Fire and Fury:

The German Tiger Battalions on the Eastern and Western Fronts, 1942-1945

Daniel Moore

30605377

HIST988

Dr. David Crum

January 11, 2021

Abstract

After finding their tanks outclassed in terms of firepower and armor in 1941, Germany opted to design and field a tank that could defeat any enemy tank on the battlefield while remaining nearly impervious to enemy anti-tank rounds. The Tiger I and II were more than capable of serving in this role, but by the time of their introduction, Germany was on the verge of fighting a defensive war that would require large numbers of tanks that could rapidly relocate across a vast front line. The Tiger tank family has been the subject of hundreds, if not thousands, of publications, but these generally are either detailed technical descriptions of the tanks or its use in the field.

This research will approach the Tiger from the point of its combat effectiveness on all fronts in which it was used, its impact on Allied planners, and its effect on German logistics and production through the latter half of the Second World War. In this context, the Tiger's ability to destroy tanks has been relegated largely to the sidelines, as simply destroying an enemy machine could never have the impact the German High Command had expected. Rather, this research approaches the Tiger in a defensive role, as a force spread among assaulting German units, and as a mobile reserve used to contain Soviet and Allied breakthroughs as they occurred.

Using in-depth analysis of memoirs, battle reports, official unit histories from the Germans and Allies, as well as archival documents, this study proves the Tiger tanks were not effective in the role for which they were designed, placed a significant strain on an already weak German logistic system, and encouraged the Soviets and Allies to produced weapons that were far more lethal against all German vehicles, not just the Tigers.

Dedication

To my parents, for giving encouraging me to always strive to improve myself. I come from a long line of soldiers, and I have no doubt that Dad has offered praise and words of inspiration from Heaven as I wrote about warfare – a subject with which we are both well-acquianted.

To my wife, Raylene, and my daughter Ellie, who have sacrificed countless hours with me over the past 16 months while I was working on this research project. Few people other than the author ever see all the revisions, edits, and deleted pages, but my wife was there for every page. I know I tested her patience as much as this work tested mine, and I can only offer her my most heartfelt thanks for her support, advice, and understanding.

Always.

Contents

Chapter I

Introduction

World War Two was a conflict where mechanized warfare became the epitome of modern warfare. Today, 80 years since the Tiger's first battle, the tanks remain symbols of German armored warfare. The Tiger and Tiger II were among the most formidable Germany had to offer during WWII, and their appearance influenced the development of weaponry capable of defeating them. Initially conceived in response to superior French armor encountered during operations in 1940, the Tigers broke with established *bewegungskrieg,* or maneuver warfare, doctrines employed by Germany in the early campaigns. Instead of speed, these tanks were designed to break prepared enemy fortifications and provide supportive firepower against enemy armor while on the offensive. However, their true power was found in the defensive, where the Tigers proved they could help contain the most aggressive Allied offensives.

Colonel-General Heinz Guderian suggested the shift in armored development that led to the Tiger. Guderian had based many of his theories on the work of others, such as Austrian theorist General Ludwig von Eimannsberger, British officers Major-General J.F.C. Fuller and Captain Basil Liddell Hart, and Marshal Mikhail Tukhachevsky in the Soviet Union.[1] In 1937, Guderian outlined his plan for armored warfare doctrine, which included consolidated

[1] Much of the myth surrounding *bewegungskreig*, known as blitzkrieg, comes from Guderian's autobiography, published in English as *Panzer Leader*, Basil Liddell Hart's *The German Generals Talk*, and Kenneth Macksey's *Guderian*. However, during his time assigned to the Inspectorate of Motor Troops from 1922 to 1928, Guderian only published five articles, and none were focused on German armor or armor doctrine. On the other hand, Ludwig von Eimannsberger had published *The Tank War* in 1934, and it received a broad audience in the German military. If credit is due to Guderian, it is for bringing von Eimannsberger's work to the higher circles where Guderian traveled and popularized the ideas. As T.N. Dupuy wrote, "Guderian was undoubtedly the leader of the movement toward armor-warfare doctrine, but it is evident there were several other young General Staff officers with comparable opinions and similar capability. See: James Corum*: Hans von Seekt and the German Military Reform* (Lawrence, KS: The University Press of Kansas, 1992), 137-143; Ludwig Ritter von Eimannsberger, *Der Kampfwagenkrieg* (Munich: J.F. Lehmanns Verlag, 1934).

deployment and an emphasis on the breakthrough that envisioned heavy tanks as a battering ram. Field Marshal Albert Kesselring, a former German army officer turned air doctrine reformer, argued that the heavy tanks would form the core of the breach. Their sole objective was the destruction of enemy tanks and anti-tank guns and penetrating as deeply as possible while not losing visual contact with them the subsequent wave of medium tanks and armored infantry.[2]

Despite Guderian's plans to incorporate heavy tanks into offensive plans to destroy fortifications and anti-tank emplacements, the *Heer* – the land component of the *Wehrmacht* – and its cavalry arm believed tanks should fit into a reconnaissance role. As a result, the heavy tanks were only theoretical, and even medium Panzer III and IV tanks were not introduced until 1936-1937. During operations in France, the Germans had found their doctrine of *bewegungskreig* was tactically sound, but their tanks lacked overwhelming firepower, particularly against the French SOMUA S35 and Char B1 heavy. This deficiency was mitigated through well-trained Panzer Divisions, where integrated infantry, artillery, and engineer units supported tank advances.[3] This was starkly contrasted by British and French doctrine, where armor was scattered among the infantry divisions, relegating them to an infantry support role rather than fully exploring their anti-tank capabilities.[4]

---

[2] Albert Kesselring, and others, eds., *Manual for Command and Combat Employment of Smaller Units.* MS #P-06B. (Washington, D.C.: Department of the Army, Office of the Chief of Military History, 1952), 115.

[3] Habeck noted that Guderian argued that future wars, i.e., after World War I, would be focused on simultaneously bringing the entire depth of an enemy's defense under attack. This was a compromise between those who viewed tanks as infantry support only and those who believed the tank would win the war on its own. See: Mary Habeck, *Storm of Steel: The Development of Armor Doctrine in Germany and the Soviet Union, 1919-1939* (Ithaca: NY: Cornell University Press, 2003, 251-252.

[4] "Besichtigungsbemerkungen der Kommanierenden Generals des Kommandos der Panzertruppen im Jahre 1937," (Berlin: Kommando der Panzertruppen, 1937), reprinted in Russell Hart, *Clash of Arms: How the Allies Won Normandy* (London: Lynne Rienner Publishers, 2001), 129.

Unlike the Germans, who could muster a large force of tanks at the focal point of the assault, the French and British dispersed their tanks throughout the infantry divisions. They envisioned the machines in a role similar to how they had been employed in the First World War – that of infantry support. After the campaign, some concerns were raised that the Panzer III and IVs had been inadequately armed and armored, and the 1940 Battle of Arras was one such indicator of this fact, as the German tanks had been unable to counter the British Matilda's effectively. To rectify this issue, the German government ordered Porsche and Henschel to submit plans for a 45-ton heavy tank by June 1942 – two full years after the French campaign was over.

During Operation Barbarossa, the Germans were dismayed to discover that the Panzer III and Panzer IV variants could not adequately engage and destroy the Soviet T-34 and KV-1 tanks. Henschel designer Erwin Aders remarked, "there was great consternation when it was discovered that the Soviets tanks were superior to anything available to the *Heer*."[5] Though heavy tank designs had been in the research and development phase since 1937, these early versions of the *Durchbruchswagen* (breakthrough vehicle) were little more than an enlarged Panzer III, as it weighed in at 30 tons compared to the Panzer III's 23 tons. Further, it mounted the same short-barreled 7.5 cm L/24 cannon as the early Panzer IV variants, a cannon woefully ill-suited to anti-tank operations.[6] Eventually, trial and error led to the submission of the VK 45.01H1, which carried an 8.8cm L/56 cannon. This design was demonstrated on the occasion of Hitler's birthday

[5] Dr. Erwin Aders quoted in Bob Carruthers, *Tigers in Combat* (Berkshire, UK: Archive Media Publishing, Ltd, 2011), 14.

[6] The Panzer IV was upgraded to a longer, higher velocity cannon in 1941, the 50mm Pak 38 L/60. It could not penetrate the T-34's sloped armor or the thickness of the KV-1 unless attacking from the flanks or at close range. This failure necessitated the immediate upgrade to the heavier 7.5 cm Kwk 40 L/46 that would remain on the Panzer IV and Stug III and IV for the duration of the war. See Hillary Doyle and Tom Jentz, *Panzerkampfwagen IV Ausf. G, H, and J* (Oxford: Osprey Publishing, 2001), 6-7.

on 20 April 1942. Hitler accepted the Henschel design and, without delay, ordered the vehicle designated *Panzerkampfwagen VI Ausf. H* into production. The vehicles were rushed into service while still in the prototype phase, and this rushed production led to several design changes for the duration of the tank's service life.

As the war raged on, the Allies developed heavier tanks to counter the threat posed by the Tiger, creating the need for a larger, more heavily armored vehicle. The German firms Henschel and Porsche, who had submitted competing designs for the Tiger, had developed a much heavier tank that mounted the 8.8cm KwK L/71. Henschel won the contract again, and their vehicle was designated *Panzerkampfwagen* Tiger *Ausf. B*, also referred to as the Tiger II. It incorporated the same powered turret motor as the Tiger I and the same powerplant – a Maybach HL 230 P30 690 horsepower gas engine – as the Tiger I and Panther tanks. Tigers I and II shared an engine by necessity, as Allied bombing prohibited a new engine from being produced to power the significantly heavier Tiger II. Thus, the tank was underpowered, slow, and incredibly fuel-inefficient, and the strain on the drivetrain created unforeseen seal, gasket, and steering gear failures which had not been reported in the Tiger I and Panther tanks. Despite these failures, the Tiger II was reportedly impervious to the Soviet 122mm D-251 cannon, the largest tank gun of the war, at ranges exceeding 600 meters.[7] This report was contradicted somewhat by later Soviet testing; though a round may not penetrate, German use of vanadium instead of molybdenum, a material the Germans desperately lacked, led to spalling on the interior face of the armor plate and, depending on shot placement, spalling created metal fragments that often damaged the engine or transmission and rendered the vehicle inoperable and, in many cases, killed German crewmen. Given the circumstances, inoperability equaled destruction.

[7] Igor Zheltov, *Iosif Stalin* (Tankomaster Special Issue 02, 2002), 33.

The total number of Tiger I and II combined was less than three thousand; conversely, the Soviet Union produced nearly six thousand IS series heavy tanks from 1944-1945 alone. The Tigers were built in sparse numbers, compared to other German vehicles such as the StuG or Panther, due to designs that were difficult to manufacture, the lack of streamlined production, and bomb damage to the sole factory which produced them. Further, where the Americans were reasonably adept at repairing damaged vehicles and returning them to the front and where the Soviets could produce new tanks cheaper than they could recover and repair them, Germany enjoyed neither of these situations with great regularity. The Tigers required extensive daily maintenance, and even during operations proscribed maintenance checks were required to be conducted periodically throughout. Further, major field overhauls were exceedingly laborious, an obstacle that prevented many s.Pz.Abt from joining battle with all their Tigers operational.

Simply stating that the Tigers were poorly designed does not tell the whole story. The government of the Third Reich inserted the Nazi Party into nearly every aspect of the procurement process, and political affiliations often trumped actual technical expertise.[8] For instance, Ford and Opel were manufacturers with considerable experience and technological ability in areas of mass production and the use of the assembly line. However, these firms were forbidden from participating in the bidding process.[9] Instead, firms such as Henschel, MAN, and

[8] United States Holocaust Museum, "Gleichschaltung: Coordinating the Nazi State," *Holocaust Encyclopedia*. https://encyclopedia.ushmm.org/content/en/article/gleichschaltung-coordinating-the-nazi-state. Accessed on November 26, 2022.

[9] Both Ford and Opel, a General Motors subsidiary, have been found to have significantly contributed to the German war effort until the declaration of war between German and the US in late 1941. Ford claims its Dearborn headquarters had lost control of its plant in Cologne, as the German government confiscated the factory. However, Ford appointed a German Board of Directors, renamed German Ford to Ford Werke, and sold stock in that new corporation preventing the Third Reich from restricting its production due to non-German ownership. Documents uncovered during recent litigation indicate Ford Werke had dedicated its entire production capacity to military trucks by 1941. See: Ken Silverstein, "Ford and the Führer," *The Nation* (January 2000); James Lucas, *World War II through German Eyes* (New York: Sterling Publishing, 1987), 114.

Porsche gained the contracts despite limited or no practical experience in mass production. German tank manufacturing firms were not prepared to produce vehicles in the numbers Germany would need to fight the coming war, and the manufacturers and designers approached tank production from the perspective of an artisan, unlike Messerschmitt, who had designed the ME109 fighter with mass production in mind. German tank designers were undoubtedly capable of producing models which could be streamlined in the face of increasing material shortages, as they did with the Panther. Still, the design flaws in the Tiger were never corrected, and vehicle production remained low.[10]

Additional factors exacerbated the inherent difficulty in the German tank-building approach. First, the civilian industries failed to switch to military production until 1943, and then did not adopt a wartime economy mentality as thoroughly as the Americans did, which produced a shortage in common consumer goods such as cosmetics and appliances. Secondly, there was little to no expectation that the large factories producing tanks would have to expand their production lines to accommodate increased demand. Henschel built Panthers, Tigers, and other Panzer variants in their Mittelfeld factory, Werk III and Tiger production took place in only shops three and five. Urban limitations prevented Henschel from building additional production lines. As the firm also did not possess the machinery required to bend or weld heavy armor plates, they received hulls and turrets from other facilities that Henschel employees then

[10] In part, German tank production was inhibited by the corporations' belief that their military support would be brief. As a result, they never prepared for total war and the suspension of civilian production. Further, the manufacturers failed to anticipate the need to expand production lines, which created a lack of spare parts and prevented stockpiling of finished products. These deficiencies were partially remedied after Albert Speer became Reich's Minister of Armaments. See: Mark Healy, *Zitadelle: The German Offensive against the Kursk Salient 4-17 July 1943* (Stroud, UK: The History Press Limited, 2010), 135-148; Albert Speer, *Inside the Third Reich: Memoirs* (New York: The McMillan Company, 1970), 244-245.

finished. Thus, Germany not only never had a surplus of spare parts as the Allies did, but their production could be bottlenecked effectively by strategic bombing.[11]

Purpose of Research

The Tigers were undoubtedly well-suited to destroying enemy tanks; this was their primary purpose. However, the war would not be won through tank destruction alone. In order to have an impact on the war, the Tigers had to maintain a high success rate in the missions they were given. In many cases, these fell outside the Tiger's established doctrinal role, and they were forced into a defensive role for which there was no doctrinal guidance.

In many cases, they were sent alone or as a pair, which directly violated General Guderian's guidance for the employment of heavy tanks. Moreover, the German government had grand expectations for these tanks. Nevertheless, they consistently deployed them to sectors inappropriate for heavy tanks, failed to support them with adequate spare parts, and failed to devise a doctrine tailored for a purely defensive war. Would the Tigers be able to overcome these obstacles?

The Tiger tanks were generally unsuccessful in their doctrinal role as a breakthrough tank. Its doctrinal role was as the first wave – the *schwerpunktwaffe*, or main emphasis weapon – and it was to close swiftly with the enemy, destroy enemy tanks and artillery, then defeat any forthcoming counterattacks. Each subsequent wave would have a specific role and well-defined mission as well. This required concentration and the ability to withstand tremendous punishment. The Tigers were indeed capable of achieving both, but as the war shifted from ongoing offensives to a primarily defensive war, they were rarely used in the role they were created for.

[11] Albert Speer, *Inside the Third Reich: Memoirs* (New York: The McMillan Company, 1970), 244-245.

Secondly, the Tiger's most significant impact outside of battle was on Allied planners and armor research and development. The Tiger's heavy armor drove the Soviets to design and produce vehicles with increasingly heavier guns with greater armor thickness, and captured Tigers were thoroughly tested, which allowed the Allies to make changes to their strategic and tactical plans. At the same time, they provided critical intelligence regarding the most effective means to disable or defeat the Tiger.

Lastly, the Tiger series were developed as breakthrough tanks meant to serve in an offensive role, but they were most effective when used in the defense. As Chapter Three will discuss, from 1943 to the war's end, the Tigers excelled defensive missions when they were in optimal terrain. This is particularly true of the Eastern Front, where Tigers operating as part of Army Detachment Narva held up Soviet advances at the Narva bridgehead for six months, and in the Courland Pocket, where German forces were cut off for nearly a year but continually beat back all Soviet attempts to crush the pocket. Moreover, in the Italian Campaign, the Tigers suffered heavily, as Chapter Four will outline, but using the poor terrain to their advantage, they assisted in holding the mountainous peninsula for 22 months, until the last week of the war. Additionally, local counterattacks to support the defense of France, such as at Villers-Bocage, took advantage of command mistakes in the British 7th Armored Division. The tactical victory at Villers-Bocage allowed Germany to hold Caen – a city Allied planners had expected to control on 6 June - for two months.[12]

Additional factors rendered the Tiger less combat-effective than it may have been otherwise. As noted above, German tank production was not positioned to build tanks rapidly nor to have surplus parts and major components. These problems were exacerbated by transportation

[12] Carlo D'Este, *Decision in Normandy: The Real Story of Montgomery and the Allied Campaign* (London: Penguin, 1983), 62-64.

difficulties, the struggle to adequately supply the heavy tank battalions, and the Allied bombing campaign that targeted factories that produced vital parts such as engines and transmissions. An example of these obstacles was the Tiger's width, which required a special narrow track for transport. To satisfy freight width restriction guidelines, the Tiger had to be transported with its outmost row of roadwheels on each side removed, a total of sixteen wheels. The tank was then fitted with 20-inch-wide transport tracks. Once at its destination, the Tiger was refitted with its roadwheels and combat tracks, which took half an hour to complete per side. This prevented the Tiger from moving immediately to combat if the situation required. This was partially mitigated by the practice of transporting the tanks with their combat tracks in place when being moved about in enemy territory, with the caveat that this practice could not be used if there were narrow passes or tunnels along the route.[13]

Combat Performance and Impact

There is little question that the Tigers made an impact on the battlefield. The Tigers were effective against enemy tanks on all fronts, whereas the British, American, and Soviet armor was woefully ineffective unless they maneuvered to suicidally close range. There were occasions when the German confidence in the new tanks led to disastrous results and when it led to massive success. Albert Speer recalled that Hitler expected the new Tiger I to change the war's course, as he did with every new technological development. His plan was for the Tigers to break through the defenses of Leningrad as a monumental debut. Guderian recalled:

> Hitler ordered that the Tigers be committed in a quite secondary operation, in a limited attack carried out… in the swampy forest near Leningrad where heavy tanks could only move in a single file along the forest tracks, which was exactly where the enemy anti-tank guns were posted, waiting for them. The results were not only heavy, unnecessary

[13] Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 69–72.

> casualties but also the loss of secrecy and of the element of surprise for future operations.[14]

The Soviets fired on the side armor of the lead and trail vehicles, disabling them, thus trapping the tanks; the remaining four were finished off in short order.[15]

Though the Tiger did not make a remarkable impression on the Soviets initially, it certainly did when it operated in the terrain it was designed for – the open steppes, where the 88mm cannon could be used to lethal effect.[16] In one such instance, a Tiger from the 2nd Platoon, 13th Panzer Company, 1st SS Panzer Regiment *Leibstandarte-SS Adolf Hitler* commanded by Franz Staudegger engaged a group of fifty T-34 tanks on the southern flank of the Battle of Kursk, near Psyolknee. Expending his Tiger's ammunition, Staudegger and his crew destroyed twenty-two T-34s and scattered the remainder. Remarkably, this feat was accomplished with a Tiger that had been left for repairs while the bulk of the fighting was further west. Staudegger and fellow Tiger commander Rolf Schamp had been left behind with tanks that had damaged tracks and running gear, but they were able to make hasty repairs which allowed them to defend against the advance of the Soviet 10th Tank Corps. In the fighting, Staudegger's Tiger was hit by 76mm shells sixty-seven times, and though the damage was extensive, Staudegger's actions blunted the Soviet advance, and he was awarded the Knight's Cross – the first Tiger crewman to earn the prestigious award.[17]

---

[14] Heinz Guderian. *Panzer Leader* (New York: E.P. Dutton and Company, 1952), 280.

[15] Albert Speer, *Inside the Third Reich: Memoirs* (New York: The MacMillan Company, 1970), 288-289.

[16] Contrary to German production methods, the Soviets opted to keep their tanks easy to build and simple to repair, and rather than upgrading existing tanks, they expended those in missions they were unlikely to complete successfully to buy time while more robust models were built. See: Anthony Tucker-Jones, *Stalin's Armour, 1941-1945: Soviet Tanks at War* (Yorkshire: Pen and Sword Military, 2021), 8-9.

[17] Evan Pinter, "Franz Staudegger – German Tiger Ace in the Battle of Kursk." *War History Online,* March 2017. Retrieved from https://www.warhistoryonline.com/guest-bloggers/franz-staudegger-german-tiger-ace-battle-kursk.html

Further evidence for the Tiger's killing abilities was found in an earlier report from 1943, written by *Leutnant* Zabel of 3rd Company, 503rd, regarding an attack on a Soviet collective farm west of Serenikovo. As the 503rd was still composed of both Tiger I and Panzer III, the Tigers drew to the front to absorb the impact of anti-tank shells. Zabel's Tiger was hit on the structure, knocking away the protective tank tracks, on the commander's cupola, blowing the vision glass out from its welded position, and on several hatches. One was so warped it later had to be opened with a pry bar. Zabel's Tiger was incapacitated when the gun mantlet was stricken, causing the cannon to be lodged in the recoil position, but the Tiger left battle under its own power. Later, the crew noted the tank had been hit by two hundred twenty-seven anti-tank rifle rounds, fourteen 57mm and 45mm anti-tank gun shells, and eleven 76.2mm main gun rounds. The right suspension was damaged, the road wheels and suspension arms were perforated, and the idler wheel was wobbling on its mount, but the Tiger drove a further sixty kilometers away from the battle.[18]

After their inability to defeat Soviet tanks with their Panzers during Operation Barbarossa, the Germans sought to recapture qualitative superiority in armor and firepower. The Tiger I accomplished this for a time, but to what effect? In the war of extermination in the East, the number of tanks destroyed by the Tigers made very little difference to a people not only fighting for their homes and country but for their very right to existence. For example, in a report

[18] This report is substantiated by the firsthand accounts of the authors of the combat history of Battalion 503, including Zabel's death in a Tiger after his promotion to *Oberleutnant* and assumption of command of 3rd Company. See: Franz-Wilhelm Lochman, Richard Freiherr von Rosen and Alfred Rubbel, *The Combat History of German Heavy Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 123, and Thomas Anderson and J. Spencer-Smith, ed., *Tiger, vol 1.* (Oxford: Osprey Publishing, 2013), 6. The original report written by Lieutenant Zabel of 2nd Company, s.Pz.Abt *503* can be found in Robin Schaefer, "Panzer VI combat and operational evaluation," *War History Online* (November 2012), https://www.warhistoryonline.com/articles/tiger-panzer-vi-combat-and-operational-evaluation-1-252-hits-taken-in-combat-ww2-by-rob-schafer.html, accessed 12 December 2021.

by Major General Khlopov, it was deemed acceptable that the T-34 would require a complete engine rebuild somewhere between one hundred and two hundred miles after leaving the factory. High Command reasoned this was tolerable as it was presumed the tank would be destroyed long before it reached that point, and as it was cheaper to produce a new tank than repair a destroyed one, and manpower was considered expendable from the mildest perspective, the Soviets were more than willing to wage a war of attrition to hold back the Germans.[19]

From an analytical perspective, the Tiger was a design required by Guderian's doctrinal theories, a design rejected as unnecessary based on the expected conduct of the coming war. The war would be swift, based on maneuver, and heavier vehicles would get in the way – why break through a fortified position when the faster light and medium tanks could outflank the position, surround it, and starve it out? This quest for mobility inhibited the evolution of German armor and made research reactive rather than proactive; where Guderian argued the Panzer III and IV would be the extent of armor development required by Germany, the Soviets had a more practical understanding of tank evolution based on their experiences at Lake Khasan and Khalkin Gol, which led them to develop sloped armor and welded plates such as found on the T-34.[20]

From 1938-1941 German tank development stagnated, and only after encounters with superior Soviet designs did the Germans realize they were producing inferior weapons, though their experiences against the French and their SOMUA S35 should have indicated a higher velocity, larger caliber cannon would be required forthwith.[21] It is important to note that, from a

[19] See: United States Army, Aberdeen Proving Ground, *Aberdeen: The T-34 and KV-1 Test.* Retrieved from http://www.tankarchives.ca/2013/04/aberdeen-t-34-and-kv-1-test.html.

[20] Alvin Cox, *Nomonhan: Japan against Russia 1939* (Berkeley: Stanford University Press, 1990), 998.

[21] Rather than testing their weapons against armor plating roughly equivalent to that of the enemy, the Chief of the Ordnance office and Inspector of Artillery told Guderian in no uncertain terms that the *Wehrmacht* had no interest in producing multiple shell calibers, and as such, the 37mm would be used in armor, as it was the same

historiographical perspective, the attitude toward German tank development had a generally flat trajectory: the tanks were upgraded to extend the life of obsolete models, as in the Panzer III and IV, where the engine and suspension were severely compromised rather than building replacement variants. They did this for complex reasons. However, as the Germans had built new armored vehicles on existing chassis, the costs involved with not only replacing the tank but replacing assault guns, mobile artillery, and mobile anti-tank and -air platforms with new models entirely was a task Germany was increasingly unlikely to accomplish after 1942.[22]

For the Americans, the Tiger's reputation followed them from Africa to France, as several works recounting fears of American and British tankers and frustration with their own equipment are available. These works, such as Robin Neillands' *The Battle of Normandy, 1944* substantiate "mythical" information about the Tiger to a certain extent and refutes information based on German propaganda, such as exorbitant numbers of kills attributed to Tigers or the "Tiger-frenzy" that occurred during the Battle of the Bulge, when reports of hundreds of Tiger II's came to SHAEF, while there were only 45 known to be in the area, belonging to 1ST SS Division *Leibstandarte's schwere SS-Panzerabteilung* 501.[23] Additionally, it appears even American commanders not on the ground transferred attributes of the Tiger to other Panzers. Omar Bradley wrote, "the American tankers learned that tank-for-tank their Grants and

caliber as the towed AT guns fielded by the infantry and ammunition was plentiful. See, Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 27.

[22] This stagnation is discussed more broadly in several works. See: Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978); Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol. 1, 1933-1945* (Atglen, PA: Schiffer Publishing, 1996); James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: The University Press of Kansas, 1992).

[23] Records indicate the 501st was at full strength based on the tables of organization for a heavy tank battalion. This included 45 Tiger II tanks broken into three Companies of 14 Tiger IIs each plus three for the battalion commander, his adjutant, and the signals officer. See: Gregory Walden, *Tigers in the Ardennes: The 501st Heavy SS Tank Battalion in the Battle for the Bulge* (Atglen, PA: Schiffer Publishing, 2014), 22-25.

Shermans were no match for the more heavily armored and better-gunned Panzers."[24] Bradley recounts information about the Tigers in North Africa, but his inconsistency is telling; at the battle in question, Kasserine Pass, the Germans were using the Panzer III and Panzer IVD, not the long-barreled Panzer IV F2. Neither the III nor the IVD could match the firepower of the Sherman, and there were neither Panzer IV F2s nor a significant amount of Tiger Is at Kasserine. Thus, the presumption may be made that Bradley attributed the American's sound defeat to the Tiger when only a handful participated.[25]

Methodology

The research methodology will be a multifaceted approach, as there are significant questions raised as a result of deficits in academic knowledge. There is no shortage of information available about the Tiger I and Tiger II tanks; British wartime reports outlining their dissection of a Tiger I are easily available, as are recollections of the Tiger series as recounted in memoirs written by the likes of Albert Speer, Otto Carius, and Heinz Guderian, to name a few. What is lacking is a detailed analysis of the operational activities of the *schwere Panzerabteilung*, both as attached to the *Wehrmacht* and the *Waffen-SS*. Further, through the duration of the war, there were only fourteen such heavy tank battalions, three of them being reconstituted and receiving new nomenclature: for example, s.Pz.Abt 502 became *schwere Panzer-Abteilung* 511 in January 1945.[26] Of these, only seven have been the topic of published histories that rely solely on firsthand accounts.

---

[24] Omar N. Bradley, *A Soldier's Story* (New York: Henry Holt and Co. Inc., 1951), 40–41.

[25] Robert Citino noted that the German attack, which included the Battle of Kasserine Pass, was spearheaded by over two hundred German tanks, but only a dozen Tigers participated. See: Robert Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 91.

[26] The majority of these units were attached to the *Heer* – Army: 501 through 511 and the 301st Funklenk. The 511th was a reconstituted 502nd and thus did not add another new s.Pz.Abt to the count and the 301st was not equipped with the full complement of Tiger and Panzer III; instead, it was outfitted with demolition carriers. The SS

These questions will require research utilizing both qualitative and quantitative analysis of information readily available through multiple publishers as well as archival data retrieved online as well as in-person from the Bundesarchive in Berlin, Germany. This repository contains extensive information about the Third Reich and, according to the website, houses four hundred seventeen kilometers of physical data, which has been carefully categorized for research purposes. Additionally, the *Deutsches Panzermuseum Munster* in Munster, Germany, and the Bundeswehr Military History Museum in Dresden, Germany, have recorded firsthand accounts from Tiger I and II tank crews. The Bovington Tank Museum in Bovington, U.K., has an operational Tiger I as well as full history since its capture in Tunisia and also has firsthand accounts of British crews who faced the tanks in North Africa and France.[27]

Doctrinal analysis will play a significant role in the research. Prior to World War II, armies worldwide struggled to determine the future of conflict and how to avoid the trench warfare of the Western Front. As the Germans had traditionally detested static warfare, they had a personal stake in regaining the ability to outmaneuver an enemy. Of note in Field Marshal Albert Kesselring's manual was the purpose of the tanks within this doctrine: they were to be used for defensive purposes only in exceptional situations. If this were the case, why were heavy

---

had three s.Pz.Abt: the 501st in 1 SS Panzerkorps, the 502nd in 11 SS Panzerkorps, and the 503rd as part of III SS Panzerkorps. The abbreviation for the heavy tank battalion changed when it belonged to the Waffen-SS as well; the *Heer* forces were designated *schwere Panzerabteilung* or s.Pz.Abt, whereas the SS designation was *schwere SS-Panzerabteilung* or s.SS-Pa. For simplicity, these designations will be used here as well.

[27] Tiger 131 belonged to the 504th s.Pz.Abt and was captured on 21 April 1943 after three shots from British 6-pounders wounded the driver and hull gunner and disabled the gun traverse and elevation mechanism. Tiger 131, still drivable, was abandoned by its crew and recovered by the British 48th Royal Tank Regiment. After it was taken to Great Britain, it was repaired with captured parts and subjected to trials at the School of Tank Technology. After trials, it was heavily dissected and rendered inoperable. It was sent to the Tank Museum in Bovington, UK, in 1951 for display. Tiger 131 was completely disassembled and restored in 1990, and with the addition of a Maybach HL230 engine borrowed from a Tiger II (its own engine, the Maybach HL210, had been cut into cross sections for display), the tank became the only fully operational Tiger in the world. A full history of Tiger 131 can be found in Bruce Newsome, *The Tiger tank and Allied Intelligence, vol. III: Tiger 131 from Africa to Europe* (Coronado, CA: Tank Archives Press, 2020).

tanks introduced at a point of the war when Germany was rapidly losing the ability to maintain its offensive operations? Did Hitler believe these tanks could truly turn the tide, or was it based on the Clausewitzian "cult of the offensive" that had permeated German doctrine since before the Franco-Prussian war?

Any thorough analysis of combat data will eventually encounter strong biases among the Allied forces regarding the number of encounters with Tigers, the number of Tigers destroyed, and the number of tanks destroyed by Tigers. One source claimed the Tigers formed the bulk of the armored force at the Battle of the Bulge when there were less than one hundred fifty Tigers on the Western Front, and those approaching the Ardennes in 1944 played a very limited role.[28] Such unrealistic accounts are also found in Soviet literature and propaganda. Soviet sources claimed over seven hundred Tigers were destroyed at Kursk, when only one hundred forty-nine Tigers actually participated.[29] Major Christopher Wilbeck's thesis, later published as *Sledgehammers: Strengths and Flaws of Tiger Tank Battalions in World War II* (2004), also examined the effectiveness of the s.Pz.Abt on both fronts during the same time period, but focused on major operations such as the Battle of Kursk and the operations in France from 1944-1945 while also relying heavily on kill: loss ratios, i.e., how many tanks did Tigers destroy compared to the number of Tigers destroyed, to determine the Tigers' effectiveness.[30]

The weight of kill: loss ratios as a standalone parameter must be heavily discounted. Steven Zaloga noted in his review of Wilbeck's work that "since the author often lacks tangible

---

[28] See: Danny S. Parker, "German Tiger Tanks were at the Bulge, but not in the numbers usually cited for them," *World War II*, March 1990, 8. Jean Restayn, *Tiger I on the Eastern Front* (Paris: Histoire and Collections, 1999), 101.

[29] Jean Restayn, *Tiger I on the Eastern Front* (Paris: Histoire and Collections, 1999), 101.

[30] Christopher Wilbeck, *Sledgehammers: Strengths and Flaws of Tiger Tank Battalions in World War II* (Bedford, PA: Aberjona Press, 2004).

evidence of the combat performance of the Tigers in roles other than tank-vs.-tank fighting, he relies on Tiger battalion kill claims against Allied tanks to assess their effectiveness. The author seems unaware that the *Wehrmacht's* own intelligence service on the Eastern Front, *Fremde Heere Ost*, regularly discounted German army tank kills by thirty to fifty percent."[31] Kill claims particularly must be reduced in value due to the proliferation of false accounts which have spread, according to Dr. Roman Töppel, due to the works of German author Franz Kurowski and his dramatized accounts and glorification of the *Wehrmacht*. Of several notable "Panzer aces" – Michael Wittman, Alfred Rubbel, Otto Carius, and Kurt Knispel – Kurowski mentioned in his *Panzer Aces*, Töppel was able to interview Carius and Rubbel, who represented the 502nd s.Pz.Abt and 503rd s.Pz.Abt respectively. Rubbel denied all of the claims Kurowski made about the 503rd and Knispel, particularly the one hundred sixty-five tank kills attributed to Kurt Knispel. Both Carius and Rubbel stated it was not customary practice to count tank kills, and while some commanders may know an exact tally, those are the exception rather than the rule.[32]

To overcome these biases, a thorough analysis of kills is required, both killed by the Tigers and Tigers killed, and a more comprehensive approach is required that regard the Tiger from a perspective greater than simple kill: loss ratios. For the purposes of this research, and as a result of the operational realities, a Tiger rendered inoperable will be considered knocked out, as Soviet and Allied planners recorded abandoned Tigers as destroyed even if they were not captured and the Germans potentially would be able to recover them. Operational histories have significant troves of data, including the names of crew members for a given Tiger, but these

[31] Steven Zaloga, "Review of Sledgehammers: Strengths and Flaws of Tiger Tank Battalions in World War II," *The Journal of Military History*, vol. 68 no.4 (2004), p. 1283-1284.

[32] Roman Töppel, "The War, One Great Adventure: The Writer and 'Historian' Franz Kurowski," (2018) retrieved from https://www.academia.edu/37429738/The_War_One_Great_Adventure_The_Writer_and_Historian_Franz_Kurowski_2018, accessed 17 January 2022.

records must be substantiated as thoroughly as possible using the aforementioned archives in Germany and the U.K. In cases where information has been taken from journals kept during the war, such as *The Combat History of German Tiger Battalion 503 in World War II,* data will be fully cross-referenced for accuracy. The history of the 503rd, for example, was written by members of the 503rd with contributions from its remaining living members and its last commander. These accounts cannot be taken at full face value, of course, but they will be regarded with certain credibility unless proven otherwise. Lastly, as the Tigers had a role in the last three years of the war, years where fighting was nearly constant, the research will be broken down in phases; from initial deployment to the Battle of Kursk, from North Africa to the Battle of the Bulge, from Kursk to the end of the war in the east, and the end of the war in the west. Statistical assessments will be based on quantitative data such as kills as well as the emphasis Allied planners placed on the tanks and the level of the response given by said planners.

Historiography

From a historiographical perspective, the Tiger series has been covered by a significant amount of academic research and military history literature. As a weapon, the Tigers, both most commonly referred to as Tiger I and Tiger II, were among the most heavily armed and armored tanks when they were initially deployed in 1942 and 1944, respectively.[33] Yet, for all the volumes committed to the memory of these tanks, the research has generally fallen into two categories: the mechanical aspects of the tank and its technical development or as a machine that was used in spectacular fashion by the men of the *Panzerwaffe*. The purpose of this research is to

[33] Generally, literature refers to these vehicles by their more common names. This includes primary source material as well, such as memoirs by Speer, von Mellenthin, and Guderian; as such, I have chosen to do so as well.

combine both aspects of the Tiger through the lens of mission performance and effects on the Allies during the course of the war.

Thomas Jentz's *Panzertruppen: The Complete Guide to the Creation and Combat Employment of Germany's Tank Force, 1933-1942.* This collection draws on primary source material, including battle reports, personal accounts, maintenance data, replacement figures, and numerous appendices, which serve to provide a thorough understanding of the composition of Germany's armored forces in the war while also providing succinct information regarding technical development and organization of the heavy tank battalions.[34]

Another work by Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics*, is one of the more valuable works for this research. This book focuses on the practical application of the Tigers and presents after-action reports, which the author believed were invaluable in understanding the true nature of the doctrinal application of the heavy tanks. Jentz's work provides the theoretical framework but only provides an abbreviated understanding of unit performance and does not analyze combat effectiveness according to the parameters of this research.

From the intelligence perspective, Bruce Newsome's four-volume work *The Tiger Tank and Allied Intelligence* provides a chronological account of the development of the Tiger, Allied reports from the first encounters with the Tiger, and information regarding its exact specifications and capabilities as determined through British testing. This series provided an in-depth look at the Tiger throughout its early history, and as it was focused on the experiences of the Western Allies, it provided significant source material for the campaigns in North Africa.

[34] Thomas Jentz, ed. *Panzertruppen: The Complete Guide to the Creation and Combat Employment of Germany's Tank Force, 1933-1942.* (Atglen, PA: Schiffer Military History, 1996), 7.

There are several works focused on the operational history as well. Christopher Lawrence's *Kursk: The Battle of Prokhorovka* is a comprehensive volume that presents archival data from both the Soviet Union and Germany to analyze the Battle of Kursk through unit histories rather than memories of those at the battle. Through detailed analysis of reports from both nations, Lawrence was able to present a battlefield with detailed accuracy. His *The Battle of Prokhorova: The Tank Battle at Kursk* provides the same level of accuracy and reliance on archival records, but as a standalone section of *Kursk*, this book is more fiscally accessible than the larger work.

David Glantz and Jonathan House's *The Battle of Kursk* also provided an in-depth account of this battle, and it provided foundational material analyzing Soviet troops' movements based on German deployments as well as a glimpse at the relationships between Soviet leadership at the front. This work also relies on Soviet archival data, which allowed Glantz to present Soviet actions with great accuracy.

Several works focus solely on the Tigers, which were given to the SS units. French MacLean's *Waffen-SS Tiger Crews at Kursk* provided not only doctrinal changes made by the SS but the Tigers in action on the southern flank of the battlefield. His narrative is supported by German and Soviet archival data as well and is mutually supportive of other secondary sources. Similarly, Ian Michael Wood's *Tigers of the Death's Head* and Wolfgang Schneider's *Das Reich Tigers* and *Totenkopf Tigers* present the combat histories of two Waffen-SS divisions from 1943-1945. Schneider relied on combat reports, and firsthand accounts where available to recount the effectiveness of the Tiger when employed by the Waffen -SS.

While the aforementioned works succinctly outline how the Tiger was built, why it was built, and the exploits of those for whom it was built, none of these works provides a significant

amount of information regarding the combat effectiveness of these vehicles both within and outside the operational constraints German armor doctrine imposed on the deployment of the Tiger series. Nor do these works analyze the research and development impact the vehicles had on the conduct of operations on both the Eastern and Western Front, and what, if any, real impact these vehicles had on the overall war effort beyond being a symptom of German over-engineering, exorbitant cost, and resource drain that was typical of the *Wunderwaffe* which were expected to provide miraculous victory. It could be considered that the Tigers were less a weapon than a symbol; they were a physical representation of the military values of Nazi Germany with the intense focus on the offensive.

As a hypothetical thought experiment, it can be theorized Germany would have been better off building more StuG III and IV's, or more Panthers, rather than spending upwards of fifty-four thousand manhours and 250,000 Reichsmarks per Tiger I and three hundred thousand manhours and 800,000 Reichsmarks per Tiger II.[35] Certainly, the engineering prowess needed to design and build such tanks highlighted the Third Reich's quest for dominance in science and technological development, and the tanks' overwhelming firepower and armor were suitable for Dr. Goebbel's propaganda machine, but were these machines worth the sacrifices made in steel, manhours, and other tangible resources Germany was desperately lacking?

Organization

The dissertation will be organized in generally chronological order, divided into five chapters plus maps, diagrams, and graphs illustrating certain aspects of the Tiger I and II's

[35] These are estimates, though there is more reliable information available for the Tiger I. The most accurate estimate is The Official Wartime Report on the Tiger I produced by the School of Tank Technology at Chobham Lane, U.K., and Schiebert's *Die Tiger-familie*. See: Bruce Newsome ed., *PzKw VI Tiger: The Official Wartime Reports* (Coronado, CA: Tank Archives Press, 2020) and H. Schiebert, *Die Tiger Familie* (Friedberg, West Germany: Waffen-Arsenal, 1979).

combat deployments, technical aspects of importance, and comparisons between the Tigers and their foreign counterparts, such as the IS and KV series and T-34 variants from the Soviet Union, Churchill, Cromwell, Comet, and Sherman variants from the British Commonwealth, and Sherman variants and early production M26 Pershings from the U.S.

