CLASH OF TANKS:
THE COMBAT EFFECTIVENESS OF THE AMERICAN AND THE GERMAN TANKS IN WORLD WAR II

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ABSTRACT

CLASH OF TANKS: THE COMBAT EFFECTIVENESS OF THE AMERICAN AND THE GERMAN TANKS IN THE SECOND WORLD WAR

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World War II was the first tank-combat-heavy war in military history. Tanks became the ultimate land weapons in World War II. This thesis is a comparative historical analysis of the American and the German tanks' effectiveness. It focuses on the tanks' combat effectiveness by examining tank kill ratios along with their overall impact in achieving the mission objectives. The Germans and the Americans produced and utilized various models of tanks in accordance with their doctrines and needs throughout the war. The study specifically focuses on different theatres of the war, where tank-heavy combats took place. By focusing on the production figures, tank kill/loss ratios and the utilization of tanks, this thesis outlines the impact of the German and the American tanks in the battlefields. In addition, based upon several assessments and observations from many sources, the thesis also outlines a number of areas where changes may have increased the tanks' effectiveness.

Keywords: Tank, effectiveness, Germany, United States, armored warfare.

ÖZ

TANKLARIN ÇARPIŞMASI: İKİNCİ DÜNYA SAVAŞINDA AMERİKAN VE ALMAN TANKLARININ MUHABERE ETKİLİLİĞİ

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İkinci Dünya Savaşı askeri tarihte tankların en yoğun kullanıldığı ilk savaş olmuştur. Bu tez, Amerikan ve Alman tanklarının etkililiğini karşılaştıran tarihsel bir değerlendirmedir. Tankların muharebelerdeki etkisine, tank yok etme oranlarına ve tankların verilen görevlerin yerine getirilmesindeki etkililiğine bakarak açıklamaktadır. Almanlar ve Amerikalılar, savaş boyunca öğretileri ve ihtiyaçları doğrultusunda çeşitli tank modellerini üretmişler ve kullanmışlardır. Bu çalışma, savaşın tank çatışmalarının yoğun olduğu muharebelere odaklanacaktır. Alman ve Amerikan tanklarının ne kadar etkili olduklarını tank üretim ve tank yok etme oranlarına ve tankların nasıl kullanıldığını odaklanarak ortaya koyacaktır. Ayrıca bu tez, birçok değişik örnek üzerinden yapılan değerlendirme ve gözlemlerden yola çıkarak, bazı alanlarda yapılacak değişikliklerin, tankların etkililiğini nasıl artırabileceğini de belirtecektir.

Anahtar kelimeler: Tank, etkililik, Almanya, Amerika Birleşik Devletleri, mekanize savaş.

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LIST OF ABBREVIATONS

Abt:	Abteilung (unit)
AFV:	Armored Fighting Vehicle
AGC:	Army Group Centre
AGN:	Army Group North
AGS:	Army Group South
BEF:	British Expeditionary Force
DAK:	Deutsches Afrika Korps (German Africa Corps)
Flak:	Flugabwehrkanone (Aircraft Defense Cannon)
LSSAH:	Leibstandarte SS Adolf Hitler
OKH:	Oberkommando des Heeres (High Command of the Army)
OKW:	Oberkommando Der Wehrmacht (High Command of Armed Forces)
Pz.:	Panzer or Panzerkampfwagen. In German, panzer means ‘armor’ and panzerkampfwagen means ‘armored fighting vehicle’.
SS:	Schutzstaffel (defense squadron)
Sch./s.:	Schwere (heavy)
StuG:	Sturmgeschütz (assault gun)

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CHAPTER 1

INTRODUCTION

Tank, the mighty and the most profound fighting land vehicle of the last 100 years, made its biggest splash in World War II. Created in World War I to cross the no-man's land, and to protect the marching infantry, tanks became the primary weapon on the battlefield during World War II. Unlike World War I, tanks played a key role in shaping the outcome of battles in World War II. This was because the fighting nations of WW2 understood the significance of tanks, and the future roles they would have on the battlefields. This thesis analyzes tanks' combat effectiveness on various battlefields, how much impact they had on the outcome, and whether they were successful in accomplishing the assigned missions. Although, tanks were looked down as merely infantry support vehicles up until 1939, that perception changed as the war started and continued. As the war went on, so the increased the roles of tanks, as they also improved, and new and better tank models were produced. This thesis examines different tanks' performances and their combat effectiveness from the start of the war in 1939 to the end of the war in 1945 by scrutinizing the German and the American tanks. The US had based its armored force structure like Germany, but both sides developed tanks that suited to their needs to achieve their intended goals. Both sides' tanks produced various results and impacted the outcomes of battles in certain ways.

Even though there is an abundance of information on tanks, and tank warfare during World War II, there are few works that focus specifically on tanks' effectiveness. Most of the information is about the technical aspects of vehicles or perspectives about the tanks' roles in a collective manner; a piece of the puzzle to understand the outcome of battles from a wholly perspective. This thesis offers a new viewpoint by specifically examining tanks' combat effectiveness through their performances on the battlefield. The main measure of effectiveness for tanks was the kill/loss ratio. However, this is not enough to analyze the effectiveness of tanks. Not all battles featured tank heavy combats, and the American tanks compared to their German counterparts did not engage much in tank-to-tank combat so kill/loss ratio does not fully assess the effectiveness. In some battles, especially in the early stages of the war, when the Germans did not possess superior tanks to their enemies, they covered the deficiencies with the use of airpower of artillery. The other measure was the role tanks that played in the outcome of battles regardless of whether the outcome was victory or defeat. Whether the tanks or tank units accomplished their missions or whether the outcomes would have been different in alternative circumstances, such as if the tanks were better armored or had better cannons, are the secondary measures in assessing and analyzing the effectiveness of tanks. Since the data on the German and American tanks are dispersed and the tanks' effectiveness are not specifically examined, this thesis fills the void in understanding the tanks' effectiveness by bringing in the dispersed data and provides a collective study of the German and American tanks. By solely focusing on the tanks, this thesis provides a clearer analysis and study of the tanks' effectiveness.

Background

World War I was the first modern war to feature air, land, and naval warfare. The war spanned for four years, and it featured some of the most revolutionary changes in warfare. Tanks were one of those significant changes. Tanks were used initially as weapons to support and provide cover for the infantry while crossing the no-man's land, and to pave way over the barbed wires. Apparently, certain lessons were learned after the war as military theorists foresaw tanks' potential as a weapon to revolutionize the warfare and bring back maneuvering to the battlefield, after a lengthy war of attrition, in which neither side could penetrate its enemy's lines. This was because of the intense firepower of the artillery that forced the infantries to entrench themselves and seek protection from the raining shells. Tanks brought back movement and speed back to battlefields. Many theorists of armored warfare emerged during the 1920s and 1930s in Great Britain, Germany, France, and Russia. They all sought different ways to penetrate enemy lines and eventually to destroy the enemy.

The German Army created its own armored forces and doctrine, secretly, as they were restricted by the Versailles Treaty to use or experiment with heavy weaponry. The result was the creation of an armored warfare that depended on fast pincer movements to encircle and destroy the trapped enemy forces. First German tanks were designed according to this understanding; tanks with speed and radio communications that allowed for coordination. As the war progressed, and upon facing tougher opponents, priorities shifted towards firepower and armor protection. German tanks became heavier, and had more firepower, but the German war industry could not produce these tanks in huge numbers due to various conditions. The shift from lighter tanks to heavier ones also signaled a change in the conduct of warfare for the Germans. German tanks,

which were at the early years of the war, the spearhead of the assaults, later turned into heavy machines of defensive warfare, and their impact changed in accordance as well.

The US Army, on the other hand, was isolated from the conflict zone of Europe, and projected that it had to be prepared for a war in North America. The US Army was among the latecomers of tank development and creation of an armored force, and it tried to create an armored branch which somewhat resembled the German panzer forces. Mobility was the keyword for the US Army; they needed speed in their tanks to quickly react on the wide continent. The US Army's focus shifted once the nation entered war in 1941. Until the end of the war, the US produced a few tank models; each lacked the necessary firepower and armor protection, for they never intended the American tanks to engage in tank-to-tank combat. Yet, the Americans achieved stability by not building various models of tanks, but by adding upgrades throughout the war to suit their needs. Both the Germans and Americans developed and produced tanks that fitted their needs as the war progressed. Although, their effectiveness varied in different theatres of the war, all tanks that were produced played key roles in the outcome of battles.

Literary Review

The literature on tanks and armored warfare in WWII is quite vast. Since it featured some of the biggest tank battles in military history, it was inevitable that there was a specific focus on tanks and tank warfare, an interest to study this aspect of the war. Since this thesis focuses on the German and the American side of tanks, the information available was chosen among the sources which studied and analyzed these two sides' perspectives and accounts. The vast literature offers a great deal about the

stages of tank development and production, armored warfare doctrines, technical aspects of tanks, and which models of tanks in which numbers took place in different battlefields. The kill/loss ratios and statistics provide the key element in the assessment of tanks' effectiveness.

The primary sources for this thesis include books written by the generals of WWII, interviews, combat reports, diaries which are accessed separately or found in some of the extensive secondary sources which rely heavily upon different archival sources. When armored warfare is taken into consideration, it is hard to ignore the works of the German General Heinz Guderian. As the *Chef der Schnellen Truppen (Chief of Fast Troops)* before the war and the *Generalinspekteur der Panzertruppen (Inspector General of Armored Forces)* during later part of the war, his book *Panzer Leader* (1952), written after the war, provides detailed information of the battles he took place with also a huge deal of information about tanks, and tank warfare. *GeneralMajor (Major General)* Friedrich von Mellenthin's *Panzer Battles* (1971), and his speech in the conference titled *Armored Warfare in World War 2* (1979) provide an excellent account of his experiences in tank combats during the war, especially at the Eastern Front. The translated version of Basil Liddell Hart's *The Other Side of the Hill. Germany's Generals* (1948) *(Hitler'in Generalleri Konuşuyor, 2019)* is also another primary source featuring many German generals' accounts of the war. The significance of this book is that the generals who shared their experiences such as Heinz Guderian, Erich von Manstein, Ritter von Thoma, Hasso von Manteuffel, Ewald von Kleist were the commanders of either Panzer divisions or Panzer corps during the war. This book provides different perspectives and details of the generals on tank warfare, the use of tanks and the tactics, and the effectiveness of tanks. Albert Speer's memoirs *Inside the*

Third Reich (1969) is also a significant source in understanding the German armaments industry during the war. Speer's accounts provide various details on how the tank development and production was shaped, and structured during the war, and how the decisions taken proved themselves ineffective to the extent that the tanks produced could not effectively change the outcome of the battles.

Many books exist detailing the technical aspects of each German tank and armored vehicle produced. One of these books is Peter Chamberlain and Hilary L. Doyle's *Encyclopedia of German Tanks during World War Two.* It lists all the mechanical details, as well as production figures, which is important in assessing the tanks' performances on battlefields. Thomas L. Jentz's *Panzertruppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force,* a two-volume work is another great source for understanding the German armored forces on structural and doctrinal level. It contains the battle reports of German commanders from armored units, detailing the strengths and weaknesses of both German and Allied tanks, and tank kill/loss ratios which are valuable in assessing the effectiveness of German tanks. Some secondary sources, like Roman Töppel's *Kursk 1943* (2018) or Robert Forczyk's *Tank Warfare on the Eastern Front 1941-1942* (2013) which focus on armored warfare on different fronts, also provide an extensive data on tank numbers, kill/loss statistics through archival sources, especially the Soviet archives. The archival materials found in these secondary sources also provide vital information about both the German and the Soviet tanks, detailing their firepower capacities, armor thickness, and mechanical features. These data were gathered through the analysis of captured tanks, which were put to trials to analyze the tanks' effectiveness. The results gathered out of those trials

provide the quantitative data on the tanks' effectiveness and performance, allowing the German panzers to be compared in an analytical method against their counterparts.

On the primary sources regarding the American tanks and armored warfare, a key source is Belton Cooper's memoirs, *Death Traps – Survival of an American Armored Division in World War 2* (1998). Cooper served as an officer, an ordnance lieutenant in the American 3rd Armored Division Maintenance Battalion during the battles at Normandy, the Ardennes and Germany, and his experience with the maintenance battalion provides a significant insight to Sherman tanks and their performances. Cooper also voices his opinions on the state of American tanks and tank development, which also provides a different context of the American perspective of armored warfare. As the commander of VIII and II Corps in Africa, and the 1st Army in France, General Omar Bradley's biography *A Soldier's Story* (1951) is also a good source to understand the American conduct of war from the African campaign to the campaigns in France. It does not necessarily deal with the tanks, but it still provides information about American tanks and the tank combats in different battles which will be referred to in this thesis. General George S. Patton's *Patton Papers* from 1939 to 1945 is also another significant source. As a general in the II Corps in Africa, and the commander of the 3rd Army in France, Patton's accounts are a valuable source, providing tank combat reports and kill/loss statistics. Tank casualty analyses by the British and Canadian Armies also provide an extensive report on both the Americans tanks they used and the German panzers they encountered. All these sources provide detailed information on tanks' strengths and weaknesses and post-combat situation to analyze the effectiveness of tanks.

Although the studies on the US armored forces focus rather on the creation and development of armored forces along with the development of tanks, there are still general sources providing information to analyze the effectiveness of the American tanks. Charles Bailey's *Faint Praise: American Tanks and Tank Destroyers during World War II* offer valuable information on the problems faced within the American tank development. Books from the Center of Military History United States Army, such as Robert S. Cameron's *Mobility, Shock, and Firepower: The Emergence of the U.S. Army's Armor Branch, 1917-1945* (2008) focuses on the whole history of the creation of armored forces, its development, and the changes within the US armored forces from a structural and doctrinal level. It is an important source to understand the shortcomings of the US tanks from the doctrinal perspective. Lastly, the works of Steven J. Zaloga, who is an expert in armored warfare and tanks, offer detailed analyses and provide valuable information on tank combats on various fronts of World War II. His books, comparing German and American tanks with each other and other armies' tanks, indicate the differences, strengths, and weaknesses of each tank under inspection. They contain information about not just the technical aspects of tanks, but also the official combat reports and statistics, hence they provide a wholesome picture to understand the effectiveness of tanks. Zaloga's other books concentrating on other campaigns and operations also provide plenty of information regarding tanks and tank combat.

Lastly, the combat reports, post-battle tank analyses and war diaries of the British and Canadian forces constitute the other sources for the American tanks. The British and the Canadian Armies employed the American tanks and their variants and thereby analyzed these tanks' technical and mechanical performances. Their official reports

provide quantitative data on the aspects like the tanks' guns muzzle velocity and penetration power, armor thickness which are relevant to this research. These sources provide detailed information on the combat effectiveness of tanks on both sides through the inspection of damaged and knocked-out tanks and including kill/loss statistics as well.

The Organization of the Thesis

There are five chapters in this thesis. The first chapter, the introductory part, structured and written in a similar manner to the introduction of Christopher W. Wilbeck's master's thesis,[1] outlines this thesis and its context, and includes a literature review. Unlike, Wilbeck's thesis, which focuses strictly on the German heavy panzers and heavy panzer battalions and their effectiveness, the focus of this thesis is on all the tank models and their combat effectiveness, including the German heavy panzers. Therefore, this thesis concentrates on various tank models, and covers a broader area and may not be as precise as the above-mentioned thesis.

The second chapter gives a background of the pre-war thinking of armored warfare in Germany and the United States. It tells the stages of the creation of armored forces, development, and production of the early tanks of the war in both countries. Chapters Three and Four are the accounts of some of the battles and campaigns in the war. These are the major chapters focusing on the combat effectiveness of the German and American tanks. The narratives of the battles provide an overall background

[1] Christopher W. Wilbeck, "Swinging the Sledgehammer: The Combat Effectiveness of German Heavy Tank Battalions in World War II" (Master's Thesis, U.S. Army Command and General Staff College, 2002).

information; therefore, some details are not included. Not all the operations and campaigns of World War II are included in these chapters as well. The focus is the on battles and campaigns where tanks were the prominent elements on the battlefield and played major roles. Since the Germans engaged in more tank-to-tank combat at the Eastern Front against the Soviet Union, the subchapters examining the battles at this theatre of the war are more detailed. The highly informative and detailed battle reports about the tanks at the Eastern Front provide a good analysis of the effectiveness of the German panzers. Therefore, these subchapters are longer than the rest because of the information relevant to understanding the panzers' combat effectiveness. These chapters also focus on battles which new tanks emerged and were tank-to-tank combat heavy, providing more details on the tanks' effectiveness by showing kill/loss ratios. The last addition to these chapters is the information given about the British and the Soviet tanks. This information provided to compare the German panzers' strengths and weaknesses against their British and Soviet counterparts, and to display the German panzers' combat effectiveness. Since the campaigns in North Africa and the Eastern Front featured many tank battles, there were various British and Soviet tank models against which the German panzers clashed. Therefore, the extensive information presented in these chapters about the Soviet and the British tanks also illuminate how the German panzers evolved as the war continued, and how the panzer development was affected as the panzers faced off against these tanks. In addition, the detailed information about their gun power, armor thickness, mechanical reliability allowed a better comparison to be made, and highlighted the German panzers' strengths and weaknesses. In the fourth chapter the whole focus is on the Western Front. The reasoning for it is to compare the American and the German tanks with one another.

In terms of better explaining the effectiveness of tanks, the information regarding the development, and production stages of tanks are provided in these chapters as well.

CHAPTER 2

THE PRE-WAR SITUATION OF GERMAN AND AMERICAN ARMORED FORCES

World War I was the apex of an age when industrialized nations of the world clashed with each other. What was referred as “The Great War” or “The War to End All Wars” saw the clash of the highly industrialized nations of Europe and the empires of the old world, using the mostly advanced weapons of that era. The firepower of the WW1 era arms was beyond anything comparable of the past. All nations engaging in the 20th century’s biggest, and the first bloodiest war had the same notion that with this kind of immense firepower and highly developed weapons, war would last less than a year or less than six months. This common pre-thinking of the war would be shattered and proven wrong by the end of 1914, the first year of the war. World War I would turn out to be a war conducted by the highly advanced and the most modern weaponry the world had ever witnessed, though operated by the doctrines, tactics of a previous era. The intense firepower shifted the war into a war of attrition, meaning the side who had the better logistics, and the willpower would eventually thrive. Such firepower intensive battlefields always favor the defensive; stalemate, attrition and catastrophic losses being the inevitable consequences of a firepower dominant battlefield. The only way to avoid this costly conclusion would be to increase mobility across the

battlefield.[2] This demand for mobility would first be showcased on 15 September 1916 at the Battle of Somme by the British Army. British Mark I tanks crossed the lines, although the results were mixed, and the full effect of tanks were absent. This would be a pre-test; the real breakthrough would occur in the Battle of Cambrai in November 1917. Massed and concentrated 476 British tanks were used to crush through the German trenches and wired defenses. The results were positive in terms of displaying the raw potential of tanks. When concentrated in masses and attacking towards a certain corridor, they could open a breach between enemy's lines and allow the infantry to move forward with ease. Tanks proved that they could serve as a great role in supporting the infantry units, providing them with cover fire and allowing them to easily cross the enemy defensive fortifications. They were and would be the perfect infantry support tool, and possibly maybe more.

When the World War I ended, the true potential and use of tanks could not be understood by all military men, but by a select few in the nations which partook in the war. The Great Britain and France were the pioneers of tank warfare and tanks, and they continued to study this new vehicle and this new type of warfare. Germans on the other hand, as the losing side, were restricted by the Treaty of Versailles, signed on 28 June 1919. While this treaty officially ended the war, it also brought out severe restrictions on Germany and German Army as well. Germany was only allowed to have an army of 100000 men, it could not have an air force and could also not create and experiment with new weapons, which included tanks and other armored vehicles.

[2] Robert Scales, "A Better Idea Can Win The Next Big War For The Ground Services", *War On The Rocks,* October 14, 2019, accessed June 11, 2020, https://warontherocks.com/2019/10/a-better-idea-can-win-the-next-big-war-for-the-ground-services/.

German officers believed that one of the causes of war was this new weapon, tank, and the lack of mobility in the front.

The pioneers in reorganizing and recreating the German army, with a specific focus on mobile and armored warfare, were colonels Oswald Lutz, Walther von Reichenau and Majors Heinz Guderian and Wilhelm Ritter von Thoma. In 1930, they constituted the group of officers who were well educated in technical training that pushed them in favor of armored forces.[3] Heinz Guderian would be the most prominent figure out of all those officers. He emphasized the fact that Germany was undefended after the Versailles Treaty, and that any new war that would take place would require a mobile defense, but the problem of the transport of motorized troops also raised the question of the protection of such transports and it could only be achieved by armored vehicles.[4] Armored warfare trials would take place as early as 1923 and 1924, showing the dedication of Reichswehr (German Army) to experiment with tanks and other armored vehicles. The officers who favored tanks and armored warfare had their education not just through theoretical readings and analyses, but by taking part in Kama training grounds in Kazan, Russia. The Germans had a secret pact with the Soviets that allowed them to test armored vehicles in Russia between 1929 and 1933. This also allowed German tank officers to be well educated in the art of armored warfare and tanks themselves. At this testing site, Germans had *traktors*, a code name given to their experimental tanks or panzerwagens. These vehicles were produced by Daimler-Benz, Rheinmetall and Krupp. These vehicles were *grosstraktor* (large tractor), *leichttraktor*

[3] Kenneth Macksey, *Panzer Birlikleri.* Translated by Şahin Selçuk Erengün (İstanbul: Kastaş Yayınları, 2003), 10.

[4] Heinz Guderian, *Panzer Leader.* (New York: Da Capo Press, 2001), 20.

(light tractor), and *kleintraktor* (small tractor), and they would constitute the inventory of the first German armored company. At the testing grounds the faults of these vehicles would be corrected and orders for new series of tanks under the new codename *Landwirtschaftlicher Schlepper* (La.S., or agricultural tractor). La.S. would eventually become Panzer I, which was actually built as a training vehicle, but saw service on the front. Panzer I had two crew members, it was lightly armored and only had two machine guns as its main gun. The importance of these tanks was the fact that they gave German officers a legit tracked vehicle to test by themselves and further improve their knowledge of armored warfare. Panzer I would serve in the Spanish Civil War in between 1936 and 1938, up until to 1941 in different variations. Panzer II on the other hand was produced as a stopgap in German tank development. Unlike its predecessor, it had 20mm cannon which provided somewhat of an anti-tank fire and also had a transceiver making it a good reconnaissance vehicle.[5] When Germany's first panzer divisions were formed in October 1935 these light tanks, Panzer I and II would be the main vehicles of these divisions. The divisions were formed in accordance with combined arms warfare, meaning that tanks alone would not form panzer divisions; they would be supported by motorized infantry and supported by artillery units behind, all working in coordination. These divisions on paper, would have 561 tanks in total complement of two tank regiments with two battalions each, motorized infantry and artillery units, engineer, signal troops and motorcycle units for reconnaissance.[6] This number was never reached before or after the war in any phase. These divisions, in the

[5] Leland Ness, *World War II Tanks and Fighting Vehicles the Complete Guide*. (London: Collins, 2002), 86.

[6] Martin Windrow, *Panzer Divisions.* (New York: Hippocrene Books, 1973), 4.

beginning also lacked the medium and heavy tanks as well. The lack of a medium and a heavy tank was because the productions levels were very low, and the development of tanks were slow. However, the German industry's inability to come up with a well-armored and well-gunned tank would not last long. In 1936 and 1937, Panzer III and Panzer IV prototypes were produced and tested, eventually giving the panzer divisions well-rounded tanks before the start of the war. Guderian and Lutz in the past emphasized that the army needed two types of tanks, one light tank that was to be armed with 50mm cannon and a medium tank with a long caliber gun.[7] However, because standardization was deemed to be important, although not a light tank, the first Panzer IIIs were equipped with 37mm anti-tank guns and Panzer IVs with low velocity howitzer like 75mm cannon. Both tanks' designs left rooms for improvements and upgrades, but the initial outcome was unlike what pro-tank officers advocated for. By 1939, with the annexation of Czechoslovakia, the German Panzer Divisions added two new Czech made light tanks, Panzer 35(t), and Panzer 38(t) to their inventory. The number of panzer divisions were increased as well, three new divisions were formed increasing the number to six before the start of the war. In conclusion, before the invasion of Poland in September 1939, Wehrmacht (German Army) would form another panzer division and raise the number to six, accompanied by four light panzer divisions.

On the other side of the ocean, the United States was also busy trying to develop its own armored branch and tanks. The US Army had fielded an armored branch in World War I, called the Tank Corps of the American Expeditionary Forces and they engaged

[7] Guderian, *Panzer Leader,* 27.

in battles late in the war in 1918. The corps was disbanded after the war in 1919, and the American General Staff with the National Defense Act of 1920 put tanks and tank development to the responsibility of infantry, defining its role as an infantry support vehicle.[8] This mindset alone hindered the US Army's development of tanks and armored branch. The General Staff limited tank production to only light and medium tanks, stating that tank-to-tank warfare would not be the case in the future. The interwar years were a time of experimentation to understand the potential of tanks and maximize it for better use. Due to the fact that the tank development and armored warfare was ceded to the command of infantry, the lack of an independent armored force prevented the US Army to experiment doctrinally in armored warfare, especially the combined-arms warfare which was advocated during these years. When General Douglas MacArthur became the US Army Chief of Staff in 1931, changes started to occur as he promoted the mechanization of the army; therefore, each army branch would develop its own mechanized forces. This positive change would eventually lead to the creation of the armored branch. However, the debates over the role of tanks continued until the early 1940s. One of the main obstacles was that the US Army expected a war in the continent. Due to the size of North America the land that had to be covered was massive, so the focus of the army was mobility and speed rather than anything else. Therefore, tanks had to be light and fast, which meant that firepower and armor had to be decreased to keep tanks as light as possible. The idea behind this thinking was raised by three prominent figures in the army, Brigadier General Frank Parker, Major General William Connor, and Major Adna R. Chaffee Jr., who would

[8] Peter Chamberlain, Chris Ellis, *British and American Tanks of World War 2. The Complete Illustrated History of British, American and Commonwealth tanks, 1939-1945.* (New York: Arco Publishing Company, Inc.), 84.

later become the first chief of the armored force. They all agreed that fast and light tanks could execute high-speed cavalry missions on the North American battlefields, and these tanks could be protected against anti-tank fire by the mechanized infantry while they performed their task of flanking enemy positions.[9] Therefore, the US Army developed and experimented with tanks that fit in with this perspective during the interwar years.

The US Army with its different branches, each experimenting with its own mechanized forces, had developed various tanks and armored cars during the interwar years. By 1940 though, when the Armor Branch was established, the most prominent tanks that was used by the Army would be the M1 light tank, M2 light tank and the M2 medium tank. The US Army in the previous years decided not to employ Walter Christie, an automobile engineer, and use his tank designs which also featured his own suspension system.[10] However his designs were not adopted by the Army because the Ordnance Department had different priorities. The M1 light tank or combat car as it was termed, had a two machine-gun turret as main guns and a small caliber machine gun in the front as secondary armament, it also weighed 9 tons. M1 did not see any combat action, as it was obsolete by 1939 after the Spanish Civil War proved that light tanks with

[9] John T. Hendrix, "The Interwar Army and Mechanization: The American Approach," *Journal of Strategic Studies*, 16:1, (1993): 78,79, accessed June 6, 2020, https://doi.org/10.1080/01402399308437505. The common and differing views of these officers are provided in detail in this article. These officers knew the importance of tanks and maneuver on the battlefield after the stalemate at World War I, when soldiers on both sides had to be entrenched that eventually led to a war of attrition. The inability of the US industry to produce heavier tanks during the interwar years was also a factor in shaping their view.

