
 Eisenhower, Gen. Dwight D. **14, 34**
 El Guettar **12**
- Falaise pocket **54**
 field telephones **46**
 First Army **16, 17, 22, 49, 81**
 FM17-100: *The Armored Division* (January 1944) **15–16, 50**
 Fort Hood **7**
 Fort Knox **6, 12, 14, 50**
 Frankfurt **63**
- Gaffey, Gen. Hugh **75**
 Garmisch-Partkirchen **90**
 Gillem, Maj. Gen. Alvan **13**
 Grimes, Maj. Gen. W. H. **12**
 Grow, Gen. Robert **32, 75**
- Habay-la-Neuve **60**
 half-tracks
 armored signal companies **48**
 M2 **36**
 M2A1 **36**
 M3 **36, 36**
 M3A1 **23, 36, 36**
 M3A2 **36**
 Harmon, Maj. Gen. Ernest **13**
 Hinds, Col. Sidney **61**
 Hodges, Gen. Courtney **49, 53**
 Hoge, Brig. Gen. William **56, 68**
 howitzer motor carriages (HMCs)
 M7 105mm **25, 39, 39, 40, 47, 53**
 M8 75mm **23, 24, 24, 34**
- Kasserine Pass (February 1943) **8, 9, 12**
 Keyes, Maj. Gen. G. **12**
 Koechling, Gen. Friedrich **61**
 Krautostheim **89**
- Leach, Capt. James **72**
 Leonard, Gen. John **56**
 Lippstadt **57**
 Ludendorff Bridge, Remagen **56, 56, 84**
- McNair, Lt. Gen. Lesley **6, 13, 14**
 Magdeburg **32**
 mine laying and clearance **41, 42**
 mortars
 M21 81mm mortar motor carriage (MMC) **25, 26**
 M4 81mm mortar motor carriage (MMC) **26**
 Mulhausen **70–71, 72**
- National Guard tank battalions **9**
 Ninth Army **17, 49**
- Oberdorla **71**
 Oberhoffen **15**
 Operation Cobra **25, 26, 48, 49, 51–53, 51, 78, 79, 80**
 Operation Grenade **15, 78**
 Operation Husky **15, 77**
 Operation Nordwind **87–88, 89**
 Operation Torch **9, 77**
- Paderborn **56–57, 58**
 Palatinate campaign **62, 63**
 Paris: liberation of (August 1944) **54**
 Patton, Gen. George S.
 and 4th Armored Division **79**
 and Armored Force **6**
 as a commander **5, 49**
 and Operation Cobra **53**
 in the Palatinate **62**
 re-equipment of tanks **27**
 tactics **7–8**
 on tank armor **31, 32**
 Paul, Gen. Willard **16**
 Philippines campaign (December 1941–January 1942) **9**
 prisoners of war **24, 79**
 Provisional Tank Group **9**
- radios
 FM radios **47–8**
 SCR-299 radio stations **47, 47**
 Remagen **54, 55, 56, 56, 84**
 rocket launchers (bazookas): MI 2.36in. **34**
 Roer river **15**
 Rose, Maj. Gen. Maurice **57, 57**
 Rosswalden **31**
- Saar-Palatinate Triangle **62, 63**
 St. Lô **53, 54**
 St. Sever, Calvados **25**
 St. Vith: defense of (December 1945)
 66–67, 68–69, **69, 83, 84**
 sandbag armor **31–32**
 Schramm, P. E. **67**
 SdKfz 251 half-tracks **37**
 Sicily **15, 77**
- Sidi bou Zid, battle of (February 14–15, 1943) **8, 12**
 Siegfried Line **21, 32, 51, 60–61, 64, 78, 79, 81, 89**
 Silvester, Maj. Gen. L. M. **12**
 Simpson, Gen. William **49**
 Singling **71–72, 73, 74–75**
 Spanish Civil War **6, 11**
- tables of organization and equipment (TO&E) **14, 17**
 tank battalions
 in armored divisions **25–34, 28**
 casualties **33**
 in infantry units **5, 7, 8–9**
 strength **30, 31**
 TO&E **27, 29**
 tank destroyer battalions
 formation **7**
 tactics **5, 9**
 Tank Destroyer Command **7**
 tanks
 armor protection **31–32**
 horizontal volute suspension (HVSS) **31**
 M2A4 **4**
 M24 light **23, 34, 91**
 M25 "Dragon-Wagon" tank transporter **43**
 M3 light **7, 11**
 M31 recovery vehicle **26, 28**
 M32 recovery vehicle **26, 86**
 M32B1 recovery vehicle **26**
 M36 90mm tank destroyer **44**
 M4 medium **11, 14, 15, 17, 25, 26, 31, 33, 52, 61, 66, 69, 90**
 M4A1 medium **8, 11, 26, 67**
 M4A2 **30–31**
 M4A3 (76mm) **27, 30, 31, 36, 56, 74, 89**
 M4A3E2 assault **32, 60, 71**
 M4A3E8 medium **31, 31, 71, 79, 90**
 M4A4 **30–31**
 M5A1 light **20, 21, 23, 24, 26, 33–34, 51**
 performance **31**
 T26E2 heavy **32**
 T26E3 heavy **32, 33, 56**
 tactics **10–11**
 Task Force Engeman **54, 56, 56**
 Task Force Richardson **56–57**
 teletypes **46–7**
 Third Army **5, 27, 31, 32, 33, 49, 79**
 Training Memorandum No. 4 **49–50**
 treadway bridges **15, 41**
- Ubach **61, 61, 62**
- Vianden Bulge **64, 65**
 Vic-sur-Aisne **24**
- Walker, Maj. Gen. Walton **12, 49**
 walkie-talkies **15, 48**
 Wernberg **74**
 Westhausen **86**
 Wittenmore **36**
 Wood, Maj. Gen. John "P" **12, 16, 32, 66, 75, 79**

Command, deployment, organization and evolution of forces in battle, describing elements of doctrine, training, tactics and equipment.



Organization charts



Full color maps



Photographs

US Armored Divisions

The European Theater of Operations, 1944–45

The armored divisions were the shock force of the US Army's combat formations during the fighting in Northwest Europe in the final year of the war. Of the 16 such divisions formed during the war, all but one served in the European Theater of Operations. This book examines the organizational structure, operational doctrine and combat mission of these divisions from D-Day onwards, describing how tactics were changed as the divisions were forced to adapt to the battlefield realities of combat against an experienced foe. The lessons drawn by the armored divisions from the bitter fighting in Northwest Europe from 1944 to 1945 strongly shaped postwar US Army doctrine.

OSPREY
PUBLISHING

www.ospreypublishing.com

ISBN 1-84176-564-3



9 781841 765648