The first chapter provides the introduction, presents the purpose of research and arguments, and provides the historical background of the Tiger and heavy tank battalions. The second chapter will outline the development of the heavy tanks from initial formation, deployment, combat history, doctrinal organization, and the overall methodology and historiography from the German, Allied, and Soviet perspectives. This chapter will contain a full analysis of the evolution of German armor doctrine as well as the integration of the Tiger's doctrinal role and mission, to include equipment, manning rosters, and tactical disposition within that doctrine. This chapter contends that the Tiger tank was developed as a result of the fear of static warfare Germany waged in World War I and argued that the doctrinal role of the Tiger was based on the 'cult of the offensive' dogma that had permeated German military philosophy.

Chapter three provides an analysis of the Tigers on the Eastern Front from 1942-1945 with emphasis on the battles of Stalingrad and Kursk, though smaller engagements will be included, particularly when those engagements – such as the initial deployment outside Leningrad – led to Tigers being defeated by the Soviets prior to the introduction of the 85mm D-5T cannon found on the SU-85 and the T-34/85 and the 122mm D-25T on the up-gunned IS-85. This chapter builds on the basic argument that the Tiger tank was not combat-effective in the offense, lost a significant portion of its tactical flexibility through the removal of the battalion's medium tanks, and was most effective in defensive operations where a battalion was dispersed, which allowed for shorter movements and enhanced battalion-level support. It further expands

the fundamental contention by arguing that the German military command failed to recognize the tactical superiority of dispersed armor when in a static defensive posture. This method had no doctrinal support – Guderian demanded concentration – but when it was employed, it proved to be highly successful.

Chapter four will provide an analysis of the campaign in North Africa and the Western Front from 1942-1945, with an emphasis on the defensive actions south of Tunis, the Italian Campaign, and the operations after the Invasion of Normandy. This chapter will discuss British modifications to the Sherman, such as the Sherman Firefly, which was armed with the Ordnance QF 17-Pounder. This chapter will present further arguments in favor of the combat ineffectiveness in the offense while supporting the argument that the tanks were capable in their defensive role, mainly when dispersed along a front with good infantry and artillery support. This chapter will also argue that the Tigers could be adequately defended against through the coordinated use of mines, anti-tank guns, and artillery.

Chapter five will be the assessment and conclusion; the assessment will be based on several tangible criteria, excluding kill: loss ratios. While kill: loss ratios will be discussed as relevant and will be broken down by battalion, Tigers not destroyed by enemy action will not be included in the count; for example, the *Panzer Lehr* division lost its first five Tiger IIs to mechanical failure before they could be used in combat; thus, these five, and others, will not be credited as destroyed by enemy action. Further, this information will not be used as a determining factor, as there are indications that the data for some battalions is either incomplete or inaccurate. This section will also discuss certain inherent flaws in both the Tiger I and II outside the exorbitant costs; these flaws, such as the drivetrain, steering gear, and in the case of the Tiger II, the seals, gaskets, cooling system, and metallurgical deficiencies due to the lack of

molybdenum (vanadium served as a replacement material, and was a poor substitute) which created low malleability that often contributed to the loss of as many tanks, or more significant numbers of tanks, than enemy actions.

The conclusion will also have a brief comparison with the *Panzerkampfwagen V* Panther, a vehicle designated as a medium tank by the Germans that was within the same weight class as the American M26 Pershing, British Churchill, and Soviet IS-2. The Panther also had more effective frontal armor, better gun penetration, and was lighter and faster than the Tiger while also being more fuel efficient and cheaper to produce by nearly half than the Tiger, as the Panther had been intended to be mass produced. The Germans were able to produce over six thousand Panthers, even given the scale of Allied bombing, and only hypothetical discussion could surmise the "what-if" outcomes were Germany to have abandoned Tigers altogether to focus on the Panther.[36]

There is little doubt the Tiger I and Tiger II made an impact on the battlefield, but they were only able to prolong a war that was increasingly unwinnable by 1943. The Tigers relied on vast resources per battalion, and their fuel consumption and spare parts requirements – not to mention the fuel for logistic support – strained the supply lines for any organization the battalions were attached to. Of more significant concern is the failure to modify the original doctrine to include defensive operations and OKW's refusal to abandon the concentration principles with which they were enamored.

---

[36] While the Germans designated the Panther as a medium tank, it outweighed the American M26 and the British Churchill and was the same weight as the Soviet IS-2, all of which were recognized as heavy tanks. Further, the Panther had a more effective armor profile in the front, as it had sloped armor, and its cannon is considered one of the most powerful of the war, and, more importantly, it was designed to be mass-produced. See a comparison of range data between the Panther and Tiger 1 in Thomas Jentz, *Germany's Panther Tank: The Quest for Combat Supremacy.* (Atglen, PA: Schiffer Military History, 1995), 127-129; Thomas Jentz, *Germany's Tiger Tanks – D.W. to Tiger I.* (Atglen, PA: Schiffer Publishing, 2000), 13, 32, 35.

Chapter II

Tradition and Modernization:

The Tiger's Link to Offensive Doctrine

The German development of armored warfare doctrine is a complicated subject that has been clouded with more than seventy years of historical inaccuracy and apologetic revisionism. Many of the post-war memoirs written by German generals and field marshals have been regarded as unreliable accounts which shift the blame for the conduct – and atrocities – of the war away from themselves and squarely on Hitler, including F.W. von Mellenthin's *Panzer Battles*, Guderian's *Panzer Leader* and *Achtung! Panzer!*, Erich von Manstein's *Lost Victories,* Hans von Luck's *Panzer Commander* and Hans-Ulrich Udel's series of works– *Wir Frontsoldanten zur Weideraufrüstung* published in 1951, *Stuka Pilot* in 1958, and *Hans-Ulrich Rudel: Aufzeichnungen eines Stukafliegers – Mein Kreigstagebuch* in 2001 (published in English nineteen years after his death).[37] Rudel is the most curious of these authors, as he was an unrepentant Nazi. He was also a popular figure in postwar Germany, as he was highly decorated and continued to serve as a pilot. Rudel claimed twenty-six more tank kills following the amputation of his right leg in 1945.[38]

[37] Many historians in the latter quarter of the twentieth and early twenty-first centuries such as Robert Citino, Volker Berghahn, Ronald Smelser, and Edward Davies have described von Mellenthin, Guderian, and von Manstein's memoirs – among others – as self-serving books with content that rarely discusses war crimes committed under their commands that are more concerned with defending the author's own reputation. See: Robert Citino, "Forgotten Army, Lost Victories, " *History Net.* https://www.historynet.com/forgotten-army-lost-victories/?f. Accessed November 26, 2022; Volker Berghahn, "Preface," in Klaus Naumann and Hannes Heer, *War of Extermination* (New York: Berghahn Books, 2004), xiv; Ronald Smelser and Edward Davies, *The Myth of the Eastern Front* (New York: Cambridge University Press, 2008), 97.

[38] Rudel the sole awardee of the Knight's Cross with Golden Oak Leaves, Swords, and Diamonds. See: Hans-Ulrich Rudel, *Mein Leben in Krieg und Freiden* (Rosenheim, Germany: Deutsche Verlagsgessellschaft, 1994), 11; Walther-Peer Fallgeibel, *Die Träger des Ritterkreuzes des Eisernen Kreuzes 1939-1945: Die Inhaber der höchsten Auszeichnung des Zweiten Weltkreiges aller Wehrmachtteile* (Freidberg, Germany: Podzun-Pallas, 2000), 35.

Post-war revisionism led researchers to believe Guderian created German armored warfare theory with little more than casual input from other *Truppenampt* officers.[39] Due to the success of his postwar memoir *Panzer Leader*, the fallacy of B.F. Liddell Hart's impact on Guderian's theories has permeated histories of the Second World War since *Panzer Leader'*s English publication in 1952. In the same way, Guderian's impact on the principles of combined arms warfare has become overstated.

In *The German Army, 1933-1945: Its Political and Military Failure*, Matthew Cooper alluded to discrepancies in the English language version of *Panzer Leader* compared to the original version in German. In the English version, Guderian credited B.F. Liddell Hart for specific ideas regarding the use of armored forces, but this passage did not appear in the German version. Cooper noted this in work mentioned above in 1978, and Guderian's son recalled his father had praised J.F.C. Fuller for his ideas (which Guderian had chosen not to present to *Truppenampt*). However, little has been written to dispel the notion that Hart had contributed significantly to the defining concepts of *bewegungskrieg*.[40]

Moreover, not only was Hart cited as a source in *Panzer Leader*, but Guderian entirely omitted the works of pioneers who did develop tank theories which later were incorporated into German doctrine. Among these theorists were *General der Arteillerie* Ludwig Ritter von Eimannsberger and *Oberst* Ernst Volckheim. Von Eimannsberger had been Inspector of the

---

[39] Heinz Guderian, *Achtung! Panzer!* (London: Cassell Publishing, 1999).

[40] Blitzkrieg is a term that will not be used here, as it was created by *Time* magazine in September 1939. Post WWII, Guderian wrote, *"Nach dem anfänglichen Gelingen rascher Schläge zu Beginn des zeiten Weltkrieges sprachen unsure Gegner daher von 'Blitzkriegen'"* (After the initial success of rapid blows at the beginning of the Second World War, our opponents spoke about 'Blitzkrieg.') Instead, following Dr. Robert Citino's example and as the product of significant research the more accurate term *bewegungskrieg*, or maneuver warfare, will be used. See, Robert Citino, *The German Way of War* (Lawrence, KS: The University Press of Kansas, 2005); Heinz Guderian, *Erinnerungen des Soldaten* (Motorbuch: Munich, 2001), 418.

Bundesheer of the First Austrian Republic and was an early pioneer of armored warfare and the use of combined arms mechanized divisions. Volckheim had served Germany in the First World War and was one of the few officers with practical experience with tanks in combat.[41] Volckheim was the first to not only predict that medium and heavy tanks would become more valuable than light tanks in a mechanized war but to emphasize the use of the tank as an anti-tank weapon.[42] Kenneth Macksey, who wrote extensively on Guderian and the German art of war, attempted to remove the pervasive 'Hart influence' from modern historiography. Still, contemporary historians such as Lloyd Clark have provided far more detail regarding von Eimannsberger and Volckheim than Guderian and provided a more thorough analysis of the early theories than von Eimannsberger or Volckheim's contemporaries.[43]

This chapter will discuss not only the advent of the Tiger but the traditional German 'art of war' as part of the "cult of the offensive" and its influence on German armor development, doctrinal shifts, and strategic calculation. It will illustrate how German heavy tank battalions had greater tactical flexibility when the battalion was equipped with medium tanks in supportive and

[41] After the *Anschluss*, von Eimannsberger was demoted several ranks, as were all Austrians of high standing. In 1940 von Eimannsberger was offered a minor role in *Oberkommando der Wehrmacht Ost* as an artillery staff officer, a role several levels below his capabilities. Von Eimannsberger opted for retirement instead and died in 1945. His most important work, *Der Kampfwagenkrieg*, was not published until 1934, and his theories were incorporated without his consult or approval in Guderian's *Achtung! Panzer!* in 1937.

[42] James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: University Press of Kansas, 1992), 126-130.

[43] Ludwig von Eimannsberger and his fellow theorists are mentioned in more recent material and older German-language publications. See, Rudolf Kiszling, *Eimannsberger, Ludwig von* in *Neue Österreichische Biographie ab 1815, Große Österreicher* (Amalthea: Vienna, 1963), 171-175; and Wolfgang Sagmeister, *General der Artillerie Ing. Ludwig Ritter von Eimannsberger: Theoretiker und Verwendung von gepanzerten Großverbäden im Kampf der verbundenen Waffen* (unpublished dissertation: University of Vienna, 2006). See also: Lloyd Clark, *Blitzkrieg: Myth, Reality, and Hitler's Lightning War, France 1940* (New York: Atlantic Monthly Press, 2016) and James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: University Press of Kansas, 1992).

reconnaissance roles and how much of this flexibility was lost once the battalions were equipped with only Tigers.

When considering *the bewegungskrieg* doctrine holistically, there was a distinct need for a heavy tank in the breakthrough role. The Luftwaffe had assumed this role during the relatively limited campaigns in France and Poland. Still, as the war dragged on and production shortfalls increased, the German military recognized they had neither produced a tank capable of breaking through defensive positions nor one which could engage and destroy the enemy effectively. However, rather than a proactive creation, the Tiger was a reactive vehicle built for offensives when Germany was rapidly losing the ability to wage offensive war.

Development of *Bewegungskrieg*

No part of the interwar *Reichswehr* has been the subject of misconception and misdirection as much as the development of a coherent tactical and strategic doctrine; moreover, it is unfortunate that historians from the 1950s to the 1970s chose to take memoirs at face value rather than viewing the German perspectives within the context of the period as a whole. Historians from the last quarter of the twentieth century have attempted to correct these misconceptions without the benefit of being able to "cross-examine" the participants and reconcile their statements with information recorded in manuscripts, memoranda, and official government and military orders and, for the most part, have been successful. However, some pervasive myths remain.

First, Guderian is generally credited as the sole creator of the *Panzerwaffe* and *bewegungskrieg*; second, Guderian faced strong resistance from the “old guard” in the High Command and *Truppenampt*; third, German armor doctrine was a development taken directly from British theorists. As in many myths, there is a measure of truth. Guderian was vital to the

creation of the *Panzerwaffe*. There were a number of traditionally trained and educated officers of high rank in the Reichswehr, but it is not unusual to find senior officers of advanced age in command of any major nation's military, and a number of influences shaped the destiny of German armor and doctrine.[44] Intriguingly, all of these popular misconceptions not only surrounded Guderian but were created by his hubris.[45]

Had Guderian never written a single page about himself, he would likely have been remembered as a successful general, intelligent strategist, pioneering tactician, and innovator who helped develop the first panzer divisions. However, Guderian was not a modest man. By his own account, he was the central figure in German armor development during the interwar period, a position supported by his biographer Kenneth Macksey. In *Guderian, Panzer General*, Macksey wrote:

> As he [Guderian] read more deeply into his subject, there began to appear profound conclusions drawn from his study of ancient and contemporary history. This led to the pursuit of a pastime that used to absorb the old Prussian General Staff - prodigious writing in military journals. Encouraged by General von Altrock, the Editor of the *Militär Wochenblatt*, he composed articles that crystallized his thoughts and his style and, at the same time, won him a reputation for clear exposition on controversial matters of immediate interest in the contemporary debate surrounding the reasons for Germany losing the last war. Nevertheless, it also won him enemies, for at this early stage the tank enthusiasts proposed converting the cavalry to mechanized divisions.[46]

The 'prodigious writing' Macksey described was little more than five articles in the *Militär Wochenblatt*, and these articles were brief, basic reflections of standard tactics.[47] Guderian's first

---

[44] Paul von Hindenburg (1847-1934) served as an Army officer from 1866 to 1919 under the banners of the German Confederation, the North German Confederation, the Kingdom of Prussia, and the German Empire. See Henry Ashby Turner Jr., *Hitler's Thirty Days to Power* (New York: Castle Books, 2003), 3-5.

[45] James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: University Press of Kansas, 1992), 135-138.

[46] Kenneth Macksey, *Guderian: Panzer General* (London, MacDonald and James, 1975), 43.

[47] James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: University Press of Kansas, 1992), 139.

significant work was the derivative *Achtung! Panzer!*, which had become popular in the inner circles of the *Wehrmacht*. Guderian's self-aggrandization was not in full effect until the post-war memoir *Panzer Leader*, as his account of German armor doctrine and development omitted all other contributions except his own.[48] Von Eimannsberger was not mentioned in this work, and Volckheim received only a brief mention as a contributor. Guderian also entirely omits the officers who trained at the Kazan Tank School in the Soviet Union. This account is contrasted with General Walther Nehring's *The History of the German Panzer Corps*, which was a carefully researched, well-written, and thoroughly detailed account of the work of the German officers who contributed to the development of German armor and armor doctrine.[49]

The general foundation for *bewegungskrieg* was created by several offices and sources. First, the efforts of the *Truppenampt*, particularly the tank and vehicle designs produced by the Weapons Office; second, the theoretical work of Volckheim, von Eimannsberger, and J.F.C. Fuller; third, the lessons learned at the Kazan Tank School; lastly, Hans von Seekt's maneuver warfare doctrine that emphasized combined arms tactics. Guderian's role was important, but he was by no means irreplaceable. As historian and military strategist Col. Trevor DuPuy wrote in *A Genius for War*, "Guderian was undoubtedly the leader of the movement toward armor-warfare

---

[48] Several works dispute most of Guderian's claims regarding *bewegungskrieg*. Some recent histories indicate that B.H. Liddell-Hart approached Guderian while he was in British captivity under the guise of an interview. He asked Guderian to say he had based his theories on Liddell-Hart's theories, and Guderian obliged. Liddell-Hart then, in turn, supported the idea of West German rearmament. See: Pier Battistelli, *Heinz Guderian: Leadership, Strategy, Conflict* (Oxford: Osprey Publishing, 2011), 5, 13, 53; Alaric Seale, "A Very Special Relationship: Basil Liddell Hart, Wehrmacht Generals, and the Debate on West German Rearmament," *War in History* vol. 5, no. 3 (1998), 327-357. Shimon Naveh, former head of Israeli Defense Forces Operational Theory Research Institute, argued that Liddell Hart, not Guderian created 'blitzkrieg' "by imposing his perceptions of mobile warfare upon the shallow concept of blitzkrieg, he created a theoretical imbroglio that has taken 40 years to unravel." See: Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Francass, 1997), 108-109.

[49] Walther Nehring, *Die Geschichte der Deutschen Panzerwaffe 1916 bis 1945* (Berlin: Propläen Verlag, 1977).

doctrine, but it is evident there were several other young General Staff officers with comparable opinions and similar capability, who could readily have provided the leadership in his stead."[50]

Similarly, Guderian created the idea that he and other officers inclined toward tank warfare faced considerable resistance from the military establishment. Guderian had a fanatical personality and was one of the rare General Staff Officers who embraced National Socialism. It was almost the norm to witness Guderian consider any disagreement with his ideas – even the lack of enthusiasm for the same – as being common to the reactionary ideas of older officers. He reserved his most scathing remarks for General Ludwig Beck, Chief of the General Staff from 1935-1938, who Guderian described as hostile to theories of modern warfare.[51] Guderian believed Beck had "no understanding of technical matters…since he inevitably chose men with much of his attitude to fill the more important General Staff posts, and even more so to form his close circle, as time went on, he erected – without wishing to do so – a barrier of reaction at the very center of the army which was to prove very difficult to overcome." Guderian argued that Beck's unwillingness to allow the armored elements to serve as independent elements was contrary to the vision Guderian – through the work of others – held for the *Panzerwaffe*. Guderian believed Beck wished for the armor to remain little more than support for the infantry and would approve no tank unit more significant than a brigade-sized element. Guderian wrote:

> I had to win a long drawn-out fight with General Beck before he would agree to set up the Panzer Divisions and publish the training manuals for armored troops. Finally, he went as far as to agree to the establishment of two Panzer Divisions, while I was already insisting on three. I described the advantages of these new formations to him in the most glowing terms…he replied: 'No, no, I do not want to have anything to do with you people. You move too fast for me.' When I maintained that, thanks to the recent

[50] Trevor DuPuy, *A Genius for War: The German Army and General Staff, 1807-1845* (Falls Church, VA: Nova Publications, 1977), 255-256.

[51] Daniel Moore, *Blitzkrieg to Götterdämmerung*: Combined Arms Warfare, Deep Operation, and the Flaws of German Doctrine, 1860-1945 (Charles Town, WV: American Public University, 2017), 27-30.

> developments of wireless, command could still be maintained despite great speed of advance, he did not believe me.[52]

Guderian believed Beck was no more than a paralyzing element that prevented the Army from developing as Guderian thought it should. Guderian's proof of this was Beck's advocation for 'delaying defense,' a method of fighting which had become the principle of the post-Versailles German Army.

This was a most unfair and inaccurate depiction of Ludwig Beck, an intelligent and thoughtful General who had drafted Army Regulation 300 in 1933, the foundational tactical manual of the German Army that remained relevant doctrinally through World War II. Beck had flirted with National Socialism in the early 1930's and had described it as a positive force in German life.[53] Further, the 'delaying defense' which so angered Guderian had been in place since 1922, long before Beck held the post of Chief of the General Staff.[54] Beck believed that, until Germany was adequately rearmed, this was the best means to resist Germany's numerically superior foes.

Though Beck often agreed with many of Hitler's policies, such as the Remilitarization of the Rhineland and was an advocate of heavy defense spending and a series of limited wars to establish Germany's sphere of influence in central Europe, he disagreed with any plans to wage offensive wars until Germany was completely rearmed.[55] Beck disagreed with plans to subjugate

---

[52] Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 32-33.

[53] John Wheeler-Barnett, *The Nemesis of Power: The German Army in Politics, 1918-1945* (London: Macmillan, 1967), 217.

[54] James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: University Press of Kansas, 1992), 140.

[55] Ernst May, *Strange Victory* (New York: Hill & Wang, 2000), 37; Klaus-Jürgen Müller, " The Structure and Nature of the National Conservative Opposition in Germany up to 1940,) in H.W. Koch, *Aspects of the Third Reich* (London: Macmillan, 1985), 158-159.

Czechoslovakia by force in 1938– not on moral grounds, but rather as he believed such a war could not begin until at least 1940 – and his disillusionment with Hitler grew as Beck discovered such plans were not those of other senior military leaders, as Beck had believed, but rather they were Hitler's, and the military was becoming increasingly subjugated because those other senior generals refused to stand up to the Führer.[56] This disillusionment grew during the remainder of Beck's military career, and after his forced retirement in 1938 he became a leading figure in the resistance movement which sought to oust Hitler, which culminated in the July 20 Bomb Plot of 1944.[57]

The image of the innovative genius struggling against an unimaginative traditionalist has been appealing to military historians, but this image is not reflective of the struggles of German military theorists in the 1920s and 1930s. This scenario reflects the struggles faced in the U.S., UK, and France by Martel, Fuller, Hart, and Eisenhower. During this time, Guderian's career was ascendant; he was appointed to the command of 2nd Panzer Division in 1935 as a colonel when the other two divisional commanders were generals.[58] He was promoted to major general in August 1936. His mentor and superior at the Inspectorate of Motorized Troops, Oswald Lutz, for whom Guderian had worked since 1931, encouraged Guderian to write *Achtung! Panzer!* as a

[56] Ernst May, *Strange Victory* (New York: Hill & Wang, 2000), 70.

[57] John Wheeler-Barnett, *The Nemesis of Power: The German Army in Politics, 1918-1945* (London: Macmillan, 1967), 500-508.

[58] When Guderian was given command, the 1st and 3rd Panzer Divisions were given to *General der Kavallerie* Maximillian von Weichs and *Generalmajor* Ernst Fessmann, respectively. Guderian remained in his post in the Inspectorate while commanding 2nd Panzer until 1938 when he replaced General Lutz, who had fallen victim to Hitler's purges. See: Heinz Guderian, *Panzer Leader* (New York: Da Capo Books, 1996), 468-469; Command and General Staff College, "Organizational History of the German Armored Formations, 1939-1945," accessed March 14, 2022, https://web.archive.org/web/20121026095922/http://www.cgsc.edu/CARL/nafziger/939GXPZ.PDF

polemical treatise that inspired strategic mechanized warfare and could promote Mobile Troops Command.

In contrast, Dwight Eisenhower was reprimanded by the Branch Chief of the U.S. Army infantry and threatened with court-martial if he continued to advocate for stronger tanks forces within the infantry divisions and published documents recommending the same.[59] Thus, while others struggled against the status quo, Guderian's complaints against "very vocal opposition" to armored units were all made at the same time Beck had ordered the creation of additional *Panzer* battalions at the cost of twelve anti-tank battalions, the inclusion of armor in infantry formations as an offensive weapon rather than a support weapon, and for additional *Panzer* brigades as a complement to the existing *Panzer* divisions as a means to bridge the limitations of a rapid expansion.[60] As James Corum wrote, "There is no German parallel to Dwight Eisenhower's experience."[61]

Lastly, the third myth was that German doctrine was 'borrowed' from British theorists, particularly from B.H. Liddell Hart. This myth seems to originate from the English version of *Panzer Leader*, where Guderian thanked Hart for suggestions for the further development of German armored warfare, an idea exacerbated by Macksey's introduction to the 1996 edition; this passage appears in none of the German editions.[62] John Mearsheimer wrote, "(I) believe

---

[59] Dale Wilson, *Treat 'em Rough! The Birth of American Armor, 1917-1920* (Novato, CA: Presidio Press, 1990), 215-216.

[60] Markus Pöhlman, *Der Panzer und die Mechanisierung der Krieges: Eine Deutsche Geschichte 1890 bis 1945* (Paderborn, Deutschland: Verlag Ferdinand Schöningh, 2016).

[61] James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: University Press of Kansas, 1992), 141.

[62] Again, Macksey seems to view Guderian in a very idealized light, describing him as a modest man who alone was willing to stand up to Hitler's wildest decisions late in the war. See Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), vii-xii.

Liddell Hart revised the historical record to enhance his claims of having invented the blitzkrieg, a claim Hart desperately wanted to be true, and which has become regarded as so."[63]

Despite his wishes, there is little evidence to suggest that, if German theorists were aware of Hart's work in the 1920s, they incorporated these theories into their own maneuver warfare theories. Hart was not cited as a source in *Achtung! Panzer!* nor was he mentioned in the work of von Eimannsberger or Volckheim. Hart's articles were often published in *Militär Wochenblatt*, but this journal was like many others of the time and of the modern era – it was a cornucopia of authors who published on several topics which was published based on reception rather than a larger topical perspective. The theorists in Germany and Austria had already developed the foundational basis for their theories, and while Hart's limited exposure in Germany may have influenced Guderian to an extent, as Guderian's theories were derivative of other German approaches, this should not lead to the assumption of Hart's early influence.[64]

The position of the German Army at this point was firmly rooted in the twentieth century, but its strategic direction was rooted in its Imperial past. This link was strong enough to survive the humiliation of Versailles and its subsequent neutering. The German Army placed great emphasis on decisive maneuver and encirclement, as taught by von Moltke the Elder and von Schlieffen.[65] Von Moltke believed new armaments produced during the Industrial Revolution,

---

[63] John Mearsheimer, *Liddell Hart and the Weight of History* (Ithaca: Cornell University Press, 1988), 164-217.

[64] Hart's influence on German armor doctrine is still debated. John Mearsheimer argued that Liddell Hart served as Guderian's "literary agent" in the English-speaking world and that Fritz Bayerlein, Field Marshal Rommel's chief of staff, helped Liddell Hart portray Rommel as a "pupil." Richard Swain reviewed Mearsheimer's work, and while he agreed with some points, he argued against the negative portrayal Mearsheimer gave of Liddell Hart. See: John Mearsheimer, *Liddell Hart and the Weight of History* (Ithaca, NY: Cornell University Press, 1988), 43, 88, 185, 190-210; Richard Swain, "Reviewed Work: Liddell Hart and the Weight of History," *Albion: A Quarterly Journal Concerned with British Studies* 23, no. 4 (Winter 1991), 801-804.

[65] Trevor DuPuy, *A Genius for War: The German General Army and General Staff, 1807-1945* (Falls Church, VA: Nova Publications, 1977), 102-150.

such as the breech-loading rifle, had made defensive firepower the predominant force on the battlefield, and to this end, he theorized:

> It is absolutely beyond any doubt that the man who shoots without stirring has all the advantage of him who fires while advancing…and that, if to the most spirited dash one opposes a quiet steadfastness, it is fire effect, nowadays so powerful, which will determine the issue. Little success can be expected from a mere frontal attack, but very likely a great deal of loss. We must therefore turn towards the flanks of the enemy's position.[66]

Von Moltke regarded turning the enemy flanks as an opportunity not to be disregarded. He believed advantages in logistics and communications could be negated if the Germans attacked before supply and communication lines were established. He also found that the idea of rapid mobilization could be used to counter the Alliance system that gripped Europe. Von Moltke believed it was possible to mass an army at one front, achieve a decisive victory, and redeploy that force to a second front where a further decisive victory could be achieved. [67]

Von Moltke believed innovation, calculation, and audacity were the epitome of the art of war and thus refused to allow his principles to be codified into rigid doctrine. He believed each new conflict was a learning experience, and those difficult lessons should be applied to combat with utmost expediency. "Strategy is a system," he wrote, "of ad hoc expedients; it is more than knowledge, it is the application of knowledge to practical life, the development of the original idea in accordance with continually changing circumstances. It is the art of action, under the pressure of the most difficult conditions."[68]

---

[66] J.F.C. Fuller, *Conduct of War* (New York: Funk and Wagnalls, 1961), 117-118.

[67] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failures* (New York: Stein and Day, 1978), 132-133.

[68] Edward Mead Earle, *Makers of Modern Strategy* (Princeton: Princeton University Press, 1943), 180.

General Alfred von Schlieffen, Chief of the General Staff from 1891-1905, held no such reservations and organized von Moltke's principles as German doctrine. Von Schlieffen rejected the concept of attrition and instead created *Vernichttungsgedanke*, the concept of annihilation. He believed decisive maneuver led to the destruction of the enemy through swift, coordinated attacks in the flanks and rear, and these attacks would lead to confusion and disarray amongst the enemy.[69] Victory would be earned through strategic and tactical surprise, overwhelming force at the decisive point, and swift encirclements which enveloped a massive portion of the enemy forces. Within the *Kesselschlachten* – cauldron battles – Germany could kill or capture an enemy cut off from retreat or resupply. In his manuals, von Schlieffen wrote:

> How is the enemy's wing to be encircled? Not with one or two corps, but with one or two armies, and the march of these armies should be directed against the enemy's line of retreat…This leads immediately…to disorder and confusion which given an opportunity for a battle with an inverted front, a battle of annihilation, a battle with an obstacle in the rear of the enemy.[70]

The Germans had created the precedent of finding victory on the flanks in earlier wars long before Guderian was born. *Bewegungskrieg* could just have easily described the campaigns from 1850-1914 as they did those from 1939-1941. The fight against Austria-Hungary in 1866 lasted a mere seven weeks; the Franco-Prussian War took barely six. In the Battle of Sadowa in 1866, Prussian artillery was ineffective, which forced the Germans to send cavalry and infantry into unbroken Austrian lines.[71] Improvements in tactical and strategic deployments of artillery and cavalry made a brutal example of Sedan in 1870, where Napoleon III was captured alongside

---

[69] Trevor Dupuy, *A Genius for War: The German Army and General Staff, 1807-1945* (Falls Church, VA: Nova Publications, 1977), 126-139.

[70] Edward Mead Earle, *Makers of Modern Strategy* (Princeton: Princeton University Press, 1943), 183.

[71] Terence Zuber, *The Moltke Myth: Prussian War Planning, 1857-1871* (Lanham, MD: University Press of America, 2008), 145-151, 160-162.

104,000 men, which was the largest force taken captive in modern warfare at that time. In 1914, facing a two-front war, Germany revived von Moltke the Elder's theories and modified the 1905 Schlieffen Plan, which expected to turn the French flank in a few weeks by cutting through Belgium. Once France was taken care of, Germany redeployed its forces to deal with Russia. The Russian Army, ponderous and elephantine, would not be fully mobilized, a situation Germany expected to capitalize upon. As audacious as this plan was, it was nearly successful. The Germans managed to advance to within thirty miles of Paris in six weeks, but tactical errors by German commanders and the physical and logistical exhaustion of both the soldiers and supplies allowed the Allies to halt the Germans at the Marne. This halt, the reasons for it, and the distance the German forces were halted from the enemy capital foreshadowed the advance during Barbarossa in 1941.[72]

After the First World War, the Germans closely examined their defeat, and they realized the military and its commanders had failed to realize two fundamental truths. First, Germany despised wars of attrition. The nature of static warfare negated advantages in maneuver warfare which Germany had carefully groomed, and the high attrition rate meant the Army with more manpower – not better training or superior tactics – would inevitably be victorious. Secondly, Germany failed to remember von Moltke's teachings, notably that contemporary inventions revolutionized warfare and offered possibilities for not only bolstering national strategy but recreating its very existence. The German military experienced something akin to an identity crisis after the war, as they had to determine if their principles were indeed sound. Had maneuver warfare been rendered obsolete when opposed by fortifications and artillery? Was a more

[72] Kenneth Macksey, *Why the Germans Lose at War: The Myth of German Military Superiority* (New York: Greenhill Books, 1996), 39-54.

cautious approach, with a vast front and no easily penetrable flank, more advantageous, as was the French position? Moreover, would any of these changes be palatable to the military?[73]

Most remaining German officers were willing to support existing doctrines, and they believed their experiences in World War I proved a greater need for mobility, not the need to remove it. Von Seekt wrote, "In brief, the whole future of warfare appears to me to lie in the employment of mobile armies, relatively small but of high quality and rendered distinctly more effective by the addition of aircraft and in the simultaneous mobilization of the whole force, either to feed the attack or for defense." Moreover, German innovations during the war proved that the principles of maneuver warfare, such as speed and flexibility, were not obsolete. In 1918, storm troops carried out infiltration missions designed to create deep penetrations in the enemy lines after an artillery bombardment softened up the defense. By attacking the headquarters elements, supply lines, and communications, the infiltrators created panic among the enemy. This penetration at the *Schwerpunkt* – focal point – set the conditions for innovation within the existing doctrines.

The development of tracked vehicles post-WWI and their use as part of the "infiltration" doctrine produced the concept of combined arms warfare. J.F.C. Fuller drew the correlation between tank vs. tank warfare and hand-to-hand combat between individual soldiers in his Plan 1919. He theorized:

> The fighting power of an army lies in its organization, which can be destroyed either by wearing it down or by rendering it inoperative. The first comprises killing, wounding, and capturing the enemy soldiers – body warfare; the second in rendering inoperative his power of command – brain warfare; to take a single man as an example, the first method may be compared with a succession of wounds which will eventually result in his bleeding to death; the second – a shot through the brain. The brains of an entire army are its Staff – Army, Corps, and Divisional Headquarters. As our present theory should be to destroy command, not after the enemy's personnel has been disorganized but before it has

[73] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failures* (New York: Stein and Day, 1978), 135.

> been attacked so that it may be found in a state of disorganization when attacked. The means proposed were a sudden eruption of squadrons of fast-moving tanks, which unheralded would proceed to the various enemy headquarters, and either round them or scatter them. Only after these operations had been given time to mature was the enemy's front to be attacked in the usual way, and directly, penetration was affected, and pursuit was to follow.[74]

It has been well-established that Heinz Guderian cannot be given sole credit for the innovations which led to German armored doctrines but rather should be regarded as an influential figure who popularized work that predated his own. This influence, when taken within the context of historical fact, cannot be overstated. General Hasso von Manteuffel, commander of the 5th Panzer Army which assaulted Bastogne and recipient of the Knight's Cross with Oak Leaves, Swords, and Diamonds – one of only twenty-seven such recipients – wrote after the war that:

> Guderian favored from the beginning the strategic use of panzer forces – a deep thrust into the enemy – without worrying about a possible threat to his own unprotected and far-extended flanks…It was Guderian – and at first, he alone – who introduced the tank to the Army and its use as an operative weapon.[75]

The combination of existing doctrine, the infiltration tactics of the *sturmtruppen*, and the integration of tracked vehicles required certain modifications to *Vernichttungsgedanke*. It would have been difficult for Guderian to convince the General Staff to depart from this concept, as it was instilled in General Staff officers. However, under the "supervision" of General Oswald Lutz, certain aspects were changed. *Vernichttungsgedanke* emphasized a centralized command structure and highly organized, well-coordinated encirclements with heavily guarded flanks. This served the dual purpose of defeating the enemy while protecting against a breakout or relief attempt.

---

[74] J.F.C. Fuller, *Conduct of War* (New York: Funk and Wagnalls, 1961), 243.

[75] B.H. Liddell Hart, *The Other Side of the Hill* (London: Cassell, 1951), 65-75.

This rigid structure was replaced by unpredictability and rapid - almost headlong – attacks which were designed to induce panic by compromising the enemy command structure by destroying headquarters elements. One key aspect of this model was initiative. German commanders were expected to understand the parameters for the offensive on a strategic level and, in the absence of orders, work within that framework to accomplish tactical and strategic goals in a practice known as *Auftragstaktik* – mission-based tactics – rather than more rigid order-based tactics.[76] As brigade and battalion level commanders understood *Oberkommando des Heeres* and *Oberkommando der Wehrmacht*'s intent (OKH and OKW, respectively), intelligent decisions regarding a rapidly changing battlefield could be made by the commander on the ground, rather than having to wait for follow-on orders from higher headquarters.

The armored concepts were relatively straightforward, and maintaining the initiative was paramount for the German Army. Operational planning – *Schwerpunktbildung* – determined where the focal point – the *Schwerpunkt* – of an offensive would most likely be successful. Once the *Schwerpunkt* was determined, all available forces were concentrated in the vicinity (*Schwerpunktprinzip*, or concentration principle), even at the cost of reducing strength in other sectors. This concentration of manpower and equipment created local numerical superiority, and thus an offensive could create a breach in the defensive lines through a coordinated effort by tanks, *Panzergrenadiers* (mechanized infantry), artillery, and close air support.

It was crucial that the forces assaulting the *Schwerpunkt* did not allow themselves to become decisively engaged, regardless of the defensive rate of fire. Were the assaulting elements to become bogged down, they would become a cork in the bottleneck, they would be destroyed, and the following elements would have neither the element of surprise nor the benefit of a

[76] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failures* (New York: Stein and Day, 1978), 139-142, 155-271.

confused and broken defense. Once the forces dedicated to the *Schwerpunkt* had cleared the breach, the gap was widened, and the initial objectives were assaulted. Upon completion of the initial objectives, commanders were encouraged to exercise initiative in locating follow-on objectives that were in keeping with the commanders' intent. This most often helped build the *Kesselschlacht* so German forces could wear the enemy down from all sides.[77]

Guderian outlined his tank development, operational development, and organizational doctrine in *Achtung! Panzer!*, and though the majority of the book centered on technical details – armor thickness, attacks using fire and maneuver, cannon size – he argued for the concentration of tanks into divisions rather than scattering the tanks piecemeal throughout the infantry divisions. His argument was based on two hypothetical nations, Red and Blue, who both have armored forces and have gone to war. Red's doctrine dictated that tanks were spread throughout the infantry formations, much as Great Britain and France had done. Blue chose to consolidate its armor into armor divisions, which would work in concert with the infantry and other supporting elements such as anti-tank and anti-aircraft battalions. In this hypothetical conflict, Guderian limited the front to three hundred miles, and of these one hundred miles cannot be traversed by armored vehicles, one hundred miles is difficult terrain, and one hundred miles is optimal terrain for an armored advance. Guderian hypothesized:

> Red has deployed a sizeable proportion of its divisions, along with their tank components, opposite the Blue positions in country where tanks cannot operate and are therefore useless; a further portion have been deployed in difficult tank country where, though not entirely wasted, their chances of successful action are small. Whatever happens, only a fraction of Red's tank forces can be employed in the country for which they are suited. Blue, on the other hand, has collected all its armor in the one place where a decision can be reached and where the ground can be made use of; he therefore has the

[77] These principles have been thoroughly documented. See, Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 18-46; Trevor Dupuy, *A Genius for War: The German Amy and General Staff* (Falls Church, VA: Nova Publications, 1984), 244-254; Kenneth Macksey, *Why the Germans Lose at War: The Myth of German Military Superiority* (New York: Greenhill Books, 1996), 55-81; Matthew Cooper, *The German Army 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 113-219.

> opportunity of going into the battle with at least double his adversary's tank strength while assuming the defensive along the rest of the front against Red's very small-scale tank attacks. We conclude that the suggestion that our tanks be divided among Infantry Divisions is nothing but a return to the English tactics of 1916-17, which were even then a failure, for the English tanks were not successful until they were used in mass at Cambrai.[78]

The armored idea hinged on the concept that the offensive force would set the pace for the campaign unrestrained by the bulk of the field army, which would be used to destroy isolated pockets of resistance, serve as security in occupied territory, and seize provisions and equipment. As with any doctrine, there are limitations that must be either accounted for or removed as efficiently as possible; the German armored warfare theories had several. Tanks required terrain suitable for their employment if they were to be able to satisfy their objectives. In difficult terrain where swift advances were not possible, armor could not adequately support the advance of the field army, or rather the armor could not undermine the enemy's will to resist. The lack of heavy support forced the infantry to assault defensive positions, thus slowing the advance. Further, inclement conditions such as hills, marshes, and urban areas were likely to lead to failure, but these geographic obstacles are not to be considered in the same category as impassable terrain, as terrain disadvantages can be overcome through the use of speed and surprise, as in the Ardennes in 1940.[79]

The logistic situation was another concern for the German Army. Mobile operations are only effective when provided adequate logistic support. In the early campaigns, rapid advances often left the supply trains behind, as they were not, nor were they at any point in the war, fully mechanized. The overextended supply lines were a problem that could have led to dire

[78] Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 45.

[79] Simon Dunstan, *Mechanized Warfare* (Edison, NJ: Chartwell Books, 2005), 40-41.

consequences had the campaigns been more prolonged, and most certainly did once the Germans were engaged with the Soviet Union, a nation with the land resources to trade space for time. In 1940, all that stood between Trier, on the Luxembourg border, and Paris was 260 miles. In the Soviet Union, it was 1100 miles from Berlin to Leningrad and 1800 miles from Berlin to Stalingrad, and for every mile supplies were shipped, they were vulnerable to partisan harassment. This not only increased shortages of fuel but the lack of replacement parts as well. This led to a reduction in combat readiness against an enemy that was equipped with technologically inferior but far more practical vehicles.[80]

Lastly, it was found that the German offensives were vulnerable if the enemy had the ability to withstand the assault at the *Schwerpunkt* and could maintain cohesion while the Germans were in the command-and-control areas. *Bewegungskrieg* dictated the requirement for local numerical superiority, even at the expense of the other regions along the front. If the enemy was able to organize a tactical withdrawal to a more tenable defensive position, the Germans did not have the reserves to continue widening the breach in the enemy lines, or there was insufficient artillery support at the 'shoulders'- the flanks of the breakthrough – to decisively engage an enemy counterattack, the Germans would be vulnerable to becoming surrounded themselves. One such failure occurred in the Ardennes when *Kampfgruppe* Peiper of the 1st SS Panzer Division *Leibstandarte-SS Adolf Hitler* was repeatedly probed by portions of the French 4th Armored Division and the British 1st Army Tank Brigade and hindered by Maxime Weygand's "hedgehog" defense, a tactic using defense in depth in multiple reinforced positions,

[80] Charles Winchester, *Advancing Backwards: The Demodernization of the German Army in World War II* (Oxford: Osprey Publishing, 2002), 18-25.

a defense which became a standard response to German breakthroughs on the Eastern Front under the Soviet doctrine deep operation doctrine.[81]

Bewegungskrieg was a combination of new and old methodology refreshed by the infusion of innovative technology. The principles created by von Moltke and von Schlieffen were improved by the use of modern weaponry, speed, and violence of action. However, *Vernichttungsgedanke*'s emphasis on precise maneuvers was casually ignored by Guderian, who believed wild unpredictability would keep the enemy off balance. This rationale worked well in Poland and France, where there was a limited amount of space for the defender to maneuver and where withdrawal to a more advantageous position was a luxury the Allies would not have for an extended period. It would not be a feasible plan in a prolonged campaign, and by 1941 several factors led the Germans to make further innovations.