[10] Walter Christie developed a suspension system, named "Christie Suspension" that allowed tanks long-range movement and higher speed by the removal of its tracks which made it possible for the tank to move in higher speed on highway. The problem was that this suspension could only be applied to light tanks. Christie suspension was later adopted by the British and the Soviets and they would apply it in their BT-26 and T-34 tanks, British in their Cruiser tanks.

little to no armor and no gun could not be effective on the battlefield. M2 light tank was also similar to the M1 Combat Car or light tanks, with two machine guns in the turret as main weapons and the design pretty much the same; however, the difference would come with the M2A4 model which replaced the two-gun turret with one main gun, and a traversing turret. It had 37 mm main gun with 25 mm in armor. This tank would see combat action early in the war in the Pacific, but its role was still limited to training, and they would be obsolete by 1940 after the German experiences in Poland and France during which under-armed and under-armored vehicles were easily destroyed. The importance of M2 was that it was a stopgap measure in developing a better light tank and would eventually lead to M3 and M5 light tanks. The other tank, M2 medium tank was also the result of American experimental T series tanks.[11] M2 was the standardized from the version of T5 Phase III tank. It had a sloped front hull and a main gun of 37 mm in a small turret with two machine guns on the sides. 18 M2 and 94 M2A1, the improved version of M2, were medium tanks built by Rock Island Arsenal, the Army's main production facility. However, M2 also had the unfortunate condition of being obsolete after the German breakthrough in France in 1940. The German Panzer III and IV, the latter with its 75 mm gun rendered M2 tank technically obsolete, and the Chief Ordnance Department ordered tanks to be equipped with a 75 mm gun.[12] M2 tanks did not see any combat action but would prove useful as a training tank. Because 75 mm howitzer gun could be implemented on T5 Phase III, M2

[11] "T Series" is the usual codename for tanks that are being developed and experimented by the US Army during interwar years. More detailed information on the interwar years tanks' specifications, variants could be found in: Michael Green, *American Tanks&AFVS of World War II*. (New York: Osprey Publishing, 2014) and Peter Chamberlain, Chris Ellis, *British and American Tanks of World War II: The Complete Illustrated History of British, American and Commonwealth tanks*, *1939-1945*. (New York: Arco Publishing Company, Inc).

[12] Chamberlain, Ellis, *British and American Tanks of World War II*, 105.

production was stopped paving the way to produce M3 tanks. All M2 and T5 chassis were retained for the new M3 tanks.

By the end of 1940, the US Army established its armored forces with much turmoil and debate. The US Army wasted 20 years by focusing on trying to make the mechanized cavalry doctrine work. Instead of finding their own doctrine of combined arms warfare and mastering it and by giving the armored vehicle development to different branches, instead of uniting it under an independent armored force, the Army also prevented itself from developing a reliable set of tanks.[13] Prior to the beginning of 1941, the US Army only fielded light M1 and M2 and medium M2 tanks with M3 on the production line. The US was ill prepared doctrinally and in inventory in terms of armored warfare.

[13] Hendrix, *The Interwar Army and Mechanization: The American Approach*, 95.

CHAPTER 3

EARLY WWII TANKS ON THE BATTLEFIELD

3.1. German Panzers

3.1.1. The Invasion of Poland and France

Poland

On September 1, 1939, German battleship Schleswig-Holstein opened fire on the Polish Military Transit Depot in Westerplatte around 04:45 in the morning, officially signaling the start of a new war in Europe, though some German forces had crossed the border prior to the firing. Germany's reason for the attack was that it wanted to remove the Polish Corridor separating mainland Germany from Eastern Prussia on the coast of Baltic Sea, north of Poland. The city of Danzig had also been declared a free city by the Treaty of Versailles, therefore, Germany wanted to recapture its old territories, that belonged to Poland at that time. For *Fall Weiss* (Case White), the codename for the strategic plan of invasion of Poland, Germany had mustered 53 divisions, 11 of which were panzer divisions with 5 of them being light panzer divisions. For the invasion, Germany had more than 3000 tanks with 2859 of them placed in the divisions of the field army. Out of 2859 tanks, Panzer I and Panzer II were the majority with the former being 1042 and the latter 1151 in number. The modern Panzer III and Panzer IV were low in numbers, only 98 Panzer 3s and 211

Panzer 4s were within inventory. The rest of the tanks were comprised of Czech-made Panzer 35t and Panzer 38t light tanks.[14] German plan of attack was to be a typical pincer maneuver, flank the enemy forces situated on the border, encircle the main Polish forces west of Vistula River and then converge on Warsaw. Wehrmacht was divided into two army groups, Army Group North (AGN) situated on the Northeast Germany under the command of *Generaloberst* (Colonel General) Fedor von Bock and Army Group South (AGS), situated on Southeast Germany under the command of Gerd von Rundstedt. AGS was the main force of attack as most of the panzer divisions were placed in this group; AGS would attack the Western Polish border and southwest from Silesia, with Slovak forces aiding them by attacking from south. AGN would attack eastwards and close the Polish Corridor. Two-pronged attack of Wehrmacht proved quite effective as the Germans penetrated deep into Poland in less than two weeks, destroying most of the Polish forces. The problem with Poland's strategy was that its leaders disdained defense, believing in counter-offensives to repulse German advance even though Poland did not possess enough mechanized troops or tanks and as a result German mechanized troops easily swept through Polish lines lacking proper and sufficient defensive fortifications.[15] Poland also pinned its hopes for overcoming an attack, on the counterattack of France and England. The only effective weapons Poles had against German panzers were their 37mm Bofors anti-tank guns, some of which was put their 7TP tanks as well and the wz. 35 anti-tank rifles equipped by the infantry. These guns were perfectly effective in penetrating the armor of early German

[14] Thomas Jentz, *Panzertruppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force 1933–1942.* (Atglen, PA: Schiffer Military History, 1996.), 88.

[15] Basill Liddell Hart, *İkinci Dünya Savaşı Tarihi.* Translated by Kerim Bağrıaçık. (İstanbul: Türkiye İş Bankası Kültür Yayınları, 2016), 41.

panzers of the war; however, they were few in numbers, especially the tanks to cause any significant damage on German tanks, and unlike panzer divisions, Polish tanks were dispersed and mainly used as infantry support vehicles.

Figure I. Map of Invasion of Poland
Source: https://encyclopedia.ushmm.org/content/en/map/german-invasion-of-poland-september-1939

The Invasion of Poland was the first significant test for Wehrmacht in terms of learning of its capabilities and limitations. The Soviet invasion on September 17 also marked the end for the Polish Army, as the last remaining unit of the Polish Army would surrender on 6 October, ending the campaign. Since the Polish Army was not adequately mechanized and did not possess enough tanks, tank warfare was not the focal point of this campaign. German panzers were still tested on separate occasions though; on the first day of battle 72 panzers out of 164 were reported to have been lost during fighting on Mlawa by the Panzer-Regiment 7 of Panzer Division Kempf.[16] Another instance during the first day of the invasion was the Battle of Mokra, when 1st and 4th Panzer Divisions lost several tanks by the Polish anti-tank guns. The 4th Panzer Division would also lose many tanks in Ochota, a suburb of Warsaw during its surprise

[16] Jentz, *Panzertruppen: 1933-1942,* 93.

attack to capture the city on September 8 and 9. "A total of 674 German tanks were knocked out, of which 217 were total write-offs. The 4th Panzer Division suffered the heaviest tank losses, a total of 81 tanks, due to its tangle with the cavalry at Mokra and its ill-fated dash into the Warsaw suburbs."[17] Overall Panzers fared well in their first test, though improvements had to be made, as stated by Heinz Guderian when Hitler made a surprise visit the front on 5 September. On his discussion with Hitler Guderian attributed the small amounts of casualties to the effectiveness of panzers, while also stating Panzer III and IV models had to be increased in numbers, they had to be delivered quickly to the front, and finally they were to be equipped with heavier armor and longer barreled guns to increase range and penetration.[18]

France

Not long after Poland's surrender in October 1939, Hitler was already thinking of a plan to attack France. The reason for it was due to the prevalent policy in Germany of not having a two-front war. Hitler wanted to remove the Allied threat in the west and afterwards focus on the eastern front. Between September 3, when France declared war on Germany, and May 10, for an 8-month period, Germany and France had the 'Phoney War' or *Sitzkrieg* (literally meaning sitting war). During this stage, neither side attempted a large-scale assault on each other with fighting remaining in small scale as skirmishes along the French-German border. Germany invaded Denmark and Norway during this period as well, and even though small French and British troops aided Norwegians, no significant clash occurred until May 1940. After Poland, Hitler

[17] Steven J. Zaloga, *Poland 1939 The Birth of Blitzkrieg.* (Oxford: Osprey Publishing, 2002), 86.

[18] Guderian, *Panzer Leader,* 73-74.

offered peace proposals to both Great Britain and France on October 6, 1939. The former rejected it on October 10 and the latter on the 12th. On the other hand, Hitler had already issued Führer-Directive Number 6 on 9 October 1939, pointing out the necessity of military actions to be taken in the West. This directive would eventually lead to *Fall Gelb* (Case Yellow), the official plan of attack on France. Hitler insisted on the plan to be conducted as soon as possible, however, his proposed dates were usually delayed either due to weather conditions or mainly by German commanders, specifically Chief of Staff of OKH (*Oberkommando des Heeres*)[19] Franz Halder and Commander-in-Chief Walther von Brauchitsch. Their main argument was Wehrmacht was not yet ready for an invasion of France. The French Army was the biggest land army in Europe and German generals also feared of a full-scale British intervention.

The invasion was going to happen inevitably, and the German plan of invasion was similar to Schlieffen Plan that was undertaken in 1914 by the German Army. Wehrmacht would attack from the right wing through Belgium and Netherlands, concentrating most of its forces here. After further delays 17 January 1940 was declared as the date the assault would commence. This date, however, was delayed due to the incident that took place on January 10 when two Luftwaffe officers – one of them carrying documents of Fall Gelb – had to crash-land in Belgium causing the plan to be postponed indefinitely by Hitler as it had eliminated the possibility of surprise attack. In the meantime, the commander of the Army Group A General Rundstedt and his chief of staff Erich von Manstein disagreed with this invasion plan. Manstein, who was assigned to XXXVIII Army Corps in East Prussia, devised a new

[19] OKH was the High Command of German Army between 1935 and 1945.

plan, which was the opposite of the OKH's. His proposal was rejected many times, but he found the chance to meet Hitler on 17 February 1940 spending the whole day and explained his plan which Hitler very much liked. Hitler later presented this plan as his own to prevent any backlashes and eventually Manstein's plan codenamed *Sichelschnitt* (Sickle-cut) was approved. The plan was,

> the Army Group B under command of General Fedor von Bock would attack from North towards Belgium and Netherlands with the aim of encircling French and British field armies by drawing them eastwards. Army Group C under General Wilhelm Ritter von Leeb's command would attack Maginot Line and if possible, penetrate it. Rundstedt's Army Group A in the center, would push through Ardennes with seven panzer divisions, by taking over crossings along Meuse River between Sedan and Dinant and then turn northeast towards the Channel. Leeb's group would not have any panzer divisions and Bock's would only have three.[20]

Before the invasion of France started, German preparations for the war included the transformation of light panzer divisions into panzer divisions, increasing the number to ten. Unlike the Polish campaign, the army had more Panzer IIIs and Panzer IVs, but the majority of the tanks still remained Panzer Is and Panzer IIs. "By May 1, 1940, the total inventory of panzers in the army were 1077 Pz. I, 1092 Pz. II, 381 Pz. III, 290 Pz. IV along with 143 Pz. 35t and 238 Pz. 38t light tanks."[21] German war industry could not produce enough of the much-needed Pz. III and Pz. IV and the existent variants were still outmatched in terms of weaponry and armor protection. Panzer III were still outfitted with 37 mm guns and Panzer IV with the 75mm short-barreled howitzers which were better suited for infantry support role rather than anti-tank combat. The majority of Panzer IIIs and IVs were received by the seven panzer

[20] John Keegan, *İkinci Dünya Savaşı.* Translated by Samet Öksüz. (İstanbul: Say Yayınları, 2019), 66.

[21] Jentz, *Panzertruppen: 1933–1942,* 118.

divisions in Army Group A. This left the 3rd, 4th, and 9th panzer divisions with the majority of obsolete Pz. I and Pz. II. France, on the other hand, had the upper hand, as its tank numbers were more than the Germans, and its tanks, especially Char B1 bis heavy and medium Somua S35 tanks were also superior in terms of firepower and armor. Germans were on paper found themselves outmatched, yet the outcomes were going to be different.

The invasion began on May 10, 1940. Army Group B moved towards Belgium and Netherlands, while in the center, situated on the Ardennes, Army Group A pierced through Luxemburg. *Luftwaffe* and *Fallschirmjagers*[22] swept through the Netherlands. Luftwaffe destroyed the tiny Dutch Airforce, and German paratroopers landed on Hague, Leyden in the Netherlands, and crossings on Meuse River, securing these points for the Army Group B. The key attack came on the Belgian fortress Eben Emael, which protected the intersection between Albert Canal and Meuse River. At that time, it was the largest fortified fortress and the key point in Belgium's defense against a possible invasion, but it was under-manned. German paratroopers landed on the fortress with gliders and by using special explosives, they quickly forced the defenders to surrender on 11 May 1940. The Dutch troops withdrew to the Canal, hoping to delay the German advance with the help of flooded canals around Amsterdam and Rotterdam but this tactic would not work. German forces swiftly captured crossings and moved towards Rotterdam where the paratroopers merged with the spearheading armored forces, but on 13 May the city was mistakenly carpet bombed by Luftwaffe ending the

[22] *Luftwaffe* was the German air force during World War II. *Fallschirmjager,* was the paratrooper branch of Luftwaffe.

Dutch resistance. The Netherlands completely surrendered on May 15, just five days after the start of the invasion.

With the rapid advance of Germans in the North, the Allies were deceived, believing that the main force of the German Army would attack from Netherlands and Belgium they deployed their best forces in this region to counter the attack. In the south, at the Ardennes region, *Panzergruppe* (Panzer Group) Kleist, under the command of General Ewald von Kleist, spearheaded by Guderian's XIX Panzer Corps punched through the Ardennes. The French Army did not view this region as a viable location for an assault. The densely forested Ardennes region was not an ideal place for *blitzkrieg*[23]. The French thinly reinforced this region and had deployed reservists, composed of old soldiers. There was not enough anti-tank guns and tanks to counter any armored attack. Army Group A, with 41140 motorized vehicles, moved in columns through the narrow Ardennes breach. The success of the whole operation depended on the panzers of Army Group A to cross Meuse River as soon as possible, and they did. By May 12 the German forces would come near Meuse and hold the east side of the river and by 13th and 14th panzer divisions crossed Meuse River at Montherme, Dinant and Sedan, eventually reaching the plains. By reaching the plains of France, panzers could easily engage in blitz tactics. Panzer divisions of Army Group A, now having found themselves in the open terrain penetrated deep into the French lines. The 7th Panzer Division, commanded by General Erwin Rommel, made the deepest push amongst panzer divisions, along with the 6th Panzer Division defeated French General Corap's 9th Army on 15 May. German panzer divisions in the south turned northwest, their

[23] *Blitzkrieg,* literally meaning 'lightning war' is the name used by the Allies to refer to the combined arms warfare implemented by the German Army during World War II.

route was now the channel. By May 15, the situation was already so dire for the Allies that French Prime Minister Paul Reynaud would tell Winston Churchill on the phone that France was defeated, that the front at Sedan was broken. The late attempts to turn the favor by the Allies, such as attacking the river crossings on Meuse River on May 14, and Prime Minister Reynaud replacing Maurice Gamelin with Maxime Weygand on May 20 for the command of the French armies and bringing Philippe Petain as his aide, could not also change the hopeless situation. The only obstacle Germans faced was the orders from the high command, telling the panzer divisions to stop and wait for the arrival of infantry divisions to merge with them. By the evening of 16 May, the panzer divisions of Army Group A moved 80 kilometers closer to the Channel, reaching River Oise. Their movement was only stopped by the fears of high-ranking German officers, worrying that there might be a French counterattack to the flanks which would break the already weak link between panzer and infantry divisions. Therefore, the advance was halted for two days for the arrival of infantry corps for them to form a shield on the flanks.[24]

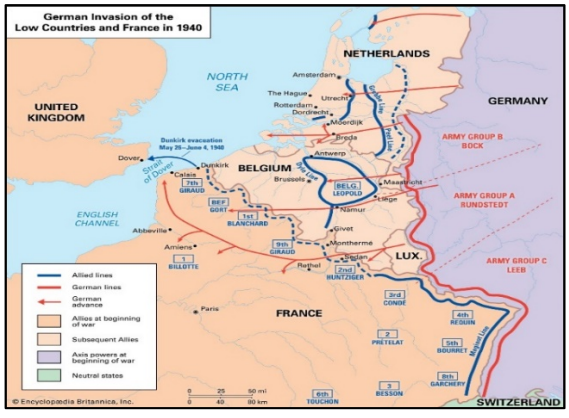

Figure II: Map of the Battle of France
Source: https://www.britannica.com/event/Battle-of-France-World-War-II/The-invasion-of-the-Low-Countries

[24] Hart, *İkinci Dünya Savaşı Tarihi,* 102.

Despite the frequent orders from his superiors to stop and link up with the following infantry and mechanized divisions, Guderian and his panzer corps crossed the Oise River on May 17 and by May 20 they would reach the Channel. The aim of this thrust towards the North was to encircle the best armies that the Allies had, situated in the Channel at Belgium. France had two of its best armies here, most of the British Expeditionary Force (BEF) and the entire Belgian Army was also at the same place. After reaching at the west coast of France Abbeville near the Channel, and effectively separating the Allied forces, Guderian's panzer corps turned northwards, towards Calais and Dunkirk. France along with BEF would try to break the German spearhead separating its armies by attacking on May 19 and May 21 at Arras; however, these attempts failed to break the panzer corridor. The swift thrust of the panzer corps and the attack at Arras, caused Hitler and his subordinates to worry again about possible Allied counterattacks and gave the halt order on May 21. Army Group A Commander General Rundstedt approved Hitler's decision that the panzers advanced too far to endanger themselves and for the surprise attack on Arras not to repeat itself panzers had to halt and wait for the infantry to line up and secure the panzer corridor.[25] On May 24 another halt order was given. As Heinz Guderian stated, this order's results would have a most disastrous influence on the whole course of the war, as the left wing of the German Army was ordered to stop and not cross Aa River, separating the Allied forces and the German Army. Dunkirk was to be left to Luftwaffe to deal with.[26]

[25] Hart, *İkinci Dünya Savaşı Tarihi,* 87.

[26] Guderian, *Panzer Leader*, 117.

With the surrender of Belgium, the evacuation of the British Expeditionary Forces, and the loss of its strongest armies, France was now alone in fighting against Germany. French Supreme Commander Maxime Weygand proposed a plan to hold the Germans at a line called Weygand Line. It was to stretch from Somme and Aisne Rivers all the way to Montmedy merging with Maginot Line and would be protected by hedgehogs.[27] *Fall Rot*[28] began on June 5, with Wehrmacht attacking towards the South, and the French, lacking any reserves and armored forces at this point, could not stop the German forces at the Weygand Line. German advance was far swifter and easier compared with the first phase of the operation as the French and German officials began to meet for talks of surrender on 18 June. On June 22, 1940, an armistice was signed between France and Germany, and the German invasion of France was complete.

The success of the German army in invading France in such a short amount of time depended on several factors; the aggressive offensive tactics implemented on the field by Wehrmacht, the coordinated use of Luftwaffe aiding the attack of the ground forces, the French attempting to defend the country by using static-war mindset, and the effective use of panzers. The German tanks were inferior to their French counterparts in terms of armor protection and firepower, but they were better in other aspects such as having radios installed in all of them, the German Panzer IIIs and IVs had 5 men crew which allowed panzer crews to operate faster compared to 3 men crew of French tanks, and because the panzers lacked heavy armor, they were faster too. Their

[27] Keegan, *İkinci Dünya Savaşı,* 89.

[28] *Fall Rot* or Operation Red, was the second phase of the German invasion of France.

superiority was that they were organized in independent divisions and could move in coordination on the battlefield by using the radios they had. The German generals, Guderian, von Thoma and Manteuffel also indicated that the advantage of the panzers laid in the fact they were faster, and they viewed speed as a key factor. The panzers were better commanded, as German officers could use their own initiative and the panzers were concentrated on the designated points, and that was one of the main reasons for their victory in France.[29] German tanks frequently faced up against the French tanks throughout the campaign, and most of the time fared well against their adversaries despite their shortcomings. The first major tank battle in the campaign was the Battle of Hannut on May 12 in Belgium. French Somua and Hotchkiss tanks encountered the 3rd and 4th Panzer Divisions. According to the reports of *Oberst* (Colonel) Eberbach of Panzer-Regiment 35, German panzers, especially Panzer IIIs with their 37mm guns could knock out Hotchkiss tanks, French tanks were slow in turning and maneuvers to counter-attack German tanks, and panzers could shoot the French tanks at very close distances, thereby increasing the penetration of armor. The enemy tanks behaved leaderless, aimlessly, and were badly commanded, and tactically inferior and aimed to get away soon.[30] The French lost 75 Hotchkiss and 30 Somua tanks; the Germans claimed victory; however, it was costly as they lost 160 tanks, almost a size of a panzer division. The bad situation of the French tanks also stemmed from the fact that they were undermanned, and the inside of the tanks were cramped. On the other hand, Panzer IIIs and IVs had 5 men crews, each one doing one specific

[29]Basill Liddell Hart, *Hitler'in Generalleri Konuşuyor,* Translated by Selçuk Uygur. (İstanbul: Kronik Kitap, 2019), 147.

[30] Jentz, *Panzertruppen: 1933–1942,* 117-118.

duty, therefore increasing their performance. German tank commanders could observe the field with open hatches.

Right after the Battle of Hannut Germans took heavy panzer losses at the Battle of Gembloux. The 4th Panzer Division could only field 137 panzers out of 314 they had at the beginning of the campaign, after 4 days of fighting.[31] Reports after the battles of Merdorp and Perwez-Malprouve also demonstrated that although Panzer IIIs and IVs were the best tanks of Wehrmacht, they were still outmatched against French medium tanks and small caliber anti-tank guns. French 25 mm anti-tank guns could penetrate Panzer IIIs at ranges up to 500 meters, and the 47 mm tank guns could do the same at ranges up to 1500 meters.[32] French tanks only attacked in small groups and numbers, limiting their superiority and effectiveness over German tanks. German tanks lacked the necessary firepower to easily penetrate the well-armored French tanks. Panzer IIIs used in the Western Campaign were *Ausführung* (model) E, F and G, equipped with the 37 mm gun. "Although, a 50 mm KwK L/42 tank gun had been developed prior to the war, due to ammunition compatibility the Army chose to retain the 37 mm tank gun."[33] This seriously hindered the firepower and penetration of Panzer IIIs, and even though Panzer IVs had 75 mm guns, they were still the short-barreled howitzers, used for infantry support they fired high-explosive rounds effective against enemy fortifications and infantry formations. Panzer IIIs remained as the main battle tank of Wehrmacht. Panzer IIIs and IVs would face another stiff test at battle of Stonne, as they faced the superior French Char B1 bis tanks. The town changed hands 17 times

[31] Prigent, Healy, *Panzerwaffe*, 42.

[32] Jentz, *Panzertruppen: 1933–1942*, 123.

[33] Prigent, Healy, Panzerwaffe, 15.

during the combat between 15-17 May. The significance of the battle was that when confronted with the superior French tanks head on, the under-gunned and under armored German panzers, without any support of artillery or air force were powerless. French tank commander Pierre Billotte's Char B1 took 140 hits with no damage, and at the same time destroyed 13 panzers, two Pz. IV and eleven Pz. III. Despite these unique occurrences and challenges, German panzers pushed would push on. The Battle of Arras on May 21 would be the last key tank combat of the war, as the tanks of the BEF tried to cut the panzer corridor. Bouncing shells from Matilda tanks exposed German panzers inability to deal with the Allied tanks, as they were not the determining factor in the halt of the British advance. The success would come using 88mm flak[34] guns as anti-tank guns, the artillery and by Stuka dive bomber planes. In the end of the two-month campaign, German panzer losses were 182 Pz. I, 250 Pz. II, 135 Pz. III, 97 Pz. IV, and the rest being Pz 35(t), 38(t), a total of 795 tanks as total write-offs. The Battle of France proved that Panzer Is and IIs were far beyond their obsolescence, being quite ineffective in combat situations. Speed and coordination were the determining factors in the success, and the effectiveness of panzers. German panzers, and panzer divisions benefitted from combined-arms tactics, and also the enemy's outdated, static understanding of defense tactics which they fully exploited to defeat their enemies. In conclusion, panzers were one of the key elements in the victory, but not the single most outstanding and determining weapons of the war.

[34] *Flak*, is a contraction word in German for *Flugabwehrkanone* which means aircraft-defense cannon.

3.1.2. North Africa Campaign and the Emergence of the American Tanks

North Africa campaign was a series of battles fought between Italy and Germany against Great Britain and the United States, lasting for almost three years from June 1940 to May 1943. The campaign ended with the Allied victory, and the Axis powers were driven out of Africa. North Africa campaign is significant due to the reason that it was the first time American tanks saw service in the Western theatre of the war; and therefore, it was the first time American tanks clashed with German panzers. It was also in Africa that Germans in 1942 established the Heavy Tank Battalions and used their first heavy tank, *Panzerkampfwagen VI Ausf. E* or better known by its popular name *Tiger*. The British armored forces also used the American M3 Grant and M4 Sherman tanks in this campaign. They were given to British Army as part of the *Lend-Lease Act*[35], and thereby were first operated by the British against German and Italian tanks.

North African campaign was initially a battle between Italy and Great Britain. Italy wanted to clear the blockade between Libya and its colonies in East Africa, and the only way that could be done was to take Egypt from the British control. Italian forces invaded Egypt from Libya on September 13, 1940. Before the arrival of *Deutsches Afrika Korps (DAK)*[36], battles in North Africa were in favor of British forces. By the

[35] *Lend-Lease Act* was a program by the United States to aid its allies during the war, by giving them military supplies, such as tanks, planes, and non-military supplies such as food and raw materials. Great Britain, Soviet Union and China were the recipients of these materials.

[36] *AfrikaKorps or Deutsches Afrika Korps* was not always the actual name of German forces in North Africa campaign. The name of the forces changed throughout the campaign, from *Panzer Group Africa* to *Panzer Army Africa* to *German-Italian Panzer Army*, and finally *Army Group Africa.* Throughout this chapter to keep the narrative coherent and convenient, *Deutsches Afrika Korps* or *DAK* was used.

second half of December 1940, Italian forces were driven back to Libyan border. In January 1941 Tobruk, the port city at northwest Libya, was captured by British and Australian forces. By 7 February, British and Commonwealth forces had captured towns of Derna, Benghazi in Libya, driving the Italians out of Cyrenaica, the region composing of eastern part of Libya. What remained of the Italian 10th Army surrendered on 7 February, and the Italians were pushed back to western Libya.

The withdrawal of Italians alerted Germans. Up until now, throughout the desert war, Germans offered to aid Italians, but these offers were deemed unnecessary. On 6 February, *Oberkommando der Wehrmacht (OKW)*[37] ordered *Unternehmen Sonnenblume* (Operation Sunflower) to send a task force to Libya. The aim was to stop the British advance through Libya and maintain the Axis presence in North Africa. Germans had been observing the desert war from its beginning and had sent officers to inspect and report the situation. General von Thoma was ordered and sent to North Africa to report on the situation of the Italian forces there in October 1940. He stated in his report:

> the challenges of the desert alone were not the only problem. The dominance of British Navy in Mediterranean Sea hampered logistics, which was a decisive element in this campaign, and that maintaining a big German force along with Italian forces was impossible. As a result, if Germany were to send a task force, it should be an armored force. Victory in North Africa could only be achieved by no less than four panzer divisions, which was the maximum amount to be effective in a march from the desert to Nile Delta.[38]

[37] OKW was the High Command of German Forces from 1938 to 1945.

[38] Hart, *Hitler'in Generalleri Konuşuyor,* 268.

This proposal did not happen. For Hitler and German High Command, North Africa was a theatre that had to be avoided at all costs.

Figure III: Map of the general area of the Desert Campaign
Source: https://commons.wikimedia.org/wiki/File:WesternDesertBattle_Area1941_en.svg

The first units of DAK and its commander Erwin Rommel arrived in Libya on 14 February 1941. For the operations in North Africa, only one panzer division was spared, the 5th Light Division, which was recently formed out of the elements of the Panzer Regiment 5. The panzers of Panzer Regiment 5 arrived in Tripoli, Libya on 8 through 10 March 1941. Despite the tank losses in Naples during loading, the panzers of Panzer Regiment 5 consisted of 25 Pz. I, 45 Pz. II, 61 Pz. III all with 50 mm guns, and 17 Pz. IV.[39] Along with 7 command panzers, DAK had 155 panzers at the ready. Since the war began this was the first time the more capable Panzer IIIs formed the majority of panzers in a panzer division; and they were the Ausf. F, G and H versions with 50 mm guns and better armor.