Durchbruchswagen to Panzer VI: Development of the Heavy Tank

By the 1930s, the Germans had secretly managed to develop prototype light and medium tanks. These tanks, which eventually led to *Panzerkampfwagen* I through IV, were moderately armored, fairly dependable, and modestly armed. The previously discussed armor doctrine was still under development, which led to the Panzer III and IV having some growing pains as their roles had not yet coalesced into a coherent form and were generally modeled as a main battle tank (Panzer III) and as a support tank (Panzer IV).[82]

The 1939 Panzer IV was the most versatile and well-designed of the first four models of German tanks. Its suspension was extraordinary, it was well-suited to accepting larger caliber

[81] Chris Bishop and Chris McNab, *Campaigns of World War II Day by Day* (London: Amber Books, 2003), 140-149.

[82] Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 12–14.

cannons, and the electrically powered turret rotated swiftly and smoothly, allowing German gunners first-shot capability. As it was initially deemed a "battalion commanders' vehicle," the Panzer IV was armed with a short 75mm howitzer. This cannon was capable of firing high explosive and smoke shells and became considered a formidable opponent during the early campaigns when an HE shell could do considerable damage to an enemy tank. However, the Panzer IV was not intended to serve as a heavy tank, and Operation Barbarossa exposed the strategic flaws in German armor development.[83]

In his memoir, Major General F.W. von Mellenthin recalled the eastern offensives in 1941 as reminiscent of Jomini's opinion of Napoleon's Russian excursion: "Russia is a country which is easy to get into, but very difficult to get out of."[84] The first weeks of the German invasion of Russia appeared very easy indeed: the Luftwaffe had overwhelmed the Red Air Force, and there were advances along the entirety of the front. Some of Hitler's decisions were questionable, such as the abandonment of Moscow in favor of the conquest of Ukraine. This would have perhaps yielded better results had the *Schwerpunkt* been as ruthlessly pursued as the doctrine described. However, Moscow could not be taken without a concentrated effort, as it had been transformed from the rural metropolis it had been in 1812 into the center of Stalin's empire. Moscow was part of a great industrial area, and as the capital, it was the center of European Russia's railway network. However, these initial successes were short-lived, as the German armored forces were to encounter significant disadvantages.

[83] Dennis Showalter, *Hitler's Panzers: The Lightning Attacks that Revolutionized Warfare* (New York: Berkley Caliber, 2010), 52-53.

[84] F.W. von Mellenthin, *Panzer Battles* (Norman, OK: University of Oklahoma Press, 1956), 153.

First, the Soviet infrastructure was generally primitive at best, and roads that were passable in one season were quagmires come autumn and spring. B.H. Liddell Hart postulated that had the Soviets possessed a road network comparable to that found in western Europe, a far greater portion of the country would have been overrun; whether or not this wider expansion, which either met or exceeded the original goal – the Arkhangelsk-Astrakhan Line – would have led to Soviet capitulation is not the concern here, but it must be stated that even under the most opportune circumstances any road-based movements would face conditions that were mediocre at best. Further, consider these roads were poor when the weight of German tracked vehicles was relatively light compared to the behemoths that were to come.[85]

Second, the Germans had severely underestimated the quality of the Soviet armor. In 1940, the experiences in the Western Campaign led Hitler to order the replacement of the Panzer III's inadequate 37mm cannon with an L/60 50mm. This order seemed reasonable, even necessary, if Germany intended to embark on further aggressive expansion, but it was a complicated issue. For the cannon retrofit, *Waffenprüfamt 6,* the ordnance office of *Waffenamt*, the German Army Weapons Agency*,* used the considerably shorter L/42 50mm rather than the L/60, an ordnance change which led to lower velocity and thus diminished armor penetration – 55mm at one hundred meters against a rolled steel plate set at a 30-degree angle.[86] Russian reports collected by the People's Commissariat for Tank Industry indicated that between August and September 1942, 54.3% of all T-34 losses were caused by the L/60 50mm cannon, not the

[85] B.H. Liddell Hart, *The Other Side of the* Hill (London: Cassel, 1951), 174.

[86] *Heereswaffenamt* was the center of research and development for the German Army from 1919-1935 and the entirety of the armed forces (*Wehrmacht*) from 1935-1945. *HWA* was organized into thirteen offices, either armaments development (*Waffenamp Prufwesen)* or testing departments (*Waffenprüfampt*). For further details, see Appendix B. Helmut Maier, *Forschung als Waffe: Rüstungsforschung in der Kaiser Wilhelm Gesselschaft und das Kaiser Wilhelm Institut für Matallforschung 1900-1945* (Göttingen: Wallstein Verlag, 2007).

L/42, which was shown to be generally ineffective against the frontal armor of either the T-34 or KV-1.[87] The Panzer III was numerically the most widely available tank on the Eastern Front, and most of these were retrofitted Ausf. E and F, along with new production Ausf. G and H models, and while the Panzer III was vastly superior to the Soviet T-26 and B.T. tanks, they were heavily outclassed by the T-34 and K.V. tanks. The 50mm L/60 Hitler had ordered in 1940 finally made its way onto the Panzer III Ausf. J in the Spring of 1942, and this cannon could penetrate the frontal armor of the T-34 at under five hundred meters and the K.V. tanks if tungsten-tipped high-velocity rounds were used, a point which could have impacted the initial phases of Barbarossa, and one which Hitler pointed out to *WaPrü* at his convenience later in the war.[88]

Lastly, in preparation for hostilities against the Soviet Union, Hitler ordered a substantial increase in the number of Panzer and Panzergrenadier Divisions in late 1940 which forced the Wehrmacht to not only use all available resources to produce vehicles in sufficient quantity to fulfill this requirement but to use inferior vehicles captured in western Europe. This had the two-fold effect of spreading the German armor more thinly, in a direct affront to accepted armored theory and the model advocated for by Guderian, and placed vehicles not suited to Eastern Europe or Africa in combat in those theaters. The latter point is self-explanatory; the former issue is more complex.

After the French Campaign, Hitler doubled the number of Panzer and Panzergrenadier divisions.[89] For the Panzer divisions, this was an expansion from ten to twenty-one divisions that

---

[87] People's Commissariat for Tank Industry. "Comparative Testing of T-34 against 50mm HEAT Shells." *Documents of the Soviet Era*, RGASPI 644-2-115, State Defense Committee 'F.644' http://sovdoc.rusarchives.ru/docs/ (accessed May 12, 2022).

[88] Steven Zaloga, *The T-34/76 Medium Tank, 1941-1945* (Oxford: Osprey Publishing, 1994), 36, 48 and Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 138.

[89] Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 138.

required an increase in tank production equivalent to 800-1000 new tanks per month.[90] *WaPrü 6* estimated this escalation in production would cost two billion marks and employ over 100,000 skilled craftsmen – many pulled from other key armament sectors. Reluctantly, Hitler abandoned the increase, and thus, while the total tank requirement was 561 tanks per division, or 11,781 tanks to outfit all Panzer divisions completely, there were only 4,198 operational by June 1941. The strongest Panzer division had 199 tanks; the average was 160 organized in one regiment of two battalions rather than the doctrinal four battalions in two regiments per brigade, with one Panzer brigade and one infantry brigade per division – a ratio reversal between infantry and armor in the Panzer formations.[91]

By 1937, while Panzers III and IV were being developed and refined, the *Heereswaffenampt* – Army Ordnance Bureau – ordered Daimler-Benz, Henschel, and MAN to develop a 30-ton tank. German intelligence had become aware of the French Char B1(bis) and Char 2C heavy tanks, both of which were breakthrough tanks, and the realization that there were no German tanks that could counter these vehicles heavily influenced German planners. The Char 2C especially concerned the Germans, as when deployed in 1923, it was the only super-heavy tank in operational status, and even the Tiger II, developed 20 years later, weighed half a ton less than the Char 2C.[92]

---

[90] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 276-277.

[91] This expansion was only part of the "quantity over quality" agenda Hitler had embarked upon when he ordered the Army to increase to 180 divisions, a total that would vastly overwhelm German automotive capabilities and petroleum reserves. As it was, Halder recorded in his war diary that he had received a report on May 20, 1941, that fuel reserves were expected to be low by autumn, especially as OKH was sending Italy fuel from the reserve." See: Franz Halder, *The Halder War Diary, 1939-1942* (Novato, CA: Presidio Press, 1988), 389-390, Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 274-280, and Robert Citino, "New Gang in Town: The Rise of the German panzer division," *MHQ: The Quarterly Journal of Military History* vol.28, no 2 (Winter 2016).

[92] The tank's class was not determined by weight but rather by tactical role. The Panther, for example, was classified as a medium tank despite outweighing most Allied heavy tanks. Heavy tanks, for example, were used for

The first attempt was the *Durchbruchswagen*. Released toward the end of 1937, the DW I was quickly upgraded to the DW II. After a further two years of refinement, Henschel delivered the VK 30.01(H), a design that incorporated a rear engine, front transmission, and vertical armor plating – typical of German designers.[93]A competing design, the VK 30.01(P), was produced by Porsche, and like the Henschel design, it fielded a 7.5cm L/24 cannon which was also found on the Panzer IV. Hitler was not satisfied with either of these, as he believed a lower caliber, high-velocity cannon was more efficient in terms of ammunition storage than a high caliber gun. Specifically, Wa Prüf had suggested using a 10.5cm main gun, but Hitler insisted on the proven technology in the 7.5cm *Panzerabwehrkanone* 41 (7.5cm PAK 41), which incorporated the Gerlich principal – squeeze bore technology.[94] While this cannon was theoretically suitable, the lack of plentiful supplies of tungsten meant this cannon was never able to use its highly effective

---

breaking through enemy lines, and light tanks were used to exploit these breakthroughs, provide reconnaissance, screen enemy forces, and provide fire support for amphibious landings. Medium tanks were a compromise between mobility and firepower, where both were incorporated based on strategic and tactical requirements, and these evolved into the modern main battle tank. Super-heavy tanks were designed to deliberately carry more armor and heavier armament than heavy tanks, which resulted in few operational models. See, J.P. Harris, *Men, Ideas, and Tanks: British Military Thought and Armored Forces* (Manchester: Manchester University Press, 1995), 275; Robert Jackson, *Tanks and Armored Fighting Vehicles* (Bath, U.K.: Parragon Publishing, 2007); Thomas W. Zarzecki, *Arms Diffusion: The Spread of Military Innovations in the International* System (New York: Routledge, 2002); and Paul Malmassari, "Les Maxi-Chars au-dela du Char Lourd, 1re partie – 1916-1927: Du char derupture au char de fortress," *Histoire de Guerre, Blindes & Materiel* 106 (2013), 39-48.

[93] The German military followed a simple nomenclature system. V.K., or *Versuchskampffahrzeug*, was a term that meant research/experimental fighting vehicle; it also indicated *Vollkette* or fully tracked. The first two digits represented the weight class in metric tons, and the last two digits indicated the vehicle's number. Additionally, the nomenclature included an (H) for Henschel and a (P) for Porsche. Thus, the VK 45.01 (P) was the first vehicle in a series of fully tracked forty-five metric-ton machines which was produced by Porsche. See: Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 13-15.

[94] Hermann Gerlich experimented with squeeze bore technology in rifles and anti-tank guns. In one test, a .35 caliber bullet was compressed to .25 caliber between the breech and the muzzle. This compression created a projectile with nearly double the velocity of the standard .35 caliber round with a significantly flatter trajectory, thus shortening flight time to target. See: "Mile-a-Second Rifle Bullet is Squeezed in Firing," *Popular Mechanics* (August 1933), 208. Accessed June 6, 2022 https://books.google.com/books?id=7OEDAAAAMBAJ&pg=PA208&dq=Popular+Science+1933+plane+%22Popular+Mechanics%22&hl=en&ei=v_wHTomlB6H30gG6tLzMCw&sa=X&oi=book_result&ct=result&resnum=6&sqi=2&ved=0CD4Q6AEwBQ#v=onepage&q&f=true

anti-tank rounds exclusively.[95] Ultimately, this design proved to be little more than a useful stepping stone, and six of the completed turrets, equipped with the 7.5cm L/24, were integrated into the Atlantic Wall on the orders of *Wa Prüf Fest*.[96]

In June 1939, *Wa Prüf* 6 requested Krupp design a turret for a new tank. *Wa Prüf* specified that the turret should be capable of mounting a 10.5 cm gun in either L/20 or L/28 length cannon and have an armor thickness of 100 mm. With these specifications as a baseline, Krupp delivered the completed concept designs in October 1939. The turret was designed with the required armor thickness, but it mounted a 10.5 cm L/25 gun with a turret ring diameter of 1.75 meters. Based on the turret weight of 8.4 metric tons, the entire tank was projected to weigh over eighty tons when – if – it was completed. During the following year, after the campaign in the West indicated tanks weighing over thirty tons would be forced to use only major bridges, Krupp was directed by *Wa Prüf* 6 to discontinue further design improvement.[97]

This hiatus was short-lived. In mid-1940, Henschel was ordered to redesign the three D.W. hulls Kassel had delivered earlier that year to mount a new turret armed with a 10.5 cm gun. This increased the projected weight of the VK 36.01 to 36 metric tons, an increase which was alleviated to a degree in March 1941, when Krupp was ordered to produce six D.W. turrets, the tapered-bore *Waffe* 0725 7.5 cm cannon. Further, Hitler decreed in May 1941 that Henschel and Porsche would each produce six heavy tanks, which were to be delivered prior to the summer of 1942.[98]

---

[95] Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 15.

[96] Thomas Jentz and Hillary Doyle, *Germany's Tiger Tanks: D.W. to Tiger I, Design Production, and Modifications* (Atglen, PA: Schiffer Publishing, 2000), 17.

[97] Ibid, 18

[98] Bruce O. Newsome, *The Tiger Tank and Allied Intelligence, vol I: Großtraktor to Tiger 231, 1926-1943* (Coronado, CA: Tank Archives Press, 2021), 20–23.

In May 1945, Kurt Arnoldt, Henschel & Sohn's chief engineer recalled, under British interrogation, the VK30.01 and VK36.01 had been considered parallel projects within a larger program codenamed "Tiger," which had the end goal of producing a larger tank than either of those projects. Arnoldt mentioned Krupp, remembering Hitler's fondness for the 7.5 cm PAK 41cannon, offered a new turret designed to field an 88 mm L/56 cannon adapted from the towed anti-aircraft/anti-tank gun of the same caliber.[99] In the competition between Porsche and Henschel in the new project, called VK45.01, a number of circumstances allowed Henschel to gain the contract. Among these were fundamental issues with the Porsche Tiger, Porsche's insistence that the 8.8 cm cannon could not be mounted in the existing turrets, the compatibility of Henschel's VK36.01 hull with the Krupp turret designed for the Porsche TYP 100 prototype, and lastly, Ferdinand Porsche's own fanaticism for the Nazi ideology. Arnoldt, paraphrased by the Allied transcriptionist, recalled, "Porsche was a capable engineer in many ways, but extremely Nazi and allowed his technical advice to be influenced by his political views. He was jealous and intolerant and was a personal friend of Hitler and Speer."[100] An interrogation of Stiele von Heydekampf in June 1945 indicated:

> Porsche had been for some time in disfavor with both the Army and the Speer Ministry owing to the unsatisfactory performance of tanks in his design. The many changes he demanded, and the fact that when the Army requested a new weapon, he proposed a completely new and unorthodox design without regard to the use of existing production facilities or past experience, were retarding production…The development of 30–35-ton

---

[99] Portions of the interview were cited in Spielberger and Doyle's *Tigers I and* II, and a transcript of the full interview, conducted by Captain R.A. Harrison of the 21st Army Group (GSI) on May 7-8, 1945, is available in the National Archives. See: GSI, "Interrogation of Herr Kurt Arnoldt, Chief Technical Engineer Henschel AFV Research and Experimental Establishment at Haustenbeck," *21st Army Group Technical Report No. 5* (May 1945). Accessed June 15, 2022. https://www.archives.gov/research/guide-fed-records/groups/331.html#331.10; Walter J. Spielberger and Hillary Doyle, *Tigers I and II and their Variants* (Atglen, P.A.: Schiffer Publishing, 2007), 17-35.

[100] GSI, "Interrogation of Herr Kurt Arnoldt, Chief Technical Engineer Henschel AFV Research and Experimental Establishment at Haustenbeck," *21st Army Group Technical Report No. 5* (May 1945). Accessed June 15, 2022. https://www.archives.gov/research/guide-fed-records/groups/331.html#331.10

> tanks was begun in 1938. Such vehicles were being tested in 1940 and 1941, with production anticipated for 1942. With the invasion of Russia in 1941, when the original Russian T-34 tank was encountered and demanded the production of still heavier tanks, it became clear that Germany desperately needed a heavy tank. As a result, the Tiger and Panther designs and production were pushed more rapidly than any previous projects. The program was pushed too rapidly with the result that many mechanical difficulties were encountered in service.[101]

Henschel and Porsche submitted prototype designs, each using the Krupp turret, for a demonstration at Rastenburg on April 20, 1942, on the occasion of Hitler's birthday. Henschel designer Dr. Erwin Aders recalled that Henschel's representatives were devastated by Hitler's enthusiasm for Dr. Porsche and his Tiger. Before the demonstration began, Hitler awarded Dr. Porsche a War Merit Cross for his contributions to the Reich, and Hitler's staff asked Dr. Porsche multiple technical questions about his design. Meanwhile, Hitler spent only "two or three minutes" with the Henschel staff. As Göring was delayed, the demonstrations did not begin in earnest until around 3:00 P.M., and at this point neither Göring nor Hitler visited the Henschel Tiger at all.[102] The Henschel team believed the result was a foregone conclusion in favor of Porsche, and an OKW report from April 22, 1942, only mentioned Henschel had brought a vehicle.[103]

However, Porsche's faith in Hitler's nepotism was misplaced. The Porsche Tiger was poorly engineered, excessively complicated, and laden with unnecessary elements. For example,

---

[101] SHAEF, Combined Intelligence Objectives Sub-Committee, "Interrogation of Herr Stiele von Heydekampf, Evaluation Report No. 153," *U.S. National Archives and Records Administration* (June 28, 1945). http://www.digitalhistoryarchive.com/uploads/2/5/4/1/25411694/cios_evaluation_report_no._153_1945.pdf. Accessed June 15, 2022.

[102] *Diary of Dr. Ernst Aders* reproduced in Walter J. Spielberger and Hillary Doyle, *Tigers I and II and their Variants* (Atglen, P.A.: Schiffer Publishing, 2007), 76.

[103] "Tiger Competition Results," *Records of the German Armed Forces High Command* (April 22, 1942) National Archives Microfilm Publication T77, roll 194, item Wi/IF 5.900, Captured German Records Collection, National Archives College Park Maryland.

Porsche used twin V-10 engines working to drive a single petrol-electric transmission, an arrangement that was not only heavily reliant on copper but also rendered the system more difficult to quickly mass produce.[104] In extended testing at Kummersdorf, the Henschel tank outperformed the Porsche in every trial due to continual breakdowns in the Porsche powertrain. The Henschel Tiger was far from flawless, but it exceeded the expectations of army observers.[105]

One key factor in Speer's decision to award the contract – numbered SS 006-6307/41 – to Henschel was the manufacturing techniques employed by Porsche and Henschel.[106] Porsche designed and built each of its own components without assistance from other firms within the Reich, and the Tiger contract would have required extensive construction to enlarge its existing facilities. Henschel & Sohn had constructed their vehicle from components produced by other firms; thus, sub-contracts could expedite the production of the Tiger, and no construction subsidized by the Reich was required. Further, Henschel promised the Reich Ministry of Armaments and War Production that their first series of Tigers would be built, delivered, and deployed to Russia by late summer or early fall of 1942.[107] This latter point was not inconsequential; the situation in Russia was growing desperate as the Soviets expanded their mobilization, and in North Africa, the Americans and British were fighting in the Mediterranean Theater. The reality facing Hitler was so desperate that he ordered the Henschel Tiger into

---

[104] Eric V. Muirhead, "The Tiger Gap: Culture Contradiction, and Clausewitz in German Armored Warfare in World War II." *University of Tennessee* (2019). Accessed November 15, 2021. https://trace.tennessee.edu/cgi/viewcontent.cgi?article=6850&context=utk_gradthes

[105] Walter J. Spielberger and Hillary Doyle, *Tigers I and II and their Variants* (Atglen, P.A.: Schiffer Publishing, 2007), 92.

[106] Thomas Jentz and Hillary Doyle, *Germany's Tiger Tanks: D.W. to Tiger I, Design Production, and Modifications* (Atglen, PA: Schiffer Publishing, 2000), 67.

[107] Albert Speer, "Führer Conference Notes," *Records of the Reich Ministry for Armaments and War Production* (June 23, 1942), National Archives Microfilm Publication T73, serial 182, roll 192, item RmfRuk 2096, Captured German Records Collection, National Archives College Park Maryland.

immediate production, with the final revisions to come after combat experience. On October 20, 1942, OKW officially designated the Henschel firm as the source of the *Panzerkampfwagen VI Tiger Ausf. E*, the Tiger I.

Organization and Tactics

The first heavy tank battalions were organized in Company strength in February 1942, well before the first Tigers were produced. These first Companies, *schwere Panzer-Kompanien* 501 and 502, were assigned to s.Pz.Abt 501, which was organized on 10 May 1942. S.Pz.Abt 502 and 503 were created on 25 May and 5 May 1942, respectively.[108]

German military formations were structured per standard organizational doctrines. The *Kriegsstärkenachweisung* (KStN) was the table of organization that determined the allowable number of men, weapons, and vehicles. The *Kriegsausrüstungsnachweisung* (KAN) was the table of allowances that determined the basic supply allowances for units of varying sizes. Both manuals were used by the s.Pz.Abt also, but as the KAN was far more detailed and provided even basic supplies such as canteens and typewriters, all organizational data here will refer to the KStN.[109]

With the creation of two companies for s.Pz.Abt 501 and a paper formation of s.Pz.Abt 502 and 503, KStN update 1150d was released, which organized the heavy company into two platoons: the Commander and Senior NCO were each assigned Tigers, and the adjutant was assigned a Panzer III; the light platoon was assigned five Panzer IIIs. The first battalion-sized elements were organized under the KStN update 1176d, dated 15 December 1942. This guidance

---

[108] *Kriegsgliederung des Feldheeres May 1941-May1942* reproduced in Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 23-24.

[109] Complete tables of organization for all German formations were corroborated using reproductions of the original documents. See: Dr. Leo Niehorster, "World War II Armed Forces: Orders of Battle and Organizations," *www.niehorster,org/index.htm.* Accessed 5 May 2022.

was used to outfit all existing and future s.Pz.Abt organizations.[110] Each s.Pz.Abt consisted of Battalion command and the light platoon – as organized under KStN 1150D - and two companies, each with a Company command group and four combat platoons. In each Battalion, the KStN outlined the following: the Battalion command group consisted of two Tigers, one Panzer III, and a supporting light platoon of five Panzer IIIs; the Company command element was equipped with one Tiger and two Panzer IIIs; the four combat platoons each were equipped with two Tigers and two Panzer III's. Allowing for the Battalion Commanders' element brought the total to twenty Tigers and twenty-five Panzer IIIs.[111] S.Pz.Abt 501 through 505 and a *schwere Panzer-Kompanie* for the Panzergrenadier Division *Großdeutschland* were organized according to these tables.[112]

After reports from the Eastern Front indicated the Panzer III had neither the armor nor the armament to conduct missions alongside the Tiger – despite their usefulness in areas in which the Tiger was ill-equipped to perform, such as reconnaissance – the General Staff issued updated KStN's on 5 March 1943. KStN 1150e provided three Tigers to the Battalion command element and removed the light platoon. KStN 1176e organized the Company into three platoons of four Tigers each, plus two for the Commander and Senior NCO. Further, the s.Pz.Abt was expanded

[110] These KStN have been reproduced in Appendices C and D, respectively.

[111] The battalion-level organization was a combination of KStN 1150d, dated 15 August 1942, and KStN 1176d, dated 15 December 1942. The former KStN organized the Battalion Command allotment of vehicles, including the support platoon, while the latter KStN organized the Company-level structure. See: Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 24-25.

[112] *Großdeutschland* was the only division to have an s.Pz.Abt permanently attached. This s.Pz.Abt, organized as the 3rd Battalion in the divisions' Panzer regiment, was organized according to KStN 1150e/ 1176e. However, though this KStN allocated 45 Tigers to the Battalion, the unit was in near continual combat from its inception. Thus, it never managed to have the full allotment of Tigers operational at one time. See: Hans-Joachim Jung, *Panzer Soldiers for "God, Honor, Fatherland," The History of Panzerregiment "Grossdeutschland:" The German Army's Elite Panzer Formation*, trans. David Johnson (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2000), 145.

from two companies to three; thus, each s.Pz.Abt was afforded forty-five Tigers plus an assortment of signals, recon, medical support, engineers, and maintenance platoons.[113] As the Tiger I (Sd.Kfz 181) was phased out in favor of the Tiger II (Sd. Kfz 182), the General Staff issued KStN 1107b (fg) and 1176 (fg) on 1 June 1944. This KStN was a "freie Gliederung," – or free outline – which allowed the General Staff to reform destroyed s.Pz.Abt with either Tiger I or Tiger II, as available. In both the A version (1 June 1944) and the D version (1 November 1944), the only change to the 1150e/1176e organization was the authorization for companies and battalions to use either the Tiger I or Tiger II. This was the final organizational revision for the German heavy tank battalions.[114]

The revision removing Panzer III's from the s.Pz.Abt. organization had the effect of removing their dedicated reconnaissance and inhibited the battalions from operating within urban terrain, as the Tiger's size made it unfeasible to operate within the confines of towns and cities. A report from 13th Company, Panzer Regiment *Großdeutschland* indicated, based on experiences outside Belgorod from 7-13 March 1943, that the Panzer III had not evolved to withstand hits from enemy weapons a Tiger can weather, and the enemy preferred to target the Panzer III rather than the Tiger. The maintenance section for a Tiger company was complicated by the addition of a second tank model, which required additional spare parts for the Panzer III rather than remaining focused only on the Tiger.[115] This change not only had the effect of eliminating a tank suited to reconnaissance but also negated the coordinated fires of the Tiger and Panzer III – the

[113] Appendix E contains this organizational chart.

[114] Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 26-27.

[115] "Report 13. Panzer Regiment *Großdeutschland*, 7-13 March 1943," reproduced in Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol.2, 1943-1945* (Atglen, PA: Schiffer Military Publishing, 1996), 38-39.

Panzer III was often used to fire high-explosive rounds at unarmored targets, while the Tigers faced the armored threat. By removing the Panzer III, the Tiger crews were forced to engage infantry and towed guns with greater regularity. Ironically, General Guderian agreed with *Großdeutschland*'s assessment and ordered the change; however, as he recognized the need for a reconnaissance element in the heavy battalions, he requested the addition of a reconnaissance platoon outfitted with armored half-tracks.[116] These had less armor and anti-personnel capabilities than the Panzer III and left the maintenance sections with still another variant to repair.

Wolfgang Schneider noted the impact a lack of adequate reconnaissance had on the combat effectiveness of the Tiger battalions. Essentially, as recon maneuvers involve long movements while taking care not to be spotted by the enemy, the Tiger was wholly unsuited to this task. However, it was not always advisable to send a lightly armored vehicle with no primary offensive weapon to scout where it was likely prepared defenses awaited. Thus, the Tigers often attacked without sufficient intelligence regarding enemy dispositions, the commanders gained a sense of invulnerability through combat experience in the Tiger that led them to ignore the need for reconnaissance altogether, and they overestimated the overall effectiveness of their weapon system. Thus, the Tiger commanders at times degraded their potential effectiveness and failed to succeed when sent blindly against a well-prepared defense in depth which created predictable and unnecessary losses.[117]

---

[116] "Memorandum from the Office of General Guderian," reproduced in Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol.2, 1943-1945* (Atglen, PA: Schiffer Military Publishing, 1996), 41.

[117] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 333.

Combat Doctrine and Tactics

Before the first three s.Pz.Abt were deployed to combat, the crewmen received little in the way of official guidance directing their tactical deployment. This lack of doctrinal or tactical guidance led the s.Pz.Abt to enter combat with a trial-and-error mentality, and as these battalions were considered strategic assets, their use was often dictated by commands at the Group level or higher. The battalions sent combat reports to the General Staff for several months, and after OKW reviewed the capabilities of the tanks, *Merkblatt 47a/29* was issued. This leaflet indicated the proper employment of the platoon, company, and battalion. The Tiger's mission was simple: it was the most potent weapon of the armored forces; thus, when concentrated and used as the focus of a direct assault into the heaviest enemy defenses, the Tiger should seek combat with other tanks, earthworks, and anti-tank gun emplacements. Organizationally, the heavy tank battalions would be considered Army-level resources and were not to be used for missions outside their scope, such as in a reconnaissance role or as a guard platoon.

In addition to its role, employment, and basic instructions for the Tiger crews, the *Merkblatt* outlined how the Tiger should be used in combat, how the battalion should assemble, what an ideal assembly area should have, and the maintenance requirements for the Tiger. *Merkblatt* indicated that:

> Every possible rest period of the Tiger battalion must be used for technical maintenance. After long periods of action, sufficient time must be given to maintenance and overhaul to restore the unit to full combat strength. The maintenance section must support all other sections and commands."[118]

The *Merkblatt* 47a/29 was used in coordination with H.Dv.470/7, the *German Army Regulation on the Medium Tank Company*, issued in May 1941. Though the manual was designed for crews

[118] *Merkblatt für den Einsatz der schw. Panzer-Abteilung "Tiger"* (Berlin: Heereswaffenamt, 1943), 4 pages. Merkblatt 47a/30.

in medium tank companies, the *Mittlere Panzerkompanie* tactics were deemed adequate for use in the s.Pk.[119] This manual stated the primary task and purpose for the heavy tanks at the platoon, company, and battalion level and provided the fundamental purpose of the heavy tanks, which was to attack against the most robust enemy defenses, break through enemy positions reinforced by defensive works, and decisively defeat the enemy.[120] This manual provided not only essential responsibilities for the leadership at the platoon and company level command but also described basic gunnery fundamentals, tactical guidance, combat formations for platoon and company level formations, fuel replenishment guidance, and, most importantly, the doctrinal guidance containing tasks and purpose of the heavy tank battalions. It stated:

> The weapons and armor, in combination with the high maneuverability, make the Tiger the most potent combat weapon of the *Panzerwaffe*. The Tiger *Abteilung* is, therefore, a powerful, decisive point weapon in the hands of the troop commander. Its strength lies in concentrated, ruthlessly conducted attacks. Each dispersion reduced its striking power. Basic preparations for employment at decisive locations guarantee great success. *Tiger-Abteilungen…*will be attached to other Panzer units in the decisive point of the battle in order to force a decision. They may not be used up too early from being employed for secondary tasks. They are most suited for fighting against heavy enemy tank forces and must seek this battle. The destruction of enemy tanks creates the prerequisite for the successful accomplishment of the tasks assigned to our own lighter Panzers.[121]

It should be noted that German doctrine for the heavy tanks placed heavy emphasis on engaging enemy tanks, especially heavy tanks, and while the guidance for the platoon and company specified fundamental actions against enemy artillery, anti-tank weapons, entrenched troops, and heavy weapons, the battalion-level guidance provided more generalized direction against the

---

[119] Bernhard Kast and Christoph Bergs, trans., *German Army Regulation on the Medium Tank Company H. Dv. 470/7 Mittlere Panzerkompanie* (London: Bernhard Kast, 2020).

[120] Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 31-32.

[121] *Merkblatt für den Einsatz der schw. Panzer-Abteilung "Tiger"* (Berlin: Heereswaffenamt, 1943), 4 pages. Merkblatt 47a/30.

"decisive points" or "taking decisive action." Even battalion-level formations were amiss, despite specificity when outlining platoon and company formations down to the most advantageous formation for a company-level attack.

Further doctrinal guidance for higher levels of command was published in the *Tigerfibel*, an instructional pamphlet designed to be easily read while providing crucial training information for young soldiers of the *Panzerwaffe*. Lieutenant Colonel Hans Christern, from the Inspectorate of Armored Troops, who was responsible for tank training in mid-1942, tasked his friend and subordinate Lieutenant Josef von Glatter-Götz to draft an instructional leaflet. Von Glatter-Götz believed humor and simple presentation were required to ease the learning process, and to that end, the writing style was more akin to the ordinary soldiers' jargon than a formal instructional manual presented in a classroom and included admonishments such as "Read your manual well, otherwise your Tiger goes to Hell!" To make the pamphlet more appealing to young soldiers, the illustrations, completed by Corporal Gessinger and Sergeant Wagner, included nude portrayals of "Tiger Elvira," who assisted with emphasizing how a technique should be used.[122] One such panel, which instructed young drivers to use the throttle gently if the Tiger's fuel tank was low to obtain the full 200 meters/ liter of traveling distance, was accompanied by an illustration of a nude young woman receiving a back massage – all in the interest of explaining just how gently the throttle should be used.[123]

---

[122] Josef von Glatter-Götz was neither a career military officer nor an expert in the Tiger. He was an artist from an artisanal and military family. His father, Colonel Josef von Glatter-Götz, formerly of the General Staff of the Imperial Army of Austria-Hungary, purchased renowned organ manufacturer Reiger & Sons after serving as the firm's General Manager in his post-WWI employment. The younger Josef, with a degree in engineering in organ manufacture, found his services were not required to build the crates and other wooden items the firm began building in 1938 as part of the rearmament effort. He thus joined the German Army in 1939 and survived the war to return to organ design in 1946 as head of his father's company.

[123] Wulf D. Brand, *Tigerfibel: The Original Tiger Tank Manual* (Branchville, NJ: Portrayal Press, 2000), 14.

Though humorous in nature, the *Tigerfibel* provided crucial lessons for both inexperienced crewmen and senior officers unfamiliar with the Tiger's operational characteristics. The manual instructed battalion commanders to issue orders to the Tiger commanders well ahead of an operation in order to ensure the crews had ample time to perform maintenance and refueling prior to their movement to the attack positions. Further, Tiger formations were forbidden from being attached to infantry divisions in an attack, as the infantry could not adequately support the Tigers in the breakthrough or in holding captured ground. Doctrinal restrictions forbade forced marches, as they which increased mechanical breakdowns in the Tiger, dictated the Tiger was only for decisive actions and indicated the Tigers should only be deployed when provided support from units appropriate to the tactical situation, such as engineer battalions, artillery, or mechanized infantry. Minimizing travel distances was of the utmost importance, which led to the concept of establishing Tiger maintenance facilities near railyards. They had the heavy equipment on hand that was needed to facilitate maintenance needs.[124]

From doctrinal and program guidance, it is clear that the Tiger was created as an offensive weapon. It was deployed in the area of the battle most heavily contested, expected to destroy enemy heavy tanks, artillery, and entrenched positions, and it was to seek decisive tank versus tank engagements. The Tiger was fully capable of completing defensive missions by counterattacking enemy penetrations as part of a mobile reserve, but the Tiger required substantial support, especially from other armored formations. Moreover, its substantial maintenance requirements meant commanders had to anticipate enemy penetrations along the

[124] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945*, trans. David Johnson (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2000), 40–41.

defensive line to allow the Tiger formations to counterattack with the least amount of movement to contact as possible. This need to use resources sparingly would be of significance on the Eastern Front.

Tiger Battalion Training and Leadership

Soldiers who served as armor crewmen were originally trained at the *Panzertruppen-Schule* in Wünsdorf, south of Berlin, but the school's capacity was exceeded once Panther and Tiger crew training was introduced. The solution was to move Panther training to Erlangen and Tiger training to Paderborn.[125] Unlike other panzers, the men selected for the Tigers were not raw recruits. They had already been tested in battle, some in multiple theaters. Generally, men who had experience with tanks in combat were plucked from their organizations and reassigned. Some, like Alfred Rubbel, who was serving with the 4th Panzer Regiment in the Caucasus in August 1942, were reassigned when the 2nd Battalion of 4th Panzer was chosen to retrieve training on a new tank variant.[126] Others, like Otto Carius, were returning to Germany on leave when a telegram reached him with orders to report for training in Oldenburg and later Paderborn.[127]

The men chosen to train on the Tiger, who would become the earliest to fill the battalions, were experienced veterans. Most of the crew were non-commissioned officers, and the driver, a position relegated to the most junior Private in modern NATO armies, was a

---

[125] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion and Company Limited, 2016), 79.

[126] Alfred Rubbel and Dale Richard Ritter, ed., *The Tiger Project: Alfred Rubbel, schwere Panzer Abteilung 503* (Atglen, PA: Schiffer Military History, 2004), 71.

[127] Carius noted it was not uncommon for entire companies to be redirected to Paderborn for Tiger training. His first commander as part of a Tiger battalion, Captain Schober, had brought his entire company from Russia for training. See: Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 16

Sergeant.[128] For the earliest group, who had been sent to Oldenburg for training, the training regimen was initially sluggish, as there was only one Tiger on hand for training. This allowed ample free time for camaraderie and fraternization with the locals.[129]

Tiger training was moved to Paderborn for two main reasons, both very practical. First, the terrain around Oldenburg was not suitable for combat training. Second, and more critical, given the Tiger's teething problems, was the proximity to the factory support headquarters at Kassel.[130] Oldenburg was nearly 300 kilometers north of Kassel, whereas Paderborn was only 84 kilometers. Further, Paderborn was the former home to the 11th Panzer Regiment. The training facilities were more than adequate for the Tiger crews, and the equipment yard at Staumühle was sizeable enough to store the tanks.[131]

As training progressed, new recruits joined the ranks of the veterans and began to become well-disciplined units. Many of the veterans, who are recovering from wounds received in combat, were able to complete their civilian education during their rehabilitation.[132] Others were offered the opportunity to become officers and were educated at various officer training academies. Ulrich Koppe graduated from the Wünsdorf Officer Academy in October 1942, was commissioned as a Reserve Lieutenant, and was assigned to *Panzer-Ersatz-Abteilung* 5, a transitional unit for armor soldiers waiting for their next assignment. Koppe was designated a

---

[128] Leo Niehorster, "KStN 1176e," *World War II Armed Forces: Orders of Battle and Organizations*. Retrieved from http://www.niehorster.org/011_germany/44_organ/43-11-01/kstn_1176e_01-11-43.html. Accessed 23 September 2022.

[129] Alfred Rubbel and Dale Richard Ritter, ed., *The Tiger Project: Alfred Rubbel, schwere Panzer Abteilung 503* (Atglen, PA: Schiffer Military History, 2004), 79.

[130] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 79.

[131] Ibid, 79.

[132] Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 3.

member of the newly created 505th and, as one of the first officers assigned to the new battalion, became the provisions officer for the battalion.[133]

Another soldier, Otto Carius, had begun his war with a draft notice instructing him to report for infantry training in the spring of 1940. A diminutive man, Carius had completed the infantry training course and was on the verge of reassignment when his company commander asked for twelve volunteers for the panzer corps. Remembering his father had explicitly forbidden him from serving with the panzers, Carius volunteered and was retrained at Vaihingen as part of the 7th Panzer Replacement Corps.[134] Carius was part of Operation Barbarossa and was a loader, which, as he remembered, was "the worst position. Not only could I not see anything, I never got to stick my nose into the fresh air."[135] Shortly after he was wounded the first time, when a T-34 killed his Panzer, Carius was promoted to Sergeant and sent to Wünsdorf to attend Officer Candidate Course 8.[136] After his graduation, Carius was sent to the 21st Panzer Regiment in June 1942, and then while on leave, was reassigned to the 500th Replacement Battalion in January 1943, where as a Lieutenant, he would undergo training as a Tiger commander.[137]

The senior battalion leadership were battle-tested veterans of the panzer divisions who had experienced combat on multiple fronts. The first commander of the 505th, Major Johannes Kümmel, had been awarded both the 2nd and 1st Class of the Iron Cross in September 1939, the Wound Badge in Black in 1939, the Knight's Cross in July 1941, and the 133rd award of the Oak

---

[133] Ibid, 1.

[134] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 2-3.

[135] Ibid, 5.

[136] Ibid, 12.

[137] Ibid, 16.

Leaves in October 1942.[138] Kümmel did not take the 505th into combat, as he was reassigned to the headquarters staff of the 14th Panzer Corps in North Africa. His replacement, Major Bernhardt Sauvant, had fought at Stalingrad as part of the 36th Panzer Regiment and had earned similar awards: 2nd and 1st Class Iron Cross by October 1939, Wound Badge in Black and Silver in 1939, Panzer Badge with '25' designation, German Cross in Gold in September 1942, Knight's Cross in September 1942 as commander of 1st Company, 36th Panzer Regiment, and 260th award of the Oak Leaves in July 1943 – four months after assuming command of the 505th.[139] This veterancy was typical for the commanders of the heavy tank battalions but was degraded somewhat as the war progressed.

Production, Maintenance, and Logistics

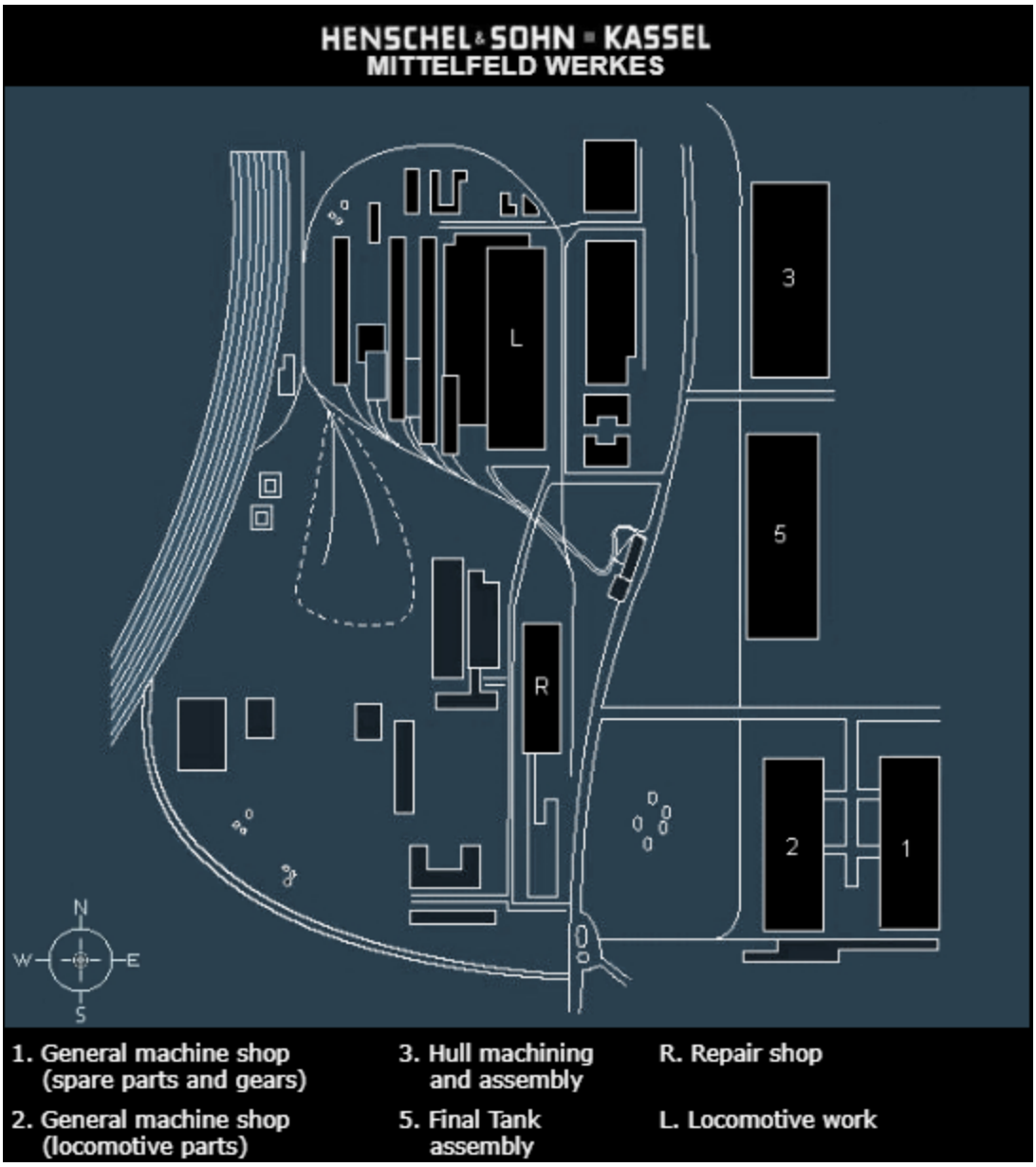
The Tiger tanks were produced at the Henschel factory in Kassel, Germany. As has been discussed, Albert Speer chose Henschel over Porsche as Henschel had existing factory space, whereas Porsche would have had to have expanded its existing facilities. However, this would prove a detriment to the Tiger program, as Henschel had no space to expand its production lines to accommodate greater demand for either the Tiger I or II. This production choice would not only limit the quantity of Tigers which could be produced, but it also allowed Allied bombing to disrupt production much more easily and limited the number of spare parts which could be

[138] Walther-Peer Fallgiebel, *Die Träger des Ritterkreuzes des Eisernen Kreuzes 1939-1945* (Friedburg, Germany: Podzun-Pallas Verlag, 2000), 55, 227.

[139] The German award structure was unique. The 2nd Class Iron Cross, a neck-suspension device, was a prerequisite to the 1st Class Iron Cross, and upon the award of both, the recipient could wear the ribbon for the 2nd Class Iron Cross through the top buttonhole of his tunic while the 1st Class Iron Cross was worn on the left tunic pocket. The Knight's Cross did not replace the 1st Class Iron Cross but rather was a neck suspension device. The Oak Leaves, Swords, and Diamonds were supplementary awards to the Knight's Cross, and each had similar requirements to the initial award of the Knight's Cross. Further, recipients of the Iron Cross in either class, who had received their award during the Great War, were allowed to wear a sponge in the form of a German Eagle clutching a swastika with a placard reading '1939', indicating the wearer had been awarded the same grade in the Second World War.

produced for the Tiger battalions – all of which had exhaustive parts requirements. These obstacles served to limit the effectiveness of the Tiger battalions.

The factory layout was basic, yet the Tiger production method was laid out in nine steps, from the initial receipt of a new hull to the final assembly. In steps one through four, shop 3 prepared the hull with machining. As Henschel did not have the capability to weld and roll the heavy armor for the hulls, they had been built by Krupp and Dortmund-Hoerder Huettenverein and required machining of provided boreholes for the suspension arms, final drives, rear idler wheels, and machine gun mounts, among others. For the fifth step, the hull was moved to shop 5, where internal equipment such as a fuel tank, drivetrain, and suspension was added to the hull. In step 6, road wheels were attached to the hull, torsion bars were added to the suspension, and the lower hull and sides were painted. Step seven included any final welding work required to finish the roadwheels, suspension, or hull, as well as the addition of the tracks and a preliminary test drive. Any mechanical issues had to be corrected before the Tiger moved on to step 8. In step 8, the turret assembly was added to the hull, and mechanical tests were performed. The final procedure, step 9, was a finished paint job and application of Zimmerit anti-magnetic-mine paste. Once this was complete, the Tiger was ready for delivery to its end user. Overall, the factory employed over 8000 workers working in two 12-hour shifts, and each step took six hours to complete. From start to finish, the process took fourteen days, and the assembly line carried an average of twenty Tigers, with the final line holding ten Tigers.



[140]

The Tiger battalions required intensive maintenance in the field. It has been noted that while the typical Panzer Regiment required two entire maintenance companies, a Tiger battalion

[140] The following website provided a detailed description of Tiger production, as well as accompanying visual representations of production methods and Henschel's factory line. See Alan Hamby, "Tiger I Information Center," (2003). Retrieved from http://www.alanhamby.com/tiger.html. Accessed 9 July 2022. Used with Permission.

required four maintenance companies.[141] This standard was supplemented in later organizational standards with an additional maintenance detachment, which performed routine maintenance, such as damaged tracks, while heavily damaged Tigers were sent to the maintenance companies.[142] The detachment's duties were not limited to superficial or minor repairs, however, as the detachment could replace an engine when necessary. This was not part of their regular duties, and their taskings were generally repairs requiring less than half a day of work.[143]

The maintenance companies were tasked with repairing Tigers which could not be repaired by the maintenance detachment, and in cases of severe damage, the Tigers were transferred to regional depot maintenance installations. They required the maintenance companies to have specialty tools and heavy machinery suitable for aiding in a Tiger's deconstruction appropriate for the amount of damage being repaired. Ultimately, the functions of the maintenance company and detachment were not strictly doctrinal, as the tactical situation and capability of the maintenance detachments determined the time in which Tigers were expected to return to operational status.[144]

As a part of day-to-day operations, the Tiger crews were responsible for not only performing basic checks of the mechanical equipment, but after they became more familiar with the tank, the crews gained the ability to conduct maintenance generally reserved for the maintenance detachment. This model is still in practice in modern mechanized armies, as the

---

[141] Lukas Freidli, *Repairing the Panzers: German Tank Maintenance in World War II* (Sussex, UK: Panzerwrecks, 2011), 56.

[142] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 439.

[143] Historical Division, European Command, "German Maintenance in World War II," *Department of the Army Pamphlet 20-202* (1954), 17.

[144] Ibid, 17-18.

crewmen are trained to conduct basic repairs of a non-specialized nature. Wolfgang Schneider, himself an armor officer in the *Bundeswehr*, wrote:

> …experienced crews were also in the position of being able to carry out automatically such activities that were actually reserved for the repair personnel if these had finally reached the limit of their physical endurance, or the time they had available, because of continual stress. This was aided by the fact that the crew – often in the absence of the commander – remained present when work was being carried out on the tank and so were able to 'look over the shoulder' of experts and also because the tank mechanics and drivers – at least to begin with – had completed factory training.[145]

In many cases, the crews were able to strip out damaged assemblies to replace them with an undamaged assembly in another damaged tank that had been deemed suitable for depot-level repair. Alfred Rubbel recalled:

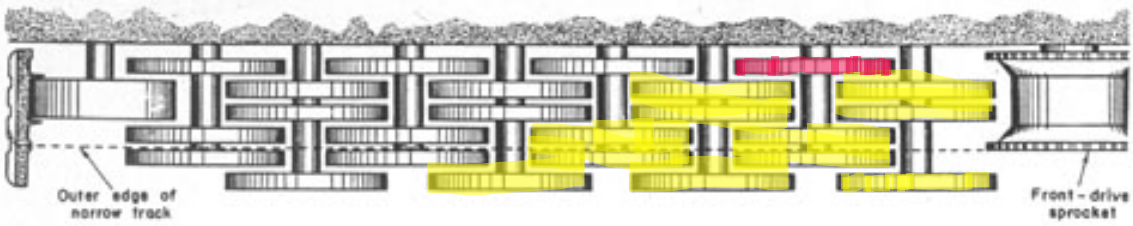
> Maintenance of the approximately two hundred fifty other vehicles was second in priority to that of the tanks…it is obvious that the combat readiness of the equipment was of central concern to the battalion's leadership. In this effort, the maintenance companies were the *Schwerpunkt*. Motor Transport specialist Späth was a well-known engine specialist. He did not limit himself to the workplace of his maintenance platoon. If a Tiger crept back from the battle line, gasping, and wheezing on half its cylinders, Späth and his specialists took charge of it, repairing or improvising, often under enemy fire. In April 1945, he was awarded an Iron Cross 1st Class, a rare award for someone in his position, a civilian who had been detailed to the front from the Maybach factory.[146]

The Tiger's design led to maintenance issues, with the road wheel pattern being one issue not immediately apparent. In order to fir the L/56 8.8 cm cannon to the Tiger, the upper hull had to extend over the tracks. To disperse the additional weight, the outer roadwheel was added, which increased the overall track width from 520mm to 725mm. Not only did this contribute to

[145] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 421.

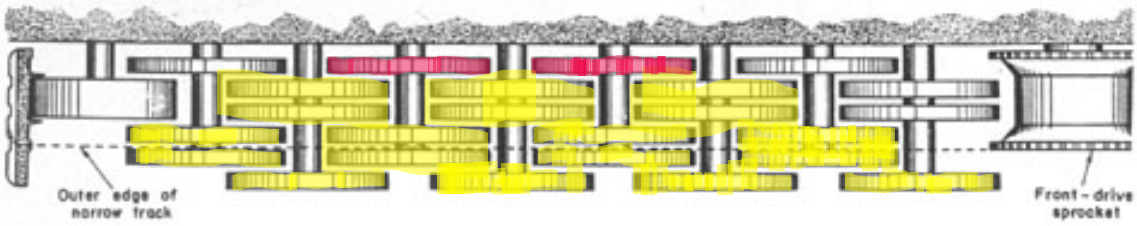
[146] Alfred Rubbel, "Technical Services and Supply/Logistics," in Franz-Wilhelm Lochman, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 39-41.

logistical issues, which will be discussed, but this also made maintenance to damaged inner roadwheels time-consuming.[147]



SUSPENSION SYSTEM OF PzKw 6

In this case, the red wheel has been damaged. Repair requires the removal of eleven other roadwheels.



SUSPENSION SYSTEM OF PzKw 6

In this example, two inner roadwheels are damaged. Exchanging these two road wheels required the removal of eighteen other road wheels.

The interleaved pattern created other difficulties as well. On the Eastern Front, the mud would collect between the wheels, and the cold would freeze the mud into the consistency of concrete. The *Tigerfibel* author commented, "if three wheels are missing, and five are jammed, and the jack sinks into the muddy ground, just think to yourself, in such misfortune, 'what would the mechanic do?'"[148] This difficult situation was exacerbated by the need to ensure the wheel nuts were kept tight, as they tended to loosen during lateral movements; the rubber also tended to

[147] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 8.

[148] Josef Glatter-Goetz, "Tigerfibel," *Internet Archive*. Retrieved from https://archive.org/details/tigerfibel/page/n1/mode/2up. Accessed 3 June 2022.

slip off the wheels during these movements as well.[149] To add frustration to an already potentially difficult situation, each road wheel was not identical, and thus, they were not interchangeable. Road wheels had to be labeled to ensure they were reattached at the correct position.[150]

The tracks were often as problematic as the roadwheels, as precise track tension had to be maintained. The track would slip off the road wheels or drive wheel, particularly during aggressive driving, with too little tension; too much, and the stress on the track tensioner and bearings within the final drive would cause mechanical failure. The tracks also were prone to stretching, where bent track pins increased the overall length of the track beyond typical tolerances. This was caused by normal use as well as a peculiar design flaw in the suspension, which caused the track to gather atop the drive wheel sprocket when reversing. In more severe cases, demolitions were required to separate the track so crews could remove a track link, thus shortening the overall length and returning the length to specifications.[151]

Issues such as complex track and road wheel design may seem like an engineering or design flaw, but with further analysis, the overlapping road wheels and wide track are likely the most advantageous arrangement for the Tiger. The tank was expected to be able to traverse off-road, and this would have been far more difficult with a narrower track configuration, whereas a wider track dispersed the weight over more ground.[152] Along with the suspension pattern, with

---

[149] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 201.

[150] French MacLean, *Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1, 2, & 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military Publishing, 2020), 29.

[151] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 207.

[152] Bob Carruthers, *Tiger I in Combat: Hitler's War Machine* (Berkshire, UK: Archive Media Publishing LTD, 2011), 47.

sixteen torsion bars and eight suspension arms per side, this road wheel pattern provided a smoother ride, which decreased wear on moving parts.[153] This came at a higher cost than the advantages provided, however, as there was no way to repair damaged wheels quickly in heavy combat. Thus, if a Tiger was immobilized beyond hope of recovery, they were often destroyed.[154] In North Africa, this practice led to Germans scoring more kills on Tigers than the Allies, as Chapter Four will elaborate upon.

A crucial yet often overlooked aspect of maintenance is logistics, especially for units fielding high-maintenance vehicles that require constant attention. As in modern combat, the Tigers required pre-, during-, and post-operation checks and services, fluids, replacement parts, and essential services. With any mechanical animal, the crews may have found a track tensioner that had blown out overnight, which required replacement before the Tiger could move. This was no more uncommon then than it is today.

Before a Tiger could join the battle, it had to be transported by rail, but the Tiger's weight meant the standard railcar could not transport the tank. To move the Tiger, the Reichsbahn, the German railway system, acquired two-hundred seventy unique high-capacity flatbed cars, which were designed to carry up to eighty-two tons. However, the rail service to the Tiger did not end with transportation – it still required petroleum products and spare parts, and these were shipped long distances by rail.

---

[153] David Fletcher, ed., *Tiger! The Tiger Tank – A British View* (London: Her Majesty's Stationery Office, 1986), 65.

[154] Bob Carruthers, *Tiger I in Combat: Hitler's War Machine* (Berkshire, UK: Archive Media Publishing LTD, 2011), 25.

The Tigers had a fuel capacity of five hundred forty liters or just over one hundred forty-two gallons, and its fuel use was, on average, five hundred fifty liters per hundred kilometers.[155] This breaks down to 5.5 liters per kilometer or 1.45 gallons per nine-tenths of a mile. A British wartime report provided numbers that were not consistent with either of the above figures and asserted, "entries show that 4197 liters of petrol went into the fuel tanks of this vehicle during a period in which 480 kilometers were covered…the apparent fuel consumption was over 10 liters per kilometer."[156] This discrepancy can be explained once we consider that the British information was obtained from Tiger 131, which was captured in North Africa in 1943. The early Tigers used the Maybach HL210 P45 engine, an aluminum block V12 with 21.353 liters of displacement. After the first two hundred fifty Tigers were produced, the powerplant became the cast iron Maybach HL230 P45, and displacement was increased to 23.095 liters. Early engines were governed at higher RPM, which led to higher fuel consumption.[157]

Discrepancies notwithstanding, these numbers only tell part of the story. The requirements of an entire Tiger battalion, including all its associated support vehicles, were immense. German historian, author, and vlogger provided numbers for the 503rd during operations. Over a nine-month period, about 1.5 million liters of gasoline and two hundred fifty

[155] Consumption figures differ by source. Thomas Jentz and Hilary Doyle gave on-road consumption as four hundred fifty liters and off-road as six hundred fifty liters, while the maintenance crews at The Tank Museum, who maintain the last operation Tiger I, indicated on road consumption was two hundred seventy liters per one hundred kilometers and four hundred eighty liters per one hundred kilometers. It is unclear if the latter figures account for engine idling time or are based on pure drive time. See: Thomas Jentz and Hilary Doyle, *Germany's Tiger Tanks: DW to Tiger I* (Atglen, PA: Schiffer Military History, 2000), 177; David Fletcher, David Willey, Mike Hayton, Mike Gibb, Darren Hayton, Stevan Vase, David Schofield, *Panzerkampfwagen VI Tiger I Ausf. E* (Somerset, UK: Haynes Publishing, 2017), 87-95.

[156] David Fletcher, ed., *Tiger! The Tiger Tank – A British View* (London: Her Majesty's Stationery Office, 1986), 41.

[157] "The Maybach Engine," Retrieved from http://www.alanhamby.com/maybach.shtml. Accessed 1 October 2022.

thousand liters of diesel were transported to the Eastern Front, or roughly nine railway tankers of fuel per month.[158] But Tigers required far more than fuel; they required large amounts of oil. The engine alone required 28 liters of oil, the gearbox needed 32 liters of transmission fluid, the right and left final drive took a further 8 liters of transmission oil for each, the turret required 5 liters of transmission oil, and the ventilation system needed 7 liters of transmission oil. The crews also had to check and fill various grease points on the Tiger, such as drive shaft universal joints, wheel hubs, and suspension arms, to name a few.[159] Much like modern machines, a detailed servicing schedule outlined maintenance intervals; some assemblies required daily checks, and others, such as the turret drive, were to be changed after 2000 hours of use.[160]

Spare parts for a Tiger battalion required a substantial logistical investment as well. From 5 July to 30 September 1943, the 503rd used a total of 275,919 kg of spare parts. In this 90-day period, this total weight equaled 4.5 metric tons of spare parts used per Tiger on average or just under 10% of the Tiger's combat weight. This is the equivalent of 50 kg of spare parts used, on average, per day per Tiger.[161] Based on additional reports from the 501st and 506th, outside of mechanical failures in the engine and transmission, the most replaced parts were in the suspension. Items such as road wheels, drive sprockets, track links, and wheel rubber were commonly damaged, either by mines or shots which sought to immobilize the Tiger.[162]

---

[158] Bernhard Kast, "Tiger Logistics," *Military History not Visualized* (2014). Retrieved from https://youtu.be/htD5NEGRwKk. Accessed 7 September 2022.

[159] Military College of Science School of Tank Technology, *P z Kw VI (Tiger): The Official Wartime Reports* (Coronado, CA: Tank Archives Press, 2020), 21, 23, 145.

[160] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 217.

[161] Bernhard Kast, "Tiger Logistics," *Military History not Visualized* (2014). Retrieved from https://youtu.be/htD5NEGRwKk. Accessed 7 September 2022.

[162] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 422.

As has been mentioned, long-distance movements were not recommended due to the excessive wear on the engine and transmission. A field report written in August 1944 by Major Schwaner, the commander of the 502nd, revealed:

> … traveling 80 to 100 kilometers per day and in extreme heat was tactically demanded, and the maintenance services proved to be unable to repair the large number of broken-down tanks despite working day and night. The suspension is not designed for such travel. The rubber tires on the inner running wheels loosen fairly quickly under heavy load, resulting in an increased burden for the remaining running wheel. Running with…damaged rubber tires quickly led to the destruction of the running wheels, bearing, and suspension arms…requiring 30 to 36 hours of maintenance if all necessary parts are on hand…but for more severe damage, such as a shock absorber assisted radius arm, the engine must be removed for the men to make the repair…these long distances led to unprecedented spare parts usage, and spare parts were backed up by blocked railway movements to Army Group North, leaving urgently needed parts on the train for fourteen days.[163]

To add a further layer of difficulty, the Tiger battalions were generally attached to various formations as needed. It was assumed that the unit gaining the Tiger battalion would also provide logistic support, but poor coordination between logistics officers was a common obstacle, as was the preference logistics officers showed their own organizations. The addition of a Tiger battalion also meant the gaining unit had to provide heavy equipment suitable for maintenance and repair, an additional burden that proved challenging to provide in more remote areas.[164] It became common for transportation officers to work directly with the depots to ensure an adequate number of parts was requisitioned, and battalion supply officers administered their own parts supply to remove interference from the larger organization.[165]

---

[163] Major Hans-Joachim Schwaner, "Field Report, 21 August 1044," reproduced in Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 207-213.

[164] Wolfgang Schneider, *Tigers in Combat III* (Solihull, UK: Helion & Company, 2016), 421-424.

[165] Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 215.

When it entered production, the Tiger promised to return qualitative superiority to the German military. However, details regarding its design and production served to limit the number of tanks produced and the number of components stockpiled in pre-production storage. Combined, these factors served to undermine the number of operational tanks in the field, which subsequently limited their overall effectiveness. Its very design led to mechanical failures in the most fundamental parts – the wheels – and the extensive logistic support required by the battalions strained a system that was underwhelming at its best.

The large number of parts required extensive rail support; the rail network in the occupied nations of central Europe had allowed the Wehrmacht to move its forces into Poland in preparation for Barbarossa successfully, but this was not the case in the Soviet Union. The Soviet rail network was primitive; it had few double rail lines connecting its major cities, the Soviet coal and water were not optimal for locomotive use even by the Soviet standards, and the Soviet rail gauge was much wider than the railways in central Europe. Some of these issues were the product of a modernization initiative that had not reached a crucial sector of infrastructure, but in other cases, the rail system was primitive by design. Many bridges had been built as temporary structures during the First World War and had no value to trains carrying heavier loads – such as Tigers. Marshaling yards and workshop facilities near the western Soviet border had been removed to prevent their use by the Germans in case of an invasion.[166] These factors meant Germany had to manage a rail network that was, in part, held over from the czarist era, and as Germany did not have the manpower surplus to handle such a daunting task, the local populace supplemented German forces.

[166] "Deutsche Reichsbahn: The German State Railway," *Feldgrau: German Armed Forces Research, 1918-1945*. Retrieved from https://www.feldgrau.com/ww2-german-state-railway-deutsche-reichsbahn/. Accessed 2 October 2022.

Chapter III

Tigers on the Eastern Front, 1942-1945

Someone had thoughtfully provided every Tiger tank commander with a demolition charge. With it, the gun could be destroyed effortlessly. If one's tank got a proper dead-on hit, then it was a sure guarantee that the tank commander did not fall into Russian hands. I used the holder to secure a bottle of schnapps. For my five-man crew, it was more soothing than any demo charge!

-Otto Carius, *Tigers in the Mud*[167]

On the frigid morning of 10 February 1943, *Kampfgruppe* Sander was in a defensive position at a train station near Rostov-on-Don. Lieutenant Colonel Erich Hoheisel, commander of s.Pz.Abt 503 was well aware that the 503rd's first engagements as part of Army Group Don – tasked with securing the withdrawal of Army Group B from the debacle that was the Stalingrad encirclement– had not gone as auspiciously as expected.[168] Hoheisel's predecessor, Lieutenant Colonel Post, managed to prevent an enemy breakthrough near Proletarskaya and had reported fourteen destroyed T-34 tanks to Army Group Don, but five Tigers had suffered mechanical breakdowns, five had been damaged by hits, and one was completely destroyed but towed back in hopes the maintenance section could manage to repair the tank. Though the majority of the issues were caused by crews who were not entirely familiar with the tank, who were not correctly retrained after receiving initial training on the Porsche Pz.Kpfw VI, and by commanders who were either not familiarized with the vehicle or who lacked combat experience on the Eastern Front, Hoheisel was concerned two of the five damaged tanks had been penetrated

[167] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 29.

[168] In the summer campaign of 1942, Hitler's written orders received by OKH emphasized Stalingrad as the primary objective in the south. However, Third Reich economic authorities argued that oil from the Caucasus was essential to Germany if the war effort was to continue. Führer Directive 41 outlined both the OKH proposal to drive toward Stalingrad while also preparing for an advance in the Caucasus. Thus, Army Group South was split; Army Group B would advance toward Stalingrad, while Army Group B would drive into the Caucasus. See: Adolf Hitler "Führer Directive 41, 5 April 1942," *Combined Arms Research Library* https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/2359, accessed 20 July 2022.

on their side by the 7.62 cm anti-tank rounds, which had previously been unable to penetrate the Tiger. No crewmen had been lost, but the Tiger could no longer be considered impervious.

The 23rd Panzer Division, which had participated in the failed breakout of the 6th Army at Stalingrad and found itself withdrawing westward under constant pressure from Stalin's "Little Saturn," had received s.Pz.Abt 503 as an attachment, as it was expected that the Soviets would attack Rostov-on-Don in early February. On 8 February, the s.Pz.Abt received alert orders attaching it to *Kampfgruppe* Sander, led by *Oberstleutnant* Joachim Sander, commander of the 201st *Panzer-Regiment*. On the 8th, the 503rd drove from the northwest of Rostov and, throughout the day, cleared out several towns along the northwest edge of the city, and two Panzer IIIs were detached to support a mechanized combat engineer battalion in the southwest part of the city. On the 9th, the 2nd Company reported to *Kampfgrupe* Sander at the Sapadnyj train station, and the 3rd Company continued to secure Krassnyj-Tschaltry, a village key to maintaining open rail usage.[169] *Kampfgruppe* Sander contacted Kampfgruppe von Winnig, and throughout the day, encountered fierce resistance as the element southward to the northern bank of the Don River, near the modern Rostov suburb of Gnilovskaya.

Into the evening of the 9th, *Kampfgruppe* Sander moved downriver along the Mertwyj Donetz, the most extensive channel of the Don River delta, northwest toward Ssmernikovo and fought through to the edge of a large ravine eight hundred meters west of the village. Unable to link up with the *Panzer-Jaegers* on the eastern edge of the village, the *Kampfgruppe* returned to Sapadnyj rail station, roughly 5 kilometers northeast of Ssmernikovo, and prepared defensive

[169] 1st Company, 503rd s.Pz.Abt. "lent" its tanks, both Panzer III and Tiger, to the 2nd and 3rd Companies on 4 February while refitting and recovering in Rostov. As intelligence suspected a Soviet attack on Rostov on the 5th, the reorganization was prudent, as the 2nd Company only had nine Tigers and eight Panzer IIIs operational, and the 3rd Company had eight Tigers and eight Panzer IIIs operational. See: Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 31-32.

positions toward the south and west.[170] On the 10th, General von Vormann, commander of the 23rd Panzer Division, ordered an attack from the southwest edge of Rostov to the northeast edge of Nishne-Ginlowskaya (Gnilovskaya) to close a break in the front line and ultimately shorten the defensive line. *Kampfgruppe* Sanders and von Winnig advanced toward the train station near the center of Nishne-Ginlowskaya, and after sporadic fighting against pockets of Soviet infantry embedded in buildings, the advance was halted mid-day. The tanks, especially the Tigers, were having difficulty sliding on the icy, sloping road, so the Germans established a defensive line along Nishne-Ginlowskaya's main road, which bisected the town east to west, and prepared for missions the following morning.

On the morning of the 11th, the Russians counterattacked from Nishne-Ginlowskaya, as they moved into the western sectors of Rostov overnight. The Germans were quickly able to repel this attack without using the s.Pz.Abt or other Panzers in the *Kampfgruppen*. A second attack, west of the Sapadnyj train station, was repelled as well, and the Soviets were sent retreating toward Ssemernikowo and the *Kolkhoz*, or collective farm, located west of Ssemernikowo.[171] Intelligence reports indicated that the sector of the Don River near Rostov witnessed reduced Soviet pressure on the German lines and indicated that the Soviets were moving south toward Ssemernikowo. Indications were that the Soviets intended to regroup,

[170] The map above was prepared by the German General Staff in 1941 on a 1:50,000 scale. The presented map is but a portion of the full sheet. See: "Map of the German General Staff of the Environs of Rostov-on-Don," http://clubklad.ru/maps/182/#map, accessed 22 June 2022.

[171] Thomas Jentz refers to the collective farms in his *Germany's Tiger Tanks* as a Kolchose. The proper term for the farms is колхо́з, Anglicized as Kolkhoz. See: Fedor Belov, *The History of a Soviet Collective Farm* (New York: Praeger, 1955), 82.

reorganize, and launch a more significant assault from Ssemernikowo toward Nishne-Ginlowskaya, or, more likely, toward the staging point at the Sapadnyj train station.[172]

On the morning of the 12th, *Kampfgruppe* Sander initiated the assault on the farm complex and, following doctrine, ordered s.Pz.Abt 503 to lead the charge. 3rd *Zug* s.Pz.Abt. 503 was tasked with leading the attack, despite *Zugführer Oberstleutnant* Hansen's Tiger having been damaged by an anti-tank shell during the fighting west of Sapadnyj, forcing him to withdraw. *Leutnant* Zabel, 3rd Platoon's acting *Zugführer* smashed his platoon into the farm and its defenders and recalled later, in a report:

> At the beginning of the attack, my Tiger was hit on the front of the superstructure by a 7.62 cm anti-tank shell. The track links, which had been fastened to the superstructure by a steel bar, were ripped away. We heard a dull clang and felt a slight jolt inside the Tiger. At the same time, we observed many near misses striking the ground to the front and the side of the Tiger, some leaving considerable burst clouds. The closer we got to the target, the harder the jolts became…the closer the Tiger approached the collective farm, the greater the intensity of the enemy's defensive fire. Each hit on the Tiger was accompanied by a sharp clang, a jolt, acid clouds of smoke, a shimmering yellow flash inside the fighting compartment, and a detonation. The nerves of the crew were stretched to the limit. We paid no attention to hunger, thirst, or time. Even though the attack lasted over six hours, at the time the crew thought that only a short time has elapsed…We counted 227 hits from anti-tank rifle rounds, fourteen hits from 5.7 cm and 4.5 cm anti-tank guns, and eleven hits from 7.62 cm guns. The right track and suspension were heavily damaged. Several road wheels and their suspension arms were perforated. The idler wheel had worked itself out of its mount. In spite of all this damage, the Tiger still managed to cover an additional 60 kilometers on its own power. The hits had caused the failure of several welded joints to crack and caused the fuel tank to start leaking. The tracks had received several hits, but these did not significantly hinder the Tiger's mobility. There were other technical faults as well, but up to now I do not have a full report about the damage. In conclusion, it can be said that the armor on the Tiger can withstand the most intense punishment that the enemy can deliver. The crew can head into combat secure in the knowledge that they are surrounded by sufficient armor to keep out the most determined anti-tank round.[173]

---

[172] "Combat Report for 2-22 February 1943," reproduced in Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 64-69.

[173] *Leutnant* Zabel's account has been reproduced in several significant works, both in translated form and in original German. His account of fighting outside Rostov survived the war as a testimonial to the Tiger's formidable nature, at least early in its life cycle. *Leutnant* Zabel, however, did not. He perished sometime between Christmas 1944 and the end of the war, on the Eastern Front, in an action and manner which has been lost. See: Franz-Wilhelm Lochman, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of German*

The attack had gone well. Zabel had pushed his Tiger forward even after the recoil cylinder failed and only withdrew after being wounded in the head. The after-action report stated that one T-34 and five American-built light tanks were destroyed, ten anti-tank guns were taken, and several mortars, additional anti-tank guns, and light infantry weapons were destroyed.[174]

When taken in conjunction with unit histories, this report appears to confirm that the Tigers, when deployed according to doctrine, were exceptionally combat-effective. In the case of the action around Rostov, the Tigers were being deployed from a forward assembly area at a train station, were moving into contact four to six kilometers from that forward position and were at times conducting follow-on missions not exceeding twenty to eighty kilometers and were moving a further four to eight kilometers to return to their forward assembly area for refit. Doctrinally, this adhered to both the *Merkblatt* and the *Mittlere Panzerkompanie* manuals, as the assembly area was at or near a railyard, where heavy equipment was available. Additionally, this operational employment emphasized the Tiger at the focal point of the operation, as the Tigers led the charge into the enemy positions, and the distances covered were well within the Tiger's operational range without being overly concerned about mid-action refueling.

Of the three years and eleven months of fighting on the Eastern Front, the Tiger I or Tiger II was deployed to the east for two years and nine months: just over 70% of the duration of the

---

Tiger Tank Battalion 503 in World War II (Guilford, CT.: Stackpole Books, 2000), 57-79, 433; Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 65-69; Thomas Jentz, *Panzertruppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol. 2, 1943-1945* (Atglen, PA: Schiffer Publishing, 1996), 47-73; Robin Schaefer, "Tiger! Panzer VI Combat and Operational Evaluation: 252 Hits Taken in Combat," *War History Online* (2012) https://www.warhistoryonline.com/articles/tiger-panzer-vi-combat-and-operational-evaluation-1-252-hits-taken-in-combat-ww2-by-rob-schafer.html?chrome=1&A1c=1&D10c=1&D_4_6_10cALL=1&D_10_20cALL=1&A10c=1, accessed 27 June 2022.

[174] Franz-Wilhelm Lochman, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT.: Stackpole Books, 2000), 57-79.

war in the east. While other Panzer variants indeed were deployed for a more significant percentage of the war, no other Panzer went into combat with the expectation that it could change the course of the war, with the exception of the Panther.[175] Both tanks were expected to have a significant impact on the Panzerwaffe, but where the Tiger was meant to push the offensive, the Panther was a replacement for medium tanks, which had both firepower and survivability to adequately support either a heavy tank battalion or a mechanized infantry division. The *Wehrmacht* had envisioned a tank that could destroy any enemy tank it encountered, and Hitler had wanted a monstrosity that would be the embodiment of his Thousand Year Reich – strength, military supremacy, and the superiority of the German *Volk*. Henschel and Sohn transformed this vision into reality through the use of high-carbon steel dug from the German industrial heartland – the Ruhr Valley.[176]

The Tiger was designed to act as a hammer within the constraints of the long-established "cult of the offensive" drilled into the German military. It was not envisioned as a defensive weapon, but the Tiger's most remarkable accomplishments on the Eastern Front came when operating in a defensive role. Their armor and ability to destroy Soviet tanks from long distances influenced the Soviets to design weapons able to counter their armor, which was also detrimental to the success of other German tanks.[177] In the defense, the Tiger battalions were most effective

[175] As the Panther's 7.5 cm KwK 42 L/70 had better gun penetration that the Tiger's 8.8 cm 36 L/56, was faster, more agile, and more capable off-road, some modern historians have argued that the Panther is the precursor to the modern main battle tank. See: Steven Zaloga, *Armored Champion: The Top Tanks of World War II* (Mechanicsburg, PA: Stackpole Books, 2015), 202; Steven Zaloga, *Panther vs. Sherman: Battle of the Bulge* (Oxford: Osprey Publishing, 2008), 5, 75.

[176] Walter Spielberger and Hillary Doyle, *Tigers I and II and their Variants* (Atglen, PA: Schiffer Military History, 2007), 8.

[177] Isabelle Hull, *Absolute Destruction: Military Culture and the Practices of War in Imperial Germany* (Ithaca, NY: Cornell University Press, 2005), 2, 13, 22.

when dispersed along the front, where they were able to cover multiple potential avenues of approach or as a strategic reserve where their largest movement would be toward the Soviet focal point.

This chapter argues that on the Eastern Front, the Tigers could not be considered to have been combat effective based on the criteria for which they were developed – the offensive. By this point in the war, Germany could no longer launch large-scale offensives, and in the limited offensives undertaken from 1943 to 1945, the Tiger was unable to perform to its expectations. Further, the initial invincibility, such as was recounted by Lieutenant Zabel, gave Tiger commanders and crew the impression they had nothing to fear from Soviet armor, while such exploits inspired the Soviets to design more effective weapons capable of countering the heavy tank battalions. This chapter will contend that the Tigers were not only far more effective when in a defensive role but that their dispersal among supportive elements along the front was crucial to their success.

From this perspective, more significant successes were achieved when the heavy tank battalions were used as a reserve force that was prepared to shift over a distance of a few dozen kilometers rather than a hundred or more. As the Soviet doctrine demanded significant attacks against multiple points on the front, concentrated battalions often were unable to counterattack in force due to mechanical failures during the march. There is a larger sample size of defensive operations involving the Tigers during this period, and in this non-doctrinal role, the heavy tank battalions managed tremendous success and impact on the war as a whole.

The flexibility of the heavy tank battalions, especially when paired with their Panzer III under the earlier KStN, allowed the Tigers to conduct operations they were unsuited for without such support, such as recon, spotting, and urban operations. Lastly, the chapter proves that Soviet

research and development designed tanks and guns solely for the purpose of countering the Tiger and conducted extensive research on captured Tiger's to determine weaknesses and how to destroy the tank most effectively. Moreover, on the Eastern Front, where the Tigers were involved in far more tank vs. tank actions, the Soviets were able to reach a point where their own tanks were able to damage or destroy Tigers consistently, but they were willing to trade 'tank for tank' in their relentless drive westward rather than employing prepared defenses, such as coordinated minefield and artillery placement, as the Western Allies had done with consistent success.

Initial Deployment: Missteps outside Leningrad

By the first half of 1942, Hitler was managing the use of every resource available in minute detail in order to squeeze every last rifle, gun, tank, and airplane out of the nation as possible. Hitler's standing order was that ever-increasing numbers of tanks of higher quality than were used in Poland and France should be produced as quickly as possible.[178] As with every new weapon, Hitler believed the Tiger would change the course of the war, and he demanded they were on the Eastern Front as rapidly as possible, with any final production issues ironed out in combat.[179]

[178] "Adolf Hitler Material Guidance" 21 March 1942; Records of the German Armed Forces High Command (National Archives Microfilm Publication T77, serial 194 roll 194, item Wi/IF 5.900); Captured German Record Collection; National Archives College Park Maryland.

[179] The Panther also suffered teething problems, as it was found to have a weak final drive that was a notorious weakness in the hands of an unskilled operator and a drivetrain that would catch fire while driving down a smooth, paved road. See: Albert Speer, "Führer Conference Notes," 5-6 March 1942, trans. FGC on 6 July 1945 *Records of the Reich Ministry for Armaments and War Production* (National Archives Microfilm Publication T73, serial 192, roll 192, item RmfRuk 2096), Captured German Records Collection, National Archives College Park Maryland.

Outside Leningrad, on 29 August 1942, amidst the thunder of falling artillery, four Tigers of s.Pz.Abt. 502 rolled off the railcars at Mga station.[180] Once the narrow transport tracks had been replaced with the broader combat tracks, the Tigers rolled into the woods to hunt, as their namesake predator would have done. Unlike their namesake, the Tigers of s.Pz.Abt 502 moved with accompaniment – a military liaison, Uebel, and an engineer, Franke, had been sent to observe the first combat action undertaken by the Tigers and were keen to be near to the fighting as to report their findings to OKH and the designers accurately.[181]

As the Tigers rolled through the forest, they came upon an open clearing. Major Richard Märker, commander of s.Pz.Abt 502 ordered the tanks to a halt to engage several targets to their front. Soviet positions were dispatched; the tanks made their way closer to the main Soviet defensive line. As the Tigers moved forward, the attack gained momentum, despite warnings from the German infantry that the ground ahead was unsuitable for tanks. These men were assigned to Field Marshall Erich von Manstein's 11th Army, the victors of Sevastopol. They had been sent north with their heavy siege artillery to make quick work of the obstinate Leningrad. These men, though not of the *Panzerwaffe*, had been in combat on the Eastern Front long enough to recognize dangers to their support vehicles.[182]

---

[180] Thomas Jentz and Hilary Doyle, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, 1933-1942*, vol. 1 (Atglen, PA: Schiffer Military History, 1996), 245.

[181] *Oberkommando des Heeres* had been led by Field Marshall Walther von Brauschitch until after the Battle of Moscow when, citing von Brauchitsch's ill health, Hitler removed the Field Marshall and named himself as the Commander-in-Chief of the Army. OKH remained the sole high command for the Eastern Front until 28 April 1945 – two days before Hitler's suicide – when Hitler formally subordinated OKH to *Oberkommando der Wehrmacht*, the high command of Germany's military, which had been responsible for all other fronts of the war. Thus, Hitler was in complete control of the conduct of the war on the Eastern Front. See: Correlli Barnett, *Hitler's Generals* (New York: Grove Weidenfeld, 1989), 497; Geoffrey Megargee, *Inside Hitler's High Command* (Lawrence, KS: University Press of Kansas, 2000). Dr. Megargee's lecture, "Not the Stuff of Legend: The German High Command in World War II," can be found on the official YouTube channel of the US Army Heritage and Education Center.