[39] Jentz, *Panzertruppen: 1933–1942, 158-159.*

What eventually became a series of seesaw battle started on 24 March 1941 when DAK defeated Allied forces at El-Aghelia, Libya. Rommel's forces engaged in fighting merely after 40 days. By 6 April Benghazi and Derna was captured, and the whole British army was on retreat. In less than just two months Axis forces had recaptured Cyrenaica region and pushed British forces all the way back to Egyptian border. The port city of Tobruk was besieged on 9 April. The capture of Tobruk was of vital importance as it was the only port town at eastern Libya. Its capture would have made the supply situation easier for German and Italian forces, whose supplies had to be transported all the way from Tripoli and Benghazi. Not just during this advance but throughout the whole campaign was the first complete mobilized campaign in the war. This was due to the desert terrain and desert conditions which necessitated all troops and supplies to be moved by vehicles. Feeding off the land was impossible as the desert offered nothing, animal transportation could not be done to cover such long distances. For the Germans, the march from El-Aghelia to east, all the way to Egyptian border took a heavy toll on panzers. Before any heavy fighting took place a big number of panzers had to go through repairs. "The average journey of 700 kilometers through the desert had an adverse effect on the panzers, causing severe engine and suspension problems. Tactical necessity of going in high speeds on unsuitable terrain aided this problem as well. Out of 5th Panzer Regiment's 155 tanks 83 of them had to be repaired by 5 May 1941 with 44 of them being Pz. III and 6 Pz. IV."[40] The desert conditions necessitated different equipment and parts for panzers and other vehicles. These vehicles were produced to cope with the weather conditions of Western Europe, not the harsh desert conditions. Unlike other theatres of the war,

[40] Ibid*, 160.*

in the desert, tank engines had to be changed after 3500 kilometers, where the usual range in Europe was 7000-8000 kilometers.[41] During this timeline, DAK had pushed the British forces back to Sollum on Egyptian border with Libya. Tobruk siege had already begun on 11 April with minor assaults, and a small gap was opened on the main attack on 14 April, which was halted by the Australian forces defending the town. The attack on 14 April started with 38 panzers, but the attack failed as DAK could not breach the defensive perimeter around Tobruk. Heavy anti-tank fire and minefields stopped advancing panzers and Germans lost 17 of them that day. The second attack on Tobruk took place on May; however, it resulted in a failure for the Germans as well. In the meantime, 15th Panzer Division was sent to North Africa as a second division in three separate convoys on 24 April, 2 May, and 6 May. 71 Pz. III, all with 50 mm Kw.K. L/42 guns, with most versions being Ausf. H. and 20 Pz. IV outfitted the division.[42]

After failing to capture Tobruk, German forces stood on the defensive, and the British forces conducted two operations. On 15 May 1941, Operation Brevity was launched to inflict tactical losses to German forces and supplies, and to gain some territory as well. The operation failed as the British failed to do any significant damage, and they only captured Halfaya Pass, which was then recaptured by the Germans on 27 May. Until 15 June, when Operation Battleaxe was launched by British forces, DAK had the opportunity to reinforce Halfaya Pass with anti-tank guns and deploy mines. Rommel and his forces were familiar with the use of 88 mm flak gun as an anti-tank weapon in

[41] Alfred Toppe, *Desert Warfare: German Experiences in World War II.* (Kansas: Army Command and General Staff College, 1991), 59.

[42] Jentz, *Panzertruppen: 1933–1942,* 164.

France and used them again in the desert. Although, the firepower of German tanks was only slightly better than their adversaries, the best anti-tank weapon Germans had in their inventory was neither their Panzer IIIs and IVs but the 88 mm flak gun. DAK had a total of 178 operational panzers against some 200 British tanks, most of which were newly arrived Crusader tanks, and Matilda Mark II infantry tanks. Operation Battleaxe took place between 15-17 June, and like the previous operation it was another failure for the British. Although small in scale, and despite German 88 mm flak and anti-tank guns stopping most of the British tanks, there occurred serious tank combat around Capuzzo and Sidi Omar in Libya. When the operation ended, the British forces lost nearly one hundred tanks and Germans had captured some Matilda II infantry tanks as well. The Germans had 50 panzers disabled on this operation with 12 being total write-offs. The low number of panzers lost by the Germans during the operation was because the battles took place within Axis controlled area, therefore the maintenance crews were able to repair and recover those tanks easily.

After Operation Battleaxe no serious fighting took place in the summer of 1941 until November. Winston Churchill was furious at the outcome of operations Brevity and Battleaxe and removed Field Marshal Archibald Wavell from Commander-in-Chief of Middle East Command duty. He was replaced by Field Marshal Claude Auchinleck, and the British started their build-up for their next operation, the Crusader. On the Axis side, the supply situation had been problematic for DAK, and it remained that way throughout much of the North Africa campaign. The start of Operation Barbarossa in June 1941 also shifted the focus of Wehrmacht to Russia, thereby limiting the number of supplies DAK received. Between April and July 1941, for the losses at combats in April and Operation Battleaxe DAK only received 34 panzers, 25 of them were Pz. III

and only 5 Pz. IV.[43] In August 1941, the 5th Light Division was reorganized as 21st Panzer Division but received no additional tanks. DAK's focus was now on capturing Tobruk, and by November 18, when Operation Crusader began, the operational number of panzers that Panzer Regiment 8 had were 77 Pz. III, 21 Pz. IV, 42 Pz. II, and Panzer Regiment 5 had 35 Pz. II, 68 Pz. III, 17 Pz. IV along with 19 more additional panzers for each regiment.[44] On the other side, the British forces had mustered more than 700 tanks along with 500 in reserve. Operation Crusader was also the first instance American Stuart light tanks were fielded against the German and Italian forces. Their first test was not good however, as 21 of them were knocked out on 19 November at the combat between Panzer Regiment 5. At this stage of the war, light tanks such as Stuart could have no impact against the highly upgraded German panzers. Their 37 mm gun could not penetrate the armor of Panzer IIIs and IVs, they could only be effective in reconnaissance tasks and infantry support. The regiment had lost 3 panzers on 19 November as write-offs, but the losses were more than that as the number of operational panzers decreased to 24 Pz. II, 45 Pz. III, and 14 Pz. IV due to mechanical failures and combat damage by the end of 19 November.[45]

Operation Crusader was the first major combat challenge for DAK and panzers. The British advance to relieve Tobruk siege and cut the Axis forces' link was eventually prevented using panzers in concentrated formations. Unlike the British, who dispersed their tanks in different units, the Germans carefully concentrated their panzers in single formations, attacking British and Commonwealth forces in full force. This was

[43] Ibid., 167.

[44] Ibid, 168.

[45] Ibid, 168.

evidenced on 21 November 1941, when 15th and 21st Panzer Divisions attacked British 7th Armored Division at Sidi Rezegh airfield in eastern Libya, knocking out 132 out of 160 tanks, while also preventing the link-up of Tobruk garrison with the 7th Armored Division. The only significant number of losses panzers received were on 23 November, when Panzer Regiment 8 of the 15th Panzer Division attacked the remnants of British 7th Armored Division and the 5th South African Brigade at south of Sidi Rezegh. Although 5th S.A. Brigade had been defeated, the division lost more than 70 tanks out of 160 which was the highest for Germans during Operation Crusader. Even though this was a tactical victory for the Germans, strategically it was disastrous for them. The British XXX Corps, despite the heavy losses of men, supplies and tanks which exceeded more than 400, the British had the reserves to replace those tank losses. Rommel and DAK did not have such a reserve.[46] By 24 November 1941, DAK had roughly 100 serviceable tanks which were no longer strong enough to restore the situation.[47] On 7 December 1941, DAK broke up the siege of Tobruk due to exhaustion of troops, lack of supplies, and insufficient number of tanks to fend off any advance by British XXX Corps. DAK pulled back to Gazala line and held there until 16 December. Rommel ordered a withdrawal from Cyrenaica region, after being left with only 30 tanks against 200 British tanks after the counterattack on 15 December.[48] Eventually DAK was able to check the British pursuit after panzer reinforcements arrived on 19 December 1941 in Benghazi and Tripoli. Panzer Regiment 8 was bolstered by the addition of 11 Pz. II and 34 Pz. III. Ships carrying 11 Pz. II and 34

[46] Hart, *İkinci Dünya Savaşı Tarihi,* 261.

[47] Toppe, *Desert Warfare: German Experiences in World War II,* 38.

[48] Hart, *İkinci Dünya Savaşı, 272.*

Pz. III for Panzer Regiment 5 were sunk. Battles on 28 and 30 December 1941 against the pursuing British 22nd Armored Brigade was successful. Overall, during the fighting in November and December both panzer regiments had suffered permanent losses of 56 Pz. II, 105 Pz. III, and 29 Pz. IV.[49] Operation Crusader ended with German and Italian forces taking defensive positions in El-Aghelia and waiting for new supplies to arrive, and for the British, a victory as Axis forces were pushed out of Cyrenaica, despite heavy loss of tanks and equipment.

1942

1942 started with the arrival of a supply convoy in Tripoli for DAK, on 5 January 1942. After being forced out of Cyrenaica region, DAK had received 54 new panzers most of which were given to Panzer Regiment 8 of 15th Panzer Division. The new Pz. III had 50 mm armor, thicker than the old versions. With a little more than 100 panzers, DAK went over to offensive on 21 January 1942.[50] On 23 January 21st Panzer Division's 16 panzers engaged British 2nd Armored Brigade in Saunnu. The concentrated fire of flak guns and panzers, in a single defensive line, repelled waves of British tanks amounting to 80 tanks. Almost 30 British tanks were left behind, some of them burning, and Panzer Regiment 5 scored 18 tanks knocked out. Only four panzers were damaged and two Pz. IV burned out.[51] The use of 88 mm flak guns in anti-tank role was quite effective in knocking out British tanks, and it was used effectively in this role throughout the campaign. The advance of Rommel's forces was

[49] Jentz, *Panzertruppen: 1933–1942,* 174.

[50] Ibid., 175.

[51] Ibid., 176.

very swift. “On 30 January Benghazi was captured and a brigade taken prisoner. In the following days, the pursuit was continued straight through the Cyrenaica. Derna was taken on 4 February.”[52] The fast advance of DAK forced the British to withdraw to Tobruk and establish a defense line between Gazala and Bir Hacheim in eastern Libya. In the meantime, between winter and spring 1942 a total of 280 panzers were shipped to DAK. When Rommel ordered DAK to attack Gazala line on 26 May, DAK was far better in terms of tank numbers, as they had 560 tanks, which the 230 of were the obsolete and unreliable Italian tanks. German tanks, except 50 light tanks, amounted to a little more than 280 medium tanks of Pz. III and Pz. IV but DAK had no reserves. British Eight Army had 850 tanks with 420 more to be sent as reinforcements.[53] One slight advantage of Germans was that their new Pz. III additions were the long barreled 50 mm gunned Pz. III Ausf. J; however, only 19 of them were available for Battle of Gazala. Whereas, two British armored divisions were supplied with 170 American M3 Grant tanks, which had 57 mm armor providing better protection and the 75 mm anti-tank gun.[54] On 1 June 1942, DAK assembled a report on M3 Grant through combat experiences of 15th and 21st Panzer Divisions. The reports stated that 50 mm gun could only penetrate the front hull of M3 ranges under 600 meters and the sides at ranges under 800 meters. The accuracy of 75 mm anti-tank gun was average to good and could penetrate the front of Pz. III and Pz. IV. at ranges from 1200 to 1400 meters.[55] Despite the shocking experience of M3 Grant tanks on German panzers, the panzers were able

[52] Toppe, *Desert Warfare: German Experiences in World War II,* 42.

[53] Hart, *İkinci Dünya Savaşı Tarihi,* 369.

[54] Ibid., 370.

[55] Jentz, *Panzertruppen: 1933–1942,* 178-180.

to knock out M3s and the other tanks by perfectly conducting combined-arms tactics, using their 88 mm flak guns with panzer regiments. The battles on 12 and 13 June took a heavy toll on the British. On 12 June, two panzer divisions pinned down British 2nd and 4th Armored Brigades, and "in the fighting the British lost 120 tanks, which had sealed the fate of Gazala Battle."[56] The next day on 13 June, the remainder of British armored forces were defeated as well, and at nighttime the number of British tanks remaining were nearly 100 and for the first time Rommel had the superior tank numbers.[57] British Eight Army withdrew from Gazala Line on 14 June, and later DAK besieged Tobruk, only to capture it on 21 June 1942. The rapid advance and success of Rommel and DAK depended not solely on panzers and their combined use with anti-air guns as anti-tank weapons, but also stemmed from the indecisiveness and bad decision making of the British commanders.

Figure IV: Picture of M3 Grant (left) & Lee (right) tanks in Sahara Desert, 1942[58]
Source: https://commons.wikimedia.org/wiki/File:M-3Grants-E_014053.2.jpg

[56] F. W. Von Mellenthin, *Panzer Battles.* (New York: Ballantine Books, 2000), chap. 7, sec. The Battle of Knightsbridge.

[57] Hart, *İkinci Dünya Savaşı Tarihi*, 376.

[58] M3 was named after American Civil War era generals Robert E. Lee and Ulysses S. Grant. M3 Grant was the British version with a radio setup and a cast turret, whereas M3 Lee was the original, American version of the tank with riveted turret and no radio setup.

On 30 June 1942, the Axis forces started what was to become their path to defeat. The battles in El-Alamein, a small town with a railway station on the northwestern coast of Egypt, took place. The First Battle of El-Alamein started on this day and continued until October 1942. The importance of these battles was that eventually they led to the complete defeat of the Axis forces in North Africa, and that the first instance of American M4 Sherman tanks and German Panzer IV Ausf. F2 with the long barreled 75 mm gun Kwk 40 L/43. For the Germans, the problem was that only they had only received 10 of Panzer IV Ausf. F2, in May 1942 and they did not receive any until July and August. On the other hand, although they took part in the Second Battle of El-Alamein, 300 Sherman tanks, the only equivalent of Pz. IV in terms of firepower, along with 100 M7 Priest self-propelled howitzers were sent to Egypt in September 1942.[59] The initial assaults by DAK during the first week of July 1942 were dire and did not produce good results for them. Against a well-fortified defense line, supported by British armored forces, DAK attacked with exhausted soldiers, and it only had 40 serviceable tanks on 2 July, 26 on 3 July and a mere 15 for 15th Panzer Division on 5 July and in total 30 for both panzer divisions in DAK[60] F.W. von Mellenthin observed that; "on the morning of 4 July 1942 the position of Panzerarmee Afrika was perilous. The Afrika Korps had thirty-six tanks in running order and a few hundred infantries in the last stages of exhaustion. The artillery was very strong, for we had a large number of captured British batteries, but our German guns had almost run out of ammunition. (15th Panzer had two rounds per gun.)"[61] The supply problem, exhaustion of soldiers

[59] Keegan, *İkinci Dünya Savaşı,* 343.

[60] Hart*, İkinci Dünya Savaşı Tarihi,* 386-390.

[61] F. W. Von Mellenthin, *Panzer Battles,* chap. 9, sec. Deadlock at Alamein.

and lack of tanks prompted Rommel on 5 July to order DAK to dig in and remain on the defensive. By 18 July DAK had less than 30 tanks available for combat use against 400 tanks of the British. With these limited numbers, DAK's panzer divisions were able to inflict huge losses on the New Zealand Division and tanks of 23rd Armored Brigade on 21 July. The 23rd Armored Brigade was lured into a minefield where no clear gap was opened for them, and they were pinned down by anti-tank and panzer fire. The Germans lost only 3 panzers to the British 118.[62] The Germans' common tactic in North Africa campaign was to engage in night raids, ambushes or lure their enemies into a trap where they could pin them down by the combined use of artillery and tank fire. A report of tank kills claimed by panzer divisions of DAK between May and July showed that Panzer Regiment 8 of 15th Panzer Division destroyed 417 tanks, and 345 for Panzer Regiment 5 of 21st Panzer Division, with a total of 1388 tanks destroyed by the other units of the divisions.[63] Despite this huge blow, the British still possessed ten times more tanks than their enemies; however, their inability to effectively use them on the battlefield prevented them from pushing the Axis forces out of Egypt. The First Battle of El-Alamein ended with a stalemate as DAK did not possess the means to continue its offensive, and British Eight Army despite its superior numbers, failed to drive back Axis forces from El-Alamein region.

Rommel and DAK prepared for a new offensive throughout August 1942. Rommel knew that the British would counterattack once their preparations were complete, and reinforcements arrived at the front. Therefore, he realized the necessity that he had to

[62] Hart, *İkinci Dünya Savaşı Tarihi,* 393-394.

[63] Jentz, *Panzertruppen: 1933–1942,* 180,182.

strike first to prevent the British Eight Army from mustering all its forces. In August, later to become field marshals, Generals Harold Alexander and Bernard Montgomery were appointed respectively as the commanders of Middle East Command and Eight Army. This was to become a significant move for the British. In August, Rommel only received a German paratrooper brigade and an Italian paratrooper division, as infantry reinforcements.[64] The last major offensive of DAK took place on 30 August 1942. Rommel ordered DAK to attack Alam el Haifa ridge in Egypt to cut off the Eight Army by going through south, turning northwards after and destroy the Eight Army by surrounding it. Heavy fortifications and minefields along with the air supremacy of the British led to the failure of Rommel plan. Montgomery's use of tanks as anti-tank guns in ditches also aided in victory. Lack of fuel was a key factor in DAK's defeat as well. On 1 September, panzers of 15th Panzer Division were left immobile, and Rommel had to change his original plan and go for a smaller operation. The next day though, on 2 September, Rommel ordered his forces to withdraw as panzer divisions only had a day's worth of fuel which was enough for mere 100 kilometers and the continuous bombardment of the British.[65] By 6 September, DAK was 10 kilometers behind its initial assault frontline. Panzers were able to knock out more than 60 tanks, but the lack of fuel prevented the operation to be continued for DAK and therefore, this rendered panzers useless.

After Battle of Alam el Halfa, DAK lost its initiative to attack and moved on to the defensive. For weeks, the British prepared for their counterattack while DAK fortified

[64] Hart, *İkinci Dünya Savaşı Tarihi,* 397,398.

[65] Ibid., 403.

their positions. The Second Battle of El-Alamein started on 23 October 1942 with the assault of British Eight Army. "For this battle, both panzer divisions of DAK had 239 panzers operational out of 264. Panzer Regiment 5 had 128 panzers of which 43 were Pz. III with long 50 mm gun and 15 Pz. IV with long 75 mm gun. Panzer Regiment 8 had the same numbers of Pz. III and IV."[66] The British counterattack differed from its predecessors, as Montgomery implemented a *blitzkrieg* style of tactic, using his tanks as the focal point of his attack. After a week of lengthy and heavy fighting, Panzer Divisions had 35 panzers operational for combat and the British were ready on 2 November for a breakthrough operation at the coast after opening a corridor through coast positions of panzer divisions.[67] The attack on 2 November was costly for the British as panzer divisions counterattacked British tanks, inflicting losses of up to 200 tanks. This was another instance showing not the superiority of German panzers but rather the superior use of panzers. Though by 3 November, panzer divisions merely had 30 panzers to engage in combat. Rommel knew defeat was inevitable and on 4 November Rommel ordered DAK to withdraw from El-Alamein lines. The rest of November was a continuous withdrawal for DAK and the recapture of locations in Cyrenaica for the British. On 13 November, British Eight Army capture Tobruk, Derna on 15 November, Benghazi on 20 November. Between 23 October and 2 December, DAK reported that 29 Pz. lI, 94 Pz. lll, 67 Pz. l11 Sp, 8 Pz. lV, 23 Pz. lV Sp, had been lost as total write-offs.[68] Despite small combats and operations, DAK retreated to Tunisia in 1943, establishing the front at Mareth Line in Tunisia, close to Libyan

[66] Thomas L. Jentz, *Panzertruppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force 1943–1945*. (Atglen, PA: Schiffer Military History, 1996), 8.

[67] Keegan, *İkinci Dünya Savaşı,* 346.

[68] Jentz, *Panzertruppen: 1943–1945,* 13.

border. Montgomery and his Eight Army had captured Sirte on 25 December 1942, and Tripoli on 23 January 1943. By 1943 Axis forces had been pushed out of Egypt and Libya.

1943

1943 was the last phase of DAK in Africa before its surrender. The path to surrender started in late 1942, when the British forced DAK to withdraw all the way to Tunisia, and the Allies conducted *Operation Torch* on 8 November 1942. This operation was created out of Churchill's intention to open a second front in Europe, through Italy starting with the island of Sicily. The aim of the operation was to pin down the Axis forces on both sides. The Allied forces had three-pronged attack, landing on beaches in Morocco, Oran, and Algiers. The US had entered the war in the West with its 1st and 2nd Armored Divisions. With the swift elimination of French Vichy Forces in Morocco and Algiers, the main thrust was to be towards Tunisia, specifically to city of Tunis. This way Allied forces would stop the supply route and eventually eliminate Axis threat in Africa.

At the same time DAK was receiving supplies of its own. The new heavy tank of Germans, *Panzerkampfwagen VI* or Tiger I was sent to Africa. These heavy tanks were attached to *Schwere Panzer-Abteilung* (Heavy Panzer Battalion), which were created in May 1942. The first Tigers arrived on 23 November 1942 in Bizerte, under *schwere Panzer-Abteilung 501.* The unit had 20 Tigers and 25 Pz. III with the short 75 mm howitzer cannon.[69] 10th Panzer Division was also ordered to be sent to Tunisia after

[69] Ibid., 13.

the landings in West Africa. Tiger tanks' performance and armor strength was proved early on 1 December when Tigers were confronted with M3 Grant tanks in Djedeida, Tunisia. In ranges between 80-100 meters, Grant tanks were able to penetrate Tiger, but two M3 Grants were knocked out by Tigers. By the end of December 1942, the initial assaults by the Allies to capture Tunis were thwarted.

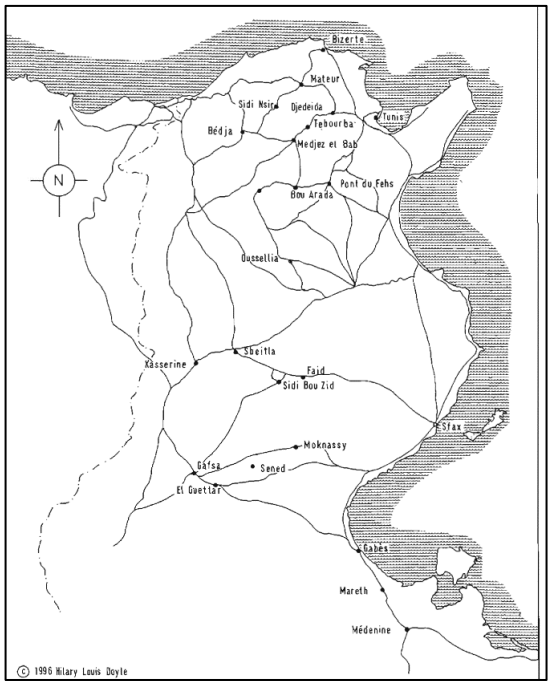

Figure V: Map of the key locations in Tunisia
Source: Thomas L. Jentz, *Panzertruppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force 1943–1945*. (Atglen, PA: Schiffer Military History, 1996), 14.

In January 1943, "the Allied forces in Tunisian front were divided into three separate sectors. At the mountains in the north was the British First Army commanded by General Anderson, the center was held by French battalions and in the south the US II Corps guarded the right flank of the Allied line and was stocking supplies in Tebessa."[70] The Allies building up strength was worrisome for Axis forces. "General

[70] Omar N. Bradley, *A Soldier's Story.* (New York: Modern Library, 1999), 24.

von Arnim knew that any race for build-up would be lost by Germans, as losses in Russia had drained Wehrmacht's reserves."[71] While this build-up continued, Rommel, fully aware of the situation, wanted to use this advantage to eliminate the Americans and then turn his full attention back to the British Eight Army whose numbers dwindled during the last three-month pursuit and its supply lines had stretched too wide. By February, the Axis forces had around 100000 men, with a little more than 280 tanks, 12 of them the new Tiger tanks, and most of which were provided by Germans. Even if all these tanks were used in an operation against the Allies, Axis forces were still quantitatively inferior. American 1st Armored Division, despite not being in full capacity, had 300 tanks, though 90 of them were Stuart light tanks, 36 tank destroyers and had an artillery unit stronger than a panzer division.[72] The only advantage Germans had at this point was, most of their panzers were Pz. III and IV with long barreled guns, and the new addition, Pz. VI or Tiger tank with its powerful 88 mm gun and heavy armor, which at the time was superior to any Allied tanks.

On 14 February 1943, Germans' attack towards Faid Pass and Sidi Bou Zid in Tunisia started. The Battle of Sidi Bou Zid took place between 14-17 February, and the Germans attacked with 21st and 10th Panzer Divisions to the American First Army and 1st Armored Division, whose tanks were dispersed throughout different locations. At the end of 14 February, the 3rd Battalion of the 1st U.S. Armored Regiment was left with 6 Shermans out of 53 on the attack to Allied line at Sidi Bou Zid.[73] The next day, the 2nd Battalion of the 1st U.S. Armored Regiment had only 4 Shermans left, losing

[71] Ibid, 24.

[72] Hart, *İkinci Dünya Savaşı Tarihi,* 555-556.

[73] Jentz, *Panzertruppen: 1943–1945*, 18.

50 of them.[74] The inexperienced American forces had to pull back after the devastating advance of panzer divisions. The loss of tanks and other materials were extremely high. The strategically important town of Sbeitla, Tunisia was also captured by the 5th Panzer Army.

What followed the Battle of Sidi Bou Zid was the Battle of Kasserine Pass, which was a notorious experience for the Americans. With this battle was Rommel wanted to pursue the demoralized Americans, and also aimed to capture Tebessa, where the main American supply dump was located; however, General von Arnim of 5th Panzer Army was cautious and did not favor such an aggressive advance due to lack of supplies.[75] Rommel ordered DAK to assault Thala and Sbiba, Tunisia, but his forces were repulsed there. On 20 February 1943, DAK turned to Kasserine Pass and captured it on the same day. The huge losses for the Americans happened on the next two days, 21-22 February, The Americans' aim to retake the pass was a huge failure for them. German panzers and anti-tank gun fire cost them almost 200 tanks, whereas the Germans' panzer losses amounted to just 20. The losses in tanks differed from each other. Despite low number of panzers, the panzer losses were usually due to the immense artillery fire of the Americans and not their tanks. On 22 February, Rommel and Kesselring decided that continuing the attack on western Tunisia was futile, and the forces of DAK had to be moved back to Mareth Line in the east, where an attack by the British Eight Army was expected. Although, tactical successes were achieved, and a huge number of supplies were captured by DAK, strategically it was a failure as

[74] Ibid., 18.

[75] Steven J. Zaloga, *US Armored Units in the North African and Italian Campaigns 1942-45.* (New York: Osprey Publishing, 2001), 64.

Rommel and DAK could not stop the threat of American II Corps. For the US II Corps, the huge losses in tanks, material, and men projected a change in command as General Fredendall was replaced by Major General George Patton on 6 March 1943.

After the Battle of Kasserine Pass, from March to May 1943, DAK engaged in one last attack in Africa on 6 March. DAK could only muster 160 panzers for this attack. On the other side, by 6 March Montgomery's forces had increased four times in numbers, they had nearly 400 tanks, 350 artillery guns, and 470 anti-tank guns.[76] It was an ill-executed operation and ended in a failure for DAK. "Without reconnaissance, without infantry support for his tanks, Rommel sought to maneuver the British flank, which was broken up by anti-tank guns, costing 52 panzers for DAK."[77] Another instance of high panzer losses occurred in the Battle of El Guettar on 23 March. The American tank destroyer battalions assigned to the US 1st Armored Division repulsed the attack of 10th Panzer Division. They engaged the panzers at a range of 2000 meters, and at the end of the conflict, they estimated German losses at 30-40 tanks; however, their losses amounted to 27 tank destroyers lost out of 36.[78] These losses were followed up by more attacks by the British and American forces, which caused DAK to withdraw northwards towards Tunis and Bizerte. By the end of April, General von Arnim only had 72 panzers available, and the direness of fuel situation forced them to distill fuel from local wines and spirits.[79] The situation was more dire when the report on panzers

[76] Hart, *İkinci Dünya Savaşı Tarihi,* 567.