[182] The transfer of the 11th Army northward had been a matter of some contention between Hitler and his Chief of Staff, Colonel-General Franz Halder. Von Manstein's position was that Leningrad was of significantly less

Suddenly, the Soviets stopped retreating. Russian forward observers relayed positioning information to the guns, and artillery ripped the ground apart in a shower of dirt clods and grass, splitting the formation of four Tigers – two went to the right of a low rise, and two went left through a slight depression. Private Matten drove the observers as close to the action as possible and was amazed when he discovered a Tiger in the open, with its transmission destroyed from the effort of the off-road movement. Shortly, a messenger arrived with news that a second Tiger was ahead, also immobilized with a damaged engine. As Matten and the observers made their way on foot to verify this, Major Märker and his Tiger approached the second Tiger. He reported that the third Tiger was further ahead, also immobilized with a ruined transmission. Overnight, the Tigers were recovered with assistance from three Sd.Kfz 9 *Famo* 18-ton halftracks. The Russians had been unaware the Tigers were immobile and, as such, had opted not to approach the behemoths.[183]

During this time, the fall rain, which so concerned German strategists, began in earnest. From the 7th through the 11th of September, rain made ponds of open fields and quagmires where once were roads. By 15 September, all Tigers had been repaired and were ready to attack the Russians once more. On the 22nd, at dawn, German artillery opened fire, clearing the way for the Tigers.[184]

---

importance than having the 11th Army in position to aid in the offensive toward Stalingrad and the Caucasus, an opinion Halder shared. Hitler overrode this, claiming his experience on the front in the *Weltkreig* gave him far more knowledge than Halder's years of command experience. See Erich von Manstein, *Lost Victories* (Novato, CA: Presidio Press, 1982), 261-263.

[183] All three damaged Tigers were recovered, and their defective parts were transported to Henschel in Kassel, Germany. The replacement parts were sent back to the front, and OKH demanded the Tigers were immediately rendered mission capable. See Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 13-15.

[184] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 14.

Attached to the 170th Infantry Division, the four Tigers from s.Pz.Abt 502 were in place as the main effort against the Soviet 2nd Shock Army, which was nearly encircled.[185] Märker attempted in vain to influence higher command to cancel the attack, as his reconnaissance reports indicated the ground was thoroughly unsuitable for heavy tanks. However, as the Führer had ordered the attack, Märker could not refuse despite his better judgment.

As Märker feared, the Tigers fared horribly in the marshy terrain around Lake Ladoga, on the eastern outskirts of Leningrad. According to Märker's gunner, Sergeant Johann Pfeffer:

> I participated in this operation as the gunner in the battalion commander's Tiger. The driver was Sergeant Balkhausen. All that we knew before the operation was that a pocket had formed in this area in which there were powerful enemy forces whose objective had been to establish a ground link with Leningrad south of Lake Ladoga. Our attack was to prevent this intention.[186]

According to another report, the Tigers were still plagued by transmission issues which caused the tanks to be less maneuverable than usual. The swampy terrain also inhibited their tactical movement, as the Tigers were forced to stay on what little hard roadway they could find. Eventually, this became impossible, and the Tigers began to sink into the mud, *Schachtellaufwerk*-pattern road wheels became caked with clay-like mud, and maneuverability

[185] Thomas Jentz and Hilary Doyle, *Tiger I Heavy Tank, 1942-1945* (Oxford: Osprey Publishing, 1993), 21.

[186] "Diary of *Unteroffizier* Pfeffer," reproduced in Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 13-15.

was further inhibited.[187] The mud placed additional strain on the engine and transmission, which led to additional mechanical failures.[188]

When the Tigers did encounter Soviet resistance, it was catastrophic. The platoon leader's Tiger was struck twice, once on the gun, rendering it inoperable, and once on the driver's hatch, making driving more difficult. Two other Tigers were damaged more severely: one was damaged so heavily it had to be towed back to the assembly area, and the second burned to the ground due to engine fire. The fourth had managed to penetrate deeply enough that, once stuck in the mud, it became the target of withering Soviet fire and could not be recovered.[189] Initially, OKH refused to allow Märker to destroy the bogged-down Tiger, but after several recovery attempts, the Major was finally allowed to "pack it full" of explosives and destroy it.[190]

Near the end of November 1942, Major Märker presented a full report personally to Hitler. In this conference with the Führer, Luftwaffe Chief-of-Staff (among other titles) Hermann Göring, OKW Chief of Operations Staff Alfred Jodl, and others, Major Märker relayed the concerns he had addressed prior to the attack, including detailed concerns regarding the terrain, which he had personally observed. Märker's concerns were ignored, and Göring went as far as to

---

[187] *Schachtellaufwerk* pattern road wheels were an elaborate system used in German half-tracks and armored vehicles. On the Tiger, twenty-four road wheels were interleaved on suspension arms, with minimal space between each arm and wheel assembly. This proved disastrous in winter when frozen mud locked the wheels together. This had the additional cost in maintenance efficiency, as when a centrally located innermost roadwheel was damaged, replacement meant removing up to fourteen wheels. See US War Department, "Tactical and Technical Trends," 6 May 1942, reproduced in Bruce Oliver Newsome: *The Tiger Tank and Allied Intelligence vol. IV: Capabilities and Performance* (Coronado, CA: Tank Archives Press, 2020), 66.

[188] Richard Freiherr von Rosen, *Panzer Ace: The Memoirs of an Iron Cross Panzer Commander from Barbarossa to Normandy* (Yorkshire: Greenhill Books, 2018), 131.

[189] "Report of Tiger I Action Near Lake Ladoga," 7 October 1942, reproduced in Thomas Jentz and Hilary Doyle, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, 1933-1942*, vol. 1 (Atglen, PA: Schiffer Military History, 1996), 246.

[190] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 74.

present aerial photographs which depicted the terrain as perfect for tanks – though it was unclear if any area around Leningrad was actually depicted. Against the sycophants, Märker was no match; he was reassigned to command the 2nd Company, 31st Panzer Regiment, and was killed on 22 February 1943.[191] After the war, General Guderian recalled this ignominious initial action, writing:

> In September of 1942, the first Tigers went into action. A lesson learned from the First World War had taught us that it is necessary to be patient about committing new weapons and that they must be held back until they are being produced in such quantities as to allow their employment in mass. In the First World War, the French and the British had used their tanks prematurely, in small numbers, and thereby failed to win the great victory…Hitler was well aware of the facts. But he was consumed by his desire to try his new weapon. He therefore ordered that the Tigers be committed in a quite secondary operation, in a limited attack carried out in terrain that was utterly unsuitable; for in the swampy forests near Leningrad heavy tanks could only move in single file along the forest tracks, which was…exactly where enemy anti-tank guns were posted. The results were not only heavy, unnecessary casualties, but also the loss of secrecy and the element of surprise.[192]

Albert Speer, Reich Minister for Armaments and Munitions, also recalled in his memoirs that Hitler had been well aware of the terrain issue:

> His staff called his attention to the fact that the sector of terrain he had chosen made a tactical deployment of the tanks impossible because of the marshy ground on both sides of the road. Hitler did not immediately reject those concerns but only after having thought about them. As a result, the first Tiger attack began. The Russians calmly allowed the tanks to roll past an anti-tank position in order to fire into the less well-armored sides of the first and last Tigers. The remaining tanks could move neither forward nor backward nor to the side into the marshland, and they were also swiftly knocked out.[193]

Nor was Major Märker the only officer to attempt to dissuade Hitler from deploying the Tigers at Leningrad. General Franz Halder, Chief of Staff of OKH from 1938 to September 1942, wrote:

---

[191] "Diary of Sergeant Pietsch, 3rd Company, s.Pz.Abt 502," reproduced in Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 15.

[192] Heinz Guderian, *Panzer Leader* (New York: Da Capo Books, 1996), 280.

[193] Albert Speer, *Inside the Third Reich* (New York: Simon & Schuster, 1997), 371-373.

> In September 1942, the situation of Army Group North was very tense. It urgently required constant support…Hitler's impatience made no distinction between the delivery of a new weapon from the factory and its operational status at the front. He completely overlooked the fact that a new tank type had to be thoroughly tested under various conditions and that the crews had to be trained until they mastered the new equipment…The Army General Staff employed every means to convince Hitler that this type of weapon could not be released for employment at the front.[194]

The commander of the XXX Army Corps, General of Artillerie Maximilian Fretter-Pico, whose command encompassed the sector where the Tigers were employed, objected strenuously to their use.[195] He had realized the focal point of the attack was to take place in an area that was canalized, along a forest road, with little to no room for maneuver. As such, not only could the Tigers not mutually support themselves they could not be supported properly by Panzer III's nor the infantry, as the terrain was unsuitable for maneuver warfare.[196]

The heavy tank battalions were, at this time, also in a considerable state of disarray. From May 1942 to July 1943, the German Army created five heavy tank battalions, but slow production meant the battalions were not afforded their full complement of Tigers until just before Kursk. In the initial planning for Operation Citadel, one potential obstacle to the offensive was that the Führer would not initiate the offensive until there were enough Tigers to achieve the overall objectives. Richard Freiherr von Rosen, who served with 2nd Company, s.Pz.Abt 502 until that Company was transferred and redesignated 3rd Company, s.Pz.Abt 503 in January

---

[194] "Letter from *Generaloberst* Franz Halder to *Major* Scultetus," January 1970, reproduced in Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 16.

[195] The German General officer structure included a *General der* rank which was equivalent to a Lieutenant General in American and British forces. These German officers had generally received specialized training in a particular branch as junior officers and were qualified to command larger formations. In the *Wehrmacht*, these Generals were often commander's-in-chief of the Army Corps. See: US War Department, *TM 30-506 German Military Dictionary* (Washington DC: War Department, 1944).

[196] Maximilian Fretter-Pico, *Mißbrauchte Infanterie: Deutsche Infanterie-Divisionen im osteuropäischen Großraum 1941 bis 1944* (Frankfurt am Main: Verlag für Wehrwesen Bernard & Graefe, 1957), 168.

1943, recalled his entire s.Pz.Abt 502, except the Tigerless 2nd Company, had been transferred to Leningrad, but rumors abounded that Major Märker had ordered the 2nd Company to deploy to Leningrad, Tigers or not. It was also rumored 2nd Company was being transferred to 1st SS Panzer Division *Leibstandarte-SS Adolf Hitler* (LSSAH) as it had been decided to allocate a heavy tank battalion to each Waffen-SS Panzer division, and the shortage of experienced tankers at this stage of the war made it advantageous for the Waffen-SS to "requisition" unemployed Panzer men rather than train their own recruits.[197]

None of the rumors proved true; the 2nd Company remained at Fallingbostel troop depot, while on the Eastern Front, the situation in late 1942 grew increasingly grim.[198] Two Soviet Army Groups made a broad movement, overwhelming the Romanian, Hungarian, and Italian forces defending the 6th Army, and met at Kalach-na-Donu. Operation Uranus smashed through the overextended and undersupplied Axis lines, and with each passing day, the pocket of resistance occupied by the 6th Army became deeper behind Soviet lines.

Based on the limited deployment of the Tigers in 1942, the Tigers cannot be considered to have been combat effective. The decision to deploy the Tigers to a poor sector in a secondary engagement, where the terrain was thoroughly unsuitable for tanks, was an unsound tactical decision. This was compounded by the inability of the Nazi inner circle to accept that aerial reconnaissance conducted before several days of torrential rain on an area of land prone to becoming marshland may be inaccurate, which indicated a lack of trust between the High

[197] It was later determined to attach an s.Pz.Abt to each SS Panzer Corps. The 501st s.SS-Pz.Abt. was attached to I SS Panzer Corps, 502nd s.SS-Pz.Abt was attached to II SS Panzer Corps and 503rd s.SS-Pz.Abt was attached to III SS Panzer Corps. There were plans for a fourth s.SS-Pz.Abt, which would have been attached to IV SS Panzer Corps, but the tide of the war precluded spreading the Tigers any further than they already were. See: Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol. 2, 1943-1945* (Atglen, PA: Schiffer Publishing, 1996).

[198] Richard Freiherr von Rosen, *Panzer Ace: The Memoirs of an Iron Cross Panzer Commander from Barbarossa to Normandy* (Yorkshire: Greenhill Books, 2018), 131-132.

Command and the officers in the field. Further, had Hitler chosen to deploy the Tigers in the sector due south of the city, between Krasnoje Selo and Slutsk, rather than into a reactionary, ill-planned operation against the Sinyavino Offensive, conditions would have been far more advantageous as there are several roads leading into the city, the terrain is more open, 8.8 cm gun could be more successfully used, and there were a number of rail yards which could have been occupied as assembly and maintenance areas.

The deployment from Mga was chosen as the Soviets had launched the Sinyavino Offensive to open a relief corridor to the city. The 2nd Shock Army, 4th Guards Rifle Corps, and 8th Army of the Volkhov Front pushed westward toward the Neva River from their front lines to the east in hopes of trapping the German XXVI Army Corps against the banks of the Neva River and the shores of Lake Ladoga. This Soviet offensive had panicked Hitler enough for him to change the deployment zone, as he had intended the Tigers to crack the bunkers and defeat the anti-tank guns along the southwestern sector of the city rather than engage in a secondary operation; however, his impulsivity won out, and the Tigers were employed unnecessarily on 21 September, when the German 11th Army had succeeded in encircling the 2nd Shock Army without any meaningful contribution from the Tigers. As von Manstein pointed out, "any attempt to get our infantry to grips with the enemy would have caused us excessive losses."[199] Only relentless artillery and Luftwaffe support sorties had been successful in the swampy forests southwest of Leningrad.[200]

---

[199] Erich von Manstein, *Lost Victories* (Novato, CA: Presidio Press, 1982), 264-267.

[200] The 2nd Shock Army consisted of sixteen rifle divisions, nine rifle brigades, and five armored brigades. The Germans had managed to capture seven rifle divisions, six rifle brigades, and four armored brigades totaling twelve thousand prisoners, three hundred guns, five hundred mortars, and 244 tanks. See: David Glantz, *The Battle for Leningrad 1941-1944* (Lawrence, KS: University Press of Kansas, 2002), 207.

Though Hitler's Tigers had made no lasting contribution during the Sinyavino offensive, they were able to make an impact during Operation Iskra, the Soviet attempt to relieve Leningrad in January 1943. After the failed Sinyavino Offensive, Soviet planners immediately began organizing a further offensive. In the south, Operation Uranus, conducted from November 19th - 23rd, 1942, had crushed the overextended and vulnerable Axis lines, encircling the German 6th Army, the 3rd and 4th Romanian Armies, and parts of the German 4th Panzer Army.[201] With 400,000 Germans, 200,000 Romanians, and a large amount of artillery and aircraft surrounded, Stalin ordered the follow-on Operation Little Saturn and Operation Mars to begin.[202] Little Saturn, which lasted from 12 December 1942 to 18 February 1943, was intended to enlarge the area of recovered Soviet territory around the surrounded Axis forces and push westward in the general direction of Morozovsk in the Rostov Oblast.[203] Mars – also known as the Second Rzhev-Sychevka Offensive – lasted from 25 November – 20 December 1942 and was the first of a series of offensive operations conducted against the German Army Group Center.[204] Operation *Wintergewitter* (Winter Storm), the attempt to break through to the 6th Army, had failed. The spearhead of the offensive, s.Pz.Abt 503 could not reach von Manstein's forces in time to aid in the breakout and thus saw no combat until January 1943.[205]

---

[201] Erich von Manstein, *Lost Victories* (Novato, CA: Presidio Press, 1982), 296.

[202] David Glantz and Jonathan House, *When Titans Clashed: How the Red Army Stopped Hitler* (Lawrence, KS: University Press of Kansas, 1995), 346.

[203] Georgy Zhukov, *Marshal of Victory*, vol II (Barnsley, UK: Pen and Sword Books, 1974), 129, 134-135

[204] Georgy G. Kolyvanov, "Mars: In the Shadow of Uranus," *The Independent* (December 2005) accessed 16 July 2022, https://nvo.ng.ru/history/2005-12-02/5_mars.html

[205] Dr. Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 59-60.

In the north, Operation Iskra placed renewed pressure on the German 18th Army. After Stalingrad, Army Group North had a sizable portion of their troops reassigned to Army Group Center, including the 11th Army, which had stopped Operation Sinyavino.[206] Under Colonel-General Georg Lindemann, the 18th Army had twenty-six divisions covering a front 280 miles long. Further, there were no tactical reserves of division-level strength; each division had a reserve of one to two battalions, and the 18th Army's reserve was part of the 96th Infantry Division and 5th *Gebirgs* (Mountain) Division.[207]

Operation Iskra began on 12 January 1943 as part of a wider winter counter-offensive across the entire front. The Soviets assaulted across a narrow front toward Leningrad in an attempt to relieve the starving city, with the reconstituted 2nd Shock Army attacking from the west and the 67th Soviet Army attacking eastward from within Leningrad. Through sheer attrition, described by one report from the German 170th Infantry Division as "the enemy losses between the power station and the paper mill had been extraordinarily high, approximately 3000 dead…whole rows of dead Russians lay on the Neva ice," 2nd Shock Army forged a salient two kilometers deep and twelve kilometers wide around Gaitolovo, a village four kilometers southwest of Sinyavino.[208]

---

[206] After the Siege of Sevastopol, von Manstein was promoted to *Generalfeldmarschall*, and he, along with the siege trains and a portion of the 11th Army, was transferred to Army Group North to assist with Leningrad, as mentioned above. The remainder of the 11th Army was allocated to Army Groups South and Center. After the Sinyavino Offensive, von Manstein was transferred to the South, and he and the elements of the 11th Army were used to create Army Group Don, which also consisted of the 6th Army and 4th Panzer Army, which were surrounded in Stalingrad. See Erich von Manstein, *Lost Victories* (Novato, CA: Presidio Press, 1982), 273-281.

[207] Wilhelm Adam and Otto Ruhle, *With Paulus at Stalingrad* (Barnsley, UK: Pen and Sword Books, 2015) 113.

[208] Samuel Mitcham, *The Rise of the Wehrmacht: The German Armed Forces in World War II* (New York: Praeger International, 2008), 470-485.

Early on the morning of the 13th, four Tigers and eight Panzer IIIs from 1st Company, s.Pz.Abt 502 was sent to reinforce the German 96th Infantry Division.[209] A hastily organized *Kampfgruppe* consisting of five battalions from the 96th Infantry Division was sent to the vicinity of the 170th Infantry Division, which was defending the eastern perimeter of Leningrad along the Neva River near the modern city of Kirovsk.[210] Soviet forces had crossed the Neva River and broken through the German defenses. Twenty-four T-34 tanks were steadily driving the Germans back, and while the German infantry had managed to disable some of the T-34s, the Soviet tanks had inflicted heavy losses on the Germans.

Moving into position, the elements of 1st Company opened fire on the T-34s and were reported to have destroyed twelve Soviet tanks in a few minutes, which blunted the Soviet offensive. According to Wolfgang Schneider, the platoon caused the remaining T-34s to withdraw westward toward the Neva.[211] The Germans attempted to regain the initiative and immediately counterattacked, but the poor weather prevented the use of air support. The German counter-offensive failed to break the Soviet advance.[212]

On the 14th and 15th, the Soviet advance eastward from the Neva slowly encircled Schlüsselburg (modern Shlisselburg). The town, situated at the mouth of the Neva on the shores of Lake Ladoga, held until 18 January, but Colonel-General Lindemann realized the town could no longer hold out and so ordered the German defenders to break out to the southeast, in the

---

[209] Jean Restayn, *Tiger I on the Eastern Front* (Paris: Histoire & Collections, 2007), 14–17.

[210] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 19.

[211] Wolfgang Schneider, *Tigers in Combat I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 74.

[212] Alexey Isayev, *No Surprise: The History of the Second World War, 1942-1943* (Moscow: Eksmo, 2007), 456-457.

direction of Sinyavino. At the same time, a counterattack against the Soviet Volkhov Front in the east was expected to secure Pesselok 5, north of Sinyavino, near the center of the corridor through which German forces were retreating to avoid encirclement against the banks of Lake Ladoga.[213] During the heavy fighting, though the 227th Infantry Division was mauled, s.Pz.Abt 502 destroyed seven Soviet tanks and blunted the Soviet assault enough that the defenders of Schlüsselburg were able to break out and rejoin the 18th Army with the majority of their equipment and their wounded.[214] In the fighting, three *Panzergrenadier* battalions suffered such heavy casualties that the 227th disbanded those battalions to reinforce other grenadier battalions.[215] Five Tigers were lost or destroyed– two to self-destruction, one to enemy fire that was later recovered, and two were bogged down and recovered by the Soviets – leaving only one operational Tiger and two Panzer III tanks in the 502nd.[216]

This was the first instance of a Tiger tank falling into Soviet hands, and both tanks were shipped to Kubinka. Soviet testing on the captured tanks, which coincided with testimony from German POWs who provided information on a new heavy tank, led the GABTU (Soviet Head Armor and Tank Directorate) to order an increase in penetration values for the 85mm gun to 100-

[213] There is no official combat history available for the 502nd, but several publications have provided information which provides corroborative information for the 14th-17th January 1943. On the 15th, 1st Platoon's *Zugführer Oberleutnant* Bodo von Gertell was killed in action, Schlüsselburg was encircled on the 16th, and two Tigers and one Panzer III were attached to the 227th Infantry Division to assist in the breakout toward Sinyavino. See: Georg Tessin, *Verbände und Truppen der deutschen Wehrmacht und Waffen-SS im Zweiten Weltkreig, 1933-1945* (Onasbruck: Biblio Verlag, 1973); Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 19; Wolfgang Schneider, *Tigers in Combat I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 74.

[214] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 19

[215] Samuel Mitcham, *German Order of Battle, vol I: 1st -290th Infantry Divisions in World War II* (Oxford: Osprey Publishing, 2007), 290-317.

[216] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 75.

110mm of armor at 2000 meters, to produce a 100mm tank gun that could penetrate 120-130mm or armor at 2000 meters, to design and produce an AP shell for the 76mm gun that can penetrate the Tiger's side armor at 600 meters, and to design a 76mm round that could penetrate the Tiger's frontal armor at 500 meters.[217]

The directives sent to the directors of Factory 8, the People's Commissariat of Armament, and the People's Commissariat of Tank Manufacture indicate the Tiger had proven to be vulnerable to few armaments fielded by the Soviets in early 1943, the Tigers were able to effectively engage and destroy enemy tanks from long ranges, including the KV-1, and that the Tigers were able to break through enemy defenses effectively when employed correctly successfully. While kill: loss claims are heavily discounted for the purposes of this research, the effectiveness of the Tiger in engaging Soviet heavy tanks effectively while being relatively impervious to 75mm guns and the 76.2mm gun mounted in the KV-1 deeply concerned Soviet High Command, as extensive trials of the 76.2mm F-34 AP shell, widely used in the T-34 and KV-1, indicated it was ineffective against the Tiger at ranges over 500 meters.[218] A summary of actions from 12 January to 5 February reported to the 18th Army command on 2 April 1943 indicated that:

> The enemy does not have anything to oppose us of equal value to the Panzer VI Tiger. Not more than four Tigers were in operation at the same time. In open terrain, these few Tigers totally dominated the battlefield. The Tigers knocked out 160 enemy tanks altogether.[219]

---

[217] GABTU, "Topic 2VV-2: Investigation of the armor of tanks of the German Army, April 1943," *Central Archive of the Ministry of Defense of the Russian Federation* (CAMD RF 38-11355-1380), Podolsk, Russian Federation. http://www.tankarchives.ca/2013/03/gabtus-answers-to-tiger.html, accessed 18 July 2022.

[218] GABTU, Report on the shooting of German tanks with AP and HE shells from tank guns," *Central Archive of the Ministry of Defense of the Russian Federation* (CAMD RF 38-11355-832), Podolsk, Russian Federation. http://www.tankarchives.ca/2013/05/f-34-vs-german-tanks.html, accessed 18 July 2022.

[219] "Aktionsbericht 1. Kompanie schwere Panzer-Abteilung 502 an Armee-Kommando 18, April 2, 1943," reproduced in Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 39-40.

Further Soviet actions between 10 February and 1 April 1943, intended to capitalize on the success of Operation Iskra, reinforced Soviet fears of the new German tank. In the subsequent operation, *Operatsia Polyarnaya Zvezda* (Operation Polar Star), s.Pz.Abt 502 was more successful, as the battalion had received Tigers in greater numbers. Though there had been some technical defects, the Tigers had proven they could operate in both the defensive and offensive counterattacks. They had influenced Russian research and development of guns in both higher caliber and in munitions capable of penetrating the frontal armor of the Tiger, and when operating in optimal terrain as dictated by doctrine, they were capable of defeating Soviet tanks which had been impenetrable by Panzer III and IV guns in 1941 and 1942.

The Tigers had a tremendous impact on Soviet operations during Polar Star. Tigers with infantry support were able to recover lost territory from the Soviets on several occasions and repelled the Soviet advance at Krasny Bor (modern Krasnoborskoye) with the destruction of forty Soviet tanks in three days, to the loss of no German armor.[220] One account witnessed two Tigers destroying two T-34 and four KV-1 tanks, and an order of the day from XXVI *Armee-Korps* written by its commander, General Ernst von Leyser read:

> Since 12 January 1943, *schwere Panzer-Abteilung 502* has been one of the corps' most effective weapons in the heavy fighting in the Leningrad area. It was always employed whenever it was imperative to achieve success in a counterattack or when the hard-fighting infantry needed effective help against superior numbers of enemy tanks…the fifty-five enemy tanks destroyed in the corps' sector and the appreciation expressed by the infantry are the best proof of this. The battalion has shown its devotion to duty through the heroic death of its company commander, the wounding of the battalion commander, and other difficult losses.[221]

---

[220] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 76.

[221] Georg Tessin, "Generalkommando XXVI. Armeekorps," in *Verbände und Truppen der deutschen Wehrmacht und Waffen-SS im Zweiten Weltkreig, 1939-1945 vol.4* (Onasbruck: Biblio Verlag, 1977), 236-237.

By the end of the Soviet offensives in early 1943, the Tigers and their crews in the 502nd had progressed from a failed initial deployment to a viable fighting force. The aforementioned report, "Aktionsbericht 1. Kompanie schwere Panzer-Abteilung 502 an Armee-Kommando 18," indicated the Tiger battalions were most effective when adequately supported by infantry as well as by their organic Panzer III tanks. During operations from 12 January to 5 February, the 502nd lost six Tigers, twelve Panzer IIIs, and forty-three men. From 12-17 February, the battalion lost three Tigers, one Panzer III, and six men. However, from 19-31 March, the battalion lost no tanks and only three men. For context, there was a *Panzergrenadier* Regiment attached to the battalion to affect local counterattacks against the Soviets in the first operation, whereas the last operation was an anti-tank operation carried out from concealed positions against tanks in the open.[222]

As promising as the results from the Leningrad deployment may have been, the Tigers suffered more losses as a result of breakdowns and subsequent destruction at the hands of their crew than from enemy actions.[223] Moreover, reports from other units operating in the same sector during these Soviet offensives provided an intriguing contrast between Tigers and other German armored units, particularly the StuG battalions. *Sturmgeschütze Abteilung* 226 was equipped with forty-one StuG assault guns and was credited with 210 Soviet tanks destroyed at the cost of 13 StuGs.[224] Further, the cost-effective StuG cost 82,500 Reichsmarks to produce, compared to the cost of the Tiger at 250,700 Reichsmarks. The StuG was built on the tested Panzer III chassis, and as it had no turret was relatively easy to build and maintain. The Germans

[222] Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 105–107.

[223] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 73-77.

[224] Thomas Anderson, *Tiger* (Oxford: Osprey Publishing, 2013), 110.

built over 10,000 StuG III's between 1940 and 1945, compared to 1,347 Tigers from 1942-1944. As such, StuG's could be used in more significant numbers, with greater effect, in early to mid-1943. Captain Lange, commander of the 2nd Company s.Pz.Abt 502 (then under the command of s.Pz.Abt 503 at Rostov) noted:

> It must be made clear by strict orders at headquarters at all levels not to use Tiger units below company strength…[and] the s.Pz.Abt with two companies had great potential fighting power. An increase by a 3rd company…is inappropriate. Such massing of the Tigers is not possible at the moment.[225]

Based on the experiences at Leningrad and Rostov, the Tigers could be effectively employed when doctrinal conditions were followed succinctly. By the fall of 1943, *Wa Prüf I* had determined that "the kill rates of assault gun battalions are frequently higher than those of the tank units even though both are frequently equipped with the same armament, and the tanks have 360-degree vision."[226] In the case of the StuG, the casemate gun, which could only traverse twenty-eight degrees without pivoting the entire vehicle, combined with its relatively low weight (24 tons) and wide stance made it optimal for defensive and ambush operations in areas where a Tiger would become bogged down or where there were dense forests.[227]

Stalingrad: Defensive Operations, mid to late 1942

On 23 August 1942, little more than six days before the Tigers of s.Pz.Abt 502 rolled into a precarious position outside Leningrad, and the Battle of Stalingrad began. The German 6th

---

[225] Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 59-62, 79-109.

[226] OKH, "Schiessverfahren bei Pz. Bekämpfung," 9 September 1943 *Records for the Reich Ministry for Armaments and War Production* (National Archives Microfilm Publication T73, serial 192, roll 210 item WaAPak14746) College Park, MD.

[227] Peter Muller and Wolfgang Zimmermann, *Sturmgeschütze III: Backbone of the German Army, vol I* (Havertown, PA: Casemate Publishers, 2010), 164-179.

Army reached the outskirts of the city in pursuit of the Soviet 62nd and 64th Armies.[228] The situation deteriorated from August to November 1942, and Stalingrad was surrounded during Operation Uranus on 23 November.[229] Field Marshall Erich von Manstein's command was reconstituted into Army Group Don and included elements trapped inside Stalingrad as well as those just outside the encirclement.[230] Operation *Wintergewitter* (Winter Storm) began favorably, and parts of the LVII Panzer Corps of the 4th Panzer Army were able to advance 60 km on the first day.[231] General Erhard Raus, commander of the 6th Panzer Division, recalled that his division was able to capture Soviet artillery largely intact, and once the 6th and 23rd had beaten the bulk of the Soviet infantry, there was a noticeable decrease in Soviet resistance. However, the LVII Panzer Corps was unable to achieve its objectives.[232]

Winter Storm made impressive gains on the first day, as *Stavka* had not expected a renewed German offensive.[233] General Aleksandr Vasilevsky, who had correctly surmised the focal point of the German relief operation, had been unable to redeploy the 2nd Guards Army in the direction of Kotelnikovov, from which Raus' 6th Panzer launched its counter-offensive.[234] By

---

[228] Georgy Zhukov, *Recollections and Reflections*, 11th ed., vol.2 (Moscow: Novosti, 1992), 298-299.

[229] Andrey Yeryomenko, *Stalingrad* (Moscow: Voyenizdat, 1961), 131–132, 225, 306.

[230] Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 294

[231] B.V. Sokolov, *Stalin: Power and Blood* (Moscow, AST-Press, 2004), 262, 264.

[232] General Erhard Raus, *Panzers on the Eastern Front: General Erhard Raus and his Panzer Divisions in Russia 1941-1945* (Mechanicsburg, PA: Military Book Club, 2002), 128-130.

[233] "Midday Conference 12 December 1942, Wolfschanze," reproduced in General Walter Warlimont, *Inside Hitler's Headquarters, 1939-1945* (Novato, CA: Presidio Press, 1962), 292-300, 521-534.

[234] Aleksandr Vasilevsky, *The Matter of my Whole Life* (Moscow: Politizdat, 1978), 243-248.

16 December, Army Group Don had lost both the element of surprise and the initiative.[235] The 18th, von Manstein wrote, was "a crisis of the first order. East of the Don, despite the arrival of the 17th Panzer Division, the 4th Panzer Army still had not fought to a point which offered any prospect of its being able to thrust swiftly into the vicinity of Stalingrad."[236] The same day, von Manstein sent his intelligence officer, Major Eismann, into Stalingrad to brief Field Marshall Friedrich Paulus on the state of the counter-offensive, and 6th Army's chief of staff, Lieutenant General Arthur Schmidt, argued the best possible course of action was to increase the aerial resupply efforts; only then would any sort of offensive action be feasible.[237] By the 19th, with LVII Panzer Corps only 30 miles from Stalingrad, von Manstein recognized there were likely to be few more opportunities to save the 6th Army. He wrote:

> The moment for which we had longed since the take-over had arrived. If the 6th Army now began its breakout while the 4th Panzer Army either continued the attack northwards or at least drew off other forces from the siege front, the enemy in between would find himself between two fires, and there would, at last, be a prospect of establishing enough contact to provide 6th Amy with the fuel, ammunition, and food it needed for continuing its breakthrough. For this purpose, the army group had assembled transport columns loaded up with 3,000 tons of supplies behind the 4th Panzer Army, in addition to tractors

---

[235] David Glantz, "Soviet Military Strategy During the Second Period of War (November 1942 – December 1943): A Reappraisal," *The Journal of Military History* (January 1996) LX, no.1, pg. 115-150.

[236] Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 331-332.

[237] *Generalleutnant* Arthur Schmidt was a German officer who refused to recant loyalty to Hitler after his capture, and modern historians claimed Schmidt, with a more assertive personality than Paulus, was the actual commander in the Stalingrad pocket. During the siege, Schmidt refused to acknowledge he, Paulus, or the 6th Army were at fault for their position and referred to the Luftwaffe's failure to supply the pocket as "the worst treason that has ever occurred in German history." Antony Beevor claimed Soviet commanders, after interrogating captured German officers, determined Paulus was practically a prisoner in his own headquarters. Schmidt was sentenced to 25 years of hard labor in Camp 48 at Voikovo, along with the other German officers, where he was sequestered from Paulus as the NKVD considered Schmidt a bad influence on the generally cooperative Paulus. See: Mike Thyssen, *A Desperate Struggle to Save a Condemned Army: A Critical Review of the Stalingrad Airlift* (Maxwell, AFB, AL: Air Command and Staff College, 1997), 19-27, https://apps.dtic.mil/sti/pdfs/ADA397944.pdf accessed 9 June 2022; Antony Beevor, *Stalingrad* (London: Penguin Books, 1999), 386; "Report to Headquarters, Army Group Don, by Major Eismann," reproduced in Matthew Cooper, *The German Army 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 429-431.

> for mobilizing part of the 6th Army artillery. They were all to be rushed through to the beleaguered army as soon as the tanks had cleared a route, however temporary.[238]

Von Manstein signaled Führer headquarters of his intentions and received no response. The day prior, von Manstein had been unwilling to order Paulus to break out directly, and Paulus would not do so of his own initiative; Paulus feared that, without a direct order from his commanding officer, his violation of a Führer Directive would bring Hitler's wrath squarely upon his own head.[239] Recognizing time was of the essence, von Manstein ordered Paulus to break out to the southwest and evacuate Stalingrad. Paulus' Army had only enough fuel to advance more than twenty miles and combined with his belief that his troops would not be able to disengage from Soviet attacks – which were constant – Paulus refused to order his army to move.[240]

With Paulus' inaction, Winter Storm was doomed to failure. Von Manstein's plan had relied on the 6th Army attacking the flanks and rear of the 2nd Guards Army as they were moving into position and the flank of the 51st Army as it advanced toward Kotelnikovov, south of the Don River.[241] Though the 6th Army had less than 100 tanks remaining and fuel for no more than twenty miles, von Manstein expected the attack would distract the Soviets enough for the 57th Panzer Corps to push the remaining twelve to fifteen miles. Paulus's failure to act and his refusal

---

[238] Von Manstein's memoir quoted in Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 430-431.

[239] Wilhelm Adam and Otto Ruhle, trans. by Tony Le Tissier, *With Paulus at Stalingrad* (Barnsley, UK: Pen and Sword Books, 2015), 143.

[240] The refusal came from *Generalleutnant* Arthur Schmidt, the Party loyalist, who replied to Eismann's directives from von Manstein, "It is quite impossible to break out just now…Sixth Army will still be in position at Easter. All you people have to do is supply it better." See: Alan Clark, *Barbarossa: The Russian-German Conflict, 1941-1945* (New York: Quill, 1965), 270-271, 288.

[241] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 430-431.

to disobey Hitler eventually doomed his army and led him into captivity as the only German Field Marshall to even be taken prisoner.[242]

There were a number of reasons Winter Storm failed. Von Manstein's Army Group had been promised four additional panzer divisions, yet these were mostly held in place to defend against the possibility of further Soviet offensives in the aftermath of Operation Uranus.[243] The *Luftwaffe* had been unable to supply anywhere near the daily requirement of 500 tons of food, fuel, and ammunition into Stalingrad, despite Göring's assurances that the *Luftwaffe* was more than capable.[244] The Demyansk Pocket airlift, which had required 270 tons daily, had been successfully executed by the *Luftwaffe*, and this success convinced both Göring and Hitler that not only could the Germans undertake airlift actions on the Eastern Front but that encircled troops should hold their territory and await aerial resupply.[245] Hitler tested that assumption and

---

[242] Paulus was promoted to Field Marshall on the day of his capture, 31 January 1943. The implication was clear: Hitler believed no German field marshal had ever been captured alive, and he expected Paulus to make the honorable choice. Just as Paulus had refused to order his Army to surrender, so too did he refuse to suicide. See: Hamburger Fremdenblatt, "Generalfeldmarschall Paulus," (31 January 1943) https://dfg-viewer.de/show?tx_dlf%5Bdouble%5D=0&tx_dlf%5Bid%5D=https%3A%2F%2Fpm20.zbw.eu%2Ffolder%2Fpe%2F0133xx%2F013314%2Fpublic.mets&tx_dlf%5Bpage%5D=2&cHash=ed97453ddf223a5691752794216cd6a1, accessed 20 July 2020; Antony Beevor, *Stalingrad: The Fateful Siege, 1942-1943* (New York: Penguin Books, 1998), 390; William Shirer, *Rise and Fall of the Third Reich* (New York: Simon and Schuster, 1960), 837.

[243] John Erickson, *The Road to Stalingrad: Stalin's War with Germany* (New Haven: Yale University Press, 1975), 470-471.

[244] *General der Infanterie* Kurt Zeitzler, Chief of the General Staff of OKH as of September 1942, pressed the issue before Hitler, Göring, Jodl, and Keitel on separate occasions. According to Zeitzler's calculations, 550 tons of material were required per flight day to provide the minimal requirements; the 6th Army received less than 20% of its daily requirements. See: General Kurt Zeitzler, "Battle of Stalingrad," in William Richardson and Seymour Freidlin, eds., *The Fatal Decisions: Six Decisive Battles of the Second World War from the Viewpoint of the Vanquished* (Barnsley, UK: Pen and Sword Books, 2012), 151-168; Kelly Bell, "Struggle for Stalin's Skies," *WWII History* (Fall 2006), 62-63; Mike Thyssen, *A Desperate Struggle to Save a Condemned Army: A Critical Review of the Stalingrad Airlift* (Maxwell, AFB, AL: Air Command and Staff College, 1997), 4-6, https://apps.dtic.mil/sti/pdfs/ADA397944.pdf accessed 9 June 2022.

[245] There were also a significantly smaller number of German troops trapped in the Demyansk pocket than were at Stalingrad. X Army Corps, consisting of the 30th Infantry Division, 290th Infantry Division, and 3rd SS Panzer Division, and II Army Corps, consisting of the 12th Infantry Division, 32nd Infantry Division, and 123rd Infantry Division, accounted for around 90,000 troops and 10,000 civilian auxiliaries. Comparatively, there were 265,000 Germans, Romanians, Italians, and Croatians encircled in Stalingrad, plus between 40,000 and 65,000 *Hilfswillige* (Soviet POWs who had 'volunteered' to assist the Reich, plus several thousand Soviet citizens and

found it was not accurate. Lastly, s.Pz.Abt 503, which von Manstein had designated as the spearhead for the offensive, had not arrived. The battalion had been formed in May 1942 at Neuruppin and filled with men released from Panzer Regiments 5 and 6.[246] As events were unfolding at Stalingrad, the 503rd had been first outfitted for the Eastern Front, then for Africa, and once again for the Eastern Front, all while only having received a complete allocation of Tigers after arrival at the Kalmuck Steppe region controlled by Army Group Don.[247] Without delving into speculation, it is unfeasible the Tigers would have been able to force the final forty-eight kilometers between the 6th Panzer Division's maximum advance and the 6th Army's defensive perimeter unless Field Marshall Paulus had been willing to ignore Hitler's orders and execute breakout maneuvers. As mentioned above, willful disobedience to the *Führer* was not among Paulus' personality traits.

Stalingrad to Rostov

When s.Pz.Abt 503 reached the front; their task was to halt the advance of the Soviet Operation Little Saturn with Army Group Don.[248] For Germany, the outcome of the *Fall Blau* offensives in 1942 was a catastrophe; in the early months of 1943, all that could be done was prevent the catastrophe from becoming an outright collapse on the Eastern Front, from Grozny in the Caucasus to near Orel in the north. While Army Group B had been focused on Operation

---

POWs captured in the fighting. The airlift cost the *Luftwaffe* dearly, as 265 aircraft were lost. See: Colonel F.N. Utenkov, *On the Northwestern Front* (Moscow: USSR Academy of Sciences, 1969), 57-61; Christer Bergstrom, *Stalingrad: The Air Battle, 1942 – January 1943* (London: Chevron Publishing, 2007), 23; Richard Overy, "Hitler and Air Strategy," *Journal of Contemporary History* vol. 15, no. 3 (Summer 1980), 405-421.

[246] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 47.

[247] Franz-Wilhelm Lochman, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 5.

[248] Dana Sadarananda, *Beyond Stalingrad: Manstein and the Operations of Army Group Don* (New York: Praeger Publishers, 1990, 56.

Fischreiher, the advance toward Stalingrad, Army Group A was tasked with Operation *Edelweiß*, the advance toward the Caucasus oilfields, and these objectives were to be taken simultaneously.[249] Army Group A, commanded by Field Marshall Wilhelm List, consisted of the 1st Panzer Army, the 11th and 17th Armies, and the 3rd Romanian Army.[250] By 12 August 1942, the Germans were atop Mt. Elbrus, having advanced over 300 miles in two weeks.[251] However, by 28 August, the offensive ground to a halt. As Army Group B began to encounter difficulty outside Stalingrad, Hitler ordered some of Kleist's 1st Panzer Army to move toward Stalingrad, including all antiaircraft and most of the *Luftwaffe*. After the war, Ewald von Kleist recalled:

> The primary cause of our failure was the shortage of petrol. The bulk of our supplies had to come by rail from the Rostov bottleneck, as the Black Sea route was considered unsafe…but that was not the ultimate cause of the failure. We could still have reached our goal if my forces had not been drawn away bit by bit to help the attack at Stalingrad. Besides part of my Motorized Corps, I had to give up the whole of my flak corps and all my air force except the reconnaissance squadrons. That subtraction contributed to what, in my opinion, was a further cause of the failure. The Russians suddenly concentrated a force of eight hundred bombers on my front, operating from airfields near Grozny. Although only about a third of these bombers were serviceable, they sufficed to put a brake on my resumed advance, and it was all the more effective because of my lack of fighters and of flak.[252]

Little Saturn forced the Germans to retreat nearly five hundred miles westward, and Army Group A was nearly cut off as the Soviets overran Rostov. To prevent Army Group A from becoming

---

[249] Peter Antill, *Stalingrad 1942* (Oxford: Osprey Publishing, 2007), 40.

[250] The commanding officers of the subordinate units are as follows: 1st Panzer Army was commanded by *Generalfeldmarschall* Ewald von Kleist (who later commanded the Army Group after Wilhelm List's dismissal in November 1942), and Group Ruoff, which consisted of the portion of 11th Army allocated to Army Group South, 17th Army, and Third Romanian was commanded by *Generaloberst* (Colonel-General) Richard Ruoff. See: Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 462; *Wilhelm* Adam and Otto Ruhle, *With Paulus at Stalingrad* (Barnsley, UK: Pen and Sword Books, 2015), 25; Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 414-415.

[251] Peter Antill, *Stalingrad 1942* (Oxford: Osprey Publishing, 2007), 39.

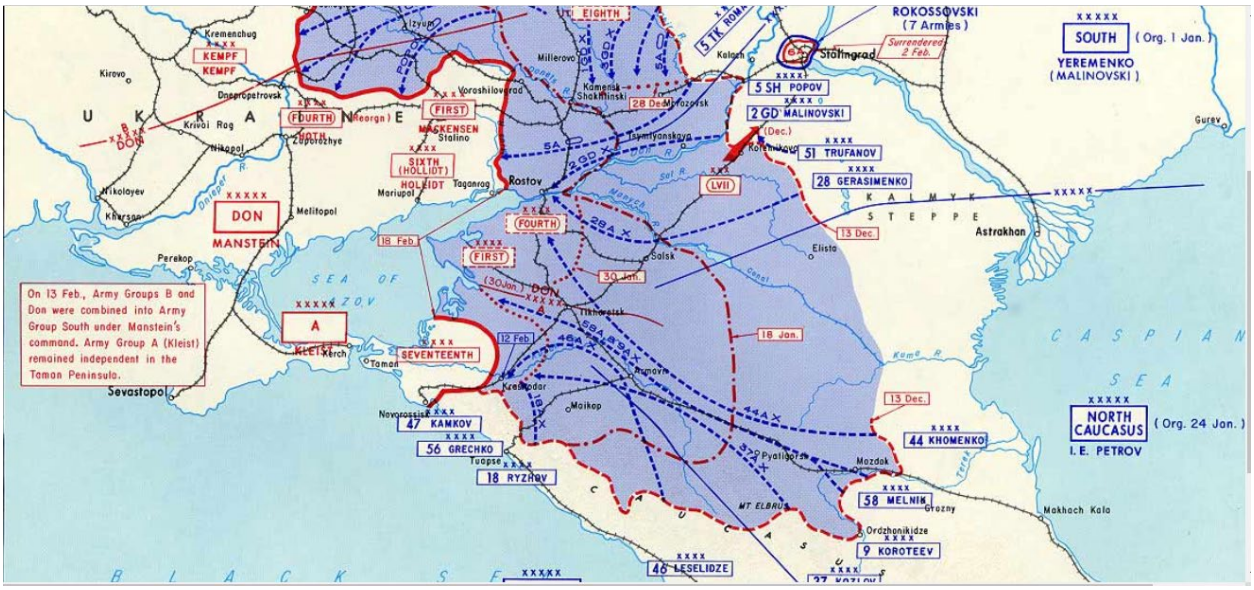
[252] "Conversation with Field Marshall Ewald von Kleist," published in BH. Liddell Hart, *The German Generals Talk* (New York: Quill, 1979), 200-202.

trapped in the Caucasus, S.Pz.Abt 503 was tasked with defending Rostov and securing bridges across the Manytsch River.[253] This action kept the 503rd engaged for the first half of January 1943, but as there was no fluid front, the battalion traveled from one hot spot to the next and covered over fifty kilometers to reach an engagement.[254] The battalion met with limited success; the Tigers were able to destroy seven T-34 tanks and five anti-tank guns in an engagement on 7 January, two T-34s, eight anti-tank guns, and an understrength Soviet infantry battalion were captured or destroyed on the 8th, and a further eight T-34's were destroyed on 9 January at the cost of two Tigers and one Panzer III destroyed, but the objective on the 9th, the Soviet bridgehead at Vesslyj, remained intact.[255]

[253] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 122

[254] "After Action Report of *Hauptmann* Lange, 3/s.Pz.Abt. 503, 29 January 1943," in Franz-Wilhelm Lochmann, Nordewin von Diest-Koerber, Ulrich Koppe, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of Schwere Panzer-Abteilung 503: In Action on the East and West with the Tiger I and II* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2000), 56.

[255] See: Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 48; Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 153; Franz-Wilhelm Lochman, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 61.



256

In the introduction to this chapter, *Leutnant* Zabel and the exploits of the Tigers attached to *Kampfgruppe* Sander were recounted. While this operation can be considered successful, the Tigers were operating in local offensive actions and the defensive rather than in their doctrinal role as breakthrough tanks. The failure to break through and demolish the Soviet bridgehead at Vesslyj, despite adequate support from the 128th *Panzer Grenadier* Regiment's 2nd Battalion, indicated the Tiger's success rate could be limited by the amount of appropriately supported enemy armor a battalion faced in combat. Further, rather than massing the Tigers for breakthrough operations as doctrine required, the 1st and 2nd Companies of the 503rd were used as "a breakwater, a rock amid the waves in the Kuberle sector, which had been abandoned in panic by the Italian and Romanian forces."[257]

[256] "Map of the Soviet Winter Offensive, 13 December 1942 – 18 February 1943," https://en.m.wikipedia.org/wiki/File:Ww2_map25_Dec42_Feb43.jpg, accessed 24 July 2022. Image is Public Domain.

[257] Franz-Wilhelm Lochman, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 61.

The 503rd displayed tremendous flexibility in those missions by changing the composition of platoon and company elements to suit mission requirements, which at times fell outside KStN 1176d. In different engagements, the 503rd formed a company-level element of only Panzer IIIs, and a heavy company of Tigers, with the remaining Panzer IIIs as support. That formation was used in areas northwest of Rostov, where rugged terrain features prevented Tigers from being effectively employed.[258] This flexibility and willingness to reserve Tigers for situations where they could be most effective rather than forcing them into poor situations and expecting positive results indicate that the battalion and company command groups were skilled at recognizing tactical and strategic opportunities.

The latter half of February 1943 provides further evidence of this tactical skill; from the 19th to the 22nd, the 503rd reported the destruction of twenty-three T-34s and eleven anti-tank guns at the cost of one Tiger and one Panzer III.[259] At this point, the battalion was down to two Tigers and five Panzer IIIs operational, and the battalion withdrew to Taganrog to refit. The 503rd reorganized under 5 March's KStN 1176e, which gave them an allocation of forty-five Tigers and removed the Panzer III and would remain out of action until Operation Citadel.[260]

The 503rd also proved to be effective at recovering their damaged Tigers, and the crews often preferred to remain with the immobilized tank until rescue arrived rather than use demolition charges to destroy them. In one instance, the 3rd Company sent three Tigers and three Panzer IIIs to support the 16th Infantry Division (Motorized) in defensive operations. When

[258] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 123

[259] Franz-Wilhelm Lochman, Richard Freiherr von Rosen, and Alfred Rubbel, eds., *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 6.

[260] Ibid, 107.

withdrawing toward Proletarskaja, where they would rejoin the battalion, the Tigers encountered mechanical issues that left them stranded without support. For thirty hours, in blizzard conditions where temperatures dropped to -40 C, the crews defended their Tigers until they could be recovered.[261]

The push and pull of offensive and defensive fighting in this region took a heavy toll on both the Soviets and the Germans. For the Soviets, *Kampfgruppe* Sander claimed the destruction of thirteen tanks, twenty-three anti-tank guns, and the elimination of several Soviet rifle battalions.[262] However, it must be noted that the *Fremde Heere Ost* (FHO), the German military intelligence service for OKH, which was responsible for the analysis of Soviet and other East European countries before and during the war, typically discounted numbers of destroyed Soviet tanks by 50%, according to captured Fremde Heere Ost documents.[263]

The differences between the German and Soviet "kill" must also be noted. For the Germans, it was common practice to consider a vehicle lost or destroyed only if it was a total loss, and for the Tigers, a monthly report to OKW outlining the disposition of each tank, length of repair, and return to service date was required; for the Soviets, a killed Soviet tank could mean anything from a tank which was immobilized, had a damaged turret ring, or had been completely destroyed. After the war, SS-Standartenführer Joachim Peiper of the 1st SS Panzer Division reported:

> The one who quietly and bravely did his duty caused no comment and, in his seclusion, remained the fool. The one however who did a lot of hollering, making an elephant out of every attacking mouse was officially commended and on top of it received quick aid in

---

[261] Ibid, 61

[262] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 60-63.

[263] Fremde Heere Ost, "Panzerverluste Ost, 5 Juli 1943 – 31 August 1943," *Der Panzeroffizier beim Chef des Generalstabes des Heeres* (Bundesarchiv, RH 2/1933: Panzerverluste Ost, BL.99), Berlin, Germany.

> cases of emergency. Untrue reporting is an innermost disease of any army and must always lead to a false estimate of the situation and to wrong conclusions.[264]

From the Soviet perspective, during the Rostov engagements, the hastily assembled *Kampfgruppen* Fretter-Pico and Hollidt had undefended flanks, and the 2nd Guards Army, 51st Army, and 28th Army drove down the Don River Valley toward Rostov but were halted by the appearance of the Tiger. According to Soviet records, the aforementioned engagement on 7 January left eighteen T-34s and twenty Tigers out of action. Comparatively speaking, the German and Soviet counts of defeated T-34s were nearly identical; however, there is a disparity of eighteen Tigers destroyed between the Soviet and German records.[265]

Major General F.W. von Mellenthin, Chief of Staff of the 4th Panzer Army during the Battle of Stalingrad and its subsequent retreat from the Volga in the face of Little Saturn, recalled:

> Having regard to the problems that faced von Manstein between December 1942 and February 1943, it may be questioned whether any achievement of generalship in World War II can approach the successful extrication of the Caucasus armies and the subsequent riposte to Kharkov. The German military writer Ritter von Schramm spoke of a 'miracle on the Donetz,' but there was no miracle; victory was gained by masterly judgment and calculation.[266]

---

[264] Tank Archives has collected reports and documents from Great Britain, the US, the USSR, and Germany and provides links to records available digitally. Peter Samsonov, the founder of the website, was born in the USSR and translated Soviet documents, which provides access to non-Russian speakers. The German and Soviet documents indicate, from a propaganda perspective, tank kills were often inflated to raise morale, but German commanders rarely resorted to such fallacies until later in the war when the expectations of OKH outweighed their abilities. Under *Generalleutnant* Reinhard Gehlen, head of the FHO from early 1942 until April 1945, the FHO produced accurate field reports that often contradicted the 'official' accounts produced by Propaganda Minister Goebbels. See: Colonel Burton F. Ellis, "Accounts by General Sepp Dietrich and Colonel Joachim Peiper," *World War II Operational Documents* (Ike Skelton Combined Arms Research Library Digital Library), Command and General Staff College, Fort Leavenworth, KS, https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/2431, accessed 1 June 2022; Markus Pöhlmann, *Der Panzer und die Mechanisierung des Kreiges: Eine deutsche Geschichte 1890 bis 1945* (Paderborn, Deutschland: Verlag Ferdinand Schöningh, 2016), 19-24; David Thomas, "Foreign Armies East and German Military Intelligence in Russia 1941-1945," *The Journal of Contemporary History* vol 22, no. 2 (April 1987), 261-301.

[265] "Ostrogozhsko-Rossosh' Offensive Operations of Voronezh Front Forces," *SVIMVOV*, no. 9 (1953); "The Voronezh-Kasternoe Offensive Operations of Forces of the Voronezh and the left wing of the Briansk Fronts," *SVIMVOV*, no. 13 (1954), 1-121.

[266] FW von Mellenthin, *Panzer Battles* (Norman, OK: University of Oklahoma Press, 1956), 208.

As glowing as von Mellenthin's appraisal of the retreat may have been, there can be little doubt that the German army was in the midst of a crisis by 1943. The defeats on the Eastern Front inflicted losses Germany could not replace. Twenty-six divisions were lost in and around Stalingrad. Including the losses in Tunisia - a further six divisions – this accounted for a loss of nearly one-eighth of the German order of battle. The loss of manpower tells only part of the story; the equipment lost at Stalingrad alone was enough to outfit forty-five divisions.[267]

In the fall of 1942, before the Stalingrad crisis had reached a boiling point, there was an attempt to cover Army manpower deficiencies through the "reallocation" of *Kriegsmarine* and *Luftwaffe* personnel. Over objections from OKH, Field Marshall Wilhelm Keitel, chief of the OKW, presented a proposal that the *Kriegsmarine* and *Luftwaffe* should 'donate' 20,000 and 50,000 men, respectively, to the *Heer*.[268] While Hitler agreed, Göring quickly interceded on his services' behalf, arguing that "he was not going to let his good young National Socialists be dressed up in the grey uniform of the Army."[269] Instead, the airmen were organized into twenty-two *Luftwaffe* divisions, and rather than filling the gaps in experienced *Heer* formations, the inexperienced, poorly trained, poorly led, and inadequately equipped *Luftwaffe* ground forces did little more than provide the same level of disappointment on the ground as they had in the air.[270]

---

[267] Matthew Cooper, *The German Army 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 451.

[268] General Walter Warlimont, *Inside Hitler's Headquarters, 1939-1945* (Novato, CA: Presidio Press, 1962), 265.

[269] Matthew Cooper, *The German Army 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 451.

[270] Kevin Conley Ruffner, *Luftwaffe Field Divisions 1941-45* (Oxford: Osprey Publishing, 1990), 10-16.

Hitler's disregard for the Army's interests in this manner was also exacerbated by the expansion of the Waffen-SS, which had impressed Hitler during Soviet winter offensives of 1941-1942 to the extent that he ordered a significant expansion. Rather than divisions scattered throughout the *Heer*, there was a significant reorganization, along with the addition of tank battalions.[271] Three SS divisions were reformed as *Panzergrenadier* divisions – *Leibstandarte*, *Das Reich*, and *Totenkopf* – were not only equipped with an entire regiment of tanks but were also allocated a company of nine Tigers.[272] By mid-1943, the Waffen-SS contained fifteen divisions, 280,000 men in the field, a further 70,000 in training, and tank formations that were equivalent to or of greater numerical strength than their *Heer* counterparts. Hitler believed the fighting qualities of the SS, particularly its officers, were due in part to their National Socialist indoctrination, which was less significant in the *Heer*.[273]

Rostov to Kursk, late 1942 to mid-1943

By March 1943, there were five Tiger battalions: the 500th *Panzer-Ersatz-Abteilungen*, the training battalion at Paderborn; the 501st, in North Africa; the 502nd, near Leningrad with Army Group North; the 503rd, at Rostov with Army Group South; the 504th, in North Africa; the 505th, with Army Group Center in Russia.[274] Additionally, five divisions were allocated a

[271] Gordon Williamson, *The SS: Hitler's Instrument of Terror* (New York: Amber Books, 2006), 141-161, 292-294.

[272] Michael Reynolds, *Steel Inferno: 1st SS Panzer Corps in Normandy* (New York: Da Capo Press, 1997), 8-10.

[273] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 450-451.

[274] The 501st was attached to the 7th Panzer Regiment of the 10th Panzer Division, while the 504th was attached to the 8th Panzer Regiment of the 15th Panzer Division. See: Samuel Mitcham, *German Order of Battle Volume Three: Panzer, Panzer Grenadier, and Waffen-SS Divisions in WWII* (Guilford, CT: Stackpole Books, 2007). For the disposition of the 502nd and 503rd, see: Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 73-120, 121-191. For the 505th, see: Richard Dale Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 18.

company-sized element of Tigers: 1st SS Panzer Division *Leibstandarte Adolf Hitler*, 2nd SS Panzer Division *Das Reich*, 3rd SS Panzer Division *Totenkopf*, Panzer Grenadier Division *Großdeutschland*, and 1st Fallschirm-Panzer-Division *Herman Göring*.[275]

Though Tiger production steadily increased, and battalions received their full complement of forty-five Tigers, the *Panzerwaffe* was in an overall poor condition. By February 1943, only 495 tanks were operational on the entire Eastern Front; most of these were Panzer III and IV variants which, while having been upgraded since Barbarossa, were still quite inferior to the T-34, both in terms of firepower and armor.[276]

Hitler's decision to recall Colonel General Heinz Guderian from 'retirement' in February 1943 was an indication of the severity of the crisis facing the armored corps. Guderian had been dismissed in December 1941 after an incident involving his superior, Field Marshall Günther von Kluge. Guderian blamed the failure to capture Moscow on von Kluge's tactically and strategically unsound deployment of the 4th Army, which had been slow to aid Guderian's 2nd Panzer Group at Tula.[277] During his period of inactivity throughout 1942, Guderian wrote:

> The unfair treatment that I had received began by making me feel, understandably, very embittered. I, therefore, requested, during the early days of 1942, in Berlin, that a military court of inquiry be set up to examine my past conduct; this would have led to the refutation of the charges that Field Marshal von Kluge had made against me and would have made clear the reasons underlying my past behavior. My request was turned down by Hitler.[278]

---

[275] For *Großdeutschland*, Tigers were originally added as the 13th Company. The company grew to battalion strength after Kursk and was redesignated III Battalion, Panzer Regiment *Großdeutschland*. See: Wolfgang Schneider, *Tigers in Combat II* (Mechanicsburg, PA: Stackpole Books, 2005), 19, 39, 69, 75, 83, 115, 155, 203, 263, 295.

[276] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 453.

[277] David Stahel, *The Battle for Moscow* (Cambridge: Cambridge University Press, 2015), 229-230.

[278] The incident in question involved Guderian refusing to issue the "stand fast" order and an accusation against Guderian of providing von Kluge with a false report, both of which von Kluge reported to OKH. OKH honored von Kluge's request for Guderian's dismissal. *Generaloberst* Erich Hoeppner, who commanded the 4th

In a meeting with Hitler's adjutant, General Schmundt, on 20 February 1943, Schmundt revealed that the tank corps was in disarray, that the General Staff and the armaments industry were barely working cooperatively, and that the men of the *Panzerwaffe* were demanding the control over the panzers be given to one who had practical knowledge and technical expertise. When offered this appointment, Guderian refused to accept any position subordinate to either the Chief of the Army General Staff or the Commander of the Training Army. As Guderian had suffered serious health concerns in mid-to-late 1942, he cited the effects of "fruitless struggles for authority' as his primary reason for this condition.[279] Guderian's conditions also included the desire for considerable influence over both *Wa Prüf VI* and the Armaments Ministry where new designs and upgrades were concerned, and the same influence over the tank units in the *Luftwaffe* and *Waffen-SS* as he would have over the *Heer*. Guderian was frank; if Hitler did not accept these conditions, the *Führer* should give up the idea of his – Guderian's – re-employment permanently. To Guderian's surprise, Hitler accepted his conditions, offered regret at their falling out through 1942, and appointed Guderian Inspector-General of Armored Troops.[280]

By mid-March, the Germans lost and reclaimed Kharkov, and with forces on both sides exhausted, the onset of the spring *rasputitsa* halted the majority of operations. While refitting in February prior to the Third Battle of Kharkov, *Großdeutschland* received its first nine Tigers in the counter-offensive between Poltava and Belgorod.[281] A report filed with the 4th Panzer Army,

---

Panzer Group under von Kluge during the failed offensive against Moscow, was dismissed after von Kluge reported him for making disparaging remarks about the 'civilian leadership,' which von Kluge assumed was in reference to Hitler. See: Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 267-272.

[279] Ibid, 288.

[280] Ibid, 289.

[281] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 70-78.

which eventually made its way to Guderian, noted that from 7-20 March, *Großdeutschland* knocked out

> …two hundred fifty T-34, sixteen T-60 or T-70, and three KV-I tanks. This count can be broken down as follows: one hundred eighty-eight by Panzer IV 7.5cm *Lang*, forty-one by StuG 7.5cm *Lang*, thirty by Tiger, eight by 7.5cm PaK anti-tank guns, one by a direct hit from sIG self-propelled artillery, and one by hand-employed shaped charge.[282] In this action, *Großdeutschland* lost one Panzer III, one Panzer IV l/24, eleven Panzer IV L/43, and one Tiger.[283]

In response to this report, Guderian's office, the *Generalinspekteur der Panzertruppen*, noted the following:

> Due to the strong armor protection and armament of the nine Pz.Kpfw. VI, it is self-evident that this unit should be constantly employed as the lead element. It is also necessary to employ individual Panzers for scouting. The Tiger must endure these combat assignments without any care or necessary technical support, even including long periods without changing the oil. The Panzers are attacking during the day and then must stand guard at night, which prevents any form of maintenance being performed. This resulted in the first automotive failures occurring after about five to six days in action; this could absolutely have been prevented through routine care and maintenance.[284]

While this report would indicate the Tigers were less combat effective than other armored fighting vehicles in the *Großdeutschland* formation, the Tigers were reportedly able to destroy thirty tanks to the loss of only one Tiger. This success rate indicated that Guderian's assessment that the Tiger should be employed as the lead element was tactically sound. However, a memorandum produced by Guderian's office in April 1943 warned, "the Tiger is a *Schwerpunktwaffe*…Dispersing them [into other units] is an idiotic squandering of this valuable

---

[282] Wolfgang Schneider, *Tigers in Combat II* (Mechanicsburg, PA: Stackpole Books, 2005), 19-21.

[283] "Battle Dispatch from the *13. Kompanie* Großdeutschland," 7-9 March 1943, reproduced in Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol.2, 1943-1945* (Atglen, PA: Schiffer Military History, 1996), 36.

[284] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 74-76.

equipment. The maintenance needs, especially for the Tiger, are not guaranteed in a normal tank battalion."[285]

After the engagements in mid-March, both sides settled into defensive positions to rest, refit, and reorganize. In a conference with Hitler on 9 March, Guderian explained to the assembled group, "The task of 1943 is to provide a certain number of panzer divisions with complete combat efficiency capable of making limited objective attacks. Only in 1944 would the German Army be prepared to launch large-scale attacks."[286] This sentiment was echoed by the majority of the assembled High Command, even Hitler, who proposed no ambitious plans for 1943. Von Manstein later remembered:

> The question now was how the German side should continue the struggle the following summer. Obviously, after so many major formations had been lost, there would no longer be the forces available to mount another crucial offensive on the scale of 1941 and 1942. What did seem possible - given proper leadership on the German side - was that the Soviet Union could be worn down to such an extent that it would tire of its already excessive sacrifices (some eleven million killed or captured) and accept a stalemate. At the time in question (March), this was far from wishful thinking.[287]

Von Manstein's concern – one shared by a number of officers within OKH and OKW – was the manner in which to conduct operations in 1943. Purely defensive tactics were rejected out of hand, as the German forces in the east were significantly outnumbered by the Soviets. Thus, there were not enough divisions to cover the whole from the Baltic to the Black Sea. On 1 April, *Fremde Heere Ost* reported the German Army had 2,732,000 soldiers organized in 147 and 22 panzer divisions, 1,336 tanks, and 6,360 guns, compared to an estimated 5,792,000 soldiers

---

[285] "Response from *Generalinspekteur der Panzer Truppen* HQ to *Infanterie Division Großdeutschland*," 27 April 1943, reproduced in Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol.2, 1943-1945* (Atglen, PA: Schiffer Military History, 1996), 38.

[286] Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 294-298.

[287] Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 443.

organized into more than 500 division equivalents, over 6,000 tanks, and 20,000 artillery pieces.[288] From von Manstein's perspective, any delay in offensive operations would deny Germany the initiative, which would potentially allow the Soviets to undertake their own offensives while Germany was distracted by Allied landings in Western Europe, a real concern after the collapse in North Africa. He argued:

> The German command thus had very little time left in which to force a draw in the east. It could do so only if it succeeded... In dealing the enemy powerful blows of a localized character which would sap his strength to a decisive degree... This presupposed an operational elasticity on our part which would give maximum effect to the still superior quality of the German Command Staff and fighting troops.[289]

Hitler had been impressed with von Manstein's handling of the counter-offensive, which recaptured Kharkov, and was willing to allow him sufficient leniency in planning for the next offensive. Von Manstein thus prepared two plans: the 'backhand' and the 'forehand.' Von Manstein preferred the 'backhand,' in which Germany would prepare significant defense networks, wait for the expected Soviet offensive in southern Ukraine, flex defensively to contain that offensive, then launch a counterattack with all available forces against the weakened northern flank to encircle the Soviets against the Black Sea coast in southern Ukraine. His less preferred 'forehand' planned for an assault on the salient at Kursk to encircle and destroy the large concentration of armor before turning south to deal with the Soviets in Ukraine.[290] If Hitler chose the latter option, the primary concern was time; as the Soviets were recovering from their own winter offensives, the operation had to be conducted in April, after the *rasputitsa*, when the

---

[288] Fremde Heere Ost, "Kraftegegenubersrellung Stand: 1.14.43," *Anlage 4b zu Abt. Fr. H. Ost (I)*, no. 80/43g National Archives Microfilm Series T-78, Roll 552, Alexandria, VA.

[289] Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 443.

[290] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 456.

ground had dried enough to allow armored operations but before the Red Army had completed its own reorganization.[291]

In *Absolute Destruction: Military Culture and the Practices of War in Imperial Germany*, Isabel Hull wrote "the German military of the 19th and early 20th centuries was dominated by a philosophy known as the 'cult of the offensive.' This paradigm stated that it was better to ruthlessly attack enemy forces where they are weakest in the fewest number of engagements possible. These victories would then lead directly to a final victory over a depleted and exhausted adversary."[292] This concept presented an opportunity that captivated Hitler: the possibility of destroying a sizeable portion of the Red Army in the Kursk salient. In a plan developed by Colonel General Kurt Zeitzler, a two-pronged attack at the flanks of the salient would be undertaken; in the north, Colonel General Walter Model's 9th Army of Army Group Center, and in the south, Colonel General Hermann Hoth's 4th Panzer Army from Army Group South.[293] Hitler's objective was limited to clearing the salient and the Red Army forces within, which he believed would bolster the morale of Germany's faltering allies while also providing a significant influx of slave labor.[294] Nor did he intend to accept that time was of the essence, as Hitler had serious doubts about the plausibility of the operation, which were in part fueled by

[291] Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 443.

[292] Isabel V. Hull, *Absolute Destruction: Military Culture and the Practices of War in Imperial Germany* (Ithaca, NY: Cornell University Press, 2005), 167.

[293] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 456-457.

[294] Mark Healy, *Zitadelle: The German Offensive Against the Kursk Salient* (Stroud, UK: History Press Ltd, 2010), 90.

Model, who assumed, correctly, that the Soviets were strong defenses in every sector they believed the Germans were likely to attack.[295]

In his official capacity, Guderian opposed the offensive. In a conversation with Hitler, where Guderian questioned Hitler's misgivings regarding Kursk while offering his own opposition to the offensive, Hitler admitted the very idea of the offensive made his stomach turn. Guderian concluded, "Then you have the right attitude towards the situation. Leave it alone."[296] Nor was Hitler alone in his concern. Senior officers and members of the government actively engaged in planning Citadel and others who had been dismissed into retirement had serious misgivings about the coming offensive, even before Operational Orders 5 and 6 gave a proposed start date of "mid-April" and 3 May, respectively.[297] Hermann Hoth, one of the more aggressive Panzer commanders, told Manstein:

> The troops, who for months have been fighting day and night without rest, have been under severe stress. The previous orders of the *Führer* have led them to believe that they had earned a certain period of rest. There will be some disappointment now if they receive orders to leave their present, quite makeshift positions. A series of reports from commanders, even once with reputations as "daredevils," have made it clear that the troops at least partly have become apathetic and have only reached their current operational goal, the Donets, under the strongest urgings of their leaders.[298]

In his retirement, Field Marshall Fedor von Bock, who had been relieved of command of Army Group B in 1942, wrote in his diary:

---

[295] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 456-457.

[296] Robert Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 125-127.

[297] Ibid, 120-121.

[298] "Statement by the Commander-in-Chief of the 4th Panzer Army to a Request from the Commander-in-Chief of Army Group South," excerpt from the War Diary of 4th Panzer Army reproduced in Eberhard Schwartz, *Die Stabilisierung der Ostfrontnach Stalingrad: Manstein's Gegenschlag zweischen Donez und Dnjepr im Früjahr 1943* (Göttingen: Muster-Schmidt Verlag, 1985), 285.

> …As I have no factual information, I cannot assess the situation. I do not know where the supreme command wishes the main effort to be, do not know whether the battle in the east can be avoided at all and know equally little as to whether the plan to wear down the Russians with limited blows is based on positive intelligence on the state of the Russian defensive strength. If this is, in fact, waning, then the German attack is justified. But if it isn't, if the supreme command is again basing everything on just wishful thinking, then the battle of attrition at Orel will be nothing but a repeat of the Battle of Verdun in 1916, which, as everybody knows, led to the bleeding white of the German army. But we need our forces in order to so smash the coming Anglo-American attack so that the enemy gives up its repetition as hopeless. I don't know whether our wealth of forces is so great that we can also be capable of major actions in the east.[299]

In a two-day staff meeting in Munich on May 3rd and 4th, Hitler, Guderian, Albert Speer, Chief of the General Staff of *Oberkommando der Luftwaffe* Colonel General Hans Jeschonnek, Walter Model, Chief of the General Staff of *Oberkommando des Heeres* Colonel General Kurt Zeitsler, commander of Army Group Center Field Marshall Gunther von Kluge, and von Manstein met to discuss the Kursk situation. After Hitler described the plan that he and Zeitzler had created, Hitler cast about the room, seeking options.[300]

Guderian dismissed the offensive as "reckless" and argued in favor of rebuilding strength in both soldiers in the field and equipment and time to iron out the *Kinderkrankheiten* – teething troubles – that were sure to be found in both the Panther and the Tiger.[301] Albert Speer also argued against assaulting the salient, as the presumed losses at Kursk would not help him get armored production in order, which in early 1943 had issues he was beginning to solve.[302] Model raised his previous concerns; 9th Army reconnaissance showed the salient was becoming heavily

---

[299] *Generalfeldmarschall* Fedor von Bock, *The War Diary, 1939-1945* (Atglen, PA: Schiffer Military History, 1996), 541.

[300] Robert Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 125.

[301] Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 306.

[302] Robert Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 126.

fortified, more so with each passing day. He believed the entire operation should be canceled, and as an aggressive, optimistic commander, Hitler tended to listen when he raised valid concerns.[303]

Von Manstein's opinion was enigmatic. As the first of those present whom Hitler asked for an opinion, von Manstein was in a precarious position.[304] As the Kursk Offensive had been his idea, he was in no position to argue against it. Nor could he argue in favor of postponing it. He recorded:

> Hitler decided to postpone Citadel until June, by which time he hoped our armored divisions would be stronger still after being fitted out with new tanks. He stuck to his decision even after it had been pointed out to him that the unfavorable developments in Tunisia could mean that if Citadel were put off any longer, there would be a danger of it coinciding with an enemy landing on the continent. Nor would he recognize that the longer one waited, the more armor the Russians would have, particularly as their tank output undoubtedly exceeded that of Germany. As a result of delays in the delivery of our own new tanks, the Army Group was not ultimately able to move off on Citadel until the beginning of July, by which time the essential advantage of a 'forehand' blow was lost. The whole idea had been to attack before the enemy had replenished its forces and got over to the reserves of the winter. At the same time, it was certain that the longer we took to launch the operation, the greater must be the threat to those of Army Group South and the Donets-Mius salient, which had had to hand over all their available forces and, most of all, to the Orel bulge as the jumping off base of Army Group Center's 9th army.[305]

Zeitzler and von Kluge were in favor of the offensive, as was Jeschonnek. Model was opposed without significant modification, von Manstein was both in favor and opposed depending on the

---

[303] Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 307.

[304] Robert Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 124.

[305] Robert Citino wrote that Hitler asked von Manstein twice for a clear opinion, but the Field Marshall would not give one. In his memoir, Guderian spoke of von Manstein's ambiguity, *keine eindeutige Antwort*. Von Manstein's own memoir was no less ambiguous and only mentioned the May conference in passing as a remark that Hitler failed to recognize the time constraint involved in a successful offensive. Max Hastings wrote that von Manstein no longer aspired to achieve Soviet defeat; he only sought a success that might oblige Stalin to acknowledge stalemate. See: Robert Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 124; Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 307; Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 447; Max Hastings, *Inferno: The World at War, 1939-1945* (New York: Vintage Books, 2012), 376.

question posed, and Guderian and Speer were against it. Hitler was noncommittal, given the divided nature of the positions presented by his senior officers, so he chose to postpone until 12 June. This date was postponed as well, as Hitler spent most of June watching the Italian situation and considering other plans, which were eventually scuttled.[306] During this time, von Manstein remained concerned about the forehand approach. As he surveyed the situation maps, a number of other opportunities presented themselves. One idea was to lure the Soviets onto the offensive with the industrialized and resource-rich Donbas as bait, and once their offensive stalled, deep in Ukraine, mobile reserves would crush the Soviets from the north, drive to Mariupol, and trap the Soviets in a *Kessel* larger than the encirclement of Kiev in 1941, where 701,000 Soviets had been killed or captured.[307]

By June, Hitler was not in the same receptive frame of mind as at the May conference. As von Manstein recognized the growing dangers in the Kursk salient, he made more persistent suggestions to use mobile operations, including feigned withdrawals designed to draw the Soviets out of the Matryoshka of death, the concentric circles of interconnected trenches, barbed wire, minefields, pre-plotted artillery, dug-in tanks, and camouflaged machine gun nests the salient rapidly was becoming.[308] Hitler would have none of it. With each passing day, he

---

[306] Karl-Heinz Frieser, "Schlagen aus der Nachhand – Schlagen aus der Vorhand: Die Schlachten von Ch'arkow und Kursk 1943," in Roland Foerster, ed., *Gezweitenwechsel im Zweiten Weltkreig? Die Schlachten von Ch'arkow und Kursk im Früjahr und Sommer 1943 in operativer Anlage, Verlauf und politischer Bedeutung* (Berlin: E.S. Mittler, 1996), 110-113.

[307] David Glantz and Jonathan House, *When Titans Clashed: How the Red Army Stopped Hitler* (Lawrence, KS: University Press of Kansas, 1995), 293.

[308] The salient was defended in a series of three main interconnected belts, and each belt was divided into defensive subzones; this accounted for a defensive depth of twenty-five miles. Behind this primary defense was another series of three belts, also divided into subzones; this accounted for a further depth of ninety-three miles. The Steppe Front built further fortifications to the east, bringing the total defensive depth in the salient to 190 miles. The Voronezh and Central Fronts prepared a total of 5,700 miles of trenches within the salient, built more than six hundred bridges and 1,200 miles of roadway, and nearly one million landmines – 1,700 AP mines per kilometer and 1,500 AP mines per kilometer. Additional mobile detachments could hastily disperse mines in front of the German advance. See: Lloyd Clark, *Kursk: The Greatest Battle, Eastern Front* (London: Headline Publishing Group, 2012),

dismissed *operieren* – operating – as he wanted his men to stand up and fight, to hold every position to the last man.[309]

These postponements and indecisiveness had done little to improve the German position but had, as von Manstein and others had feared, provided the Soviets time to prepare a hellish defensive network it was unlikely the Germans could penetrate while also allowing the Red Army time to rebuild their armored divisions and fill out the infantry divisions with fresh conscripts. Further, as planning, preparation, and field training progressed, it was increasingly unlikely Hitler would call off the offensive, regardless of his misgivings, as the idea of the offensive carried more weight than the offensive itself. Kursk had become the Wehrmacht's death ride.

Operation Zitadelle: Death Ride of the Wehrmacht

By May 1943, the *Wehrmacht* had expanded the heavy tank battalions by a further four, the 506th, 507th, 508th, and 509th.[310] Production had increased from the initial twenty-five tanks per month in September 1942 to around fifty per month from April to June 1943.[311] On the eve of the Kursk Offensive, the Tiger was the most heavily armed, most lethal tank on the Eastern Front.

203, 211; David Glantz, "Soviet Defensive Tactics at Kursk, July 1943," *US Army Command and General Staff College* (September 1986), 20; David Glantz and Jonathan House, *The Battle of Kursk* (Lawrence, KS: University Press of Kansas, 1999), 63-71; David Glantz and Harold Orenstein, *The Battle for Kursk 1943: The Soviet General Staff Study* (London: Frank Cass, 1999), 41, 49.

[309] Erich von Manstein, *Lost Victories: The War Memoirs of Hitler's Most Brilliant General* (Novato, CA: Presidio Press, 1982), 447.

[310] Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 267, 295, 321, 345.

[311] Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol 1, 1933*-1942 (Atglen, PA: Schiffer Military History, 1996), 266-268; Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol.2, 1943-1945* (Atglen, PA: Schiffer Military History, 1996), 286-287.

During the *rasputitsa*, the Soviets had been engaged in more than just preparing defenses in the salient. There was not enough time to design, produce and deploy a tank that could counter the Tiger, but they did begin designing tanks such as the T-34/85 and KV-85. In the meantime, as a stopgap weapon, the Soviets developed and fielded the SU-152, a KV-2 that had been retrofitted with a 152 mm gun designed to defeat German heavy tanks.[312] Combined with existing designs such as the SU-76 and SU-122, the Soviets organized twenty-one SU regiments, of which most were concentrated at Kursk; a further three were in reserve, and seventeen more were organized and trained.[313] The SU-152 may have been a stopgap weapon, but it proved successful as a multirole field gun – it was able to engage Tigers effectively and support infantry assaults by destroying fortifications – and it remained in service until 1958.[314]

The Soviets also formed anti-tank battalions, which were armed with 85mm antiaircraft guns specially mounted to deliver ground fire in a manner not dissimilar to the German 88mm gun. These battalions were assigned to tank and mechanized corps, though not all involved at Kursk had been so reinforced before the Kursk Offensive.[315]

Two s.Pz.Abt. participated in the Battle of Kursk: the 503rd as part of Army Group South, and the 505th, attached to Army Group North.[316] As units moved into position, the battalions were attached at the *Schwerpunkt*, as doctrine mandated.

---

[312] Williamson Murray and Allan Millet, *A War to be Won: Fighting the Second World War* (London: Belknap Press, 2000), 292; Anthony Tucker-Jones, *Stalin's Armour, 1941-1945: Soviet Tanks at War* (Barnsley, UK: Pen & Sword Military, 2021), 213-214.

[313] самоходная установка (Samohodnaya Ustanovka), or self-propelled installation. See: David Glantz and Jonathan House, *The Battle of Kursk* (Lawrence, KS: University Press of Kansas, 1999), 19.

[314] Anthony Tucker-Jones, *Stalin's Armour* (Barnsley, UK: Pen & Sword Military, 2021), 215.

[315] Walter Dunn, *Hitler's Gamble, 1943* (London: Praeger Publishers, 1997), 30.

[316] Niklas Zetterling and Anders Frankson, *Kursk 1943:A Statistical Analysis* (London: Frank Cass, 2000), 134; Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol.2, 1943-1945* (Atglen, PA: Schiffer Military History, 1996), 74.

The 505th, commanded by Major Bernhard Sauvant, was in the northern sector under Army Group North, attached to the 6th Infantry Division of Lieutenant General (*General der Panzertruppe)* Joachim Lemelson's XLVII Panzer Corps.[317] Lemelson's corps was part of Model's Ninth Army; this force was the largest single army ever assembled on the Eastern Front at any point in the war. Model had five corps organized into nineteen divisions in his army, including six panzer divisions.[318] His objective was to penetrate near Orel and drive along the railway through Olkhovatka to Kursk, where they would take the high ground north of Kursk and meet Hermann Hoth's 4th Panzer Army, which had driven from the south, thus completing the *Kessel*. The *Schwerpunkt* was Lemelson's, and he had been given three panzer divisions and the 505th s.Pz.Abt to accomplish his mission.

The 503rd, commanded by Captain Clemens-Heinrich Graf von Kagenek, was in the southern sector under Field Marshall Erich von Manstein's Army Group South, attached to Lieutenant General Werner Kempf's Army Detachment Kempf as part of III Panzer Corps, commanded by Lieutenant General Hermann Breith.[319] However, the 503rd was not used as a *Schwerpunktwaffe*; contrary to Guderian's previous guidance that Tigers must be employed in a concentrated effort, and against the advice of Captain von Kagenek, Breith chose to attach a

---

[317] The order of battle for Kursk is extensive; for clarity, Army Group Center under Generalfeldmarschall Gunther von Kluge controlled the northern sector. The subordinate units were Second Panzer Army, commanded by *Generalleutnant* Rudolf Schmidt; Ninth Army, commanded by *Generaloberst* Walther Model; and Second Army, commanded by *Generaloberst* Walter Weiß. See: Robert Citino, *The Wehrmacht Retreats: Fighting a Lost War, 1943* (Lawrence, KS: University Press of Kansas, 2012), 130-132. For information on the 505th, see: Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019).

[318] David Glantz and Jonathan House, *The Battle of Kursk* (Lawrence, KS: The University Press of Kansas), 283-285.

[319] Niklas Zetterling and Anders Frankson, *Kursk 1943: A Statistical Analysis* (London: Frank Cass, 2000), 134.

single company to each of the III Panzer Corps three panzer divisions: 1st Company was attached to the 6th Panzer, 2nd Company was attached to the 19th Panzer, and 3rd Company was attached to the 7th Panzer.[320]

Army Group South was numerically inferior to Army Group North; there were as many divisions – nineteen – in Model's Ninth Army as there were in von Manstein's entire Army Group. However, Army Group South had an advantage not found in Army Group North – the II SS Panzer Corps and Panzergrenadier Division *Großdeutschland*. Commanded by SS-*Oberst-gruppenführer* Paul Hauser, the corps consisted of the *Leibstandarte*, *Das Reich*, and *Totenkopf* Divisions, each of which had an attached 13th company of Tigers.[321] Each SS division was allocated varying numbers of Tigers – 1st SS had thirteen, 2nd SS had fourteen (assigned to 8th Company), and 3rd SS had fifteen (attached as 4th Company).[322] Along with *Großdeutschland*'s thirteen Tigers, this gave Army Group South an additional fifty-five Tigers alongside its s.Pz.Abt 503. However, as Army Group South lacked infantry units, this forced the 4th Panzer Army and Army Detachment Kempf to use the Tigers and other tanks as the initial assault.[323]

---

[320] Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 138.