[77] Bradley, *A Soldier's Story,* 48.

[78] Zaloga, *US Armored Units,* 67-68.

[79] Keegan, *İkinci Dünya Savaşı,* 351.

on 4 May indicated only 44 Pz. III, 25 Pz. IV and 1 Tiger were operational.[80] The end of DAK came on 13 May 1943, after the capture of Tunis on 7 May, and General von Arnim on 12 May.

The North African campaign was a huge challenge for both the Axis and Allied forces. The war in the desert necessitated a complete mobile warfare; therefore, tanks and other vehicles were of utmost importance. The panzers of DAK fared well against its adversaries throughout the campaign, as each year, new and upgraded versions Panzer III and IV arrived at Africa. The campaign also featured the first heavy tank of Germans, Panzer VI Ausf. E or generally known as Tiger. Despite the limited quantities, and technical problems, and not being the most effective tank for the Germans, on few occasions Tigers showed that they could be brutally effective with their 88 mm gun, which could easily penetrate any Allied tank in the campaign. The common, and the key problem for DAK was the problem of logistics, The British air and naval base in Malta disturbed Axis supply convoys at the sea and in the air, as German ME 323 Gigant transport planes carrying fuel were shot down. Because supplies were so low, panzers were badly affected. Most panzer losses happened due to mechanical breakdowns, lack of fuel and by anti-tank guns of the British. The conditions in the desert also meant constant maintenance for panzers. Since centralized maintenance was not feasible in North Africa, and because the Wehrmacht was heavily engaged in Russia, the tank maintenance personal had to rely on improvisation and cannibalization due to lack of spare parts.[81] The six-week specialized training course

[80] Jentz, *Panzertruppen: 1943–1945,* 20.

[81] Department of the Army. *German Tank Maintenance in World War II.* (Washington D.C.: Center of Military History United States Army, 1954), 2.

for maintenance crews were also found to be ineffective due to its shortness. This caused many valuable panzers to be abandoned or destroyed on the battlefields as these crews were unable to fix them under intense pressure.[82] In spite of these problems, once Panzers III and IV were upgraded with longer barreled 50 mm and 75 mm guns, they were able to knock off the British and American tanks at longer ranges. Despite the immense number of problems faced by DAK, panzers, with clever implementation of armored warfare tactics, were able to inflict huge losses on enemy tanks and accomplish the missions at hand.

On the Allied and American side, the situation started to change with the arrival of American M3 Grant/Lee and M4 Sherman tanks in North Africa. M3 Grant/Lee tank was very well received by the British as its 75 mm sponson-mounted[83] gun could easily penetrate the panzers; although, its high silhouette and limited traverse of its 75 mm gun were tactical weaknesses. Despite its shocking effect on the Germans, M3 tanks failed to turn the tide for the British at Battle of Gazala in 1942, and they were quickly knocked off by 88 mm flak guns. Overall, because M3 was a short-gap solution to the US tank production, its effectiveness on the battlefield was short-lived as well. M4 Sherman on the other hand was much more effective, especially in the hands of the British. The Sherman tank received high praise from both American and British as result of the campaign in North Africa. The limited use of Shermans in tank-to-tank combats was also a source of his praise, but even the embarrassing defeat at Kasserine Pass did not put the blame on Shermans. It was attributed to the inexperience of the

[82] Ibid., 42.

[83] Sponson-mounted means the cannon is not on the turret of a tank but on one of the sides.

American troops.[84] M4 Shermans were on par with German Panzer IV or even better. In tank-to-tank combats, M4 Sherman easily matched Pz. IV, and could destroy it at all normal combat ranges. Pz. IV's 75 mm gun was also effective at penetrating M4 Sherman, but Sherman's turret's fast power traverse and gyrostabilizer allowed it to get the first shot.[85] The deficiencies of M4 Shermans also became apparent in this campaign. General Omar Bradley, who was the deputy commander of the US II Corps in North Africa stated that; Shermans established a bad reputation among its crews, as they tended to go up in flames when their high-octane fuel engines were hit.[86] Shermans were outgunned by the introduction of Tigers with 88 mm gun, but their advantage laid in the fact that it was dependable, high in numbers and could surround enemy tanks, knock them on their flanks or their rear.[87] M4 Shermans, despite these criticisms, and the failure at Kasserine pass were generally well regarded by tank crews, and helped the Allies capture Tunisia and rout Axis presence out of Africa.

3.1.3. Operation Barbarossa

Arguably the most brutal and tank-heavy combat front of World War II was the Eastern Front. For four years, until the end of the war in 1945, the battles between Germany and Soviet Union featured lots of and many different types of tanks on battlefields. The Eastern Front was opened in summer of 1941, on 22 June with the invasion of the

[84] Charles Bailey. *Faint Praise: The Development of American Tanks and Tank Destroyers During World War II*. PhD diss.. (Duke University, 1977), 85.

[85] R. P. Hunnicutt. *Sherman: A History of the American Medium Tank.* (N.p.: Presidio Press, 1976), 183-184.

[86] Bradley, *A Soldier's Story*, 40,41.

[87] Ibid, 40,41.

Soviet Union by the German Wehrmacht. Although the majority of tank battles took place at the Eastern Front, Operation Barbarossa in 1941 was an exception. It featured only one major tank battle, but the campaign itself was important for Germany. It was not the first time the Germans possessed inferior tanks against their enemies', but Operation Barbarossa seriously challenged the effectiveness of German panzers, which eventually led to different approaches in tank development and production and the questioning of panzers.

For Operation Barbarossa, Germany had assembled the largest invasion force in the history of warfare. The preparations for the invasion had started in December 1940, but the invasion itself was delayed by the interventions in Yugoslavia and Greece, both of which were captured by Wehrmacht. After the invasion of France, panzer divisions were gradually increased to twenty during the fall of 1940. For the invasion, the German army, by June 1941, had twenty panzer divisions. However, the number of divisions were misleading, the new divisions were formed by removing one regiment from the existing panzer divisions. This decreased panzer numbers in a division in half, with each division now having 160 panzers in its inventory.[88] Wehrmacht still had the same core of panzers for the operation, they were comprised of Panzer I, II, III and IV. The panzer inventory on 1 June 1941 for the army was 877 Pz. I, 1074 Pz. II, 170 Pz. 35t, 754 Pz. 38t, 350 Pz. III with 37 mm gun, 1090 Pz. III with 50 mm short-barreled gun and 571 Pz. IV.[89] The number amounted to almost five thousand panzers, but the actual number that was deployed in the invasion was less than that. Most Germany's

[88] Hart, *İkinci Dünya Savaşı Tarihi,* 215-216.

[89] Jentz, *Panzertruppen: 1933–1942,* 186.

panzers were already obsolete by June 1941. The majority of Pz. I was relegated to training roles with only 281 along with 743 Pz. II taking part in Operation Barbarossa; thereby these two panzers constituted 28 per cent of total tank force.[90] The rest of the panzers were Pz. III and IV models, which the Germans counted on the most to overcome enemy tanks.

German intelligence on the Soviet Red Army prior to the operation, estimated that, the Soviets could muster 200 divisions in total and had a tank force of 10000 tanks against the German 3500; whereas the actual number was 24000.[91] These numbers were way off then the actual numbers, but they were also misleading. The main body of the Soviet tank force consisted of T-26 and BT tanks. Both of these tanks were produced in huge amounts in 1930s, both had 45 mm guns which could easily penetrate all German panzers. The Soviets also had KV (Kliment Voroshilov) heavy tanks, and the medium T-34 tank which were far superior to any panzers the Germans possessed. They had 76 mm guns capable of easily penetrating every German panzer and KV tanks' armor proved impenetrable by panzers' cannons.[92] However, all 24000 Soviet tanks were not available to operate. Due to the Red Army's modernization efforts in 1940 and the Winter War against Finland in 1940, many tanks needed repair. A report on 15 June 1941 stated that 73 per cent of T-26 and BT models required some sort of maintenance, with 29 per cent in need of serious maintenance and 44 per cent in need

[90] David Stahel, *Operation Barbarossa and Germany's Defeat in the East.* (New York: Cambridge University Press, 2009), 107-108.

[91] Keegan, *İkinci Dünya Savaşı,* 132.

[92] Stahel, *Operation Barbarossa and Germany's Defeat in the East,* 112-113.

of lesser.[93] This meant that at least 10000 tanks were not combat ready. Despite these readjusted numbers, The German panzers were qualitatively and quantitatively inferior against their counterparts.

The operation started on 22 June 1941. Around 3500 German panzers were distributed to three different army groups and organized in four *Panzergruppen* or panzer groups. The 1st Panzer Group commanded by Colonel General Ewald von Kleist was attached to Field Marshall Gerd von Rundstedt's Army Group South (AGS). Their main task along with the AGS was to advance through Pripet Marshes between Belarus and Ukraine, and eventually capture Ukraine, the economic heartland of Soviet Union. The 1st Panzer Group included five panzer divisions. It was the second-best equipped panzer group with 730 panzers and included no Czech-made Panzer 35t and Panzer 38t tanks. It had a fairly good amount of Panzer IIIs but slightly more ground to cover.[94] This also made the 1st Panzer Army the weakest, as the ground to be covered was larger and the number of tanks was insufficient. The 2nd and 3rd Panzer Groups were attached to Army Group Centre (AGC), commanded by Field Marshal Fedor von Bock. The former was under General Guderian's command, and the latter was under General Hermann Hoth's. These two panzer groups had nine panzer divisions in total. Guderian's 2nd Panzer Group was the biggest of all three with nearly 1000 panzers and had the most Pz. III, whereas Hoth's 3rd Panzer Group had no Pz. III, but was equipped with 507 Czech-made Pz. 38t light tanks. Pz. 38t was reliable, faster than Pz. III, but lacked the armor and the firepower of the latter. Together, these panzer groups

[93] Ibid., 114.

[94] Robert Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt.* (Barnsley: Pen&Sword Books, 2013), chap. 1, sec. The German Panzerwaffe. Epub Edition.

comprised of 57 per cent of all panzers in the operation.[95] The main task of these army groups was to spearhead AGC, help capture Minsk and Smolensk, thereby securing the highway to Moscow. Lastly, the 4th Panzer Group was attached to Field Marshal Wilhelm von Leeb's Army Group North (AGN) and was commanded by General Erich Hoepner. The 4th Panzer Group was the weakest of all, with only three panzer divisions, it was comprised of all panzers in the army inventory, but mostly Pz. 35t and Pz. 38t.[96] Its mission was to support AGN in its advance towards Leningrad and the capture of Baltic States. Heinz Guderian stated that these three army groups had to break through the Soviet forces stationed near the frontier, then encircle and destroy them, and the panzer groups were to push forward deep into Russia to prevent any new defensive fronts from being formed.[97]

In the first week of the invasion, the German panzers had two major tank-to-tank encounters with the Soviet tanks. The first one was in Lithuania, in the town of Raseiniai. The 6th Panzer Division of the 4th Panzer Group occupied the town on 23 June after crossing Dubysa River. The next day, on 24 June Soviet Major General Solyankin force-marched his 2nd Armored Division 100 kilometers to counterattack German 6th Panzer Division at Raseiniai and to capture the town. The division had 31 KV-1, 19 KV-2 and 50 T-34 tanks.[98] It was the first encounter of panzers against the new Soviet medium and heavy tanks.

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[95] Ibid., chap.1, sec. The German Panzerwaffe.

[96] Ibid., chap.1, sec. The German Panzerwaffe.

[97] Guderian, *Panzer Leader*, 145.

[98] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt,* chap.2, sec. Panzergruppe 4 versus the Northwest Front, 22–30 June.

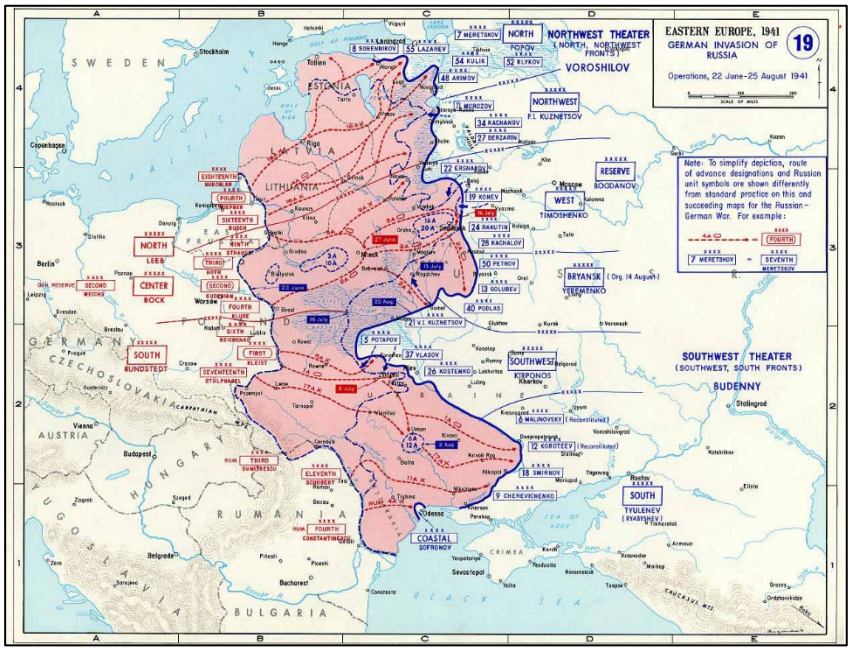

Figure VI: Map of Operation Barbarossa from 22 June to 25 August 1941
Source: https://ww2db.com/image.php?image_id=4594

The Soviet 2nd Tank Division attacked on 23 June 1941 and overran elements of the 6th Panzer Division. About 100 panzers from Panzer Regiment 11, assembled for a counterattack, one third of these panzers were Pz. IV. Some panzers engaged the Soviet tanks from the front, but most of them engaged these heavy Soviet tanks from flanks; however, the effort was in vain, and they had to retreat after taking casualties.[99] Despite having the 75 mm short-barreled gun, Pz. IV could not penetrate these Soviet tanks. Panzer 35t of 6th Panzer Division could not destroy heavy KV tanks with its own 37 mm gun. Despite inflicting high losses, the Soviets did not continue their offensive and withdrew due to lack of ammunition and fuel. A single KV tank[100] got stuck behind German lines and for 24 hours it could not be eliminated. The Germans

[99] Erhard Raus, *Panzer Operations: The Eastern Front Memoir of General Raus, 1941-1945.* Translated by Steven H. Newton. (Cambridge, Massachusetts: Da Capo Press, 2005), 22.

[100] Records vary on what model this KV tank was, but according to General Erhard Raus' account, it was a KV-1 tank.

had to bring in 88 mm flak gun and 105 mm howitzer to penetrate the heavily armored tank, and later they had to use explosive charges as well to destroy the tank. This engagement alone, in the beginning of the invasion manifested that the German panzers were not a match for the new Soviet KV and T-34 tanks. Germans had to rely on combined-arms tactics and effectively use artillery, anti-tank guns, and when necessary, they had to use air force to overcome new Soviet tanks.

The second engagement was in the southern front. The Battle of Brody,[101] one of the most tank-heavy combats of the war, took place in a triangle formed around the towns of Lutsk, Dubno and Brody in Western Ukraine, between 23-30 June 1941. It was a series of clashes that lasted for a week between the German Army Group South and the Soviet armies in the Southwestern Front. Army Group South's mission, along with its panzer divisions, was to dive deep into Ukraine and capture Kiev. Ukraine was vital for both sides in terms of its economic value. As part of their objective, Kleist's 1st Panzer Group had to cross to the western part of the Bug River in Ukraine, and the infantry divisions had to create bridgeheads for the panzers to cross the river. The Soviet commander of the Southwestern Front, General Mikhail Kirponos was ordered to counterattack and stop the German panzers' advance. The Soviets tried to stop the German advance on 23 June with an attack on the town of Radekhov, which was captured the same day by the Germans. The elements of the 11th Panzer Division fought off a wave of Soviet tanks in broad daylight. The first line of Soviet light tanks was easily knocked off by panzers, firing from 400 meters, but the fire from T-34 tanks on the next wave, from 800-1000 meters knocked out three Pz. III and two Pz. IV. The

[101] The name of the battle varies. It is also called as the Battle of Dubno, Dubno-Brody.

panzers could only defeat them by shooting at their reserve fuel drums and by immobilizing them by shooting at their tracks.[102] The 1st Panzer Group crossed the River Styr on 25 June, the towns of Lutsk and Dubno were captured by the 11th Panzer Division, and the Soviet 5th and 6th Armies were encircled. By 30 June, the battle ended with the Soviets failure to prevent AGS' advance. The Battle of Brody was one of the largest tank battles of the war, in which "the Soviets outnumbered the Germans near 5 to 1 with 3800 tanks to Germans' 800 panzers."[103] "The week-long combats saw Soviets lose two thirds of their armor, which amounted to 2500 tanks, though many tank losses were due to mechanical failures and lack of driver training."[104] The German loss of panzers were considerably low. Excluding Pz. I of which 25 were destroyed, by 30 June the 1st Panzer Group had another 100 panzers that were damaged or down for repair, but all five panzer divisions were fully combat capable.[105] Despite these huge tank numbers, the Battle of Brody manifested that the panzers were seriously inferior to the new Soviet tanks. They could not knock-off these tanks with their own guns. Panzer divisions had to effectively use 88 mm flak guns, artillery battalions and Luftwaffe for close air support to destroy the Soviet medium T-34 and heavy KV tanks. With these two important battles and the other engagements, the panzer groups

[102] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt,* chap. 2, sec. Von Kleist's Panzergruppe 1 versus the Southwest Front.

[103] David Glantz, Jonathan M. House, *When Titans Clashed: How the Red Army Stopped Hitler*. (Kansas: University Press of Kansas, 2015), 62.

[104] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt,* chap. 2, sec. Von Kleist's Panzergruppe 1 versus the Southwest Front.

[105] Ibid, chap. 2, sec. Von Kleist's Panzergruppe 1 versus the Southwest Front.

lost 106 panzers as total write-offs, with 33 being Pz. 38t, 44 Pz. III and 15 Pz. IV, and some 200 panzers were damaged or down for repair.[106]

Outside of these two significant battles, Army Group Centre was occupied with encircling Bialystok in Poland and Minsk in Belarus, during the first week of the invasion. Panzer Groups 2 and 3 of AGC, were tasked with encircling Minsk, and by 30 June 1941, Minsk was already captured, and the pocket around Minsk was closed. The report of the inspection of panzers by General of Panzer Troops Ritter von Thoma stated that 70 per cent of the panzers of 3rd Panzer Group were fit for service by 2 July, and 30 per cent were only broken down.[107] Such high attrition on the eight day of the invasion was striking.[108] By 10-11 July 1941, panzer groups of AGC crossed Dnieper River in Belarus, and were on their way to Smolensk, nearly 600 kilometers deep in Soviet territory.

The 4th Panzer Groups' combats continued after Raseiniai, on its advance to Leningrad. On 7 July, the tank battle at Pskov pitted the 6th Panzer Division against the Soviet 3rd Tank Division. The 3rd Tank Division, with its 100 BT and T-26 light tanks mounted an attack to prevent the 6th Panzer Division to cross Yelikaya River in Pskov, Russia. Pz. 35t and Pz. IV had the upper advantage, and by nightfall the 3rd Tank Division had about 35 BT tanks left, while 6th Panzer still had more than 200 panzers.[109] Again, panzers proved that they could easily overcome BT and T-26 light

[106] Ibid, chap. 2, sec. An Assessment of the June 1941 Border Battles.

[107] Stahel, *Operation Barbarossa and Germany's Defeat in the East*, 188.

[108] Ibid., 188.

[109] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt*, chap. 2, sec. Stopping Höpner's Advance on Leningrad, July–September 1941.

tanks. By 15 September 1941, panzers of the 4th Panzer Group of Army Group North helped advance rapidly to Leningrad and besiege the city. At the center, by the first week of August of 1941, the panzers of Panzer Groups 2 and 3 had closed the pincers around Smolensk, Russia and the pocket of Smolensk was closed. Their advance on Moscow was halted in mid-July by Hitler's orders. The major problem from the beginning of the operation, was which strategic location had to be the main target. The differences between Hitler and OKW led to conflicts in planning, and the eventual plan was that Panzer Groups 2 and 3 were to be diverted to North and South. Hoth's 3rd Panzer Group was to aid the advance on Leningrad and Guderian's 2nd Panzer Group was to aid AGS to capture Kiev, therefore, delaying the advance on Moscow.[110] This decision to delay the advance on Moscow put panzers and panzer groups in a bad situation. This was due to the fact of the lack of modern roads in Russia, as General Blumentritt stated; the roads were just sandy paths and they were even problematic for panzers and tracked vehicles, and when it rained, roads turned into muddy swamps and panzers got stuck in the mud. Panzer divisions had to wait for sun to come up and dry the muddy ground.[111] The narrower tracks of early panzer models did not help in this situation as well, because they applied more pressure into the ground, causing panzers to sink into the mud. And the delay meant that summer was going to end and *rasputitsa,* the rainy season during fall was going to make things harder for panzers.

Despite the heavy panzer losses during the encirclement of Smolensk, the 2nd Panzer Group's swift advance to southeast towards Kiev, threatened Kirponos' rear. To

[110] Keegan, *İkinci Dünya Savaşı,* 199.

[111] Hart, *Hitler'in Generalleri Konuşuyor,* 305-306.

prevent the 2nd Panzer Group's advance, Soviet General Yeremenko was ordered to attack Guderian's divisions. The Soviets employed 107 tanks of which fifty-six were T-34s and nine KV heavy tanks against 17th Panzer Divisions 50 panzers with only half of them Pz. III.[112] Despite the numerical advantage, with the Germans' better use of combined-arms tactics, the battle that took place between 30 August and 7 September became a failure for the Soviets. The Soviets had lost 75 out of 127 tanks, and Germans had, 20 knocked out and 5 destroyed.[113] The Soviets also lost many tanks to Kleist's panzers in Kremenchug, Ukraine. "The Soviet attack on German bridgehead at Dnieper at Kremenchug cost them 279 tanks, this was because they did not expect any German panzers at that sector."[114] With the most of Kirponos' armies and tanks destroyed, Kleist's and Guderian's panzer groups linked up at Lokhvitsa, east of Kiev on 15 September 1941. The outer pocket around Kiev was closed and four Soviet armies were trapped in Kiev. They surrendered after four days, on 19 September 1941. Overall, the Soviet Southwestern Front had 700000 casualties during the Battle for Kiev, losing four of its armies comprised of 43 divisions.[115]

By late September, panzer groups enabled Wehrmacht to advance more than 600 kilometers deep into the Soviet Union. AGN had surrounded Leningrad in the north, AGC had captured Minsk, Smolensk and lastly Kiev was captured by AGS. The Germans inflicted heavy losses on the Soviets; however, their losses had accumulated

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[112] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt*, chap.2, sec. Yeremenko's Attempted Deep Battle, 30 August–7 September.

[113] Ibid., chap.2, sec. Yeremenko's Attempted Deep Battle, 30 August–7 September.

[114] Ibid., chap. 2, sec. Kiev: Closing the *Kessel*, 1–20 September.

[115] David Glantz, *Barbarossa Hitler's Invasion of Russia 1941.* (Gloucestershire: Tempus Publishing, 2001), 132.

as well. According to the status reports of the panzer divisions between August and September 1941 panzer losses were as such; of some more than 3500 panzers, 972 panzers are total write-offs, 252 of them are Pz. III, 125 Pz IV, and 184 are Pz. 38t models.[116] German panzer numbers increased with the addition of 2nd and 5th Panzer Divisions. These divisions were being refitted after the Balkan Campaign, during the early phase of Operation Barbarossa. With the addition of 160 new panzers, these two divisions added 380 more panzers to the German order of battle.[117] With Kiev captured and Leningrad besieged, German Army High Command had turned its attention to Moscow, and Operation Typhoon was ordered on 26 September. The attack on Moscow was to be spearheaded by Panzer Groups 2,3 and 4. Hoepner's group was called to join AGC. Hoth's and Hoepner's panzers would attack eastwards and Guderian's panzers would attack northwards. The aim of this operation was to eliminate all remaining Soviet forces and capture Moscow before the rainy season and Russian winter started. Red Army's strength was down to 363 planes, 770 tanks and 800000 soldiers in 90 divisions against a force that was supported by 1400 planes, which also had 14 panzer divisions and 8 mechanized divisions by October 1941.[118]

Operation Typhoon started on 30 September 1941, with the attack of Guderian's 2nd Panzer Group towards Orel. AGC's attack followed on 2 October. An attack on Guderian's left flank on 1 October showed that Germans were adapting tactics to

[116] Jentz, *Panzertruppen: 1933–1942,* 206. The report dates are different in each panzer divisions, but they are dated between late August and early September 1941. Panzer losses are especially higher in numbers for Panzer Groups 2 and 3 of Army Group Centre because of heavy fighting in Minsk and Smolensk pockets.

[117] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt*, chap.2, sec. Sustaining the Tanks, September 1941.

[118] Keegan, *İkinci Dünya Savaşı,* 207.

counter Soviet heavy tanks. One medium 105 mm howitzer and one 88 mm flak gun were attached to each panzer abteilung.[119] Rounds of these guns were able to penetrate every Soviet heavy tank and medium T-34 tank, and therefore, they were employed as anti-tank guns. Guderian's panzer units reached Orel, Russia by 3 October and captured it. Despite this rapid advance, the battle at Mzensk on 6 October proved what Soviet heavy and medium tanks could achieve when used correctly. Though it was a battle between two single tank battalions, the Germans lost 10 panzers and 5 artillery pieces to the Soviets' 7 tanks lost. Although, this was not the first time Germans faced these tanks, it was the first time that they were used effectively and forced the Germans to retreat.[120] On the other front, Hoth's and Hoepner's panzer groups swept through the Soviet forces. In ten days of fighting, the Soviet Western and Reserve Fronts were decimated, having lost more than 800000 troops, 830 tanks and 6000 artillery pieces. Soviets also lost more than thirty divisions and eight tank brigades, whereas the Germans' losses amounted to sixty panzers and five assault guns.[121] Panzers were spearheading these enormous gains, though their effectiveness against the Soviet tanks were in serious question by the German commanders. The successes depended on the perfect use of combined-arms tactics and the use of artillery guns in panzer battalions to overcome the Soviet medium and heavy tanks. Red Army's ill-use of its new, powerful tanks also helped Germans. Despite their advantage in armor and firepower because they were either not supported by infantry and artillery or spread amongst infantry divisions, they could not be effective against the German panzers and panzer

[119] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt*, chap. 2, sec. Typhoon: Guderian's Battle, 30 September – 16 October.

[120] Ibid., chap. 2, sec. Typhoon: Guderian's Battle, 30 September–16 October.

[121] Ibid., chap. 2, sec. Höpner Seals Vyazma Kessel, 2-12 October.

divisions. On 7 October the first snow fell and melted, turning the roads into muddy swamps which slowed the progress of panzers. Many panzers were kept out of action or became useless because of these roads and rapidly decreasing temperatures. General Raus of 6th Panzer Division stated that:

> Losses in tanks and motorized vehicles were extraordinarily high. 2nd Panzer Group, operating in Orel area lost 60 per cent of its tanks in the mud. 10th Panzer Division lost 50 tanks without a shot fired. Sudden frost in late October crippled 6th Panzer Division's panzers, and they could never move. Supplies of fuel, food, towropes had to be air-dropped. Panzer crews, whose panzers got stuck in the mud, had to abandon their vehicles to seek shelter and food, and no replacements were being sent. At the time Germany was producing only eighty-five panzers and forty assault guns a month.[122]

A report on Soviet tanks by 4th Panzer Division's commander Freiherr von Langermann stated the inferiority of panzer against their counterparts. The report stated:

> After the capture of Orel, the Soviets employed their heavy tanks in mass and engaged the panzers, in half a circle at a range of 1000 meters and deliver enormous penetration. 50 mm tank guns could only deliver penetrations on weak points of Soviet tanks at very close ranges under 50 meters. Attacking these Soviet tanks with 88 mm flak and 105 mm howitzers were not sufficient, as they were too slow and were easy targets. Just like the 76 mm gun on T-34, Pz. IV had to have same caliber gun mounted and a self-propelled anti-tank gun with 100 mm gun had to be produced. Old anti-tank guns had to be discarded and until all these improvements were completed, all Pz. III had to be fitted with 50 mm guns.[123]

After heavy fighting and worsening weather conditions, AGC had to halt on 30 October. On 13 November, Chief of Staff of OKH Franz Halder met with chiefs of

[122] Raus, *Panzer Operations,* 88.