[321] The SS rank structure differed from that found in the *Wehrmacht*, which itself had slight discrepancies just as the modern US military does – Private 1st Class, for example, in the Army, whereas the Air Force has Airmen 1st Class. The SS rank *SS-Oberstgruppenführer* is the equivalent of a Colonel General in the *Wehrmacht.* See: Gordon Williamson, *The SS: Hitler's Instrument of Terror* (New York: Amber Books, 2006), 291.

[322] The SS Panzer Divisions were organized with a division headquarters, a panzer regiment with two panzer battalions, an anti-tank battalion, two Panzergrenadier regiments with three battalions each, an armored reconnaissance battalion, and an artillery battalion. The Tiger companies were attached to the panzer regiments as the 13th Company and consisted of thirteen Tigers. *Großdeutschland* also attached the Tigers as the 13th Company of its panzer regiment. See: French MacLean*: Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1,2, and 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military, 2020), 38-39.

[323] Walter Dunn, *Hitler's Gamble, 1943* (London: Praeger Publishers, 1997), 109.

On the first day of the attack in the north, 5 July, Army Group Center tasked the 505th with penetrating the defensive belts so the panzer divisions could exploit the breakthrough. As the terrain in this sector was crossed by several small streams, the 505th used Panzer IIIs – which the battalion had converted into improvised bridging vehicles by removing the turrets – to avoid sinking into the soft ground around the streams.[324] The streams were not the primary concern for the Tiger crews; the minefields were. The 505th provided covering fire for the engineers sweeping the minefields, which allowed the men of the 31st Engineers to open two lanes. With support from the 6th Infantry Division's 58th and 18th Panzergrenadier Regiments, Soviet infantry was engaged and defeated near the Oka River.[325] The attack continued toward Podolyan, and when T-34s from the 15th Rifles Division were encountered, the battalion claimed forty-two T-34s and a number of anti-tank guns destroyed with assistance from the Panzergrenadiers.[326] This assault caused the 15th Rifles to collapse, which weakened the right flank of the Soviet 70th Army, but this opportunity could not be exploited as the 6th Infantry Division on the 505th left flank had not achieved its objectives, nor had the 2nd Panzer Division been committed to the offensive.[327] Tiger commander Josef Sandner recalled:

> The success of the 505th was more than *Generaloberst* Model had expected, with the result that the reserves were not in a position to be committed to exploit the initial penetrations further… *Generalleutnant* Großmann advocated bringing up the reserves and committing them to the fight. The 2nd, 9th, and 18th Panzer Divisions waited. Großmann stated, '… far ahead of the division lay high ground on which we could see movements by the Russians. If the panzers had rolled through then, we would perhaps

[324] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 85.

[325] Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 46.

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

[327] Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 46.

> have reached the objective of Kursk because the enemy was completely surprised and still weak. Valuable time was lost that the enemy used to in his reserves.' Employment of the 2nd Panzer division at that time, not as scheduled on the following day, may have destroyed the entire front.[328]

By the end of the first day, battlefield reports given to Army General Konstantin Rokossovsky were grim. The minefields had affected the lead tanks, but the following tanks pushed through. The Germans had advanced eight kilometers without committing their entire force. When reporting the situation to Stalin, Rokossovsky was promised the 27th Army from the reserve but instead sent that Army to the Voronezh Front, where another serious situation had developed.[329]

The Voronezh Front, commanded by Army General Nicolai Vatutin, was indeed in peril. Here, the terrain was much flatter, with small tributaries of the Donets and Razumnoe Rivers running throughout, and though there were minefields scattered throughout the passable land, there were multiple lanes of approach. II SS Panzer Corps advanced toward the northeast, with the 1st SS on the left flank, the 2nd SS in the center, and the 3rd SS on the right flank. As the three divisions rolled forward, they encountered heavy resistance from infantry, anti-tank guns, and tank, but mine-clearing operations during the night had cleared multiple avenues of approach.[330] Advancing across a twelve-kilometer-wide front, the three divisions of the 52nd Guards Rifle Division with forty-two Tigers and almost five hundred other tanks and assault guns at the *Schwerpunkt*. 1st SS advanced toward Bykovka, 2nd SS pushed through the center, disrupting Soviet reorganization efforts, and 3rd SS advanced toward Gremuchi.[331] By the evening, II SS

---

[328] "Recollections of Josef Sandner," reproduced in Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 46-47.

[329] Konstantin Rokossovsky*, A Soldier's Duty* (Moscow: Voyenizdat, 1997), 269.

[330] Lloyd Clark, *Kursk: The Greatest Battle: Eastern Front* (London: Headline Publishing, 2012), 247.

[331] French MacLean*: Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1,2, and 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military, 2020), 45-48.

Panzer Corps had broken the Soviet's first defensive belt, captured or destroyed numerous tanks, and captured Bykova.[332] 3rd SS had difficulty advancing through a larger branch of the Donets but managed to advance eleven kilometers to the main road between Gonki and Belgorod, compared to nineteen kilometers for the 1st SS and twelve kilometers for the 2nd SS.[333]

Großdeutcshland achieved extraordinarily little success on the first day. Advancing along a three-kilometer front against the 67th Guards Rifle Division, two of its regiments were caught in minefields that had not been cleared the night before and were raked by a heavy Soviet artillery barrage. The Tigers had been ordered to capture and hold Point 229.8 to allow the 3rd Panzer Division to cross a large creek, but the Tigers were unsuccessful. They were successful in their efforts to take the village of Butovo.[334]

The 503rd also had difficulty on the opening day. While the 1st Company was able to attack toward Mikhailovka, the 2nd Company encountered a minefield and, in attempting to cross it, managed to take damage to all of its Tigers. 3rd Company was unable to ford the Donetz seven kilometers south of Belgorod, but once a pontoon bridge was hastily erected, the company was able to hold off a Soviet counterattack and claimed the destruction of thirty-four Soviet tanks.[335]

In the north, through the 6th and 7th, the 505th encountered several Soviet counterattacks and, in the process gave some ground which was recovered. The objective, the Ol'Khovatka

---

[332] 2nd SS claimed twenty-three tanks were destroyed, but neither the 1st nor 3rd SS made specific claims. See: Wolfgang Schneider, *Tigers in Combat II* (Mechanicsburg, PA: Stackpole Books, 2005), 87, 117, 157.

[333] French MacLean*: Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1,2, and 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military, 2020), 48.

[334] Lloyd Clark, *Kursk: The Greatest Battle: Eastern Front* (London: Headline Publishing, 2012), 242.

[335] Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 139.

Heights between the villages of Ponyri and Soborovka, was heavily defended by T-34s and well-entrenched anti-tank guns, and over the fifteen-kilometer-wide front, a major tank battle involving over a thousand tanks.[336] Despite inflicting heavy losses on the Soviet 16th Tank Corps, the 505th was unable to breakthrough at Ol'Khovatka, within the second line of defense, nor was Ponyri able to be taken, as it was heavily defended by the 307th Rifle Division.[337]

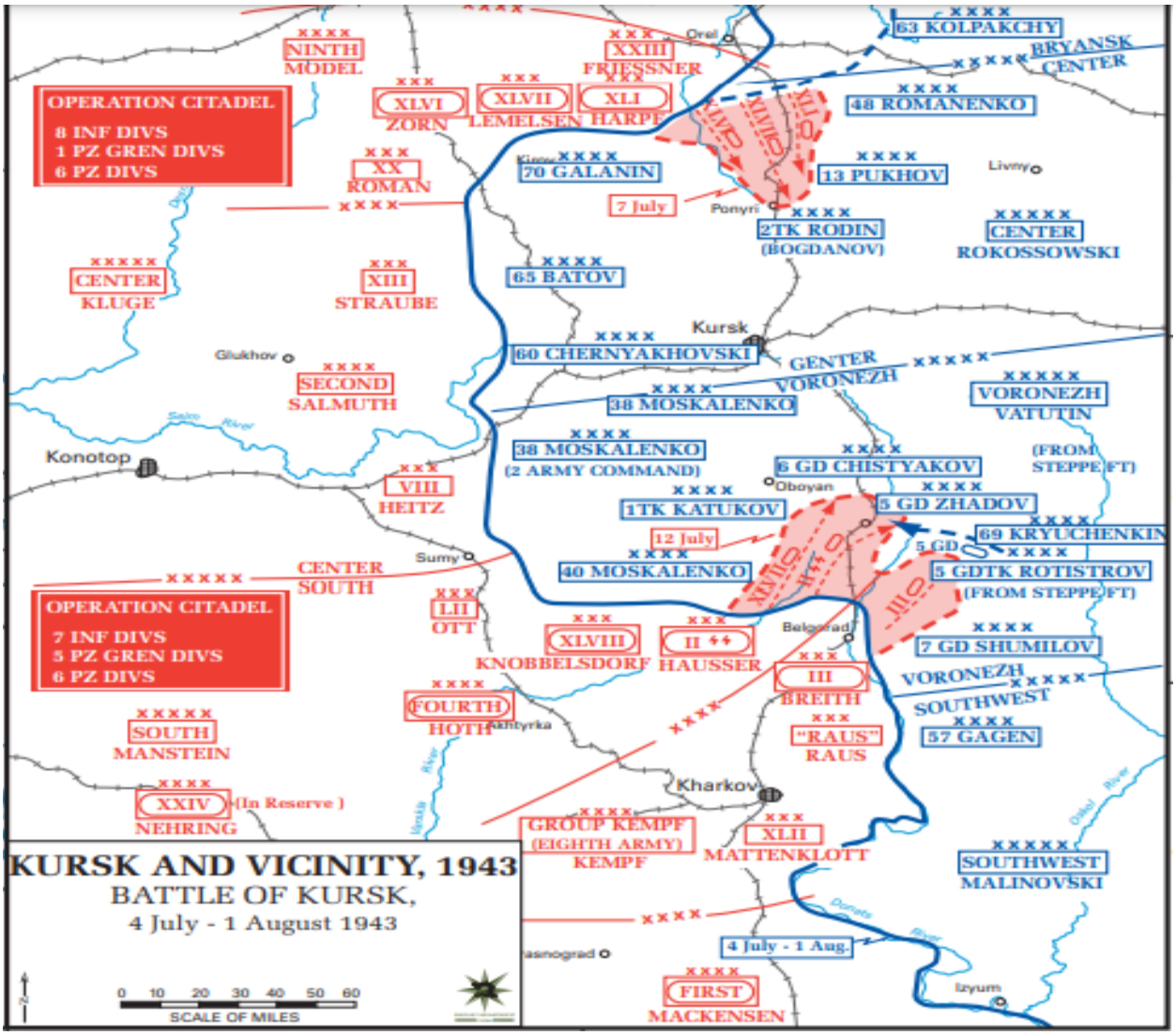
After much-needed maintenance on the 9th, the 505th was able to engage toward Teploye (Teploe), but this attack turned into a battle of attrition the Germans could not weather. The offensive had begun with a forty-five-kilometer-wide attack front, which was reduced to forty kilometers by the end of the 6th; by the 8th, it was only 15 kilometers wide, which allowed the Soviets to concentrate their firepower on a much smaller area both sides viewed as strategically vital.[338] The Germans made no further advances after the 9th, and on the 11th, the 505th conducted limited security operations against local Soviet counterattacks in the hills near Teploye.[339]

[336] Both Wolfgang Schneider and Thomas Jentz note that the records for the 505th are incomplete, and no records of their employment survive in the records of the Army Group Center. Thus, the number of tanks in this engagement cannot be fully substantiated. See: Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 224; Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 89; Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 54.

[337] The Soviets acknowledged tank losses well after the war. The *Voenno-istoricheskii zhurnal* (Military-historical journal) published several accounts of German and Soviet tank losses. See: A. Vitruk, "Bronia protiv broni," *VIZh* (June 1983), 72-79.

[338] Richard Overy, *Why the Allies Won* (New York: Norton Press, 1995) 90-94.

[339] Dale Richard Ritter,ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 74.



340

In the south, the Voronezh Front's crisis on the 6th had become critical by the 7th and 8th, but it would have been significantly worse had the 6th Panzer Division managed to accomplish any of its objectives on the 5th or made any advance.[341] A Soviet counterattack on the 6th had cost

[340] "Map of Kursk and Vicinity, 1943," *United States Military Academy* https://www.westpoint.edu/academics/academic-departments/history/world-war-two-europe, accessed 18 September 2022.

[341] After losing thirteen tanks, including four Tigers, the 6th Panzer Division moved to a different bridgehead and then halted to see if the infantry could make any progress before it committed its tanks. See: Christopher Lawrence, *The Battle of Prokhorovka: The Tank Battle at Kursk, the Largest Clash of Armor in History* (Guilford, CT: Stackpole Books, 2015), 59-60.

General Katukov's 1st Tank Army significant T-34 losses, which he had relayed to Stalin when Vatutin failed to respond to Katukov's messages urging Vatutin to call off the counterattack.[342] By the 7th, II SS Panzer Corps had broken through the first two defense lines and were approaching the marshes ahead of the Peel River.

At this location, the third defense line had been constructed 13 kilometers behind the second, and the geography meant the sector was lightly defended.[343] The II SS Panzer Corps hoped to exploit this weakness, as did the XLVII Panzer Corps, with *Großdeutschland*, in an area near Oboyan, where the third defensive ring had been left unmanned only sixty kilometers south of Kursk, roughly halfway between Kursk and Belgorod.[344] 1st SS had broken into the third defensive line, destroyed several tanks carrying infantry from the 31st Tank Corps, and captured Hill 258.2, scattering the defending 183rd Rifle Division.[345] The 2nd SS advanced past Kalinin, forty kilometers south of Kursk, across the Belgorod-Kursk railway but was halted by withering fire from an armored train. Tiger S24 was destroyed, and the Regimental adjutant, *SS-Hauptsturmführer* Karl-Heinz Lorenz, was killed, along with the radio operator, *SS-Panzeroberschütze* Ernst Schäfer. Three other crewmen were wounded grievously, one of whom – *SS-Rottenführer,* Heinz Wilken – died the following morning.[346]

---

[342] General Mikhail Katukov, *At the Spearhead of the Main Blow* (Moscow: Voyenizdat, 1974), 236-237.

[343] Geoffrey Jukes, *Stalingrad to Kursk: Triumph of the Red Army* (Barnsley, UK: Pen & Sword Military, 2011), 185.

[344] The threat of a breakthrough by *Großdeutschland* was significant enough to force *Stavka* to commit the strategic reserve – the 5th Guards, 5th Guards Tank Army, and 2nd Tank Corps – to the Voronezh Front on the second day of battle. See: David Glantz and Jonathan House, *The Battle of Kursk* (Lawrence, KS: The University Press of Kansas, 2004), 93, 113.

[345] Christopher Lawrence, *Kursk: The Battle of Prokhorovka* (Sheridan, CO: Aberdeen Books, 2015), 527-530.

[346] "SS Officer Personnel Files," *National Archives Microfilm Publication* A3343, Series SSO, National Archives and Record Administration: College Park, MD, Roll 277A (Lorenz, Karl-Heinz, 03-Jul-1917).

Despite damage to several Tigers, the Company advanced through to Belenikhino, forcing elements of the 21st Guards Tank Brigade to abandon the railway station there.[347] 3rd SS attacked Krapivenskiye Dvory, twenty-eight kilometers north of Belgorod, then secured the high ground on the west bank of the Lipovyy Donets River, fourteen kilometers east of Krapivenskiye Dvory.[348] The Tigers generally were able to absorb Soviet fire but could not press the advance beyond the river. The exception was artillery; Soviet artillery hit 1st Platoon's Tiger 914, killing *SS-Unterscharführer* Richard Müller. The 3rd SS reported the destruction of eighty-six Soviet tanks to the loss of three Tigers damaged.[349]

As Soviet reinforcements made their way into the Voronezh Fronts area of operations, the 5th Guards Tank Army rushed toward Prokhorovka, a town thirty kilometers north of the 3rd SS position at Krapivenskiye Dvory. The commander of the 5th Guards Tank Army, Lieutenant General Pavel Rotmistrov, wrote:

> By midday, the dust rose in thick clouds, settling in a solid layer on the roadside bushes, grain fields, tanks, and trucks. The dark red disc of the sun was hardly visible. Tanks, self-propelled guns, artillery tractors, armored personnel carriers, and trucks were advancing in an unending flow. The faces of the soldiers were dark with dust and exhaust fumes. It was intolerably hot. Soldiers were tortured by thirst, and their shirts, wet with sweat, stuck to their bodies.[350]

---

[347] Wolfgang Schneider, *Das Reich Tigers* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2006), 87, 108, 114, 119.

[348] Wolfgang Schneider*, Totenkopf Tigers* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2011), 93; Ian Michael Wood, *Tigers of the Deaths Head: SS Totenkopf Division's Tiger Company* (Mechanicsburg, PA: Stackpole Books, 2013), 48.

[349] Christopher Lawrence, *Kursk: The Battle of Prokhorovka* (Sheridan, CO: Aberdeen Books, 2015), 477.

[350] Pavel Rotmistrov, "Tanks against Tanks," in John Erickson, ed., *Main Front: Soviet Leaders Look Back on World War II* (London: Brassey's Ltd., 1987), 106-109.

The 10th Tank Corps managed to make Prokhorovka by the night of the 7th, and the 2nd Tank Corps arrived at Korocha, a village forty kilometers south of Prokhorovka, on the morning of the 8th.[351] Army General Vatutin ordered an immediate counterattack against II SS Panzer Corps on the 8th, which consisted of the 2nd and 5th Guards and 2nd and 10th Tank Corps, and an attack by the 6th Tank Corps against the XLVII Panzer Corps, to stop the Germans from breaking through into the undefended rear.

On the 8th, the 1st SS had taken Malye Mayachki, just twenty kilometers from Prokhorovka. The Tigers attacked north toward Veselyy, destroying forty-two T-34's according to a report filed by *SS-Hauptsturmführer* Kling.[352] The most notable action of the day was conducted away from the company's main effort. That morning, when the company departed the assembly area, Tiger 1324, commanded by *SS-Sturmmann* Rolf Schamp, and Tiger 1325, commanded by *SS-Unterscharführer* Franz Staudegger, remained at the company maintenance area in Teterevino. The Tigers had damage to the tracks, reducing their mobility significantly. Mid-morning, German infantry in Teterevino received a warning that a Soviet armored force of at least fifty tanks was incoming. Having been alerted of the Soviet advance, Staudegger and Schamp repaired what damage they could to bring the Tigers to a state resembling combat readiness, and they set off.[353]

Staudegger and Schamp found themselves facing a brigade of Soviet armor from the 10th Tank Corps, part of the counterattack Army General Vatutin had ordered earlier in the morning.

---

[351] David Glantz and Jonathan House, *The Battle of Kursk* (Lawrence, KS: The University Press of Kansas, 2004), 114.

[352] French MacLean*: Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1, 2, and 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military, 2020), 57.

[353] Neal Shera, "Amazing Feats of the Tiger Tank," *Firearms News* (August 2019).

Moving to the northeast of the village, Staudegger, with Schamp guarding his flank, chose a firing position next to an embankment. Over the course of the next few hours, Staudegger's Tiger destroyed 17 T-34s with armor-piercing shells, and when he had expended all of those, Staudegger ordered his gunner to use high explosives, which worked to devastating effect. The Tiger destroyed a further five T-34s, and the 10th Tank Corps withdrew. For his actions on 8 July, Staudegger would receive the Knight's Cross, the first Tiger crewman to receive Germany's highest military award.[354]

The remainder of the 10th Tank Corps ran headlong into the 2nd and 3rd SS and were routed. A follow-on attack by the 5th Guards Tanks Corps and the 2nd Tank Corp were also repelled with heavy losses. The Soviet counterattack was a spectacular failure due mostly to the piecemeal engagements; rather than a concentrated assault, the elements failed to coordinate their advances, and the Red Army suffered dearly for this lack of communication. The 2nd Guards Tank Corps had managed to conceal its approach through dense forests sixteen kilometers north of Belgorod; they were detected by aerial reconnaissance, a were devastated by Stuka's and ground attack aircraft armed with MK 103 30mm cannons, destroying nearly fifty tanks.[355] A Soviet prisoner captured on 31 July admitted, under interrogation, that his unit had an assault canceled as the supporting artillery had all been destroyed by the Luftwaffe. The Soviets did not have the same effect on the German formations.[356]

---

[354] Evan Pinter, "Franz Staudegger: German Tiger Ace in the Battle of Kursk," *War History Online* (April 2017), https://www.warhistoryonline.com/guest-bloggers/franz-staudegger-german-tiger-ace-battle-kursk.html?chrome=1, accessed 31 July 2022; Christopher Lawrence, "Panzer Aces Wittmann and Staudegger at Kurst," *DuPuy Institute* (July 2018), http://www.dupuyinstitute.org/blog/2018/07/09/panzer-aces-wittmann-and-staudegger-at-kursk-part-1/, accessed 31 July 2022.

[355] Tank losses were given as fifty in one air raid and another thirty in subsequent raids. See: Lloyd Clark, *Kursk: The Greatest Battle, Eastern Front 1943* (London: Headline Publishing, 2012), 299.

[356] Roman Töppel, *Kursk, 1943: The Second Greatest Tank Battle of the Second World War* (Warwick, UK: Helion & Company, 2018), 158.

For the first time in military history, an armored formation had been defeated solely through air power. This created a dangerous precedent, as for the duration of the operation, Soviet troop movements had to be conducted at night, which delayed the deployment of Soviet reserves into their blocking positions.[357] A radio operator for one German JU-87 dive bomber, Hans Krohn, recalled:

> Our 'cannon planes' took a terrible toll on the Russian armor. We attacked at a very low altitude – I often feared that we were going to hit a ground obstacle with our landing gear – and my pilot opened fire at the tanks from a distance of only 50 meters. That gave us very little margin to pull up and get away before the tank exploded, so immediately after the cannons were fired, I always prepared myself for a very rash maneuver. At the same time, in that moment, I had to be very watchful because in this area, the Russian fighters were very active, and they sure were the most serious adversaries![358]

On the 9th - 11th, II SS Panzer Corps continued to attack north in an effort to seize Prokhorovka and Beregovoye. The first German units reached the Psel River on the 9th, and infantry crossed the morning of the 10th to clear mines and obstacles.[359] The full effort of the II SS was now aimed at Prokhorovka, though von Manstein was concerned Army Detachment *Kempf* would not be able to advance far enough to protect the II SS's eastern flank. On the 11th, *Kempf* finally made considerable progress and seized a bridge over the Donetz in a night operation. General Breith pushed every available truck, tank, and soldier across the bridge, hoping *Kempf* could link up with the II SS and encircle the 69th Army.[360]

---

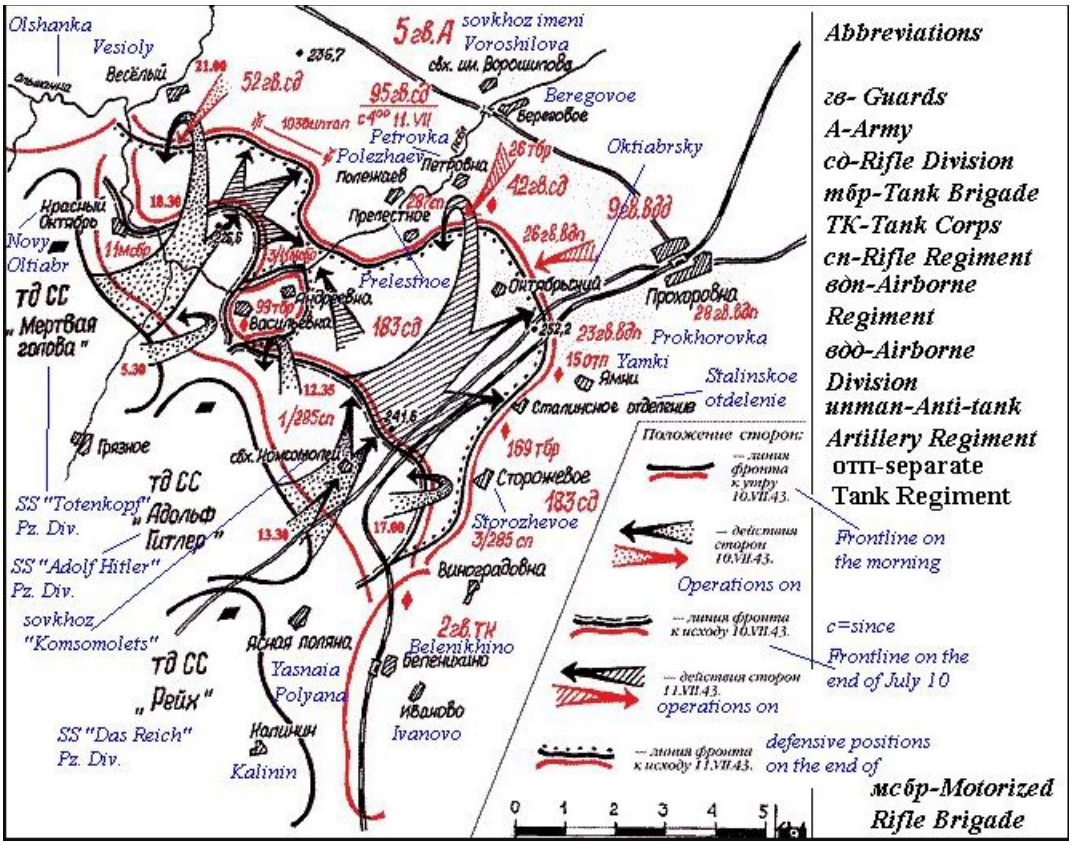
[357] David Glantz and Jonathan House, *The Battle of Kursk* (Lawrence, KS: The University Press of Kansas, 2004), 114, 135.

[358] Ralph Wetterman, "Kursk: The Greatest Tank Battle in History Might have Ended Differently had it not been for the Action in the Air," *Smithsonian Magazine* (May 2015). Retrieved from https://www.smithsonianmag.com/air-space-magazine/kursk-180954670/, accessed 22 August 2022.

[359] French MacLean*: Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1, 2, and 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military, 2020), 64.

[360] Geoffrey Jukes, *Stalingrad to Kursk: Triumph of the Red Army* (Barnsley, UK: Pen & Sword Military, 2011), 187-190.

With an opening artillery barrage at 0800, so began the Battle of Prokhorovka. Five tank brigades from the 5th Guards Army advanced from the hills east of the town.[361] The 1st SS was first attacked by over fifty enemy tanks from two Corps. Then in succession, they were attacked by thirty-five from the northeast and forty from near Yamki farm to the north.



362

[361] French MacLean*: Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1,2, and 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military, 2020), 69-72.

[362] "Battle of Prokhorovka," *Armchair General*, http://armchairgeneral.com/rkkaww2/maps/maps1943SW.htm#Prokhorovka, accessed 31 July 2022.

Supported by the 2nd SS Panzergrenadier Regiment, the 1st SS counterattacked the 170th and 181st Tank Brigades at Oktiabrsky, just outside Prokhorovka.[363] The Soviets made a local breakthrough in the early afternoon, but the 1st SS restored its lines in a little over an hour. By the evening, the 1st SS withdrew to the lines it had held that morning. *SS-Untersturmführer* Michael Wittman, in Tiger 1331, was credited with destroying twenty-eight T-34s.[364]

3rd SS repelled the initial enemy attack and moved to a position five kilometers northwest of Prelestnoe. By the evening, the 3rd SS was advancing toward the Karteschewka-Prokhorovka road and managed to reach the crossing by 2300, but the division lost half its armor in so doing. Though this was the furthest north Army Group South managed to push during Citadel, the crews were suffering; the Tigers were all being patched together almost daily.[365] The II SS Panzer Corps had managed to repel everything the 5th Guards Tank Army had sent, but neither side could accomplish their objectives. The battle ended in a strategic victory for the Soviets, as they had done enough to prevent a German breakthrough.[366]

After the debacle in the minefield, the 503rd had somewhat better luck over the next few days of the offensive. Supporting the 6th Panzer Division, the 503rd was tasked with spearheading the drive to link up with the II SS Panzer Corps.[367] Over nine days of fighting, the 503rd

---

[363] Christopher Lawrence, *Kursk: The Battle of Prokhorovka* (Sheridan, CO: Aberdeen Books, 2015), 929-940.

[364] Patrick Agte, *Michael Wittmann & the Waffen SS Tiger Commanders of the Leibstandarte in WWII* (Guilford, CT: Stackpole Books), 126-127.

[365] French MacLean*: Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1,2, and 3 in Operation Citadel, July 5-15, 1943* (Atglen, PA: Schiffer Military, 2020), 72.

[366] Deiter Brand, "60 Years Ago: Prokhorovka," *Austrian Military Journal* no. 6 (2003).

[367] David Glantz and Jonathan House, *The Battle of Kursk* (Lawrence, KS: The University Press of Kansas, 2004), 136.

destroyed roughly seventy-two tanks, losing only four in combat.[368] The battalion maintained an operational rate near 60%, despite near continuous combat, and the battalion did not have to abandon any Tigers due to remaining on the offensive, giving recovery units time to rescue damaged tanks.[369]

In Citadel, the Tigers were not employed according to accepted doctrine nor according to Guderian's explicit instructions. The dispersal of the heavy battalions violated the concept of concentration Guderian's office, the Inspectorate of Armored Troops, had issued on 14 May, but even in cases where numbers of Tigers were concentrated, they were unable to have success at the level expected of them.[370] As there were only around one hundred forty-six Tigers at Kursk, this is a comparatively low number of tanks for so high an expectation, given the total number of Soviet tanks in the area. The expectation that Tigers could achieve success regardless of the odds greatly contributed to dwindling numbers of operational Tigers in all units except the 503rd, which maintained an offensive posture, enabling maintenance sections to repair damaged Tigers rather than resorting to leaving them for the Soviets or destroying them. The 503rd also managed to sustain over twenty, and on the 8th and 9th, over thirty operational Tigers from the 5th to the 13th, whereas the II SS often fell to low single digits. The exception is the 505th, which also maintained a generally high number of operational Tigers, but this unit also received fourteen

[368] Alfred Freiherr von Rosen, "Zitadelle," in Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 137-141.

[369] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 90-91.

[370] Ibid, 79.

replacement tanks during the battle and had the highest number of losses as total write-offs, with six.[371]

While they were not able to achieve doctrinal success, the Tigers were certainly successful in pushing the German offensive forward, in destroying enemy tanks and anti-tank positions, and in operating on the defensive, as evidenced by the Tigers of the II SS Panzer Corps over the last three days of the battle. This latter point is interesting, given that the 505th was used as the *Schwerpunktwaffe* in a concentration, whereas the 503rd was dispersed among three separate divisions. This indicates the Tiger was capable of success in both concentration and when dispersed, as long as they were used in tactical situations for which they were most suited.

While it is unfair to compare the Soviet medium T-34's capabilities to the Tigers, it is clear the Tigers were able to destroy the T-34 far more effectively than the T-34 could operate against the Tiger. The majority of the Tigers lost were due to minefields and artillery, though others were damaged by anti-tank guns in fixed positions with a clear field of fire. This generally consisted of 'mobility kills,' where the track is damaged, and the Tiger is unable to withdraw. Again, the small number of Tigers counted as a total loss indicates the Soviets did not have remarkable success at capturing Tigers, nor were the crews willing to hand them over without a fight or willing to destroy them with demolition charges. Further, the sparse numbers of operational Tigers in the II SS, where the greatest strategic success had been made, likely contributed to the low rate of killed Tigers, as there were, in some cases, only one or two Tigers operational for the Soviets to target.

Captain Clemens Graf von Kagenek wrote, toward the end of the battle:

---

[371] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 90.

> While we had been the spearhead up to that point, it was the role of 'fireman' that fell to us now. Our neighbors pulled back under the growing Russian pressure, and Ivan advanced with strong armored forces. On one such action, I was able to hastily assemble eight tanks and we attacked across the swampy sector, behind which an alder-covered slope rose to high ground. Then we saw an amazing picture. Rifleman from our neighboring division were withdrawing, still in half-organized fashion, and then between them rolled Russian tanks, firing wildly around in all directions. We were already in an ideal position and, in a short time, knocked out more than twenty of the Russian tanks that were moving in front of us like targets on a range. Once again, the weakness of the T34 showed up - the tank commander in the turret could not see around him. Therefore, none of them noticed how the neighboring tanks were going up in flames and new targets kept coming over the hill.[372]

This recollection indicates the Tigers were capable of being extraordinarily successful in a defensive position, and as their effective firing range greatly exceeded that of the T-34, they were able to accurately target and destroy Soviet tanks before the T-34 commanders knew Tigers were nearby.

The Long Retreat West

After the defeat at Kursk, the Germans never launched another large-scale offensive. The remainder of their war was defensive against an enemy with limited mobility and preferred massed attacks callous to the toll on human life.[373] By mid-1943, the Germans had lost the initiative and were subjected to Soviet offensives, which were best described as "an alternating series of strokes at different points, each temporarily suspended when its impetus waned in the face of stiffening resistance, each so aimed as to pave the way for the next, and all timed to react on one another…in that offensive process, the Russian losses were naturally heavier than the Germans,' but the Germans lost more than they could afford, following the costly failure of their

[372] Clemens Graf von Kagenek, "Recollections from my Time as Commander of Tiger Tank Battalion 503, June 1943 – January 1944," in Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 109 – 114.

[373] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure.* (New York: Stein and Day, 1978), 460.

own offensive."[374] As General Siegfried Westphal wrote, "The continual demand that the almost impossible shall be made possible is in itself a brake on the action." [375]

The defensive situation was exacerbated by Hitler's policy of 'no withdrawal.' Despite the loss of the 6th Army at Stalingrad, Hitler believed the winter offensives of 1941-1942 justified his belief, and he spent the remainder of the war entrenched in the position that any withdrawal to get operational freedom would end in disaster.[376] Von Manstein, who had been relieved in March 1944, wrote in his memoir:

> The fundamental issue was between two incompatible conceptions of strategy and grand tactics: Hitler's, which arose from his characteristics and opinions... and those based on the traditional principles and outlook of the German general staff. On one side, we had the conception of a dictator who believed in the power of his will not only to nail down his armies wherever they might be but even to hold the enemy at bay. The same dictator, however, fought shy of risks because of the inherent threat to his prestige and who, for all his talent, lacked the groundwork of actual military ability. On the other side stood the views of military leaders who, by virtue of their education and training, still firmly believed that warfare was an art in which clarity of appreciation and boldness of decision constituted the essential elements.[377]

Guderian echoed this sentiment when considering the fierce fighting for a bridgehead over the Dnieper in December 1943:

> At Nikopol, Hitler wished to exploit the supplies of manganese there available. This was an economic reason for retaining that bridgehead, though a weak one, and, as already seen, the bridgehead was operationally harmful to us. So far as all the others were concerned, it would have been better to give them up and retire behind the broad river line. Thus, reserves could have been built up primarily in the form of Panzer divisions, and with such reserves, that would have become possible to fight a mobile war and pursue an operational plan. However, if Hitler heard the word ‘operational,' he would lose his temper. He believed that whenever his general spoke of operations, they meant

---

[374] B. H. Liddell Hart, *A History of the Second World War* (New York: Putnam, 1971), 492.

[375] Siegfried Westphal, *The German Army in the West* (London: Cassell, 1951), 165.

[376] “Extracts from Hitler’s Speeches and Conferences,” *Liddell Hart Papers* reproduced in Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 460.

[377] Erich von Manstein, *Lost Victories* (Novato, CA: Presidio Press, 1982), 547.

> withdrawals, and consequently, Hitler insisted with fanatical obstinacy that ground must be held, all ground, even when it was to our disadvantage to do so.[378]

Gotthard Heinrici, one of the best defensive generals in the *Wehrmacht*, believed the defeat in the east was due to:

> … one main reason – that our troops were compelled to cover immense spaces without the flexibility in the command that would have enabled them to concentrate on holding decisive points. I doubt whether we could have worn down the Russians by the pure defense, but we might well have been able to turn the balance by more mobile kind of warfare, and by shortening our front so as to release forces that could be used for effective counter strokes... Thus, they lost the initiative permanently... Hitler always made us fight for every yard, threatening to court-martial anyone who didn't.[379]

Other German commanders felt mobile warfare was the only way Germany could regain the initiative and that a static defense would only lead to more deaths and an eventual German defeat.[380] Just as Hitler refused to accept the change on the eastern front and adapt his policies, so too did the Tiger doctrine remain focused on the offensive; as General Inspector of Armored Troops, Guderian never made doctrinal changes to reflect a defensive role.

In the autumn of 1943, two more heavy tank battalions were formed and sent to reinforce Army Group South, and *Großdeutschland*'s heavy company was expanded to battalion size. These units, s.Pz.Abt's 506, 509, and the 3rd Battalion, Panzer Regiment *Großdeutchland*, arrived from August to November 1943, and the reconstituted 501st, which had been destroyed in Africa, was sent to Army Group Center in December.[381] Thus, four of seven Tiger battalions

---

[378] Heinz Guderian, *Panzer Leader* (New York: Da Capo Press, 1996), 323.

[379] Quoted in BH. Liddell Hart, *The Other Side of the Hill* (London: Cassell, 1951), 324-325.

[380] As noted, the German art of war has traditionally regarded war of attrition as anathema. For a discussion on the German generals, see: BH. Liddell Hart, *The Other Side of the Hill* (London: Cassell, 1951), 324-331.

[381] The North African campaign, as well as the Western Front, will be discussed in Chapter Four. For the above dates, see: Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 124-125.

were operating in Ukraine, and the Tiger companies that were assigned to the three SS divisions of II SS Panzer Corps remained as well.[382]

The deployment of the two new Tiger battalions was fraught with complex, poor communication and disarray. The 506th, attached to the 9th Panzer Division, conducted defensive operations which consisted of local counterattacks east of Zaporizhzhia, Ukraine, where the battalion's forty-five Tigers were halted on 20 September, with six tanks damaged and one lost, managed a successful defense on the 22nd and 23rd, and was stopped cold by heavy anti-tank fire on the 24th, losing three Tigers.[383]

A common issue for the 506th and 509th was the piecemeal deployment of the individual companies, as the 503rd had noted at the Battle of Kursk. Major Withing, the commander of the 506th, noted that the battalion suffered significant transportation issues, maintenance deficiencies, and poor coordination with supporting units, especially infantry units, and the impact German propaganda had on the German crews in combat. Where transportation was concerned, any damage to a loading ramp not only increased the time required to unload a Tiger but also delayed train traffic on the line behind the transport. In a preliminary report, he wrote:

> Because of propaganda in the newspapers, the Tiger had been touted as an invulnerable battering ram. But it can be knocked out by T-34 tanks or 7.62 cm anti-tank guns from the front at ranges of up to 500 meters, and from the side and rear, it ranges of up to 1500 meters…Extensive propaganda in the newspapers touts the Tigers as being invulnerable and pure life insurance, so the higher command, as well as simple infantry, must believe that they can continuously accomplish anything with this fortress. But this is not so. From the many direct hits on the Tigers, comparatively few penetrations were achieved. But many Tigers were immobilized; however, the crews usually remained protected…after the 7th day, not a single Tiger remained operational. Six were shot up, burned out,

[382] The II SS Panzer Corps was ordered to withdraw in preparation for a move to Italy to defend the 'soft underbelly' after Operation Husky on July 9-10, but due to Soviet offensives by Southwestern and Southern Fronts, 1st SS "*Leibstandarte"* gave its heavy equipment to *Das Reich* and *Totenkopf*, who raced southward to defend against the Soviet offensives. See: David Glantz and Jonathan House, *The Battler of Kursk* (Lawrence, KS: University Press of Kansas, 1999), 223.

[383] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 268.

> exploded, and were written off. Even the Tiger can be wounded and must be tactically employed the same as the other Panzers if it is to be successful and have few losses. It should be employed as a concentrated unit and not dispersed in a broad front along the main battle line. When because of the situation that Tigers have to be dispersed, the Tiger behind cover in hull-down positions is superior to any approaching opponent. However, by charging into enemy territory with a few Tigers, they can be easily lost to the concentrated fire of the enemy defensive weapons and captured. In this case they will have to be sacrificed due to propaganda.[384]

The experience of having a battalion transferred from one hot spot to another across a large front, which reduced time for desperately needed maintenance, was shared by the 509th. Its commander, Major Kurt Gierga, complained that the inefficiency of the transport trains had scattered elements of the 509th across the southern Eastern Front such that it was impossible to know where his battalion was located. Once the battalion was consolidated, it was ordered into heavy defensive fire at a bridge near Ustinovka, with four Tigers out of action due to damage to the tracks and gun and two suffering armor penetrations. Further, as the battalion was shifted from one division to another on the orders of OKH, it became necessary to give the crews medication to prevent them from falling asleep.[385]

The Tigers were still, at this point in the war, difficult to destroy outright. But the Soviets had discovered that even if they could not kill the Tiger, they could cripple it. The gunners in tanks and who manned anti-tank guns targeted the tracks, running gear, and vision slits in the Tiger, which proved to be nearly as effective at negating their effectiveness as an outright kill.[386] The vehicle's internal communication system was also flawed, as external hits could render the system inoperable. Major Withing complained, in his 30 September report, that "the driver could

---

[384] Major Withing, “Preliminary Experience Report for Tiger Abteilung 506,” 30 September 1943 reproduced in Thomas Jentz, *Germany’s Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 135-137.

[385] Major Gierga, “Report to Army Group South,” reproduced in Thomas Jentz, *Germany’s Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 139-142.

[386] Ibid, 139-142.

no longer be directed by the commander, which made command extraordinarily difficult because the Tiger had to halt, and the engine switched off each time the commander needed to redirect the driver.[387] Such deficiencies, in combat, could often be costly ones. In an environment where communication is critical, tank crews left unable to act upon their commander's orders were rarely able to maintain combat efficiency.