[123] Jentz, *Panzertruppen: 1933–1942,* 205,208,209.

staff of army groups and the decision was made to continue the attack on Moscow, despite the 35 per cent losses in armored forces.[124] The second phase of Operation Typhoon started on 16 November. The plan was a classical pincer attack, Hoth and Hoepner's 3rd and 4th Panzer Groups would approach Moscow from north, through Kalinin and Klin, Guderian's 2nd Panzer Army[125] would seize Tula and approach Moscow from the south and the AGC would attack directly at the center. Von Bock's hope was three panzer groups would link up east of Moscow and encircle the city.[126] Swift attacks by 3rd and 4th Panzer Groups brought them close to Moscow. By the end of November 3rd Panzer Group at Krasnaya Polyana, was 28 km, 4th Panzer Group, headquartered in Burtsevo, was 40 km away from Moscow. Guderian's 2nd Panzer Group, which circled around Tula, was 100 km away.[127] The frozen ground had helped panzers move rapidly, but the increasing cold, and the decreasing supplies and equipment put the operation to halt. Hoth had 80 panzers in his panzer divisions and Hoepner had about 170 by the end of November but the fuel and ammunition were running low.[128] Operation Typhoon ended on 4 December 1941, thereby declaring the end of Operation Barbarossa.

A report on 22 December 1941 by 16 panzer divisions listed both operational and repairable panzer numbers as: 254 Pz. II, 286 Pz. 38t, 434 Pz. III and 211 Pz. IV, 1185

[124] Keegan, *İkinci Dünya Savaşı,* 208.

[125] On 5 October 1941, 2nd Panzer Group was retitled as the 2nd Panzer Army.

[126] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt*, chap. 2, sec. Typhoon: the Last Roll of the Dice, 1 November–4 December.

[127] Keenga, *İkinci Dünya Savaşı,* 209.

[128] Forczyk, *Tank Warfare on the Eastern Front 1941-1942 Schwerpunkt*, chap. 2, sec. Typhoon: the Last Roll of the Dice, 1 November–4 December.

in total. The total numbers of panzers lost by 31 December 1941 were 428 Pz. I, 424 Pz. II, 796 Pz. 35t and 38t, 660 Pz. III, 348 Pz. IV and along with command panzers, 3920 in total. They were total write-offs or no longer repairable.[129] German panzers' effectiveness throughout this operation had been questionable. Despite, being outnumbered 6 to 1 at the beginning of the campaign, panzers were able to overcome their Soviet counterparts. Panzers' lack of armor, firepower was covered with combined-arms tactics and adaptions as the operation progressed. The best panzers in Wehrmacht inventory, Pz. III and Pz. IV were able to knock out the Soviet BT and T-26 light tanks which comprised most of the tanks Red Army had. The appearance of T-34 medium and KV 1 and KV 2 heavy tanks clearly proved the deficiencies of Pz. III and Pz. IV. Medium panzers could penetrate these Soviet tanks neither at long nor at short ranges, they could immobilize them by shooting at their tracks and specific artillery guns or air support was required to destroy them. However, the inexperienced, and undertrained Soviet tank crews also helped the Germans, as they could not effectively use their new tanks. Soviet tanks also did not have radios just like the French tanks in the prior campaign. This made it difficult for tank crews to coordinate their attacks, and therefore, panzers could swarm singled out, out of line Soviet tanks as easy prey. In terms of mission objectives accomplished, panzers in panzer divisions, were able to spearhead the invasion and create pincers around the Soviet forces, allowing infantry divisions to eliminate Soviet army units in Bialystok, Minsk, Smolensk pockets. Elimination of enemy fronts at Vyazma, Bryansk in Russia, besieging Leningrad and capture of Kiev were only made possible by panzer divisions.

[129] Jentz, *Panzertruppen: 1933–1942,* 209.

Other important factors affecting the impact of panzers were logistical problems caused by the terrain, lack of modern roads, wear and tear after long marches and fighting, lack of spare parts and lastly the cold weather. Because the Russian railway gauge was wider, the lines had to be reset to fit German trains, so this required supplies to be transported by trucks and panzers were fitted with more rounds and loaded with two 200-liter petrol tanks, to make them self-sufficient.[130] However, as the distance increased supplying panzers with ammunition and fuel became more problematic. Spare parts became more critical as the campaign progressed. Lack of spare parts caused panzers to not work or not be repaired. "During the first 3 months, panzers had sufficient spare parts, but as of autumn of 1941, with the supply lines overextended and railroads not capable enough carrying supplies, damaged panzers could not be repaired, as the supply truck columns also bogged down in muddy roads, during muddy season."[131] This hindered panzer operations and panzers' effectiveness, as they could not be repaired and put swiftly back to action. Some panzer models' production was also ceased. General Raus of the 6th Panzer Division stated:

> The average distance driven by our Panzers was 11,500 kilometers for PzKw II, 12,500 for PzKw 35t, 11,000 for PzKw IV, and 3,200 for command tanks. The special situation in regard to repair of the PzKw 35t is well known. It is indeed deemed necessary to point out that repairs can be accomplished only by cannibalizing other Panzers because there are no longer any spare parts for the PzKw 35t. This means that after retrieval of the Panzers that are scattered around the terrain, a maximum of ten can actually be repaired out of the forty-one PzKw 35ts reported as needing re-pair. The PzKw 35ts can no longer be rebuilt. All of the components are worn out. To be practical, perhaps the armored hulls are still salvageable.[132]

[130] David Stahel, *Operation Barbarossa and Germany's Defeat in the East.* (New York: Cambridge University Press, 2009), 132,133.

[131] Department of the Army. *German Tank Maintenance in World War II.* (Washington D.C.: Center of Military History United States Army, 1954), 23.

[132] Raus, *Panzer Operations,* 88.

In the end, panzers as a whole and as divisions, could not be effective enough to gain a decisive, and strategical victory for Germany. They helped inflicting huge losses on the Red Army, "as the Red Army's losses in six months were appalling. Wehrmacht advanced 1200 km along a 1000 km front, 4,5 million military casualties and a loss of more than 20000 tanks."[133] The failure to capture Moscow and ineffectiveness against new Soviet tanks, seriously required changes in panzers, and a new model of panzer to be produced to counter these Soviet tanks.

[133] Glantz, *Barbarossa Hitler's Invasion of Russia 1941,* 210.

CHAPTER 4

THE EMERGENCE OF NEW TANKS AND OPERATION CITADEL

The importance given to tanks by the Americans and the Germans increased during 1942 and 1943. For the Americans, the experiences gained during the desert battles in North Africa pushed them to recheck their tanks' and tank destroyers' effectiveness, to implement improvements, and discuss the development and production of a new tank. For the Germans, Operation Barbarossa in 1941, followed by *Fall Blau* (Case Blue) in 1942 against the Soviet Union and the campaign in North Africa provided a good number of feedbacks which proved that their panzers were far more inferior compared to the Soviet tanks at the Eastern Front. This fact forced the Germans to also upgrade their panzers and develop new panzer models.

On the American side, in the late 1942s, M4 Sherman became the standard medium tank for the Army after the stopgap solution of M3 Grant/Lee tanks. However, despite fielding 75 mm gun, Sherman tanks were still outmatched in the field against German panzers, specifically after new models of the Panzer IV equipped with longer barreled 75 mm guns were produced and sent to battlefields. Sherman's ineffectiveness at combat stemmed from the fact that the American doctrine did not put emphasis on tank versus tank battles and Shermans would be needed to attack enemy targets after a breach had been made in the enemy line; therefore, the Army had not requested a tank

gun powerful enough to be an effective anti-tank gun.[134] In Spring 1942, the Army Ordnance Department also started a project for new tanks to replace M4 Sherman. The prototypes produced at this project were the T20 series tanks. The main goal was to develop a better armed, and armored low silhouette tank. However, the lack of urgency and disagreements between the American commanders hindered the development of the new tank. The first T20 pilot appeared in May 1943, and the first T23 pilot, which featured the 76 mm on in January 1943.[135] The Ordnance Department was also considering the installation of a 90 mm gun to Shermans or a new tank. However, in late 1943 it was understood that 90 mm gun would overload the Sherman and the proper solution was the early production of a T20 series tank with a 90 mm gun, but this idea was rejected by Army Ground Forces on the grounds that it was tank-destroyers' job to fight against enemy tanks.[136] These projects to upgrade existing tanks and develop a new one through T series tanks eventually led to the creation of T26, later to be named as M26 Pershing as its standard name. Despite this, the understanding that tank versus tank battles was the responsibility of tank destroyers negatively affected the American tank development. It was a common notion among American generals as well. General Patton's 5 June 1943 dated instruction letter to the unit commanders stated that; "the primary mission of armored units is to destroy infantry and artillery. Tank versus tank battles, although sometimes necessary, are

[134] Kim Andrew Tomasch, "A Comparison of German and American Tank Development and Production in World War II" (Master's Report. Kansas State University, 1972), 43-44.

[135] Green, *American Tanks&AFVS of World War II,* 101.

[136] Hunnicutt, *Sherman: A History of the American Medium Tank,* 212.

expensive and indecisive."[137] All in all, the lack of urgency and combat experience along with the disputes among commanders hindered the American Army's tank development and production stages; thereby the Americans could not field a new tank in 1942 or 1943.

On the German side, the experiences of Operation Barbarossa in 1941 and the ongoing desert warfare in North Africa manifested that, major upgrades and even a new panzer was needed to fight against the enemy armor, specifically the Soviet T-34 medium and KV heavy tanks. In November 1941 officers from the Army Ordnance Office visited Guderian's headquarters to study T-34 medium tank. Guderian stated that the officers in panzer corps favored the idea of T-34 simply being copied, but the designers could not agree to this.[138] The project for a new medium tank started in 1942, and two companies MAN and Daimler-Benz started to work on it. The new tank was to be a 30-ton tank with 60 mm sloped frontal armor and a heavier gun. The new panzer was known as VK 30.02.[139] The design of Daimler-Benz was favored by Hitler; however, the project was cancelled, because it had a diesel-engine which was not favored by other officials. Germany had no available diesel engines at hand, and the development of one would take a long time. On 2 July 1942, Armaments Minister Albert Speer ordered the cancellation of Daimler-Benz design, and thereby preventing the panzer forces of a more technically reliable panzer.[140] The prototype of MAN's design was

[137] George S. Patton, George S. Patton Papers: Diaries, -1945; Annotated transcripts; 1943, Apr. 8-July 1, George S. Patton Papers: Diaries, 1910-1945, 5 June 1943, the Library of Congress, https://www.loc.gov/item/mss35634027/.

[138] Guderian, *Panzer Leader*, 276.

[139] Robert Forczyk, *Panther vs. T-34 Ukraine 1943*. (Oxford: Osprey Publishing, 2007), 10.

[140] Ibid., 11-12.

tested on 2 November 1942 and on 22 February 1943, 13 more Panthers were tested and approved by Armaments Minister Albert Speer. However, the new tank Panther, had teething problems from the beginning. 6 of 13 Panthers broke down and one caught fire at the trials on 22 February, and the panzer was deemed not ready on 16 June 1943 by General Heinz Guderian, who was then appointed as the Inspector of Armored Forces.[141] The key problem for VK tank, which was named 'Panther' or *Panzerkampfwagen V Panther,* was that its' initial weight was increased to 45 tons, since more armor was added for protection. This strained the engine and the final drive of the panzer. Although the design and production of Panther absorbed almost the whole 1942, and Panther, having the most ballistically effective tank gun of WWII in its 75mm L/70, only 250 was projected to be delivered to the Army by May 1943 for the upcoming operation.[142]

By the spring of 1943, Germany had its heavy panzer in Tiger, and it was tested at the battlefields in Leningrad and in Tunisia in North Africa, during late 1942. "With its powerful 88 mm gun, protected by more than 100 mm frontal armor, Tiger could outshoot anything on the field and at long ranges. And because it was seen as an offensive weapon, it was to be great fit at Kursk, where ideals situations for Tiger were developing."[143] The emphasis given to the existing panzer models were changing as well. Pz. III with its smaller turret and chassis could not mount the more powerful 75 mm gun, and therefore more attention was paid to Pz. IV in late 1942 and 1943. Pz.

[141] Ibid., 14.

[142] Dennis Showalter, *Armor and Blood: The Battle of Kursk: The Turning Point of World War II.* (New York: Random House Publishing, 2013), chap. 2 Preparations, sec. I. Epub Edition.

[143] Ibid., chap. 3 Preparations, sec. I..

IV had become the main battle tank of Wehrmacht in 1943. The expansion program of Albert Speer increased the production of not just Pz. IV but all armored vehicle production as well. "In July 1942 only 88 Pz. IV were produced, whereas in in March and May 1943, respectively 205 and 272 Pz. IV were produced."[144]

New tank destroyers and upgraded versions were also produced in certain numbers during 1942 and 1943. Stug III, which was mainly an assault gun for infantry, became an efficient tank destroyer. "Like Pz. IV, Stug III had been up-gunned in early 1942 with 75 mm L/43 and L/48 tank gun, effectively destroying Soviet tanks in the field, even surpassing conventional tanks in effectiveness."[145] Stug III was built on the Pz. III chassis, and therefore, with the production of Pz. III nearing the end in 1943, all available chassis were converted into tank destroyers. Another tank destroyer was the "Ferdinand" or "Elefant" heavy tank destroyer. This heavy tank destroyer was built on the chassis of Porsche's Tiger design, which was rejected in favor of Henschel design. With Hitler's order on 22 September 1942, pre-produced 90 chassis of Porsche Tiger was to be turned into assault-gun and tank destroyers, mounting the formidable 88mm PaK 43L/71 cannon.[146] Although, heavily armored and possessing a powerful gun, Ferdinand had its weaknesses, specifically in its extremely heavy weight of 65 tons, could only carry 42 rounds of ammunition, and did not have a machine gun for protection against enemy infantry.

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[144] Mark Healy, *Zitadelle The German Offensive Against The Kursk Salient 4-17 July 1943*. (Gloucestershire: The History Press, 2016), chap. 3 Chariots of Fire – Tanks at Kursk, sec. 22 December 1942 – The State of Panzer and AFV Production. Epub Edition.

[145] Ibid., chap. 3 Chariots of Fire – Tanks at Kursk, sec. 22 December 1942 – The State of Panzer and AFV Production.

[146] Ibid., chap. 3 Chariots of Fire – Tanks at Kursk, sec. 24 The Wonder Weapons.

1942 and early 1943 were times of immense focus of tank development and production for both the Americans and the Germans. American medium tanks M3 and M4 Sherman witnessed combat in North African theatre of the war, and at initial stages of their appearance, they performed quite well. When the Germans started up-gunning their panzers and introduced heavy panzer Tiger, it was observed that both tanks, with M3 being a stopgap solution, were frighteningly ineffective against panzers. On the other hand, Germany's focus on armored warfare changed drastically at the Eastern Front, after its panzers were deemed to be outmatched by the Soviet tanks. Germany's panzer industry focused on up-gunning its existing panzers and developing new panzers, specifically heavy ones, that possessed thick armor and powerful tank guns with good penetration.

Operation Citadel

In the aftermath of Operation Barbarossa, Germany's next offensive *Fall Blau* (Case Blue) in 1942 faltered. The German AGS failed to capture the oilfields in the Caucasus region and the German 6th Army could not capture the city of Stalingrad. By the end of January 1943, the 6th Army surrendered, and AGS was pushed back from the west of the Don River. The Soviet offensives were held back by Field Marshal Manstein's counteroffensive. Operations on both sides ceased by the end of March 1943, due to spring mud season, Soviet logistics lines spreading too wide, and Germans last offensive to hold back Soviet offenses and establish a new line. The final outlook by the start of April 1943 was, a salient was formed at Kursk in Russia.

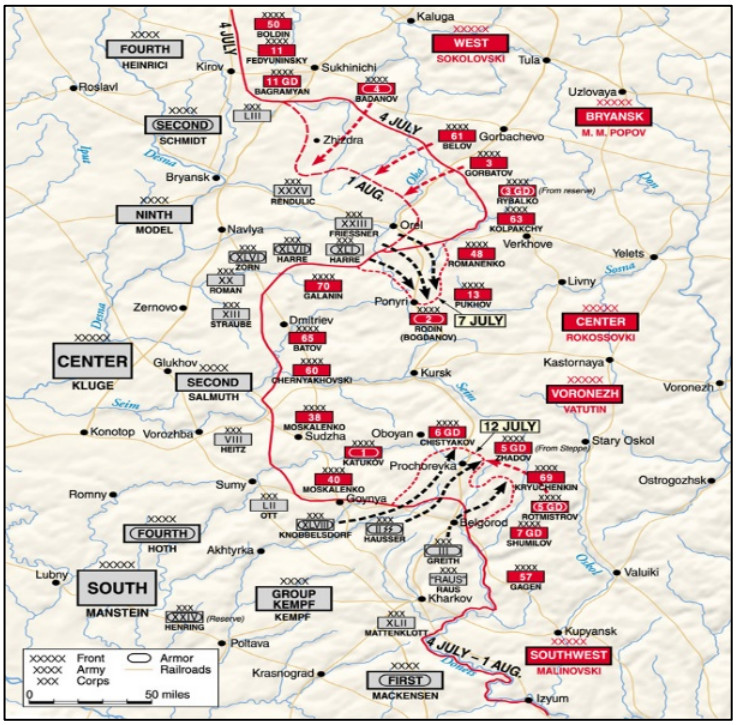

Figure VII: The Battle of Kursk Map
Source: https://warfarehistorynetwork.com/2016/09/02/the-battle-of-kursk-showdown-at-prokhorovka-and-oboian/

Since Wehrmacht had suffered tremendous losses in 1941 and 1942, along with its Axis allies, it could not conduct a huge scale offensive in 1943. A smaller operation was to be conducted and the salient in Kursk was chosen as the next operation's main target. At Kursk salient "the front lines bent westward, forming a Soviet bulge that was 250 kilometers from north to south and 160 kilometers from east to west. If the Germans could pinch this salient off by attacking at the northern and southern shoulders, they could destroy a large concentration of Red troops, shorten their lines, and free up reserves for future actions."[147] The Soviets defended the salient with two army fronts. The Central Front and Voronezh Front with five rifle armies defended this front, and they had eighteen hundred tanks.[148] The German plan was, to encircle

[147] Glantz, House, *When Titans Clashed: How the Red Army Stopped Hitler,* 209.

[148] Showalter, *Armor and Blood,* chap. 2 Preparations sec. II.

these armies from north and south and close the salient at Kursk, and thereby deal a big blow to Soviet Red Army. An operation to attack the battered Soviet forces in Kursk salient was requested by the commanders in the field. It had to be conducted in April or early May, but it was postponed. "The reason for the postponement of the operation was to wait for the arrival of new Pz. V Panther and more Pz. VI Tigers. With these new and heavy panzers, the time allowed for Soviets to build up defensive fortifications would be offset, as these panzers would overcome the Soviet defenses."[149]

For the operation, Wehrmacht mustered two main armies and one army detachment. In the north, "9th Army of AGC had 6 panzer divisions and 1 *panzergrenadier*[150] division, fielding 599 panzers, 299 assault guns, and 90 Ferdinand tank destroyers. In the south, AGS deployed the 4th Panzer Army with Army Detachment Kempf to its right. It had five panzer divisions, four panzergrenadier divisions, and could deploy 1377 operational fighting vehicles."[151] When Operation Citadel started on 5 July 1943, the German forces encountered a Soviet defense line of maze of ditches, tank-traps, wire obstacles, anti-tank fronts, minefields, strongpoints with build-in cannons.[152] In the north, Model's 9th Army could not achieve a major breakthrough at the Soviet lines because Model sent his infantry first rather than concentrating all of his panzers. Despite heavy Soviet artillery fire and the failure to break through the Soviet defenses,

[149] Raus, *Panzer Operations,* 211.

[150] *Panzergrenadier* is a term to define the mechanized infantry units in German army.

[151] Karl Heinz Frieser, Klaus Schmider, Klaus Schönherr, Gerhard Schreiber, Krisztián Ungváry, and Bernd Wegner. *Germany and the Second World War Volume VIII The Eastern Front 1943–1944: The War in the East and on the Neighbouring Fronts.* (Oxford: Oxford University Press, 2017), 87,91.

[152] Ibid., 102.

Model sent 90 Ferdinand tank destroyers regardless. However, 33 Ferdinand tank destroyers out of 45 were fit for combat by day's end, most of them damaged by mines.[153] On the same day Tigers of s. Pz. Abt. 505 destroyed 42 T-34 tanks after crossing Oka River, reaching as far as Butyrki.[154] This allowed the Germans to breach the first line of defense and were able to penetrate only a few kilometers. On 6 July, Tigers of the 9th Army were able to fend off the Soviet counterattack. Tigers of s. Pz. Abt. 505 knocked off 46 tanks out of 50 of a Soviet tank brigade, comprised of T-34s, T-70s and T-60s in a few minutes.[155] The success of Tiger depended on the panzer's firepower, armor, and crew. T-34 was vulnerable to Tiger's 88 mm gun and could be hit at 2000 meters, when the higher velocity *Panzergranate 40* ammunition was used. The average range at which Soviet tanks were defeated at Kursk, was between 1500-2000 meters.[156] From 7 July to 10 July, the 9th Army's main objective, its *schwerpunkt* (main effort) was Ponyri and Olkhovatka. On 7 July, the Soviets dug in their tanks, using them as anti-tank guns, and the panzers could not be effective under heavy artillery and anti-tank fire. Despite inflicting serious casualties on 2nd and 20th Panzer Divisions, the Soviet 16th Tank Corps and 19th Tank Corps had to write-off 35 and 49 tanks respectively, against 8 panzer write-offs by 2nd Panzer Division on 7 July 1943.[157] The 9th Army's attack on 10 July towards Olkhovatka, using all its panzers available and in close formation ended in failure as the German attack was halted by

[153] Showalter, *Armor and Blood,* chap. 3 Strike, sec. I.

[154] Wolfgang Schneider, *Tigers in Combat I.* (Mechanicsburg: Stackpole Books, 2004), 224.

[155] Showalter, *Armor and Blood,* chap. 3 Strike, sec. I.

[156] Healy, *Zitadelle,* chap. 3 Chariots of Fire – Tanks at Kursk, sec. 26 Armor and Firepower.

[157] Roman Töppel, *Kursk 1943 The Greatest Battle of the Second World War*. (Warwick: Helion&Company, 2018), chap. 2 The Bulge of Fire, sec. The Attack of the Ninth Army on Kursk. Epub edition.

the Soviets. Due to Model's restrained approach towards using his panzers in full force, 9th Army's armored vehicle loss was only 63 by July 11 and throughout the Operation Citadel, relatively low 77 losses occurred, whereas 526 losses on Soviets' side.[158] The attacks by the Soviets on 9th Army's rear on 12 July and the relatively low number of panzers and AFVs available for 9th Army, forced Model and his commanders to accept the failure of Operation Citadel and put the army in defensive formation.

Figure VIII: Picture of a Tiger, Panther, and Panzer at the Battle of Kursk
Source: https://i.pinimg.com/originals/bd/54/2f/bd542f4968b331f20270c36c43089dd1.jpg

The main force of Wehrmacht was in the south of Kursk salient. Hoth's 4th Panzer Army was comprised of the 48th Panzer Corps with two panzer divisions and the elite panzergrenadier *GrossDeutschland* Division, 2nd SS Panzer Corps constituted of *1st Leibstandarte Adolf Hitler, 2nd Das Reich, 3rd Totenkopf* SS panzergrenadier divisions. Army Detachment Kempf had 3rd Panzer Corps with three panzer divisions. The number of panzers these divisions had in their inventory on 4 July 1943 were, 1132

[158] Frieser et al., *Germany and the Second World War,* 111.

panzers, Pz. III, Pz. IV, Pz. V Panther, and Pz. VI Tiger models. 836 of these panzers were the upgraded Pz. III and Pz. IV with longer 75 mm guns. SS panzergrenadier divisions and *GrossDeutschland* had more panzers than the others, with *GrossDeutschland* having 305.[159] 200 Panthers which were brought to the Eastern Front, were deployed in independent panzer battalions, they were to be the game changers in this battle. However, Panther had shown that it had teething problems before the assault. On 4 July, when Panthers reached the assembly area, two Panthers were destroyed by engine fires on the short road march, and 18 others broke down.[160] The attack of the 4th Panzer Army commenced with 184 Panthers. 4th Panzer Army's strongest division was the *GrossDeutschland* Division. On 5 July 1943, the attack began, however, the Germans failed to observe the heavy Soviet defense fortifications on this sector. Panthers of the division got stuck in muddy marshes and were immobilized by uncleared minefields. No fewer than 36 Panthers blundered in the attack, and they became the main targets of Soviet anti-tank guns. As per orders, the trapped Panthers maintained their fire, using High Explosive shells against Soviet fortifications and later, armor piercing rounds against American Lend-Lease M3 Lee tanks, which were easily destroyed over the range of 2000 meters. American M3 tanks were labeled by the Soviets as "a grave for seven brothers".[161] Although this was a single incident, this also manifested that American M3 tanks were not preferred by the Soviets, and they were not effective tanks against the panzers, especially new models.

[159] Healy, *Zitadelle,* chap. 7, sec. Appendix 1 German Army Order of Battle. These numbers exclude obsolete panzer models, and I excluded the number of other AFVs on the list.

[160] Forczyk, *Panther vs. T-34 Ukraine 1943,* 50.

[161] Healy, *Zitadelle,* chap. 4 The Battle of Kursk: 4 July – 11 July 1943, sec. 30 The Offensive Begins: Monday 5 July – Army Group South.

The next day panzers of 2nd SS Panzer Corps were able to break through the second line of Soviet defenses. Army Detachment Kempf responsible for guarding the right flank of the 4th Panzer Army, was delayed on the same day at Mikhailovka bridgehead south of Belgorod. Some Tigers of S. Pz. Abt 503 attached to Army Detachment Kempf were able to cross Donets River before the bridge was destroyed and the need for a pontoon bridge of 60 tons for Tigers to cross was needed. The effectiveness of Tigers of Pz. Abt. 503 varied on 5 July. 42 Tigers of s. Pz. Abt 503 were divided in three units, all attached to three different corps. Tigers of 2nd s. Pz. Abt. 503 were stuck in a minefield near Mikhailovka, whereas the Tigers of 3rd s. Pz. Abt 503 knocked out 34 counterattacking T-34s seven kilometers to southeast.[162] In the upcoming days of the battle until 11 July 1943, Army Detachment Kempf could not achieve breakthrough along heavily fortified Soviet defense lines.

The main German attack was delivered by the 2nd SS Panzer Corps at the south and penetration was achieved on 6 July. That specific date was particularly challenging for the Germans as the Soviets had done their utmost to halt the German breakthrough. 2nd SS Pz. Corps was tasked with capturing some hills and breaking the second Soviet defense line. The counterattack by the Soviets, using all the reserves of the Voronezh Front inflicted high panzer losses. On 6 July, the SS Panzer Corps was to report 110 AFVs as 'fallen out'. The 48th Panzer Corps registered 134 losses and the 4th Panzer Army for the opening two days of Operation Citadel, lost some 263 AFVs from all causes, which proved the strength of second defense line.[163] This outcome led to the

[162] Schneider, *Tigers in Combat I,* 125.

[163] Healy, *Zitadelle,* chap. 4 The Battle of Kursk: 4 July – 11 July 1943, sec. 32 Tuesday 6 July – Army Group South.

change of plans for the Germans. The 48th Panzer Corps, which was to carry the main thrust of the attack could not make fast progress like 2nd SS Panzer Corps, which had penetrated 25 km and reached Teterevino, Russia. The main thrust was then shifted northeast towards Prokhorovka.[164] On 7, 8, 9 July Soviet Voronezh Front Commander General Vatutin ordered his forces to counterattack to stop the German advance. German 4th Panzer Army faced seven Soviet tank and mechanized corps on 8 July. Strong resistance by 2nd SS Panzer Corps, especially by Das Reich division, claiming 190 tanks destroyed. In total Vatutin's formations lost 343 tanks and AFVs on 8 July, whereas only 20 write-offs for Hoth's 4th Panzer Army.[165]

4th Panzer Army's advance continued 9 July 1943. The situation of the 4th Panzer Army was down to 600 AFVs ready for action on 9 July, a forty per cent decrease since the start of the operation, and the army's spearheads were fifty miles away from Kursk, and almost a hundred from Model's 9th Army in the north.[166] Not all these losses were write-offs though, many panzers and other AFVs required maintenance and repairs due to mine damage, and anti-tank round damage. Despite these losses, the first units of the 4th Panzer Army reached the Psel River on 9 July, and on 10 July, the infantry crossed. The losses on the Soviet side were catastrophic. Tank units of the 6th and 7th Soviet Armies were destroyed in the first two days. By 10 July 1943, 1st Armored

[164] Frieser et al., *Germany and the Second World War*, 113.

[165] Töppel, *Kursk 1943,* chap. 2 The Bulge of Fire, sec. The Tank Battle at Prokhorovka, 12 July 1943.

[166] Showalter, *Armor and Blood,* chap. 3 Decisions, sec. I.

Army's 646 tanks and assault guns had shrunk to 100, whereas AGS had only lost 116 panzers and assault guns, despite fighting in adverse conditions.[167]

What followed these events was arguably the greatest or one of the greatest tank battles in history. The Battle of Prokhorovka on 12 July 1943 was a testament to imply how effective German panzers were at this stage of the war. SS LSSAH's advance on 11 July 1943, put them 2.5 km away from Prokhorovka in Russia. The railway between Kursk and Belgorod passed through this small town and its capture was important for the Germans. In the meantime, the Soviets prepared for an attack under the command of General Pavel Rostmistrov of 5th Guards Tank Army.

"On 11 July 1943, 2nd SS Panzer Corps had 339 operational AFVs in its inventory."[168] The distribution of panzers among three divisions were "50 panzers for LSSAH, 65 for Das Reich, 94 for Totenkopf."[169] The Soviets on the other hand, had far more tanks and AFVs than their German enemies. Rostmistrov's 5th Guards Tank Army possessed 838 operational fighting vehicles, of which 672 were engaged in fighting against LSSAH and Das Reich divisions on 12 July.[170]

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[167] Frieser et al., *Germany and the Second World War*, 117.

[168] Ben Wheatley, "Citadel, Prokhorovka and Kharkov: The armoured losses of the II SS Panzer Korps *Sonderverbände* during the battle of Kursk, July-August 1943," *Journal of Intelligence History*, DOI: 10.1080/16161262.2021.1889278, 4.

[169] Ibid., 10. These three SS panzergrenadier divisions, LSSAH, Das Reich and Totenkopf had respectively 96, 110, 133 panzers and AFVs, operational in their inventories on 12 July 1943. The majority of panzers available and operational in these divisions were Pz. III and Pz. IV.

[170] Frieser et al., *Germany and the Second World War*, 121-122.

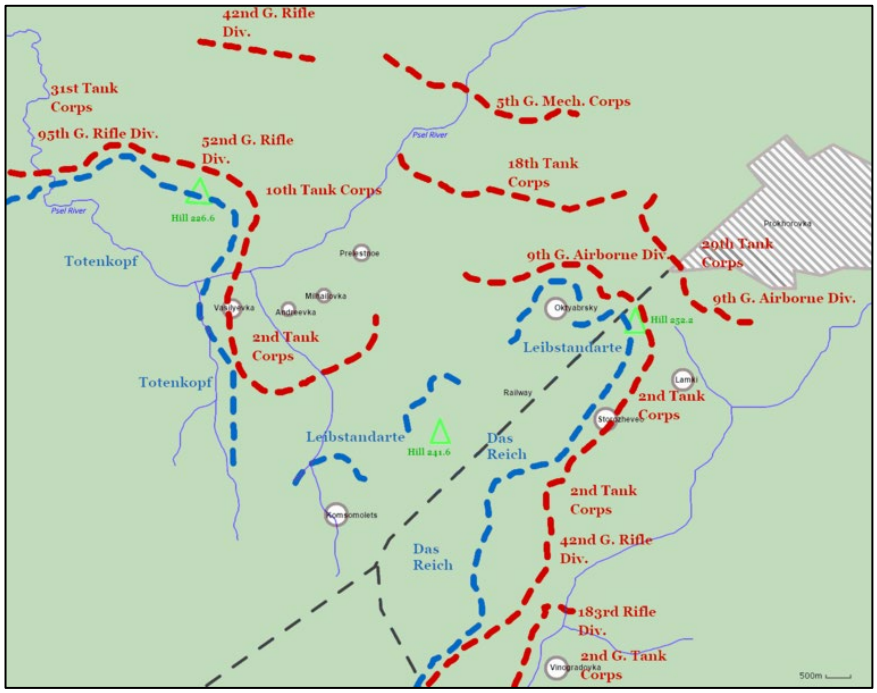

Figure IX: Situation around Prokhorovka on the night of 11 July 1943
Source:
https://commons.wikimedia.org/wiki/File:Prokhorovka,_Battle_of_Kursk,_night_11_July.png

The Soviets' objective was to destroy the whole 4th Panzer Army around the Prokhorovka region. The Soviets' attack started on the morning of 12 July. Rostmistrov's T-34 medium tanks attacked in waves towards Hill 252.2 against LSSAH's positions. First to react to the attack with panzers was SS *Obersturmführer* Rudolf von Ribbentrop[171]. "Ribbentrop rushed to Hill 252.2 with 7 Pz. IV, however four of those panzers were knocked out. Because the Soviet tank crews did not concern themselves with the remaining three panzers, von Ribbentrop managed to get back in German lines and he was credited with 14 Soviet tanks destroyed with his Pz. IV."[172] This also proves that Pz. IV, that were equipped with longer 75 mm gun could match

[171] Rudolf von Ribbentrop was a tank commander in Waffen SS. He was the son of German diplomat and Foreign Minister Joachim von Ribbentrop. *Obersturmführer* was a rank, considered equivalent of an *Oberleutnant* (Lieutenant or Senior Lieutenant) in Wehrmacht.

[172] Töppel, *Kursk 1943,* chap. 2 The Bulge of Fire, sec. The Tank Battle at Prokhorovka, 12 July 1943.

and destroy Soviet T-34 tanks; a huge indicator of how upgrades to Pz. IV made the panzer more effective, especially since Operation Barbarossa. One of the fatal mistakes made by the Soviets was to attack the German armored formations directly. Rostmistrov ordered tanks to attack head-on because he knew that Soviet guns were too weak to penetrate Tiger's front armor and he was convinced that SS Divisions had 110 Tigers at their disposal, whereas they only had 5 operational on 12 July 1943.[173] Despite possessing only five operational Tigers, they were quite effective in terms of knocking out Soviet tanks. A Tiger company and LSSAH knocked out 163 enemy tanks on 12 July, with one Tiger knocked out.[174] At the day's end, Soviet 5th Guards Tank Army could not achieve its mission and suffered huge losses in tanks. The Germans held onto their positions, not losing any ground.

Although tank losses at battle of Prokhorovka has been debated, the new findings provide clear evidence of German panzer losses. The maximum number of AFV losses the Germans suffered at Prokhorovka was 14, 16 if SS Totenkopf's losses are added to LSSAH and Das Reich's totals. 12 of those were total losses and 2 needed homeland maintenance.[175] The Soviet losses in tanks and AFVs were almost fifteen times more than the Germans. 235 Soviet tanks and AFVs were destroyed and written-off on 12 July 1943.[176] The low number of German panzer and AFV losses could be attributed to their positions at the battlefield. "The battle was largely fought by the Germans from

[173] Ibid., chap. 2 The Bulge of Fire, sec. The Tank Battle at Prokhorovka, 12 July 1943.

[174] Wolfgang Schneider, *Tigers in Combat II*. (Mechanicsburg: Stackpole Books, 2005), 86.

[175] Wheatley, "Citadel, Prokhorovka and Kharkov: The armored losses of the II SS Panzer Korps *Sonderverbände* during the battle of Kursk, July-August 1943," 40.

[176] Frieser et al., *Germany and the Second World War*, 130.

extremely strong defensive positions which meant that German armor was seldom in locations in which it could either be damaged or lost in great numbers."[177] The panzers' effectiveness at this stage of the war and at the battle of Prokhorovka, in terms of knocking out enemy tanks, could be attributed to their improved guns and firepower. They could easily take out enemy tanks at long ranges. This also indicates that priorities were beginning to change in German tank development, as with Panther and Tiger models, new panzers were robust with thick armor, higher firepower. Yet, they were heavier, slower than their former models.

After the Battle of Prokhorovka, on 13 July 1943 Operation Citadel was terminated by Hitler's order, citing the invasion of Sicily on 10 July 1943 by the Allies. Manstein wanted the 4th Panzer Army to continue its advance with Operation Roland on 14 July, but that operation failed as well. The Battle of Kursk continued up until late August 1943. The Germans had to go on the defensive as the Soviets counterattacked, eventually capturing Kharkov in August, and pushing the Germans way back.

German panzer losses during Operation Citadel were quite low. 252 panzers and AFVs were lost by both German armies. Model's 9th Army, up to 14 July and including, lost 41panzers, 17 assault guns, 19 tank destroyers. Total losses of AGS, up to 16 July and including, were 161 panzers, 14 assault guns and 10 Tigers.[178] On the other side, the Soviets' losses were devastating. The Soviets' total losses in tanks and AFVs were almost two thousand. From 5 to 15 July, the Central Front had written-off 526 tanks,

[177] Ben Wheatley, "Surviving Prokhorovka: German armoured longevity on the Eastern Front in 1943–1944," *Journal of Intelligence History*, DOI: 10.1080/16161262.2020.1750841, 19.

[178] Frieser et al., *Germany and the Second World War*, 150-151.

Voronezh Front 1223 tanks up to 13 July and including.[179] Although the Germans failed to achieve their objectives, the panzers proved themselves as super effective on the battlefield. Tigers and Pz. IV were quite remarkable the best panzers in Wehrmacht's inventory, as Tigers could outshoot any Soviet tank and Pz. IV could engage T-34 medium tanks at ranges between 800-1000 meters. Pz. V Panther failed to be the game-changer on the battlefield; however, with its powerful gun, it still proved useful. "Although the majority were in repair shops throughout Operation Citadel, few operational Panthers shot down 286 Soviet tanks by 15 July."[180] Out of 200 Panthers sent to the front before Operation Citadel, by 20 July 1943, 41 one of them were operational, 85 could be repaired by regimental maintenance units, 16 required homeland maintenance, 56 burned out and 2 were out of action before the operation.[181] Despite its subpar performance, Panther had a lot of potential to be an extremely effective panzer, once its teething problems were fixed. Its main gun's accuracy and penetrating ability were deemed good, as it could knock out enemy tanks between 1500-2000 meters, with one T-34 being knocked out at 3000 meters at one instance.[182]

The loss of the Battle of Kursk and failure of Operation Citadel had put the Germans in defense, as they lost the initiative to launch major offensives. Panzers of Wehrmacht, with varying performances, proved that they were and could be highly effective in knocking out enemy tanks. "The Tiger proved to be an excellent tank that

[179] Ibid., 152.

[180] Ibid., 158.

[181] Jentz, *Panzertruppen: 1943–1945*, 101.

[182] Ibid., 99.

could withstand many large caliber hits and still continue its mission. The low number of Tigers destroyed by direct enemy action is proof of its resilience. Though, the low operational rate may have contributed to its low number of Tigers destroyed in combat."[183] Pz. IV became one of the main medium panzers of Wehrmacht along with Panther. Although they had different guns, both of their 75 mm longer barreled guns could match any enemy tank on the field. On the other hand, von Mellenthin stated that; "armored formations of panzers should have never been engaged the deep anti-tank front, strengthened by large anti-tank minefields and armored forces."[184] This situation hindered panzers' effectiveness as they had to be constantly repaired due to mine, artillery, and anti-tank gun damage, and had to be put back to service as soon as possible. They could not be effective to achieve a breakthrough in the Soviet defense line, and therefore panzers did not achieve their missions. With a second front having opened in Italy in 1943 and the loss of the Battle of Kursk, the focus of Wehrmacht shifted to defense, thereby the focus in panzer development and production would be more defense oriented, emphasis placed on firepower and armor more than ever.

[183] Wilbeck, "Swinging the Sledgehammer: The Combat Effectiveness of German Heavy Tank Battalions in World War II," 69.

[184]F. W. Von Mellenthin, "Armored Warfare in World War 2: Conference Featuring F. W. von Mellenthin, General Major a.D., German Army" (Armored Warfare in World War 2 at Battelle Columbus Laboratories Tactical Technology Center, Columbus, Ohio, 10 May, 1979), 110.

4.1. A New Front

4.1.1. Tank Battles of Normandy

In July 1944, the Allied armies of the US, Great Britain and Canada invaded the mainland Europe with an amphibious assault by landing troops on Normandy coast of France. The forces of these Allied forces landed on the coast on 6 July 1944. A new front, which was called the Western Front was created. The Germans were planning for an Allied invasion. On 6 June 1944, ten panzer and panzergrenadier divisions were stationed in France and Belgium. Only the 21st Panzer Division was deployed in Normandy region, in the Caen area.[185] The Germans had more than 1600 panzers in total in its panzer divisions in the West. Majority of these panzers were Pz. IV and Panthers, respectively 758 and 655 in numbers.[186] The most common of Pz. IV models were the latest Ausf. J and Ausf. H.[187] On paper it seemed that the Germans were ready for an invasion and could even repulse it. However, this was not the case, because "the panzer divisions were dispersed around different areas of France, denying the possibility of a great defensive victory."[188] Another reason was the difference of opinions among the German generals as to where to deploy the panzers and panzer divisions. Rommel, who knew of the Allied air power supremacy unlike Guderian or General Geyr von Schweppenburg, commander of the Panzer Group West, favored the dispersal of panzers near and around the coasts of France, whereas the latter, disagreed

[185] Guderian, *Panzer Leader*, 331-332.

[186] Jentz, *Panzertruppen: 1943-45*, 177.

[187] Eric Lefevre, *Panzers in Normandy Then and Now*. (London: After the Battle Magazine, 1983), 20.

[188] Guderian, *Panzer Leader*, 332.

by adhering to the principles of armored forces.[189] These decisions hindered the combat effectiveness of the panzers and the overall impact of panzer divisions.

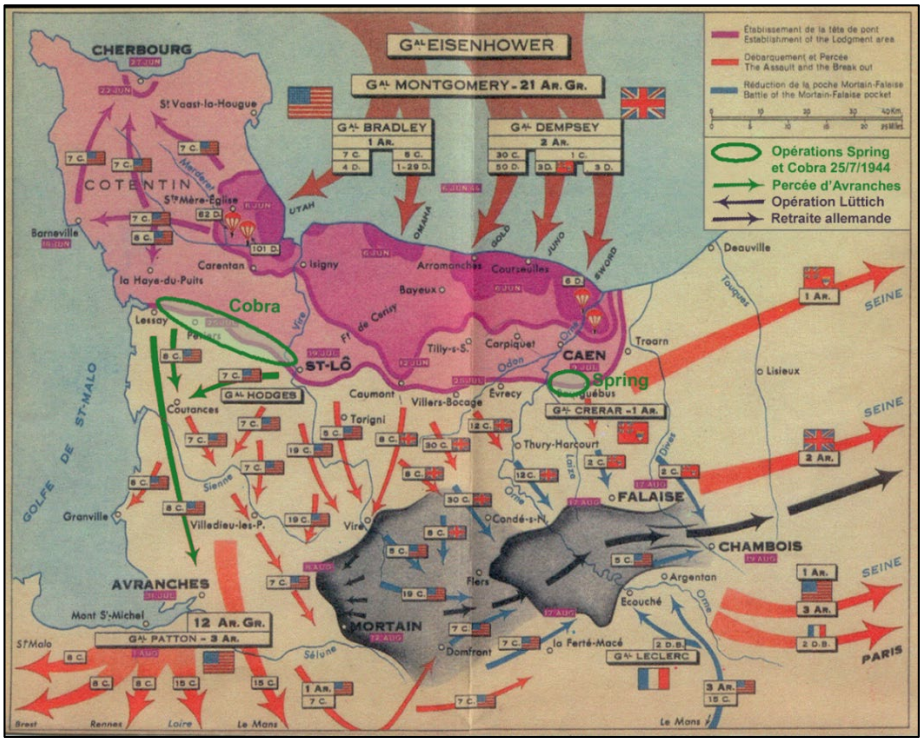

Figure X: Map of the Battle of Normandy and the operations
Source: https://commons.wikimedia.org/wiki/File:Bataille_de_Normandie-Cobra-Spring.png

The first German counterattack happened in the afternoon of 6 June 1944. Units of the 22nd Panzer Regiment of 21st Panzer Division attacked the British forces which landed at Sword beach. "Facing stiff resistance from the British tanks and anti-tank fire, the battle groups of the 22nd Pz. Regiment suffered 16 panzer losses at the end of the day and its attempts to mount a counterattack had been completely stymied."[190] One of the failures that prevented the panzers to be used effectively to repulse the invasion was the late response of the German command and the situation of panzer divisions. "It

[189] Hart, *Hitler'in Generalleri Konuşuyor,* 432.

[190] Georges Bernage, *The Panzers and the Battle of Normandy, June 5th–July 20th, 1944*. (Bayeux: Heimdal, 2000), 9-10.

was not until the afternoon, when it gradually became apparent how successful the Allies had in fact been on the coast, that Hitler and his Wehrmacht command decided at least to release units stationed south-west of the Seine (12th SS-Panzer Div., Panzer-Lehr Div., and I SS-Panzer Corps staff). Yet their deployment could not be expected until 7 June at the earliest, because they were too far away (80 to 150 km), and the Allied air forces made it well-nigh impossible for them to move in daylight."[191]

The next day, on 7 June 1944, elements from the 12th SS Panzer Division *Hitlerjugend* (Hitler Youth) arrived Caen. The British and the Canadians' goal was to move eastwards and capture the city of Caen. The advance of the British and the Canadians was stopped by the panzers of the Hitlerjugend Division. A Canadian vanguard of the 2nd Canadian Armored Brigade engaged 12th SS Panzer Regiment comprised of Pz. IV. At the end of the attack they lost 28 Sherman tanks. The 12th SS lost only six Pz. IV.[192]

On 9 June 1944, with the arrival of Panzer Lehr Division on 8 June 1944, the Germans counterattacked to recapture Bayeux. Yet the Allied aircraft soon got involved, and a Canadian counterattack drove a wedge between the Panzer Lehr and the Hitlerjugend.[193] Sherman tanks of the 6th Canadian Armored Regiment halted the German counterattack. A Sherman Firefly tank managed to knock out 5 Panthers with

[191] Horst Boog, Gerhard Krebs, Detlef Vogel, *Germany and the Second World War Volume VII The Strategic Air War in Europe and the War in the West and East Asia, 1943-1944-1945*. (Oxford: Oxford University Press, 2006), 593.

[192] Yves Buffetaut, *German Armor in Normandy*. (n.p.: Casemate, 2018), 81.

[193] Ibid., 86.

five shots.[194] Sherman Firefly tank was the solution the British found for the ineffective 75 mm gun of M4 Sherman. The British 17 pounder (76 mm) anti-tank gun could penetrate even the heavy German tanks. General Bradley wanted these guns to be mounted in American M4 Sherman as well, but Field Marshal Bernard Montgomery's reply was "that ordnance in England was overloaded on British orders."[195] The search for a better tank gun was a continuous issue in the US Army. During the initial fighting stages of Normandy, nearly all medium tanks in the US armored divisions were the 75 mm M4 and M4A1 Sherman. The constant fighting against Panthers necessitated the 76 mm gun, which was being mounted on Shermans in early 1944, therefore the demand was increasing for it.[196]

By 10 June 1944, the Germans could not launch their counteroffensive to repel the Allies and the British continued pushing towards Caen. The destruction of the headquarters and the chief of staff of Panzer Group West on 10 June by the Allied bombers aborted the three panzer division counterattack and forced the panzers to be put on defensive.[197] The British attack towards Caen was once again checked at Villers-Bocage. The heavy panzer battalions arrived Caen on the evening of 12 June, and on 13 June 1944, Tigers of s. Pz. Abt. 501 and panzer of Panzer Lehr Division managed halt the advance of the British 7th Armored Division's leading brigade. "The decisive portion of this battle was the virtually single-handed attack made by First

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[194] War Diary of 6 Canadian Armored Regiment by Lieutenant-Colonel F.E. White, 1944, RG 24-C-3 Volume 14213; Microfilm Reel T-12657, RG 24 The Department of National Defence Fonds, Laurier Military History Archive, Waterloo, Ontario, Canada.

[195] Bradley, *A Soldier's Story*, 323.

[196] Zaloga, *US Armored Divisions: The European Theater of Operations, 1944-1945*. (New York: Osprey Publishing, 2004), 26,27.

[197] Buffetaut, *German Armor in Normandy*, 86.

Lieutenant Michael Wittmann, the commander of the 2d Company. During this attack, he destroyed the lead British tank and infantry companies, the regimental headquarters element, and portions of the second tank company."[198] Wittman with his Tiger tank, managed to knock out 15 tanks, 4 of which were Shermans and hit 6 more tanks, whose crews had to abandon them.[199] At the end of the day, the British lost 27 tanks, including 4 Sherman Fireflies, and 28 other AFVs, whereas the Germans' losses were 6 Tigers and 2 Pz. IV.[200] The durability of the heavy Tiger panzers and their firepower made them so effective that they prevented an armored divisions advance by themselves.

A stalemate occurred after the battle at Villers-Bocage, which continued until 26 June 1944. Between 26 June and 30 June 1944, the British assaulted towards the hills near Odon River in France, as part of Operation Epsom. The four-day fighting was a failure for the British, however, the damage done to the panzers were hard. Out of approximately the 400 panzers committed to the battle, no more than 302 panzers were available for the panzer divisions deployed, and the Germans' last chance to regain tactical initiative also disappeared.[201]

On 3 July 1944, 537 tanks of the Allies claimed to have been destroyed by the Germans were compiled, and nearly half, 227 of them were destroyed by the panzers. The losses in numbers between 6 June 1944 to 8 July 1944 were 324 in total, with 197 being Pz.

[198] Wilbeck, "Swinging the Sledgehammer: The Combat Effectiveness of German Heavy Tank Battalions in World War II,", 96.

[199] Jentz, *Panzertruppen 1943-45*, 182.

[200] Bernage, *The Panzers and the Battle of Normandy, June 5th–July 20th, 1944*, 92-93.

[201] Buffetaut, *German Armor in Normandy*, 97.

IV, 112 Panther and 15 Tigers.[202] Despite these number of losses, the Allies still feared the German panzers.

> At the end of June the apparent superiority of German tanks seemed particularly serious. Searching for evidence of a forthcoming enemy counterattack against the Allied foothold, Allied intelligence estimated that 230 Mark IV, 150 Mark V (Panther), and 40 Mark VI (Tiger) tanks faced the Allies. To these could be added the tanks of three elite divisions assembling one hundred miles west of Paris-about 200 Mark IV, 150 Panther, and 80 Tiger tanks. These constituted a sizable armored force, especially if, as seemed likely, the Germans were to employ them in a massive counterattack.[203]

During the first three weeks of the invasion, on the western part of Normandy, at Cotentin peninsula, the Americans were busy trying to capture Carentan. On 12 June Carentan fell to the Americans and the two beachheads were firmly united.[204] The area where the Americans fought, the south of Cotentin peninsula, was known for its hedgerows called "bocage" which were created to protect the fields from harsh winds of the Atlantic Ocean. These hedgerows could grow to be as tall as three meters and proved to be a death-trap for the Americans.[205] The bocage provided the Germans with natural defensive positions, and made the American Shermans as easy targets, because they could not breach the tall hedgerows and when they surmounted the smaller ones, they exposed their belly armor making them easy targets for the German anti-tank

[202] Jentz, *Panzertruppen 1943-45*, 185.

[203] Martin Blumenson, *Breakout and Pursuit*. (Washington, D.C.: Center of Military History United States Army, 1961), 45-46.

[204] Max Hastings, *Overlord: D-Day and the Battle for Normandy*. (London: Pan Books, 2015), 197.

[205] Belton Cooper, *Death Traps: The Survival of an American Armored Division in World War* II. (New York: Ballantine Books, 2003), chap. 1 Reflections, sec. The *Bocage* and the Hedgerows.

fire.[206] Because the bocage county was ill-suited for tank operations, the Americans tanks faced mostly the German assault guns, anti-tank guns and no major clash with panzers occurred until early July, near the Vire River against the Panthers of Panzer Lehr Division.[207]

After the capture of Cherbourg on 26 June 1944, the Allies secured an important port to receive supplies. "The Allies' main objective, after taking Cherbourg, was however to create suitable conditions for breaking out from the Normandy bridgehead as quickly as possible. Their next tactical aims were to take over the important towns of St-Lo (US sector) and Caen (British-Canadian sector), because the beachhead had now become too small for the continual inflow of troops."[208] To capture these two strategic locations, the Allies launched Operation Goodwood and Operation Cobra on 18 and 25 July, respectively. For Operation Goodwood, the British assembled more than 1000 tanks distributed among three armored divisions.[209] However, the Germans had intelligence of the British plans to assault and had prepared defensive pattern comprised of three lines.[210] The outcome of this operation showed again that at this stage of the war, the German panzers with their long-barreled guns and high firepower, were still deadly weapons on the battlefield. At Cagny sector, the panzers of the 21st Panzer Division and Tigers of s. Pz. Abt. 503 along with 88 mm flak guns destroyed

[206] Zaloga, *Armored Thunderbolt The U.S. Army Sherman in World War II*. (Mechanicsburg: Stackpole Books, 2008), chap. Bocage Buster, sec. Hedgerow Hell. Epub Edition.

[207] Ibid., chap. Bocage Buster, sec. Hedgerow Hell.

[208] Boog et al., *Germany and the Second World War Volume VII*, 600.

[209] Bernage, *The Panzers and the Battle of Normandy, June 5th–July 20th*, 138

[210] Ibid., 138-139.

40 Sherman tanks of 29th Armored Brigade.[211] The 11th Armored Division lost 126 tanks on 18 July 1944, between the fighting at Cagny and Bourguebus Ridge.[212] Operation Goodwood ended on 20 July after failing to achieve a breakthrough in German lines. The British lost 400 tanks, which was 36 per cent of their armored strength in France; however, the immense Allied reserves quickly replaced the tank losses within 36 hours.[213] On the other side, despite losing three times less than their enemies, the Germans losses were around 130 panzers for three panzer divisions and one heavy panzer battalion and unlike the British, they could not replace these losses.[214]

Operation Cobra was the Americans' attempt to break out of the hedgerow country along the Normandy coast and swing south to the open terrain.[215] "While Montgomery was being held in check in Operation *Goodwood*, the Americans were preparing to strike a decisive blow."[216] The Germans had very few panzers at northwest France. Panzer Lehr Division had 80 panzers by 23 July, of which 16 Panthers and 15 Pz. IV were operational, and the 2nd SS Panzer Division Das Reich had 37 Pz. IV, 41 Panthers and 25 assault guns.[217] The Americans had ten times more tanks than their enemies. At the start of Operation Cobra, the US First Army had 1269 M4 Sherman, 694 M5A1

[211] Buffetaut, *German Armor in Normandy*, 107.

[212] Ibid., 107.

[213] Hastings, *Overlord*, 304.

[214] Buffetaut, *German Armor in Normandy*, 110.

[215] Zaloga, *US Armored Divisions*, 51.

[216] Buffetaut, *Allied Armor in Normandy*. (n.p.: Casemate, 2018), chap. Caen: From Stalemate to Breakthrough, sec. Operation Cobra. Epub Edition.

[217] Zaloga, *Operation Cobra 1944: Breakout from Normandy*, (New York: Osprey Publishing, 2001), 22-23.

light tanks dispersed among three armored divisions and separate tank battalions.[218] The operation began on 25 July 1944, with the air bombing of the Allies and the bombing continued the next day. The Panzer Lehr Division, with the quickly repaired ones included, could only put 28 panzers in the field by 27 July, after the Allied air bombardment.[219] The German panzers could do nothing to be combat effective during this operation, because the Allied air superiority wiped out the panzers. This was evident when the Allied airplanes destroyed huge number of panzers and AFVs at Roncey Pocket. At Roncey, the bulk of the 2nd SS Panzer Division and 17th SS Panzergrenadier Division was trapped and on 29 June 1944, the Allied P-47 planes attacked about 500 vehicles jammed together, causing the destruction, and abandoning of 122 panzers, 259 other vehicles.[220] The pocket in Roncey was caused by the swift movement of the 4th and 6th US Armored Divisions along the coastline and the capture of the town of Coutances. The German forces tried to escape the encirclement, but they could not. By the end of July 1944, the German forces and panzer divisions were crippled, and the American armored divisions were rolling towards the south. By 1 August 1944, the German Seventh Army's panzer divisions only had 32 operational panzers in their inventory.[221] For the US 2nd Armored Divisions, the losses were relatively low with only 45 tanks lost between 26 and 31 July.[222]

[218] Ibid., 30.

[219] Lefevre, *Panzers in Normandy*, 94.

[220] Zaloga, *Operation Cobra*, 50.

[221] Zaloga, *Panzer IV vs Sherman France 1944*. (Oxford: Osprey Publishing, 2015), 69.

[222] Ibid., 70.

During the first two months of the invasion, most of the tank combats and therefore the losses took place on the eastern part of Normandy. Montgomery's 21st Army Group fielded 550 Churchills, 2300 M4 Shermans and 175 Sherman Fireflies, whereas the US First Army only had 765 Shermans at the end of June 1944.[223] M4 Sherman losses constituted about 67 per cent of all the Allied tank losses, with 1141 of them lost during the first two months.[224] Despite these huge numbers of tanks, tank-to-tank combat was sporadic, and was limited to little skirmishes most of the time, involving fewer than five tanks on either side. Though, the Americans deployed armored divisions and huge number of tanks at Operation Cobra, their impact in terms of tank-to-tank combat was limited.[225]

On 6 August 1944, the Germans initiated Operation Lüttich (Liege) to cut off the American 3rd Army from the rest of the Allies. "Tactically, the German plan was simple: to attack from both sides of Mortain and charge on Avranches, with the support of around 300 fighter aircraft. Once the breakthrough was complete and the troops reached the sea, a solid front would be established to the north."[226] For the attack, a total of about 120 panzers and 32 assault guns were available.[227] The German counterattack was held by the American ground forces and the Allied air force. The attack on Mortain was costly for the Germans. The panzers could not penetrate the

[223] Zaloga, *Armored Thunderbolt*, chap. Bocage Busters, sec. Ronson Lighters.

[224] Zaloga, *Panzer IV vs Sherman France 1944*, 71.

[225] Ibid., 72.

[226] Buffetaut, *German Armor in Normandy*, 119.

[227] Zaloga, *Operation Cobra*, 69.

American lines, and the Germans had abandoned over 100 panzers on the battlefield of Mortain.[228]

After the failure of Operation Lüttich, the German 7th Army and former Panzer Group West now Fifth Panzer Army was encircled by the Allies in a pocket around Falaise. The Allies linked up on 19 August 1944 at Chambois on the east of Falaise. On 21 August, the pocket was closed, and the Allies dealt a crushing blow to the Germans. Despite securing a narrow corridor towards the east and managing the escape of a great number of soldiers, the Germans lost 344 panzers and 2447 other vehicles.[229] The panzer divisions were in a desperate shape on 21 August 1944.

> The shape that the Panzer-Divisions were in was reflected in the Panzer operational status report for the evening of 21 August 1944: 10. SS-Pz.Div. - No Panzers, 12. SS-Pz.Div. - 10 Panzers, 1. SS-Pz.Div. - No report, 2. Pz. Div. - No Panzers, 2. SS-Pz.Div. - 15 Panzers, 9. SS-Pz.Div. - 20 to 25 Panzers, 116. Pz.Div. 12 Panzers, 21. Pz.Div. - Still in combat.
>
> British examination of 223 Panzers captured from 8 to 31 August 1944 revealed the cause of their loss as 24 by armor-piercing shot, 1 by hollow charge projectiles, 4 by artillery high explosive shells, 7 by rocket projectiles from aircraft, 1 by cannon from aircraft, 2 by bombs, 108 destroyed by crew, 63 abandoned, and 13 due to unknown causes.[230]

The closure of Falaise Pocket signaled the end of Battle of Normandy. The Allied forces continued their push to the east towards Germany. “The battle for Normandy had cost the German Army a total of 1500 tanks, 3500 guns and 20000 vehicles.”[231] Based on the claims of the Americans and the British, panzer losses from D-Day to

[228] Hastings, *Overlord*, 373.

[229] Boog et al., *Germany and the Second World War Volume VII*, 612.

[230] Jentz, *Panzertruppen 1943-45*, 190.

[231] Hastings, *Overlord*, 408.

August 1944 were 1088, whereas the Allied tank losses between 6 June-5 August 1944 were 1689, thousand less than the German claim of 2771.[232] Despite failing to prevent the Allied advance, the German panzers maintained their superiority in tank-to-tank combats. A British analysis of the knocked-out Allied tanks found out that, out of the 45 tanks analyzed 40 were shot with an armor-piercing round, with 82 per cent of those shots coming from 75 mm guns, and the average number of hits to knock out a Sherman was 1.63.[233] Besides the anti-tank guns, this is an indicator that Pz. IV and Panthers were superb panzers, that can easily deal with and knock-out the Allied tanks.

Table I: Sherman Tank Casualties Analysis
Source: *Montgomery's Scientists: Operational Research in Northwest Europe: The Work of No. 2 Operational Research Section with 21 Army Group June 1944 to July 1945*, 395.

Analysis of Sherman Casualties		
(i) Total tank casualties analysed:	45	
	Proportion of total tanks	
(a) Number penetrated by German AP shot	40	89%
(b) Number mined	4	9%
(c) Number damaged, unidentified but "brewed up"	1	2%
(ii) Total "Brewed up"	37	82%
(a) Number penetrated by shot and "brewed up"	33	73%
(b) Number mined and "brewed up"	3	7%
(c) Number "brewed up" by unknown causes	1	2%

The Panther in encounters with the American M4 Sherman in bocage country was not incredibly effective. Panzer Lehr Division's commander General Fritz Bayerlein stated that the American 57 mm anti-tank guns could penetrate the side armor of Panthers, and Panther, due to its long gun barrel, width and high silhouette was an easy

[232] Zaloga, *Panzer IV vs Sherman France 1944*, 71-72.

[233] *Montgomery's Scientists: Operational Research in Northwest Europe: The Work of No. 2 Operational Research Section with 21 Army Group June 1944 to July 1945,* Terry Copp, ed. (Ontario: Laurier Centre for Military Strategic and Disarmament Studies, 2000), 395-396.

target, and unlike Pz. IV and Sherman, it lacked the maneuverability in bocage country and villages to effectively fight.[234] When the Americans deployed the 76 mm gunned M4A1 at Operation Cobra, even they proved to be ineffective guns. Both M4 and M4A1 Shermans were outgunned by Panthers, whose muzzle velocity was 3300 feet per second (1000 meters per second), and even at times the Pz. IV.[235] This advantage in firepower should have provided the panzers with an edge on the battlefield; however, the tank-to-tank combats were sparse in the American sector of Normandy. Most of the tank combats took place in the British and the Canadian sector, in the east of Normandy, where the terrain was more open. This allowed panzers to engage the Allied tanks at long ranges, as they had the advantage. Short distances in bocage country required tactical maneuverability, limiting the technical aspects. The Allied air supremacy over France also hindered panzers' effectiveness. The panzers could not easily move in daylight and therefore were regularly late at arriving the intended locations. The destroyed rail-network of France also slowed the deployment of panzers. The Allied tanks' main advantage was their numbers. As General Bradley stated, "our tank superiority devolved from a superiority in the number rather than the quality of tanks we sent into battle."[236] The Germans did not have this numerical superiority. Because the German factories were targeted and bombed by the Allied planes, the German Armaments Minister Albert Speer had to cut down on spare parts production to maintain or increase the panzer production, causing a lack of spare

[234] Zaloga, *Armored Thunderbolt*, chap. To Paris and Beyond, sec. Taming the Panther.

[235] Cooper, *Death Traps: The Survival of an American Armored Division in World War II*, chap. 2 First Combat, sec. Tragic Inferiority of M4 Sherman Tank.

[236] Bradley, *A Soldier's Story*, 323.

parts.[237] Guderian, pointed out to Speer, that if they could have supplied the armies with sufficient spare parts, panzers could be repaired faster, cheaper and more panzers would be available on the battlefields.[238] The failure to address this factor throughout the war, prevented the Germans from fielding more panzers at Normandy to affect the outcome of the campaign.

4.1.2. The Battle of the Bulge

On 16 December 1944, the German Army had 806 operational panzers and variants in its inventory in the West.[239] 600 of these were panzers and they were accumulated in two panzer armies, the Sixth Panzer Army, and the Fifth Panzer Army.[240] The Germans launched an attack on the Ardennes to cut off the British and the American armies by reaching the port city of Antwerp, Belgium. This attack was spearheaded by these two panzer armies.

[237] Zaloga, *Armored Thunderbolt*, chap. To Paris and Beyond, sec. American Firefly Deferred.

[238] Albert Speer, *Inside the Third Reich*. (New York: Simon and Schuster, 1997), 234.

[239] Jentz, *Panzertruppen 1943-45*, 202.

[240] Bradley, *A Soldier's Story*, 459.

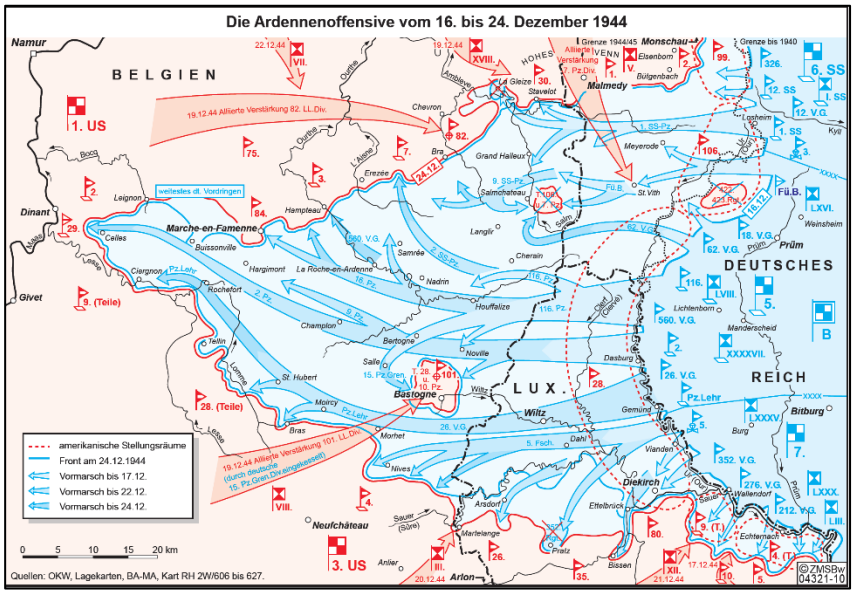

Figure XI: Map of the Ardennes Offensive or the Battle of the Bulge
Source: OKW, Situation maps, BA-MA, Kart RH 2W/606 to 627 - https://m.bpb.de/

The Americans did not have many tanks in the Ardennes, as this region was dubbed the "ghost front", as there was almost no combat here, and the American forces only had separate tank battalions attached to infantry divisions.[241]

The Germans' initial attacks with panzers allowed them to penetrate the American lines, The 12th SS Pz. Division had a hard time at Krinkelt-Rocherath, as its panzers engaged in a series of close-range battles.[242] "The 12th SS Panzer Division "Hitler Youth" lost 67 of its 136 tanks in the first three days of the battles for Krinkelt and Rocherath."[243] The Germans managed to capture St. Vith, Belgium on 21 December 1944 after 5 days of the operation and managed to besiege the town of Bastogne,

[241] Zaloga, *Armored Thunderbolt*, chap. 8 Armored Superiority in the Ardennes

[242] Zaloga, *Armored Attack 1944 U.S. Army Tank Combat in the European Theater From D-Day to The Battle of the Bulge*. (Mechanicsburg: Stackpole Books, 2011), chap. 11 The Battle of the Bulge Begins. Epub Edition.

[243] Samuel W. Mitcham, *Panzers in Winter: Hitler's Army and the Battle of the Bulge*. (Westport: Praeger Security International, 2006), 73.

Belgium. One of the key problems hampering the panzers from making fast progress was the lack of fuel. General von Manteuffel stated that OKW had promised sufficient fuel for the assault to continue; however, their promise was based on wrong calculations.[244] One of the examples of the lack of fuel situation was when the 2nd SS Panzer Division's advance stalled and its 134 panzers and assault guns were immobilized on the third day of the assault.[245] Unlike the panzers in 1940, the panzers of Wehrmacht in late 1944 were far heavier and slower than their predecessors. The heavy panzer battalions were fitted with Panzer VI Ausf. B or Tiger II. Just like its predecessor, Tiger II had an upgraded version of 88 mm gun, weighed 68 tons due to its 180 mm heavy armor in the front.[246] Tiger II was slow and mechanically unreliable for such an operation that required speed. The hilly terrain of the Ardennes did not make it easy on these beasts as well, because the soft surfaced, narrow roads were insufficient for such heavy vehicles.[247]

The farthest the Germans reached during the offensive was on 23 December 1944, when the elements of the 5th Panzer Army reached Celles, France, which was 7 km away from the Meuse River.[248] The Ardennes Offensive was a desperate attempt from the beginning, and by the end of the first week of the operation, it stalled. The panzers of the 6th and 5th Panzer Armies, which should have spearheaded the assault did not

[244] Hart, *Hitler'in Generalleri Konuşuyor*, 497.

[245] Mitcham, *Panzers in Winter*, 117.

[246] Peter Chamberlain, Hilary Doyle, *Encyclopedia of German Tanks of World War II*, ed. Thomas L. Jentz. (London: Arms and Armour Press, 1994), 142.

[247] Wilbeck, "Swinging the Sledgehammer: The Combat Effectiveness of German Heavy Tank Battalions in World War II," 101.

[248] Boog et al., *Germany and the Second World War Volume VII*, 691.

even cross the Meuse River. Without fuel panzers turned into static anti-tank weapons, and therefore the main element of the operation, the panzers could not bring the continuity of it. On 24 December 1944, after days of fighting in the village of La Gleize, SS *Obersturmbannführer* (Lieutenant Colonel) Joachim Peiper's *Kampfgruppe Peiper* (Battle Group Peiper) had to abandon his panzers and other vehicles, due to the stall of its advance, and they had to blow up their equipment and vehicles, losing 28 panzers.[249]

The Americans' counterattack on 23 December 1944 signaled the end of the German offensive. The rapid advance of the armored divisions, specifically the armored units of Patton's 3rd Army. This feat was achieved by the superior automotive reliability of M4 Sherman tanks.

> The American counterattacks during the second phase of the Battle of the Bulge were predicated on the reliability and mobility offered by the Sherman tank. Patton's Third Army had to rapidly move more than 100 miles under winter conditions and be ready to immediately go into combat, even though in many cases their tanks had not undergone serious maintenance for weeks. For example, Patton's 4th Armored Division, which would spearhead the drive north, was badly understrength after a hard month of fighting, yet it did not have the time to recuperate or reequip. This is a clear example of how McNair's insistence on "battleworthiness" showed its value. The Sherman proved to be a useful weapon because it was dependable. As would be clear in the next week of fighting, the same could not be said for many of its German opponents.[250]

By the early January 1945, it was accepted by the German High Command that the offensive faltered. The German losses in panzers and AFVs were 730, about 45 per

[249] Mitcham, *Panzers in Winter*, 93.

[250] Zaloga, *Armored Thunderbolt*, chap. 8 Armored Superiority in the Ardennes, sec. Clear Skies and Hard Ground.

cent of their original strength, whereas the Americans' vehicle losses were 730 as well, with the First Army losing 320 Sherman tanks.[251] At this stage of the war, the Germans' gamble to launch an offensive mustering nearly all its available panzers in the West would cost them their panzers and panzer divisions. The panzers lacking fuel throughout the offensive failed to inflict any significant damage or penetrate the heavily defended American lines. Despite fielding far more powerful panzers than they did in 1940, the German panzers of 1944 and 1945 manifested themselves as mechanically unreliable, far too heavy to conduct swift advances and maneuvers. Without the aid of an air force, the combined-arms element was non-existent for the panzers. On the other hand, the American tanks and tank destroyers proved that they could hold their ground against the German heavy armor. Despite being inferior in terms of firepower and armor, the combined use of artillery and air power helped the American tanks massively. M4 Sherman, being the main medium tank of the armored divisions, proved itself as a reliable tank, which could cover huge distances in a very short time, and despite the strain of the long-distance travel. They also proved that they were mechanically sound and reliable tanks.

[251] Ibid., chap. 8 Armored Superiority in the Ardennes, sec. Clear Skies and Hard Ground.

CHAPTER 5

CONCLUSION

The German panzers and the American tanks played significant roles in the battles that took place in North Africa, the Soviet Union, and Western Europe. Both countries' tanks had different roles and impact on the battlefields of World War II. From the beginning, the Germans were pioneers in armored warfare. They developed doctrines that transformed the conduct of armored warfare and the use of tanks. The German doctrine was also a model for the American Ground Forces as well. Despite the differences in the doctrines of both countries' armies, both the American and the German doctrines mutually favored mobility and speed. The Germans developed and produced their panzers in accordance with their doctrine. Their panzers in the initial stages of the war were light and fast which gave them a tactical advantage against their better armored, and gunned counterparts in the battlefields of France and Soviet Union in 1940 and 1941. The panzers' weaknesses were minimized with the combined-arms tactics and blitzkrieg. The boldness of the German commanders and their preference to fully benefit from the panzers' potentials made the panzers quite potent armored vehicles. The panzers were able to quicken the invasion operations in Poland, France, and the Soviet Union. Undoubtedly, the Germans' blitzkrieg tactics that advocated for the encirclement of the enemy's forces could not be achieved without the panzers.

The panzers achieved their main purpose in the campaigns that took place in the first half of the war. Their weaknesses in armor and firepower gradually improved as the war progressed. The increase in the armor and the up gunning of Pz. III and Pz. IV models made them steadily a match against the Allied and the Soviet tanks. The Soviet medium and heavy tanks that the panzers faced in 1941 and 1942 necessitated a shift in the German panzer production and development. The Germans' focus gradually shifted towards producing panzers with heavier armor and more firepower; however, in this process of developing new tanks they ignored the material limitations and other priorities that enabled the panzers and panzer forces to continue to fight. Hitler's continuous interference in the German arms development hindered the production of panzers and spare parts needed to repair the battle-damaged panzers.[252] The insistence of bigger and heavier panzers prevented the optimization and standardization in the German panzer development and production. When the new panzers, Pz. V Panther and Pz. VI Tiger emerged in late 1942 and 1943, they were deemed as the game changers; however, until the end of the war, these two models were hampered by mechanical problems that affected their performance on the battlefields.

After 1943, when the Germans lost the strategical initiative to conduct offensive operations, their armored warfare doctrine was not transformed to suit the needs for defensive combat. The priority of the panzers shifted to tank-to-tank combats, and with improved armor and firepower, they could easily outshoot and destroy any tanks the Allies and the Soviets could put on the field. In most battles, the panzers achieved this feat, as the panzer losses were usually lower than the enemy tanks.

[252] See Speer, *Inside the Third Reich*, 232-235.

As the Germans started losing the war from 1943 onwards, their panzer production took huge blows as well. The constant air raids and bombings conducted by the Allied warplanes and the loss of Romanian oilfields along with the constant lack of fuel throughout the war, caused many panzers to be abandoned or destroyed by their crews in 1944 and 1945. Thereby, the panzers had no chance to be combat effective on the battlefields, especially in the Western Front. The Allied air supremacy beginning with Summer 1944, affected the conduct of operations of the panzers as the panzers became easy targets for the Allied fighter planes. In tank-to-tank combat against the American tanks, German panzers were always superior, as their counterparts possessed neither the armor to remain operational nor the firepower to easily penetrate and destroy the panzers. The only match for the American tanks were the Pz. IV model. Even Pz. IV had a better gun than the American medium tanks. The German 75 mm and 88 mm guns were the dominant causes of the American tanks to be destroyed.[253]

Despite their superiority in tank-to-tank combat and inflicting huge losses on the Allied and the Soviet tanks, the panzers' combat effectiveness was not enough for the German Army to achieve its objectives in its missions. Their powerful presence on the battlefields alone could not stop the Allied victory, as Wehrmacht lacked the means to conduct combined-arms warfare which brought victories in the early phase of the war.

Unlike the Germans, the Americans strictly adhered to their armored doctrine. The American doctrine stated that the tanks' main role was to operate in the rear areas of

[253] See Survey of the Allied Tank Casualties in World War II, Technical Memorandum, ORO-T-117 by Alvin D. Coox, L. van Loan Naisawald. Washington D.C.: Operations Research Office The John Hopkins University, 1951, 26. This study provides detailed analysis of the Allied tank casualties based upon a sample of 12140 Allied tanks.

the enemy once the infantry achieved breakthrough. Therefore, the Americans never required tanks with heavy armor or massive firepower, because tank-to-tank combat was not deemed to be among the tasks of the tanks. This task was delegated to tank-destroyer battalions, which proved to be a mistake. The Americans' insistence on avoiding tank-to-tank combat continued until the end of the war.

The Americans' isolation from the mainland Europe and not engaging in combat directly for the first two years of the war also hindered the American tank development process. The Germans had to find solutions to overcome the powerful Soviet tanks, but the Americans never had such priorities until late 1943 and 1944. The American Lend-lease tanks of M3 Lee/Grant and M4 Sherman in the British and the Soviet tank inventories witnessed combat in North Africa and in the Eastern Front. Before the Germans fielded heavy Tigers and upgraded Pz. IV models, M3 and M4 were very well received by the British. As the war progressed, the weaknesses of these tanks began to surface. By 1943 M4 Sherman, just like the German Pz. IV, became the de facto main medium tank of the American Army; however, matchups against the German panzers proved that they were not combat effective tanks in tank-to-tank combats. The fighting at the Western Front, specifically in France made the Allies become victorious, but the performance of M4 Shermans were subpar. The Allies tried to make M4 a better tank in the fight against panzers by implementing 76 mm gun. The British 17 pounder or 76 mm anti-tank gun was the best field gun the Allies had in defeating the German panzers. The American 76 mm gun on the other hand, proved insufficient. The Americans tried to overcome the weaknesses, and the deficiencies of their tanks by making them extremely reliable vehicles of war. The might war industry of the US produced so many tanks that the losses in tanks could be quickly replaced,

and therefore the need for a better tank was continuously neglected. In the end, the American tanks, specifically M4 Sherman proved itself as a weak tank in terms of tank-to-tank combat. However, for the Allied generals it was the tank that got the job done and brought victory.

Where Americans succeeded, the Germans failed. Had the Germans tried to achieve the optimization and standardization of their panzers, they could have fielded more technically reliable panzers. Instead of rushing in panzers like Panther or Tiger, which were both high maintenance vehicles, the Germans could have fielded many more Pz. IV models with long 75 mm guns or could improve the Panther project. Focusing on heavier panzers limited the production numbers as well because these panzers required more materials.

On the other side, the Americans could have invested more in tank development. The T-series tanks eventually produced the M26 Pershing tank, which had a very thick armor and 90 mm powerful gun, that could easily matchup against the heavy German panzers. The US Army continuously delayed the development of T-series tank, ignoring the complaints of the tank crews. With its industrial might, the US could have fielded a better tank than M4 Sherman to satisfactorily equip all its armored divisions, and the possibility that the war in the Western Front could have ended far sooner.

The Americans' strict adherence to their armored warfare doctrine prevented them from ever fielding a combat worthy tank in World War II. The American M3 Grant/Lee and M4 Sherman tanks were mechanically reliable tanks and they proved themselves as capable weapons of war against the German panzers in 1942 and early 1943 in North Africa. As the war progressed and neared the end, the inability of the

US Army to produce better tanks or upgrade M4 Shermans proved disastrous. M4 Sherman was easily destroyed by the German panzers in the campaigns at France. As Belton Cooper stated, at Normandy, the 3rd Armored Division entered combat with 234 Sherman tanks, and during the European Campaign, the division had some 648 Sherman tanks destroyed in combat and 700 more knocked out, repaired, and put back to action, amounting to a loss rate of 580 per cent.[254] M4 Sherman's mechanical reliability and speed was could not be used effectively to knock-out German panzers especially late in the war, when the panzers could easily target and knock-out the American tanks from long distances. The Americans' upgraded Shermans with 76 mm gun and the British "Firefly" version offered a better firepower; however, there were not in sufficient numbers to actively engage the panzers and eliminate them. The US military's neglect to improve Sherman's weaknesses in armor and firepower, hindered Sherman's tank-to-tank fighting capabilities and ultimately made it just a mechanically reliable tank.

The Germans used many and different tanks throughout the war. Panzer III and Panzer IV were the workhorses of Wehrmacht in the early years of the war; however, Pz. III became obsolete and Pz. IV had to be up-gunned to have an impact in tank-to-tank combat. With its long barreled 75 mm, Pz. IV remained the workhorse of Wehrmacht until the end of the war. In terms of firepower, it was on par with the American M4 Sherman. Along with the 75 mm gunned Panther and the anti-tank guns, Pz. IV with

[254] Cooper, *Death Traps: The Survival of an American Armored Division in World War II*, sec. Preface.

its 75 mm gun inflicted the second highest percentage in the Allied tank casualties in the European Theatre of the war.

Table II: Sampling of the Allied Tank Casualties in the ETO by Caliber
Source: Survey of the Allied Tank Casualties in World War II, Technical Memorandum, ORO-T-117, 27.

TABLE XIV

SAMPLING OF ALLIED TANK CASUALTIES IN THE ETO BY CALIBER

CALIBER	UNITED STATES						UNITED KINGDOM						CANADA		TOTALS	
	NO. OF FUSA TANKS	PERCENT OF FUSA SAMPLE	NO. OF TANKS IN US SAMPLE NO. 2	PERCENT OF US SAMPLE NO. 2	TOTAL US SAMPLE	PERCENT OF TOTAL US SAMPLE	NO. OF TANKS AORG SAMPLE	PERCENT OF AORG SAMPLE	NO. OF TANKS IN UK SAMPLE NO. 2	PERCENT OF UK SAMPLE NO. 2	TOTAL UK SAMPLE[1]	PERCENT OF UK TOTAL[1]	NO. OF TANKS	PERCENT OF SAMPLE	TOTAL ETO SAMPLE	PERCENT
20-mm	2	.5	2	.4	3	.5							2	1.6	5	.6
37-mm	2	.5			2	.3							16	13.0	18	2.1
40-mm			3	1.3	3	.5									3	.4
47-mm	3	.8			3	.5									3	.4
50-mm			1	.4	1	.2	1	1.1	3	2.5	3	2.5	1	.9	5	.6
57-mm	4	1.1	2	.9	6	1.0									6	.7
75-mm	204	54.7	86	38.1	290	48.4	68	72.3	34	28.6	34	28.6	9	7.3	333	39.6
76-mm	8	2.1	4	1.8	12	2.0									12	1.4
77-mm	1	.3			1	.2									1	.1
88-mm	113	30.3	111	49.1	224	37.4	24	25.5	81	68.1	81	68.1	95	77.2	400	47.6
105-mm	20	5.4	4	1.8	24	4.0	1	1.1	1	.8	1	.8			25	3.0
150-mm	4	1.1	9	4.0	13	2.2									13	1.5
155-mm	2	.5	3	1.3	5	.8									5	.6
170-mm	2	.5			2	.3									2	.2
178-mm	7	1.9			7	1.2									7	.8
210-mm	1	.3			1	.2									1	.1
240-mm			2	.9	2	.3									2	.2
	373	100.0	226	100.0	599	100.0	94	100.0	119	100.0	119	100.0	123	100.0	841	100.0

[1] *The two UK samples cannot be combined due to possibility of duplication.*

Pz. IV was also as reliable as the M4 Sherman; however, the mismanagement of the German tank and spare parts production hindered Pz. IV to be produced in larger numbers and have much more of an impact on the battlefields. Panther tank, arguably the best tank of the war, became the second most produced panzer in the war. Its 75 mm gun made it a highly efficient tank-killer, as its firepower was higher than the 88 mm gun of Tiger. Despite the mechanical problems in its debut in 1943, those mechanical problems were solved in 1944 and 1945, making the Panther a highly effective panzer. The German heavy panzers, Tiger I and Tiger II were the heaviest

and most powerful tanks of the war. “Whatever mission heavy tank battalions were given, their primary task was to destroy enemy tanks. In so doing, they were undeniably successful. The kill ratio of heavy tank battalions when measured against Tigers lost in direct combat is an impressive 12.2 to 1.”[255] They were quite effective at destroying enemy tanks; however, due to high maintenance requirements and high percentage of oil use, they could not be deployed rapidly. Since they were extremely effective at destroying enemy tanks, they could stop the enemy penetrations; however, because they could not be concentrated in a major attack and could not achieve breakthrough at enemy positions.[256] The Germans’ war-long logistical problems and fuel shortages which increased in 1944 and 1945, also hindered the panzers’ combat effectiveness as the panzers were either abandoned by their crews or could not be repaired to be put in action. Therefore, their impact in combats were hindered by non-combat reasons.

[255] Wilbeck, “Swinging the Sledgehammer: The Combat Effectiveness of German Heavy Tank Battalions in World War II,”, 126.

[256] Ibid., 132.

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APPENDICES

A. TURKISH SUMMARY / TÜRKÇE ÖZET

Tank son yüz yılın muharebe alanlarındaki en etkili kara araçlarından birisidir. Tankların çıkış tarihi Birinci Dünya Savaşıdır. Bu savaşta tankların asıl rolü siperler arasında çarpışan piyadelere, düşman savunma hatlarını yarmalarında kolaylık sağlayacak türden bir tür kalkan rolü oynamış olmalarıdır. Tankların düşman siperlerini yarma görevini etkili bir şekilde yerine getirme becerisi bu savaşın sonlarında anlaşılmış ve savaş sırası ve sonrasında tankların gizilgücü irdelenmeye başlanmıştır. Birinci Dünya Savaşından İkinci Dünya Savaşına uzanan süreçte, tankların gelişimi süratle artmış ve tanklar İkinci Dünya Savaşında, muharebe alanlarının en önemli etmenlerinden birisi halinde gelmiştir. Tankların gizilgücü ve muharebe alanındaki etkilerini birinci elden deneyimlemiş olan Almanya ve Amerika Birleşik Devletleri, İkinci Dünya Savaşına uzanan süreçte kendi zırhlı muharebe öğretilerini geliştirmek, ürettikleri öğretiye uygun tanklar tasarlamak ve üretmek için farklı biçimlerde çalışmışlardır. Bu tezin amacı da İkinci Dünya Savaşında etkin rol oynayan ve muharebelerin gidişatını ve sonucunu belirleyen tankların muharebe etkinliğini anlayıp ortaya koymaya çalışmaktır. Bu araştırmayı da savaşta yer alan Amerikan ve Alman tanklarının muharebe etkinliğini, yer aldıkları ordular ve zırhlı tümenlere verilen görevlerin yerine getirilmelerinde nasıl bir rol oynadıklarını kıyaslayarak gerçekleştirmeyi amaçlamaktadır. Muharebe etkinliğinin ölçülmesindeki

etmenler, tankların birbirleriyle olan çatışmaları ve bu çatışmalarda karşı tarafın tanklarını imha etme ve hareketsiz kılma, kısacası savaş dışı bırakma kabiliyeti yönünden ele alınmıştır. Ayrıca tankların, bulundukları ordular ve birlikler içerisinde, taktiksel ve stratejik hedeflerin gerçekleştirilmesindeki rolleri ve etkileri de değerlendirme içinde yer almıştır.

Almanların zırhlı muharebe öğretisi, Birinci Dünya Savaşı sonrasında yeniden düzenlenen *Reichswehr* (Alman Ordusu) içerisinde görevlendirilen birtakım subaylar tarafından oluşturulmuştur. Bu subaylar, Albaylar Oswald Lutz, Walther von Reichenau, Heinz Guderian ve Wilhelm Ritter von Thoma idi. Tankların gizilgücünü ve muharebedeki etkinliğini inceleyen bu subaylar, tankların ilerleyen dönemlerdeki savaşlarda muharebenin gidişatını değiştirebilecek silahlar olduğunu fark etmiş ve Almanya'nın bu silahlardan en etkili şekilde faydalanabilmesi için bir öğreti ortaya koymaya çalışmıştır. Birinci Dünya Savaşı sonrasında Almanya'nın silahlanmasına izin vermeyen Versay Antlaşmasını göz ardı eden Alman Ordusu, gizlilik içerisinde ve 1920'li yıllarda Sovyetler Birliği ile de anlaşarak tank prototipleri üretmiş ve bunları da Kazan, Sovyetler Birliğinde bulunan Kama Tank Okulunda sınamıştır. Almanları tank üretimi ve öğreti belirleme sürecinde Fransa, İngiltere gibi tanka ayrıca önem ülkelerden ayıran özellik, tankı sabit bir silah olarak kullanmak yerine, onu seyyar bir silah olarak görmüş olmalarıdır. İkinci Dünya Savaşı öncesinde tanklarını bu şekilde geliştiren ve üreten Almanya'nın tanklarında emsallerinden farklı olarak radyo bulunmaktaydı ve süratli olmaları ön plandaydı. Tankları cephede ve muharebe alanında piyade destek silahı yerine yarma harekâtı gerçekleştirebilecek, düşman kuvvetlerini kıskaca alabilecek etkinlikte kullanmakta kararlıydılar ve bütün tank üretim süreçlerini ve öğretilerini de bunun üzerine kurmuşlardı.

ABD ise Avrupa kıtasından uzak olmanın sağladığı avantajla, tank geliştirme ve öğreti oluşturma süreçlerinde Almanya veya diğer Avrupa ülkeleri kadar süratli bir gelişme gösteremedi. ABD'nin tank geliştirme ve öğreti oluşturma süreci İkinci Dünya Savaşının başlangıç yıllarına denk gelmiş ve bazı yönlerden Alman öğretisini benimsemişlerdir. Tanklardaki önceliği hız olarak benimseyen ABD, gelecekte gerçekleşmesi olası olan bir savaşta Amerika kıtasındaki çarpışacağını düşünerek ve yüzölçümü geniş olan sınırlarını ancak süratli ve seyyar birimlerce koruyabileceği çıkarımıyla kendi öğretisini şekillendirmiştir. Birleşik Devletler Ordusunun göreceli bu rahat yaklaşımı, 1941 yılında savaşa girmesiyle farklı bir rotada seyretmiştir.

Almanya'nın savaşı başlatan ve merkezinde yer alan ülke olması, farklı cephelerde aynı anda ve farklı ordularla savaşması, tank üretimini ve yeni tank modellerinin tasarlanmasını muharebelerden alınan dönütlerle gerçekleştirmesine yol açtı. Savaş boyunca pek çok farklı model tank ve tasarımlar üreten Almanya'nın tankları muharebe alanlarında farklı biçimlerde etkin oldu. ABD'nin savaşın ortası olan 1942 yılına kadar hiçbir tank muharebesine girmemiş olması tank üretim sürecini olumsuz etkilese de 1942 yılı ve sonrasında rakibi Almanlara kıyasla daha az tank modeli üretmiş ve tank üretiminde bir standardizasyon yakalamıştır.

Tezin ilk bölümünde yukarıda anlatılan süreçler, tezin düzeni, tezin amacına erişmesinde kullanılacak olan kaynaklar belirtilmiş ve savaş öncesinde iki ülkenin tanklar ve zırhlı muharebe yaklaşımlarına dair kısa bir bilgilendirme yapılmıştır. Tankların muharebe etkinliğinin nasıl ele alınacağı da anlatılmıştır.

İkinci bölümde ise Alman ve Amerikan tanklarının, tank birliklerinin geliştirilme ve kuruluş süreçleri ele alınmıştır. Savaş öncesi dönemde tankların geliştirilmesi ve

üretilmesi süreçleri ayrıntılı bir biçimde incelenmiş, karşılaşılan zorluklar, üretilen farklı tank prototipleri ve üretim süreçleri ele alınmıştır. Tankların üretilirken hangi öncelikler kapsamında geliştirilip şekillendirildiği ve nasıl test edildikleri anlatılmıştır.

Tezin üçüncü bölümü ana bölümü oluşturmaktadır. Bu bölümde, Amerikan tankları savaşın ilk yarısında yer almadığı için öncelikle Alman tankları üzerinden Almanya'nın yer aldığı savaşlar ve muharebeler ele alınmıştır. 1939 yılından başlayarak Almanya, ortaya koyduğu yıldırım savaşı taktiğiyle önce Polonya'ya saldırmış ve bu ülkeyi işgal etmişti. Tanklarını ilk defa muharebe alanında sınayan Almanya, onların savaşın bir ay kadar kısa sürede kazanılmasındaki rolünden memnun kalmıştı. Polonya'nın istilası sonrasında oluşan boşlukta, Almanya Fransa'yı işgal etme planları ortaya koymuş ve Mayıs 1940 tarihinde Fransa'ya o zamana kadarki en büyük tank ordularıyla saldırmıştı. Fransızların tankları sabit bir biçimde ve dağınık şekilde savunma silahları olarak kullanmasına kıyasla Almanlar, hızlı tanklarını belirli noktalarda kümeleyerek düşman hatlarını süratle yaracak şekilde kullanmışlardır. Alman tanklarının tank çatışmalarında yetersiz kaldığı ise bu savaşta ortaya çıkmıştır. Ağır zırhlı ve daha güçlü toplara sahip olan Fransız tankları, süratli fakat yeteri kadar zırhlı ve güçlü silahı olmayan Alman tanklarını, az sayıda gerçekleşen tank çatışmalarında kolaylıkla yok etmiştir. Almanlar ise zayıflıklarını tanklarındaki radyoları kullanıp, koordineli bir şekilde düşman tanklarını birden fazla tank ile sararak veya süratle arkalarına sarkıp, zırhın zayıf olduğu kısımlarından vurarak imha etmeyi başarmıştır. Fransız ordularını tankların ve tank tümenlerinin hızla gerçekleştirdiği kıskaç harekatlarıyla yeniden birkaç haftalık kısa bir sürede yok etmeyi başarmışlardır. Fransa'nın işgali Almanlar için ellerindeki tanklarını gözden geçirmeleri ve geliştirilmeleri gerektiğini ortaya koymuştur. Alman tankları, başarılı

geçen bu seferlerden sonra savaşın başında müttefik olduğu Sovyetler Birliği'ne, Barbarossa Harekâtı adını verdiği bir seferle, 1941 yılında saldırmıştır. Alman tankları bu harekata da daha güçlendirilmiş ve daha etkin tank modelleriyle girişmiş olsa da Sovyetlerin orta ve ağır tankları bir şok etkisi yaratmıştı. Sefer boyunca Sovyet tanklarına karşı baskınlık kuramayan Alman tankları, topçu birliklerinden, uçaksavar silahlarından ve Alman Hava Kuvvetlerinden yardım alarak Sovyet zırhlı engelini geçmeyi denemiştir. Alman tankları tank çatışmalarından genellikle kaçınmış ve kıskaç hareketleriyle düşman ordularını teslimiyete zorlayacak cepler oluşturulmasında rol oynamıştır. 1941 yılının çetin sonbahar ve kış koşulları sonucunda Alman hücumu, zırhlı birlikleri ve tanklarının süratine rağmen ana hedef olan Moskova'nın ele geçirilmesini başaramamıştır. Harekât sonrası Almanlar, modası geçmiş olan tanklarını elden çıkarma, var olanları güçlendirme ve yeni bir tank modeli arayışı sürecine girmişlerdi.

Alman tankları, Alman Afrika Kolordusu bünyesinde yer alarak, 1941,1942 ve 1943 yıllarında Kuzey Afrika'da önce İngiliz daha sonra da Amerikan birliklerinin de katılmasıyla her iki askeri gücün tanklarına karşı savaşmıştır. Libya'da İngiliz güçlerine karşı zorlanan İtalyan Ordusuna yardım amacıyla gönderilen Alman güçleri, savaşın ilk iki yılında, Libya'nın çöllerinde ileri geri muharebe olarak tanımlanan muharebeler gerçekleştirmiştir. Çölün düz ve açık yapısı, Almanların tanklarını öğretilerinde belirlediklerine en uygun biçimde, mükemmel olarak kullanmalarına olanak sağlamıştı. Erwin Rommel'in Afrika Kolordusu, panzerlerin etkili kullanımı sayesinde İngiliz tanklarına büyük kayıplar yaşattıkları gibi İngiliz Ordusunu da zor durumda bırakmıştır. Almanların ikmal sıkıntıları bazı zamanlar tankların işlevsiz kalmasına yol açmıştır. Bu durumda Afrika Seferinin yer yer sekteye uğramasını ve

belirlenen hedeflerinin yerine getirilememesine yol açmıştır. Almanlar 1942 yılında Mısır sınırının içlerine kadar ilerlemiş, fakat İngilizler kadar iyi ikmal edilememelerinden ötürü geri çekilmek zorunda bırakılmışlardı. İngilizlerin Amerikan M3 ve sonrasında da M4 Sherman tanklarının da yardımıyla Almanları Libya'ya kadar püskürtmesi 1942'nin ikinci yarısında gerçekleşmiştir. Amerikan tankları ilk defa Alman tanklarına karşı çatışmaya girmiş ve performanslarıyla İngilizleri etkilemişlerdi. Amerikan orta M3 ve M4 tanklarının güçlü 75 mm'lik topları, en iyi tank topu 50 mm olan Alman Panzer III'lerine kıyasla çok daha iyiydi ve daha uzak mesafelerden düşman tanklarını yok edebiliyorlardı. Almanlar ise Panzer IV modellerini ilerleyen süreçte uzun namlulu 75 mm'lik anti-tank toplarıyla donatmış ve bu da durumu bir nebze olsun eşitlemişti. Almanların bu değişime kadarki en iyi tanksavar silahı bir tanka ait olmayan, fakat bir uçaksavar olan 88 mm'lik topuydu. Almanya'nın 1942'de hedefini tamamen Doğu Cephesindeki Sovyetlere çevirmiş olması, Kuzey Afrika cephesinin gitgide zayıflamasına sebep olmuştu. Müttefiklerin Doğu'da Mısır, Batı'da ise Meşale Harekâtı kapsamında Fas ve Cezayir'e amfibi çıkarma yaparak asker ve tank indirmesi Almanları kıskaca sokmuştu. 1943 yılında Libya'yı da elinden kaybeden Afrika Kolordusu ve Mihver güçleri Tunus'ta mevzi almışlar ve her iki yandan da çevrilmişlerdi. Almanlar 1942'nin sonlarında yeni ağır Panzer VI "Kaplan" tanklarından oluşan ağır tank birliklerini Rusya'da Leningrad cephesine ve Afrika'da da Afrika Kolordusuna göndermişti. Bu tanklar 88 mm'lik güçlü tank topuna sahipti ve savaş boyunca da bütün Müttefik ve Sovyet tanklarını, uzak mesafelerden rahatlıkla alt edebiliyordu. Bu ağır tanklar güçlerini Tunus'taki muharebe sahalarında gösterdi ve özellikle de Amerikan tankçılarını zor durumda bıraktı. Şubat 1943'te Alman tankları, Amerikan tanklarına ve tank tahrip edicilerine

Tunus'taki Kasserine Geçidinde ağır bir darbe indirdiler. Almanlar, tanklarını belirli noktalarda kümeleyip, ateş gücünden en verimli şekilde faydalandıklarında rakiplerine ağır kayıplar yaşattılar. Afrika Cephesi 1943'ün mayıs ayında Almanların teslim olmasıyla sonuçlandı. Amerikan tankları bu cephede yer aldıkları ilk çatışmalarda etkili olsalar da ilerleyen süreçte tanklarının zayıflıkları kendilerini belli etmeye başladı.

Tezin dördüncü bölümünde ise 1943 yılından savaşın sonuna doğru uzanan kısım ele alınmıştır. Tezin genelinde olduğu gibi, Amerikan ve Alman tanklarının yer aldığı ve çatıştığı her cephe ayrıntılı bir biçimde anlatılmamıştır. Odak nokta tank muharebelerinin yoğunluklu olduğu, yeni tank modellerinin ortaya çıktığı ve dönüşümsel noktaların yaşandığı cepheler ve muharebelerdir. Bunlardan en önemlisi de 1943 yılının yazında gerçekleşen Kursk Muharebesidir. Almanların Sovyet orta T-34 tankı ve diğer ağır tanklarına karşı koymak için geliştirdiği Panzer V Panter tankının da kullanıldığı bu muharebe, savaşın en büyük tank muharebesi olarak anılmaktadır. Alman tankları iki koldan, Kursk çıkıntısında mevzilenen Sovyet ordularını kuşatmak için giriştikleri harekatta yüksek bir etki göstermiş ve Sovyet tanklarına büyük çapta, ciddi zarar vermişlerdir. Muharebenin ilkbahar yerine Temmuz'da gerçekleştirilmesi ve güçlendirilmiş Sovyet savunma hatları, Alman tanklarının işini zorlaştırmış ve Alman tanklarının yarma harekatları sınırlı kalmıştır. Yeni Alman tankı Panter'in yeterince hazır olmadan cepheye sürülmesi pek çok mekanik arızanın oluşmasına ve bu tankların muharebe boyunca öngörülenden daha az etkili olmasına yol açmıştır. Panterler savaşı Almanlar lehine dönüştürecek tanklar olmasa da iki yüzden fazla Sovyet tankının imha etmişlerdir. Yedek parça ve yakıt eksikliği Alman tanklarının yer yer tamamen etkisiz kalmasına veya yeterince hızlı

tamir edilip cepheye tekrar sürülememesine yol açmıştır. Bu muharebede Amerikan M3 orta tankları da Sovyetlerin tarafında muharebeye dahil olmuştur. Bu tanklar Sovyet tank mürettebatları tarafından bir mezar olarak anılmış ve yeterince etkili olmadıklarını ortaya koymuştur. Alman tanklarının kalın zırhı ve güçlü topları, Sovyet tanklarını uzak mesafelerden yok etmelerine olanak vermiştir. Buna rağmen kuzeyde sadece 10 km ve güneyde de 30 km yarma gerçekleştiren Alman tank tümenleri, Kursk çıkıntısını saramamış ve sonrasında Sovyetlerin karşı saldırıları sonucu, yıpratma savaşına dönen süreçte Almanlar dayanamamış ve geri çekilmek zorunda kalmışlardır. Kursk Muharebesi sonucunda Almanlar stratejik olarak büyük çaplı taarruzlar uygulama olanaklarını kaybetmiş ve savunmaya çekilmişlerdir. Alman Panter ve Kaplan tanklarının yüksek ateş gücüne sahip olmaları mekanik sorunlarını bertaraf etmek için yeterli olmamıştır. Göz ardı edilen Alman Panzer IV tankı ise fiilen Alman ordusunun ana orta tankı olmuş ve savaşın sonuna kadar da durum böyle devam etmiştir. Alman tankları Sovyet tanklarını büyük kayıplara uğratmış olsa da stratejik hedeflerin başarılmasında yeteri kadar etkili olamamıştır.

Dördüncü bölümün devamında ise Batı Cephesi olarak anılan ve Müttefiklerin Fransa'nın Normandiya kıyılarına gerçekleştirdiği amfibi çıkarma ve sonrasında gerçekleşen tank muharebeleri ele alınmıştır. Bu muharebe öncesinde Amerikalılar, tanklarını iyileştirmek ve Alman tanklarına karşı daha güçlü kılmak için çalışmalar yürütmüşlerdir. Bu tank geliştirme süreçlerinde halihazırda var olan M4 Sherman tanklarına daha güçlü tank topları yerleştirmek, zırhı daha kalın ve tank topunun delici gücü daha yüksek yeni bir tank üretme tartışmaları olmuştur. Amerikalıların savaşın sonunda cepheye süreceği ve pek çatışma yaşamayan M26 Pershing tankı da bu süreçte yer alan T serisi prototip tank modellerinin ardından geliştirilmiştir. M4 Sherman ise

tıpkı Alman Panzer IV tankı gibi Amerikan Ordusunun ana orta muharebe tankı olmuştur. Almanlar ise 1944 yılında daha ağır ve daha güçlü tank modelleri yapmaya devam etmiş, var olan tanklarını da daha geliştirmeye ve mekanik sorunlarını ortadan kaldırmaya çalışmıştır. Almanlar Fransa'da, Batı Cephesinde 1600'den fazla tank konuşlandırmıştı. Müttefiklerin Normandiya kıyılarında beş farklı noktaya çıkarma yapmasını izleyen süreçte, İngiliz ve Kanada zırhlı tümenleri doğuya, Caen şehrine yönelmiş ve Ağustos 1944'e kadar operasyonlarını bu kenti ele geçirmek üzerine kurmuşlardır. Amerikanlar ise çıkarmada zırhlı tümenler yerine piyade tümenlerine bağlı tank birlikleri göndermiş ve bu tanklar da Normandiya'nın batısında yoğun ve yüksek çalılıkların olduğu bir arazide mücadele etmiştir. Doğu'daki arazinin düzlük olması İngiliz ve Kanada zırhlı tümenlerinde yer alan Amerikan M4 Sherman tanklarının yoğun kullanımına sahne olmuştur. Normandiya'daki tank muharebelerinin çoğu bu bölgede gerçekleşmiş ve en büyük tank kayıpları da yine bu bölgede olmuştur. İngiliz ve Kanadalı kuvvetlerin Temmuz 1944'te gerçekleştirdiği Goodwood Harekâtında, zırhlı birlikler Alman tankları ve savunma hattı karşısında büyük bir yenilgi almıştır. Haziran ve Temmuz 1944 boyunca gerçekleşen muharebelerde Müttefikler yüzlerce tank kaybetmiş, fakat Müttefiklerin tank üretim seviyesi o kadar ileri boyutta olmuştur ki muharebe dışı kalan tanklar bir veya iki gün içinde yenileriyle değiştirilmiştir.

Normandiya'nın batısında ise Amerikan tanklarıyla Alman tanklarının çatışmaları daha az ve düşük yoğunlukta geçmiştir. Almanlar bu bölgeye yeterince tank konuşlandıramamıştı. Çalılıklar ise Almanlara doğal savunma mevzileri oluşturuyor ve Amerikan tankları Alman tanksavar topları tarafından kolaylıkla imha edilebiliyordu. Çalılık bölgesinde tanklar arası mesafelerde kısaldığı için tankların

teknik özellikleri muharebe etkililiği açısından fazla önem taşımıyordu. Manevra kabiliyeti ve taktiksel adımlar daha belirleyici etmenler olmuştu. Amerikan tanklarının zayıf 75 mm topları ise daimî bir sorun olarak kendini gösteriyordu. Amerikan Birinci Ordu Komutanı General Bradley, İngilizlerin M4 Shermanları kendi 17 pound'luk tanksavar toplarıyla donatmasından etkilenmiş ve bunun Amerikan Shermanlarına da uygulanması için Montgomery'ye danışmıştı. Aldığı yanıt ise İngilizlerin bunu sağlayabilecek imkanlarının olmamasıydı. Sherman Firefly Müttefiklerin elinde bulunan ve tank topu en etkili tank olarak kendini belli etmişti. Alman orta ve ağır tanklarını delebilme gücüne sahipti. Fakat hiçbir Müttefik zırhlı tümeninde bu tanklardan yeterince yoktu. Müttefiklerin bu cephede Alman tanklarını yok etmede en büyük yardımcıları hava kuvvetleri ve topçu birlikleriydi.

Temmuz 1944'te Amerikan zırhlı birliklerinin de hedeflenen yere varmasıyla, Amerikan tankları Batı'da Kobra Harekâtında yer aldı. Bu harekatın sonucunda Amerikan birlikleri Normandiya'nın çalılık bölgesinden dışarı çıkabilmiş ve düzlüğe ulaşabilmişlerdi. Alman tankları ise Temmuz'un ortaları ve sonlarından itibaren Müttefik ilerleyişini durdurmada tamamen başarısız olmuşlardı. Yakıt sıkıntısı, Müttefik uçakları tarafından gerçekleşen taciz saldırıları ve yetersiz tank sayıları muharebe etkililiğini düşüren etmenlerdendi. Ağustos 1944'te ise Müttefikler Batı'daki Alman tank tümenlerini ve tanklarını neredeyse tamamen yok etmişlerdi. Normandiya muharebelerinin sonucu Almanlar için felaketti. Neredeyse 1000'den fazla tank kaybetmişlerdi. Müttefik tank kayıpları ise neredeyse 2000 idi ve tankların çoğu da Amerikan M4 Sherman idi. Bu sonuca rağmen, muharebe ve savaş sonrası yapılan araştırmalarda Alman tanklarının ve tank toplarının Müttefiklerin en iyi tanklarından ve tank toplarından daha iyi olduğu ortaya konulmuştu. Amerikalıların

76 mm M4 Shermanlarının Sherman Firefly kadar etkili olmadığı görülmüştü. Amerikan tanklarının mekanik güvenilirliği ve dayanıklılığı öne çıkan etmenler olmuştu.

Bölümün sonunda ise Ardenler Taarruzu irdelenmiştir. Bu taarruz Almanları tank tümenleri ve tanklarla Batı cephesinde gerçekleştirdiği son büyük çaplı taarruzdu. Alman tankları Ardenlerdeki Amerikan güçlerini yararak Belçika'daki Anvers kentine uzanan bir yarma harekâtı gerçekleştirmeyi ve Amerikan ve İngiliz ordularını birbirlerinden ayırmayı amaçlamaktaydı. Bölgenin dağlık ve ormanlık arazi ve dar yolları Almanların ağır tankları için ideal değildi. Alman tankları da 1940 yılında gerçekleştirilen yarma harekâtına gerçekleştirebilecek hareketlilikten yoksundu. Bölgenin dar yapısından ötürü tank çatışmaları sık değildi ve çoğu zaman Alman tankları yakıt yoksunluğundan çatışmaya bile giremeyecek şekilde muharebe dışı kalıyordu. Amerikan M4 Shermanları bu taarruzda kendilerini etkin bir tank olarak göstermiş ve bulundukları zırhlı tümenlerle bölgeye hızlıca varmışlardı. Ardenler taarruzu Alman tanklarının kısıtlanmış olan etkililiğinin boşa atıldığı ve büyük tank kayıplarına yol açan bir kumar harekatıydı. Tankların hareket için yeterince yakıtlarının olmaması muharebe etkililiğini tamamen ortadan kaldıran bir etmen olmuştu.

Tezin son bölümünde, Alman ve Amerikan tankları arasında yapılan kıyaslamanın ve önceki bölümlerde bahsedilen muharebe etkililiğinin kısa bir özeti sunulmuştur. Savaşın başından sonuna kadar aradaki farklılıkların oluşmasında belirleyici olan öğretiler, tank üretim yönelimleri ve geliştirme süreçleri irdelenmiştir. İki tarafın tanklarının arasındaki muharebe etkililiğinin farkları gösterilmeye çalışılmıştır.

Amerikan ve Alman tanklarının muharebe etkililiğinin muharebelerin sonuçlarını nasıl etkilediğini ve belirlenen hedeflerin kazanılmasında ne kadar etkili oldukları, genel bir biçimde açıklanmaya çalışılmıştır. Amerikalıların ve Almanların tank geliştirme ve üretim süreçlerini etkileyen noktalar belirtilmiş, savaşın ilerleyen süreçlerinde özellikle de Alman savaş sanayisinin yaşadığı zorluklar ve bu zorlukların sonucunda tank geliştirme ve üretiminin nasıl etkilendiğinden bahsedilmiştir. İki tarafın ellerindeki imkanlar dahilinde yapabilecekleri farklı hususlar ve tankların etkililiğini artırabilecek öneriler son bölüm bağlamında sunulmuştur.

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