In the north, the 502nd had been conducting operations around Leningrad since August 1942. In near constant action, the battalion had destroyed nearly seventy Soviet tanks while suffering substantial losses to its own crews, particularly those in the Panzer III. While 502nd had suffered maintenance issues as well, the majority of the Tigers were able to be recovered despite several Soviet offensives intended to relieve Leningrad. The combat history of the 502nd noted the frequent dispersal of its companies throughout the 18th Army, as would take place in the southern portion of the Eastern Front, and frequent employment as a single Tiger without infantry support.[388] During the 2nd Mga Offensive, despite difficulties in tactical deployment, the Soviets failed once again to break the Siege of Leningrad, and the 502nd claimed over 100 tanks destroyed.[389]

By early 1944, the Germans were facing offensives across all fronts. In the north, Army Group North planned for a tactical withdrawal to the "Panther Line," which generally ran south from Narva to Pskov in the north, through Vitebsk to Gomel in the center, through Kiev, Dniepro

[387] Major Withing, "Preliminary Experience Report for Tiger Abteilung 506," 30 September 1943 reproduced in Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 135-137.

[388] Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 77.

[389] Ibid, 77.

and to Mariopol in the south.[390] Otto Carius was stationed along the "Rollbahn Line," a stretch of railway between Tosno, Lyuban, and Chuovo, roughly halfway between Leningrad and Novgorod. Carius remembered:

> We were standing in the open and noted that our tanks were rolling towards us on the Rollbahn over the high ground. When I identified the first tanks more clearly, I was startled. Infantry was sitting on them. Binoculars out - yes, indeed, the Russians were personally paying their respects. As fast as lightning, everyone was back in his seat, but they didn't even take notice of us. They probably thought we were a knocked-out vehicle and weren't counting on enemy contact. Just as I wanted to call out open fire my driver lost his nerves and attempted to move out. The first Russians were no more than sixty meters away from us. Just in the nick of time, Clajus, my gunner, cleaned their clock with a round between the turret and the hull. The tank turned into the ditch and smoldered. There are no more signs of life from the crew. Clajus was occupied with the remainder of the enemy tanks. They ran into one another in a wild panic, turned around, and didn't think at all about initiating a fight with us. Only two of the twelve T-34's escaped our fire… despite all precautions and despite all attempts to seal them off, the Russians had succeeded in continuing to infiltrate our front to the old gap. They had built a long thin 'pipeline' through which they pumped more and more men and materiel. With our weak forces, we were not in a position to seal off this penetrated area, cut off the Russians, and eradicate the ensuing pocket. The danger became greater every day that the ''pipeline' would burst and that the Russians would encircle us. That was the question that was often asked during the Russian campaign: 'Who is encircling whom?' We were therefore withdrawn to the west in order to prevent any further advances from out of the 'pipeline.' The terrain was simply not suited for tankers. We reached the train station before its demolition. We loaded up and steamed off in the direction of Gatschina. The great haste didn't bode well when we arrived. We discovered the sad details of the destruction of our 1st Company. It had been surrounded on the Rollbahn by Russian tanks. Lieutenant Meyer's platoon was almost completely annihilated. Meyer himself put his pistol to his head when the Russians tried to take him prisoner.[391]

Despite all efforts to withdraw to more tactically sound positions, Hitler forbade giving the Russians a single inch of ground. He was fully committed to his policy of no retreat, but the Soviets were pushing the Germans back regardless of Hitler's wishes. The Leningrad-Novgorod

---

[390] Alastair Noble, "The Phantom Barrier: Ostwallblau 1944-1945," *War in History* no. 8, vol. 4 (2001), 442-467.

[391] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 33-43.

Offensive from January to March 1944 lifted the eight-hundred-seventy-two-day siege and led directly to the Battle of Narva, a contest for control of the Estonian Narva Isthmus, which is bordered by Lake Peipus on the south and the Gulf of Finland to the north.[392] Walter Model, who replaced Field Marshall Georg von Küchler as commander of Army Group North, convinced Hitler the Army Group should create a defensive line on the west bank while holding a strong bridgehead at Ivangorod, a town across the river from the city of Narva.[393] During the offensive, the Soviets managed to capture Narva, but the 502nd destroyed over fifty tanks, a large number of anti-tank guns, and heavy equipment and shattered the Soviet infantry.[394] The Germans reduced several bridgeheads over the Narva River, and in their prepared defense at the Tannenburg Line, they stopped the Soviet advance and stabilized the front until 10 August, when the Soviets halted the offensive.

In six months of near-continuous fighting, the 502nd was instrumental in preventing Soviet breakthroughs at various bridgeheads along the Narva River.[395] The Tigers were often used to conduct local counterattacks against the Soviet bridgeheads and were successful at preventing their widening through the use of skillful flanking maneuvers that allowed them to get behind enemy guns before they were emplaced.[396] However, the Tigers were once again

[392] Grigory Krivosheev, Vladimir Andronikov, and Petr Burikov, *Russia and the USSR in the Wars of the Twentieth Century* (Moscow: Veche, 2010), 310-320.

[393] Kenneth Estes, *A European Anabasis – Western European Volunteers in the German Army, 1940-1945* (New York: Columbia University Press, 2001), 177–216.

[394] Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 80-81.

[395] Mart Laar, *Estonia in World War II* (Talinn: Grenadier Press, 2005), 32-59.

[396] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 101.

deployed in a manner not considered doctrinal. The majority of the battalion was at Pskov, where other Soviet offensives required heavy tanks.

The Soviet armor was no longer inferior to the Tiger. The combat diary of the 502nd mentions several occasions where Tigers are knocked out at range by ISU-152, a self-propelled casemate-type assault gun based on the IS-2 hull.[397] As a result, the Tigers began to suffer more significant casualties among both men and machines, and the Tiger had difficulty penetrating the sloped armor of IS series vehicles.[398] Additionally, as the ISU-152 could be employed as self-propelled artillery, the Germans were forced to disperse their vehicles in a wider assembly area which inhibited reaction time to Soviet attacks.[399] However, new Soviet armor and a shift in procedures did not affect the Tiger's effectiveness against the Soviets, as between 23 February and 26 September, the battalion was recognized for the destruction of its five-hundredth and one-thousandth tank.[400]

The remainder of the German army notwithstanding, the Tigers were as successful as could be expected given the circumstances. As always, maintenance was an issue, and the degradation of conditions on the Eastern Front, as well as a high operational tempo for extended periods, inevitably led to mechanical breakdowns. The 502nd often had more Tigers on hand than the table of organization called for – on 19 April, the combat dairy claimed seventy on hand, but

[397] Anthony Tucker-Jones, *Stalin's Armour, 1941-1945: Soviet Tanks at War* (Barnsley, UK: Pen & Sword Military, 2021), 207.

[398] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 177.

[399] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 100-101.

[400] Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 80-88.

only nineteen operational – which allowed the maintenance crews to keep as many Tigers operational as possible by scavenging from severely damaged ones.[401]

A measure of the Tiger's success can be ascertained by Soviet propaganda, some of which was based on intelligence gathered from the German's tank-to-tank radio communications. Just as propaganda had been used to stiffen German morale on the home front, Soviet propagandists encouraged Germans to 'help' them shorten the war. Otto Carius wrote that his company commander, Lieutenant von Schiller, whom he had known since his arrival at the Training Battalion at Paderborn, chastised him for not following radio protocol. He recalled:

> I couldn't or simply didn't want to get used to the silly code names. During an operation, was I always supposed to radio, 'Nightcap, this is Wood Grouse' and similar messages? Our men felt a whole lot better when they were addressed with their real names. I naturally made use of the code names when radioing the battalion and the supply point. With the men up front, however, I had addressed and continued to address them with their real names…Naturally, the Russians listened in. Because of transmissions in the clear, they knew right away that wherever the Tigers showed up, there were also always the same men. One time, for instance, they announced via a loudspeaker unit that our infantry should hand me over to them. They would receive their choice of thirty soldiers in return. They demanded that our men defang the 'bloodhound' that was forcing them to hold out…After I was wounded at Dünaburg, the Russians announced over the radio that I had been killed. The Soviet officer who delivered the lost map board with my name on it to prove his success was decorated.[402]

The Tigers were also used to break through small encirclements in a manner that resembled their doctrinal use. One report from 7 April 1944 outlined a mission to support the 8th Jäger Division that was in danger of being encircled by infantry supported by artillery and approximately thirty-five tanks and assault guns at Vidrino, a village south of Pskov.[403] If successful, the Soviet attack

---

[401] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 81; Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 80-88.

[402] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 79-80.

[403] Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 81.

could penetrate to Pskov or Ostrov within an hour, depending on their mission objective.[404] Two Tigers were initially dispatched, with a third joining half an hour later; one Tiger knocked out fifteen tanks, the second Tiger claimed seven, and the third managed one before being knocked out by an ISU-152.[405] This action both relieved the 8th Jäger Division, but also decisively defeated the Soviet advance. Operations of this type were typical in the northern sector of the Eastern Front, as the Soviets launched successive campaigns with little time to reorganize and refit. The Soviets were capable of launching offensives, but their assaults were akin to a sledgehammer and were often based solely on the use – and waste – of their significant manpower reserves. The Soviets made gains, but the Germans made them pay heavily for anything gained.

The End on the Eastern Front

By mid-1944, every Tiger battalion on the Eastern Front was used to blunt Soviet offensives to negligible effect. In May, the 503rd had been removed from the front for a complete refit, as most of its tanks had been lost in the Hube pocket or handed over to the 509th.[406] This left the 506th, 507th, and 509th – as well as the III Battalion of *Großdeutschland* assigned to Army Group South.[407] The 501st, which had been reformed after its surrender in Tunisia in May 1943,

---

[404] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 102.

[405] Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 81.

[406] Alfred Rubbel, "The Battalion Receives the King Tiger," in Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 253.

[407] Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 270, 297, 350-351. The 507th is covered in Helmut Schneider, ed., *Tiger Battalion 507* (Barnsley, UK: Pen & Sword Books, 2020), 6-20.

was attached to Army Group Center alongside the 505th.[408] The 502nd remained in the north, outside Narva and Pskov, attached to Army Group North.[409]

The Tiger had, by May 1944, been in production for 22 months; during that time, the Tiger had forced the Allies to develop larger guns and more powerful tanks to counter the Tiger, just as the Tiger had been rushed into production to counter the appearance of the Soviet T-34 and KV-1 in 1941. The Soviets were unsuccessful at developing a vehicle that could kill a Tiger at ranges that exceeded the Tiger's lethal envelope, but with the development of the T-34/85 medium, which was faster, lighter, and more maneuverable than the Tiger, and the JS-2 heavy, with a 122mm D-25T gun capable of penetrating the Tigers frontal armor at 1200 meters, the kill envelope was tightened significantly.[410]

While the Tiger was in the early phases of production, *Wa Prüf 6* decided a larger tank was needed that incorporated sloped armor and a more powerful version of the 88mm gun.[411] As with the Tiger I, Tiger II development was pursued by both Porsche and Henschel, with a turret and new 8.8 cm gun designed and produced by Krupp.[412] Henschel eventually won the contract,

---

[408] See: Wolfgang Schneider, *Tiger in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 46; Dale Richard Ritter,ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 224.

[409] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 81-83.

[410] Soviet testing concluded that the D-25 could penetrate the front armor of a Panther at 2500 meters, the Tiger's turret at 1000-1500 meters, and the Tiger's front plate at the weld joints at 500-600 meters. *Wa Prüf* 1 produced a report indicating the JS-2 could penetrate a Tiger from 500 to 1500 meters, while the Tiger could penetrate the JS-2 frontal armor, with a 30-degree slope, at 100 to 300 meters. See: GABTU, "Comparative Penetration," *Central Archive of the Ministry of Defense of the Russian Federation* (CAMD 38-11355-2375), Podolsk, Russian Federation. https://andrewbek-1974.livejournal.com/120699.html, accessed 31 July 2022; Thomas Jentz and Hilary Doyle, *Tiger I Heavy Tank 1942-1945* (Oxford: Osprey Publishing, 1993), 19-20.

[411] Walter J. Spielberger and Hilary Doyle, *Tigers I and II and their Variants* (Atglen, PA: Schiffer Military History, 2007), 106.

[412] There are two easily recognizable turrets for this tank, one with a rounded front and curved mantlet and one with a flat face and mantlet. Having discovered the rounded mantled created a 'shot trap,' where deflected shells were directed downward and often damaged the turret ring, immobilizing the turret; the rounded, so-called "Porsche" turret was only used on fifty tanks, whereas the flat-faced, "Henschel" turret was used on the remainder.

and the design had technical innovations such as a powered turret traverse that could rotate the turret at 36 degrees per second and had a control lever that allowed for precise control – 0.1 degrees per second – without having to use the hand wheel, as a gunner in a Sherman or T-34 would.[413] This combination resulted in a very accurate weapon with significant penetration power. The *Turmzielfernrorh* 9d (turret telescopic sight) produced by Leitz allowed a 2.5x magnification with a width of 444 meters at 1000 meters distance, and the gunner could adjust the focus.[414] In tests, it was found that when the gun fired an armor-piercing *Panzergranate* 39/43 shell, it could achieve penetration of 202mm at 100 meters and 132 mm at 2,000 meters against a slope of 30 degrees, the same slope as the JS-2 heavy tank.[415]

However, the tank had several severe defects. It used the same engine as the Tiger I, which had already been underpowered. This situation was exacerbated by the 70-ton weight of the Tiger II, compared to 57 tons of the Tiger I.[416] The steering gear, a Henschel L-801 Double Radius, was prone to failure if used by an unskilled or poorly trained driver.[417] Further, the engine had significant defects in its gaskets and seals and its transmission; the drivetrain had

---

As noted above, neither Henschel nor Porsche were involved in producing the turrets; they were Krupp's. Further, the 8.8 cm Kw.K 43 L/71 produced by Krupp appeared similar to the 8.8 cm KwK produced by Rheinmetall, they had vastly different technical specifications. See: Thomas Jentz and Hilary Doyle, *Germany's Tiger Tanks: VK45.02 to Tiger II, Design, Production & Modifications* (Atglen PA: Schiffer Military History, 1997), 20-22; Thomas Jentz and Hilary Doyle *Kingtiger Heavy Tank, 1942-1945* (Oxford: Osprey Publishing, 1993), 8-9.

[413] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 23.

[414] Thomas Jentz and Hilary Doyle, *Germany's Tiger Tanks: VK45.02 to Tiger II, Design, Production, and Modifications* (Atglen, PA: Schiffer Military History, 1997), 42-43.

[415] Thomas Jentz and Hilary Doyle *Kingtiger Heavy Tank, 1942-1945* (Oxford: Osprey Publishing, 1993), 23-24.

[416] Thomas Jentz and Hilary Doyle, *Germany's Tiger Tanks: VK45.02 to Tiger II, Design, Production & Modifications* (Atglen PA: Schiffer Military History, 1997), 162-165.

[417] Thomas Jentz and Hilary Doyle *Kingtiger Heavy Tank, 1942-1945* (Oxford: Osprey Publishing, 1993), 11.

been designed with a 40-ton vehicle in mind, and it was powering a 70-ton tank.[418] Dr. Erwin Aders, the head of Henschel's design office, identified the source of many problems and recorded:

> In February 1943, *Wa Prüf* 6 required thorough compatibility between the Tiger B and the Panther II, which was also in development by MAN, Nuremberg. The highest possible number of complete components were to be exchangeable. Meetings were held, and a designer from Henschel worked for a while at MAN. What was achieved was that the following components…[went into the Tiger B from the Panther II] the engine cooling system, engine compartment, transmission ventilation, fuel system, ventilation for the engine exhaust pipes, engine compartment deck, engine exhaust system, and turret hydraulic drive… the inherited components taken over in this way turned out to be disastrous in spite of assurance by *Wa Prüf* 6 specifying that only tested improvement designs be used… the numerous joints in the lines of the fuel system and the positioning of the filler tank presented problems, primarily overheating, fuel evaporation, and fires. The cause was partially in the unsuitable seals, partially in the standard connectors, which had been adopted from the aircraft industry, and finally in the considerable number of connections - about 180 - that had to be reduced to around 60 by diverting from the use of standard parts and other measures.[419]

Lastly, the main disadvantage of the tank was the cost to produce, operate, and maintain the vehicle. As it did not enter production until mid-1944, the Tiger II was a monumental burden on a collapsing German economy. Each tank required over 200,000 manhours to produce and cost over 800,000 Reichsmarks – the equivalent of over $5 million in 2022 US dollars.[420] This cost eclipsed even the exorbitantly expensive Tiger, which had a cost of 250,700 Reichsmarks.[421] From an operational perspective, the Tiger II had a range of 170 kilometers on the road and 120

---

[418] Ibid, 34.

[419] Dr. Erwin Aders, "Anmerkungen zu Tiger B, February 1945," reproduced in Thomas Jentz and Hilary Doyle, *Germany's Tiger Tanks: VK45.02 to Tiger II, Design, Production & Modifications* (Atglen PA: Schiffer Military History, 1997), 64-68.

[420] Inflation calculator provided by Amortization.org https://www.amortization.org/inflation/amount.php?year=1944&amount=300000

[421] Steven Zaloga, *Armored Champion: The Top Tanks of World War II* (Mechanicsburg, PA: Stackpole Books, 2015), 39.

cross country on a tank of 860 liters of fuel; its Soviet cousin, the IS-2, had a range of 540 kilometers on the road and 210 kilometers cross country on a tank of 820 liters.[422] Germany could no longer afford the Tiger II's appetite, but the Reich was convinced that the Tiger II could change the course of the war.

There was little strategic change in the deployment zones of the s.Pz.Abt. between March and April 1944. However, in early-to-mid June, some changes were made, mainly on the Western Front. The most notable change was the addition of the 510th, the last new heavy battalion to be organized, and the addition of Tiger II tanks.[423] This period marked both the extent of heavy tank battalion expansion and the greatest availability of Tigers as replacements in the battalions. It also marked the beginning of constant defensive operations, with notable exceptions.

On 22 June 1944, three years after Hitler launched Operation Barbarossa, Stalin launched Operation Bagration against Army Group Center.[424] Prior to the operation, Soviet *maskirovka* (deception) strategies as part of their Deep Battle doctrine had convinced Hitler that the next major offensive was to fall against Army Group North Ukraine (the renamed Army Group South), and OKH redeployed significant forces from Army Group Center to counter this attack:

---

[422] Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, 1943-1945* (Atglen, PA: Schiffer Military History), 294-295.

[423] Due to the low production numbers of the Tiger II, most battalions never received a full complement of forty-five tanks, used a mix of Tiger I and II, or never received any Tiger IIs. For example, when the 503rd was pulled off the front for rest and refit in May, it returned to the Eastern Front in June 1944 with twelve Tiger IIs (Battalion Command and 1st Company) and thirty-three Tiger I's (2nd and 3rd Companies). Battalion 510 was sent to the front in June with forty-five Tiger I's, and while records are incomplete, it is not likely the battalion received any Tiger II tanks. See: Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, 1943-1945* (Atglen, PA: Schiffer Military History), 170-171; Alfred Rubbel, "The Battalion Receives the King Tiger," in Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of German Tiger Tank Battalion 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 253.

[424] Anthony Tucker-Jones, *Stalin's Revenge: Operation Bagration & the Annihilation of Army Group Center* (Barnsley, UK: Pen & Sword Military, 2009), 4-5.

almost all of its tanks, half its tank destroyers, and over a quarter of its artillery were redeployed south.[425] The head of *Fremde Heere Ost*, Colonel Reinhard Gehlen, assessed there would be Soviet offensives on every single sector of the front but emphasized the threat to Army Groups North Ukraine and South Ukraine. After the war, he recalled:

> By the spring of 1944, the military situation on the eastern front was so gloomy that I felt safe to supply our long-term intelligence digest only and sealed envelopes to other leading members of the general staff and to Major Baun [in charge of espionage operations in the Soviet Union]. I had to ask them not to show the reports to anyone else and to return the documents to me, 'in view of the way the enemy position is viewed therein.'[426]

The intelligence prompted a shift in the heavy tank battalions as well; the 501st sent nine Tigers to the 509th to ensure it was at full strength, leaving it with twenty Tigers, and the 505th was redeployed to Army Group North Ukraine.[427] This left only an understrength 501st with Army Group Center.

The offensive prompted the immediate deployment of the 501st near Orscha in eastern Belarus, a town situated near the crossroads of Mogilev in the south, Smolensk in the east, Vitebsk in the north, and Minsk in the west. There are few records of the first few days, but there was fierce fighting on the 23rd, which caused the battalion to withdraw. During this withdrawal, a bridge over the Oscha (Orsjitsa) River northeast of the junction collapsed with Tiger 201 on it,

---

[425] A thorough examination of the Soviet 'deep battle' and its practice of *maskirovka* may be found in Brigade Commander Georgii Samilovich Isserson, *The Evolution of Operational Art* (Fort Leavenworth, KS: Combat Studies Institute Press, 2013).

[426] Reinhard Gehlen, *The Service: The Memoirs of Reinhard Gehlen* quoted in Anthony Tucker-Jones, *Stalin's Revenge: Operation Bagration & the Annihilation of Army Group Center* (Barnsley, UK: Pen & Sword Military, 2009), 4-5.

[427] The 501st 'donation' can be found in Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2000), 46; Disposition of the 505th can be found in Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 211.

and several other Tigers were immobilized due to a lack of fuel.[428] In other sectors, the 501st was committed Tigers to the 14th Infantry Division and the 78th Sturm Division.[429] Tigers in these sectors fared little better, and despite receiving five replacement Tigers at Molodetschno, the battalion lost its last Tigers in fighting on 5 July.[430] In fourteen days, the 501st was annihilated.

During this period, the battalion reported the destruction of only four T-34s, but due to the battalion's dispersal, reports to the battalion were sporadic. This rapid collapse, not of just the 501st but the entirety of the Army Group Center, led OKH to relocate two battalions to Army Group Center. The 507th was transferred to Baranovicze, in east central Belarus, while the 505th was deployed at Tolotschyn (Talachin) Belarus, west of Orscha; the destination was changed several times due to Soviet advances, and the battalion ended up dispersed along a sixty-four-kilometer stretch.[431]

The 505th was responsible for containing the Soviet advance along the axis of the Minsk-Moscow highway, including maintaining bridgeheads over the Bobr and Beresina Rivers. 1st Company was deployed near Krupki and destroyed sixteen Soviet tanks on the 27th, and a further seventeen on the 28th, at the cost of three Tigers. On the 29th, the 1st Company was encircled while conducting blocking actions and lost three tanks, but the company was relieved by the battalion and was withdrawn across the Beresina near Bolunho-Lody. During this same time, the

---

[428] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2000), 46

[429] Steven Zaloga, *Bagration 1944: The Destruction of Army Group Center* (Oxford: Osprey Publishing, 1996), 50-59.

[430] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2000), 46.

[431] The battalion had been scheduled to detrain in Orscha, but the tactical situation there dictated a change in itinerary. Further changes dictated detraining at Bobr, then Pryamino (Priyamino). Dale Richard Ritter, ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 227, 230; details of the deployment of the 507th can be found in Helmut Schneider, ed., *Tiger Battalion 507* (Barnsley, UK: Pen & Sword Books, 2020), 117.

3rd Company contained Soviet advances near Ssloboda and destroyed seventeen tanks, to the loss of three Tigers.[432]

During the first week of July, the 505th engaged in further blocking actions and supported defenses against the Soviet advance. By the 6th, however, the advance westward had grown from a walk to a run, and the battalion could no longer keep up recovery operations as it moved further westward. On the 7th, the Soviets broke through and overran the railway, leading to the destruction of one prime mover and several Tigers.[433] On the 9th, the remaining Tigers and men of the 505th arrived in Grodno; the combat journal claimed the battalion destroyed one hundred twenty-eight Soviet tanks in twelve days.[434]

From 2 July to the 10th, the 507th conducted operations from Baranovicze. During the fighting, which included blocking actions similar to the 505th and the rescue of Hungarian prisoners, the battalion was slowly forced back to Slonim, fifty-four kilometers to the west.[435] By the 5th, ground had been regained, and the battalion was once again at Baranovicze. However, the same day, significant Soviet artillery and air raid barrages forced the front to be pulled back twenty kilometers, and German forced in Minsk were encircled; *Oberschütze* Anton Seefried noted in his journal:

> We came to a village where it was quiet all day. In the afternoon, we entered a neighboring village where all cattle were slaughtered in expectation of our being

---

[432] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2000), 232.

[433] Dale Richard Ritter,ed., *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2019), 238.

[434] The combat journal does not specify the number of Tigers that survived the retreat; however, Wolfgang Schneider claims thirty arrived in Grodno. See: Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2000), 233.

[435] Helmut Schneider, ed., *Tiger Battalion 507* (Barnsley, UK: Pen & Sword Books, 2020), 117.

> surrounded. When we returned to 'our' village, it had just been ravaged by aircraft, and half of it was in flames.[436]

The battalion was encircled near Slonim and, on the 8th, forced a breakout to Slonim. After four additional days of fighting, the battalion was withdrawn to Ulezly, seventy kilometers west of Slonim, and by the 15th, the battalion was a further seventy-three kilometer west, at Podozierany, Poland. By the 19th, the end of Bagration, the battalion was conducting operations to maintain bridgeheads over the Narew River west of Bialystok, Poland, and over the Loknica River near Trezeszczotki, Poland.[437] From the 2nd to the 20th of July, the 507th had withdrawn two hundred seventy-six kilometers, but unlike the 505th, they were not taken off the line for a refit; the 507th maintained no fewer than thirty-eight Tigers for the duration of July, often over forty operational during August, and fell to a low of twenty-two on 11 September.[438] The 507th would conduct successful defensive operations around the Narew River. They forced several bridgeheads, which allowed retreating Germans safe crossing. Lieutenant Gerd Eychmüller, a *Zugführer* in 1st Company, wrote in his diary:

> After approximately two months of defensive battles in the Army Group Center's sector, we had so dampened down the Russians' strength that, at first, they gave up the idea of launching out from their two strong bridgeheads at Rozan and Nasielsk on the Narew River north of Warsaw. Panzer Battalion 507 was, therefore, able to spend four weeks recuperating from the strain of fighting these endless retreats and to 'lick its wounds.' On 4 October 1944, we began the attempt to crush and, if possible, eliminate entirely the bridgeheads on the River Narew. That day the Tiger of my company commander, *Oberleutnant* Beilfuss, was hit, killing the driver while the commander himself was seriously wounded and had to be transported to a military hospital... There now followed five full days of operations, details of which I no longer remember except on 5 October my former commander, *Hauptmann* Neumeyer, lost his life, and a Panzer in first platoon was destroyed when a round from a SU-152 self-propelled gun tore off the turret of his

---

[436] Anton Seefried, "Diary of Anton Seefried," reproduced in Helmut Schneider, ed., *Tiger Battalion 507* (Barnsley, UK: Pen & Sword Books, 2020), 120-121.

[437] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2000), 298-299.

[438] Ibid, 299-300.

> Panzer… even though we and the other units with which we were deployed failed to crush the Narew bridgeheads, and despite our fairly high losses in men and material, we inflicted such heavy casualties on the enemy that for the remainder of 1944 he decided not to attempt any advance any further westward.[439]

The three heavy tank battalions that participated in defending against Operation Bagration could not have been expected to blunt the Soviet offensive. Karl-Heinz Freiser estimated the Soviet strength at 2.5 million men, 6,000 tanks and assault guns, and 45,000 guns, rocket launchers, and mortars.[440] From 22 June to 19 August, the Germans lost twenty-eight of thirty-four divisions, suffered 450,000 casualties, and had a further 300,000 encircled in the Courland Pocket.[441] Even if all three battalions had been at full combat strength, little could have been accomplished against an enemy with such vast numerical superiority.

Helmut Schneider, himself a commander of 1st Company, wrote, "the soldier in the field had felt for some time that the Eastern Front was like a growing child's shirt: too short in the back if you pulled it down in the front, and vice versa."[442] The Tiger battalions were pulled in such a way, from one defensive position to the next, from one emergency to another, and they attempted to halt the Soviets long enough to allow as many German forces as possible to escape captivity or death. This pull had, to Schneider, become much more acute both after the

---

[439] Gerd Eichmüller, "Impressions of Sixteen Days of Operations," reproduced in Helmut Schneider, ed., *Tiger Battalion 507* (Barnsley, UK: Pen & Sword Books, 2020), 175-178.

[440] Karl-Heinz Freiser, Klaus Schmidt, Klaus Schörner, Gerhard Schreiber, Kristian Ungvary, and Bernd Wegner, *Die Ostfront 1943/44: Der Kreig im Osten und an den Nebenfronten* (München: Deutsch Verlags-Anhalt, 2007), 534.

[441] Alex Buchner, *Ostfront 1944: The German Defensive Battles on the Russian Front, 1944* (Mechanicsburg, PA: Schiffer Publishing, 1995), 212; Karl-Heinz Freiser, Klaus Schmidt, Klaus Schörner, Gerhard Schreiber, Kristian Ungvary, and Bernd Wegner, *Die Ostfront 1943/44: Der Kreig im Osten und an den Nebenfronten* (München: Deutsch Verlags-Anhalt, 2007), 661; Werner Haupt, *Heeresgruppe Nord: Der Kampf im Nordabschnitt der Ostfront 1941-1945* (Eggolsheim, Germany: Dörfler Verlag, 1967).

[442] Helmut Schneider, ed., *Tiger Battalion 507* (Barnsley, UK: Pen & Sword Books, 2020), 190.

Normandy landings and the later Ardennes Offensive, where troops from the Eastern Front were relocated to take place in the failed offensive against the Allies.[443]

Conclusion

In just over two years of fighting, the Tigers had proven themselves to be ruthlessly efficient at destroying Soviet armor on the offense and defensive; they were able to slow or halt Soviet advances, maintain bridgeheads for retreating units, and extricate themselves from encirclements if allowed the tactical flexibility to do so. At the Battle of Narva, for example, the 502nd, along with other German forces, were able to hold the Soviet Leningrad Front from entering Estonia from February to August 1944.[444] This is misleading in itself, as once the Soviets had pushed the Germans back at Narva, Army Group North, with the 502nd and 510th, became trapped in the Courland Pocket and repelled six Soviet offensives to clear the Baltic region and restore Soviet borders.[445] The Soviets never advanced further than forty kilometers into the German perimeter, and when the war ended, the Soviets were within a few kilometers of their starting positions.[446]

It must be further noted that the Germans had placed such faith in their heavy tanks the 502nd and 510th sent their respective 3rd Companies out of the encircled pocket by boat from Libau, Latvia, through Danzig to Paderborn, to receive training on the Tiger II. The respective companies then retrieved their Tiger II's directly from the factory (the last twelve to be produced

[443] Ibid, 190.

[444] Mart Laar, "Battles in Estonia in 1944," *Estonia in World War II* (Talinn: Grenadier, 2005), 32-59.

[445] Howard Grier, *Hitler, Dönitz, and the Baltic Sea: The Third Reich's Last Hope, 1944-1945* (Annapolis: Naval Institute Press, 2007), 80-90.

[446] Ibid, 85-87

plus three older, refurbished tanks) in Kassel. This led to immediate defensive operations around Kassel, which was under assault by the Western Allies.[447]

The Tigers were rarely employed according to doctrine on the Eastern Front; as a *schwerpunktwaffe*, they were infrequently employed in a breakthrough, and those that were attempted were not always successful. Even in the same operation, some units would have far greater success than others. Kursk is the best example of this, where the Tiger battalions attached to Army Group South – the numerically inferior German formation at Kursk – had far greater success than Army Group Center, where Tigers were employed in terrain advantageous to the offense.

The Germans failed to make either defensive additions to the Tiger's doctrine or to scrap the Tiger altogether in favor of a more capable, cheaper, and easier-to-maintain defensive weapon in response to the changing situation after the autumn of 1942.[448] Though doctrine did not change, the Tiger battalions were able to adapt the existing offensive doctrine to their defensive needs. The concentration principle, for example, which Guderian had emphasized so heavily, was effective in two areas: in the offense, a concentrated Tiger battalion was a red flag for the Soviets and indicated where the weight of the German offensive was to fall; in the defense, the concentrated Tiger battalion was easier for Soviet armor to bypass, and the concentration generally increased the maintenance and logistic requirements for that sector untenable for the German supply lines.

---

[447] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2000), 89, 377. For the defense on the Western Front, see: Ibid, 92, 379.

[448] The Nashorn was one such example. It was an open-topped, casemate-style, self-propelled tank destroyer that had mounted the 88mm 43/1 L/71 cannon the Tiger II used. It was capable of penetrating 185mm of armor plate on a 30-degree angle at 500 meters, 165mm at 1000 meters, and 132 mm at 2000 meters. Built on the *Geschützwagen* III/IV chassis, the Nashorn was generally free of defects, easy to maintain, and had very few mechanical issues. See: Robert Jackson, *Tanks and Armored Fighting Vehicles* (Bath: Parragon Publishing, 2007), 130; Werner Haupt, *Panzerabwehrgeschütze 1935-1945* (West Chester, PA: Schiffer Publishing, 1990), 39-44.

The Tigers were thus most effective when used as a reserve force rather than the main effort when on the defensive, as the Soviets would be unsure where the heavy tanks would be employed. When dispersed as an individual company attached to the infantry or another Panzer division, they could cover a wider range of the defensive front, particularly in restrictive terrain. The concentration principle certainly would have been effective once the *schwerpunkt* was decisively engaged, but the Tigers should not have been viewed as the *schwerpunktwaffe* but rather as a wedge that forced the breach to open further. From a comparative perspective, an analysis of Soviet deep operations indicated the Soviet theory of tactical deep battle, where multiple points were treated as the focal point, with reserves fully mobilized, and were used to keep the Germans from recognizing their true objectives.[449] Deploying the Tigers in such a manner would not only have masked the German's tactical and strategic objectives but could have prevented tanks that were meant to break through a defensive perimeter from being used in a manner counter to their doctrinal role, their mechanical capabilities, and the logistic realities the Reich faced by 1943.

Moreover, the German's rigid adherence to a doctrine that insisted upon gaining local numerical superiority at a single focal point diminished the Tiger's advantage in firepower. For example, at Kursk, the 505th was assigned as the spear tip for the 2nd Panzer Division, which was not committed to the offensive on the first day. However, the II SS Panzer Corps incorporated a company into their divisional organization, which provided both the Panzer Division and their Tiger *Kompanie* flexibility to react to evolving tactical situations as the battle progressed. While contrary to both established doctrine and Guderian's specific guidance regarding Tiger

[449] Brigade Commander Georgii Samilovich Isserson, *The Evolution of Operational Art* (Fort Leavenworth, KS: Combat Studies Institute Press, 2013), 53-75.

employment, dispersal into company strength rather than battalion strength provided the II SS Panzer Corps with a greater level of “operational art” than established doctrinal guidance.

Chapter Four:

Tigers on the Western Front: North Africa, Italy, and France

> I'm afraid we, I think most people were pretty scared of Tigers, they were remarkable things…we always believed that if you met a Tiger tank, there was no one-to-one thoughts at all. You would need three tanks to fight a Tiger, so that two would be on the flanks trying to find some weaker spots.[450]
>
> -Lance Corporal Reg Hunt, 9th Queen's Royal Lancers

The Tigers involved in fighting in North Africa, Italy, and Western Europe had a much different combat environment than their counterparts on the Eastern Front. By the time the Tigers had been developed, Germany was the master of Western Europe, and the fighting was in North Africa, a front opened by Italy in 1940. With their ally Italy faltering in their attempt to reclaim the territory of the Roman Empire, Germany was inclined to enter to support the Italian war effort against the British.

With one notable exception, the Tigers took part in no major offensives on the Western Front. Thus, not only were the Tigers being used in a defensive role, but they were also subjected to a foe they had little recourse against – air power. American air power made up for what its armored forces lacked, and the Tigers, relentlessly effective at destroying American and British tanks, could not withstand strategic bombing by the American and British forces on the continent.[451]

This chapter will argue that the Tigers were not only rendered wholly ineffective in their doctrinal role, but their defensive role was limited by Allied planners who opted to bypass Tiger

---

[450] Mr. Hunt visited The Tank Museum in Bovington, UK, in 2017, at age 101, to speak of his experiences in the Second World War. He completed his service in 1947 as a Sergeant in Italy. See: Ian Hudson, "North Africa Veteran Reg Hunt Remembers," *The Tiger Collection* (June 2017). Retrieved from https://blog.tiger-tank.com/people/north-africa-veteran-reg-hunt/#:~:text=In%20June%202017%20North%20Africa,the%20Army%20in%20April%201939. Accessed 24 August 2022.

[451] Ian Gooderson, "Allied Fighter-Bombers versus German Armor in North-West Europe 1944-1945: Myths and Realities," *Journal of Strategic Studies* vol. 14, no. 2 (1991), 210-231.

battalions wherever possible. Both Tiger I and II had little to fear from Allied armor in Italy, France, or North Africa, but they made easy targets for bombers. Further, their armor and firepower inspired the development of more heavily armed and armored tanks, which were effective against the Tigers and the other Panzers fielded by the German Army from 1943-1945. Additionally, when the Tigers were used in localized counterattacks, they were met by the Allied technique of deploying minefields with overwatching anti-tank guns and artillery. This practice allowed the Tigers to be countered appropriately without having to use tanks that the Tigers were easily able to destroy. Moreover, the introduction of handheld anti-tank weaponry allowed the British and American infantry to counter the Tiger effectively. Lastly, the Tigers' ineffectiveness was exacerbated by the German economy, as the Reich could neither afford to produce new Tigers nor logistically support their efforts, though they were prepared to attempt such at the cost of other production sectors.

This knowledge did not alter Albert Speer's opinion of the Tiger, when, despite an intimate understanding of the realities facing the Reich, he stated, "With ten Tiger IIs, you can compete against 200 Shermans…you see that in itself, the Tiger II has threefold the weight of the Panzer IV but also has about twenty times the combat value."[452] Speer justified the Tiger as combat effective to boost crumbling morale, and despite knowledge that economically Germany was defeated, Speer continued to argue that even tactical superiority could prolong the war – a local superiority the Tiger had proven capable of providing. But this ability to project tactical superiority on the ground could not compete with the Allied strategic superiority in the air. Speer recognized that Germany had doomed itself through resistance to superior tactics, but he was

[452] Albert Speer, "Speech Comparing Industrial Production," 1 December 1944, *Records of the Reich Ministry for Armaments and War Production*, National Archives Microfilm Publication T73, serial 180, roll 180, item RmfRuk 1701, Captured German Records Collection, National Archives College Park Maryland.

unable to force the cancelation of the Tiger program because the tank itself was now a symbol of German resistance against its ideological enemies.[453]

North Africa

By the fall of 1942, the war in North Africa was going poorly for the Axis. The British victory at El Alamein and the Allied landing in Morocco and Algeria backed Rommel's *Afrikakorps* into a corner in Tunisia, where ports allowed the Germans to receive supplies they required for defensive operations. Though German intelligence had discounted the possibility of Allied landings in territory held by the Vichy French – who were neutral – the Torch landings had commenced on 8 November 1942.[454] Hitler considered North Africa to be vital to the war effort, and he ordered the deployment of s.Pz.Abt 501 to the North African theater.[455]

The campaign had not been doomed to the failure it faced in late 1942. Rommel's drive in July to El Alamein, sixty-five miles from Alexandria, had been one of the darkest moments of the campaign for the British. However, Hitler had a corporal's understanding of warfare, and as he was unskilled in military theory, he failed to capitalize on Rommel's success. American journalist and war correspondent William Shirer argued:

> …He awarded the daring leader of the Africa Korps a Field Marshall's baton, but he did not send him supplies or reinforcements. Under the nagging of Admiral Raeder and the urging of Rommel, the Führer had only reluctantly agreed to send the Africa Korps and a small German Air Force to Libya in the first place. Nevertheless, he had done this only to

---

[453] Eric Muirhead, "The Tiger Gap: Culture Contradiction, and Clausewitz in German Armored Warfare in World War II." *University of Tennessee* (2019), 69. Accessed 15 November 2021. https://trace.tennessee.edu/cgi/viewcontent.cgi?article=6850&context=utk_gradthes

[454] David Walker, "OSS and Operation Torch," *Journal of Contemporary History* vol. 22, no .4 (1987), 667-679.

[455] Hitler's ambitions led him to openly speak of a pincer movement spanning from central Russia to the Suez, with India as the ultimate goal, even prior to Barbarossa. However, he was surprised Rommel had managed to drive nearly to the Egyptian border. See: John Toland, *Adolf Hitler volume II* (Garden City, NY: Doubleday and Company, 1976), 748, 754.

> prevent an Italian collapse in North Africa, not because he foresaw the importance of conquering Egypt.[456]

Cicero wrote, “Armies are of little value in the field unless there is wise counsel at home.”[457] There was little wise counsel to be found in Hitler or his sycophants in High Command. By the time Hitler realized the importance of North Africa, the Americans had landed in Algeria and Morocco. Rommel recalled, in 1944, that:

> The German high command... failed to see the importance of the African theater. They did not realize that, with relatively small means, we could have won victories in the Near East which, with their strategic and economic value, would have far surpassed the conquest of the Don Bend. Ahead of us lay territories containing an enormous wealth of raw materials... which could have freed us from all our anxieties about oil. A few more divisions for my army, with supplies for them guaranteed, would have sufficed to bring about the complete defeat of the entire British forces in the Near East.[458]

Nor was the campaign decided solely on resources. Not only was Rommel hindered by both German and Italian High Commands, but he also had shortages in men and materiel. Recalling 1942, Rommel contended:

> It was apparent that the High Command's opinion had not changed from that which they had expressed in 1941, namely, that Africa was a 'lost cause' and that any large-scale investment of material and troops in that theatre would pay no dividends. A sadly short-sighted and misguided view. For, in fact, the supply difficulties which they were so anxious to describe as 'insuperable' were far from being so. All that was wanted was a real personality in Rome, someone with authority and drive to tackle and clear away the problems involved…our government's weak policy towards Italy seriously prejudiced the German -Italian cause in North Africa.[459]

---

[456] Rommel cabled Hitler to determine his plans regarding a government when Egypt was captured. Hitler responded that the matter was “not urgent.” For the above quote, see “William Shirer, *The Rise and Fall of the Third Reich* (New York: Simon and Schuster, 1960), 912. For insights on Hitler from the Italian perspective, see Count Galeazzo Ciano, *The Ciano Diaries*, 1939-1943 (New York: Doubleday, 1946), 502-504.

[457] M. Tullius Ciceri, *De Officiis* (Cambridge: Harvard University Press, 1913). Retrieved from http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A2007.01.0048%3Abook%3D1%3Asection%3D76#text_main:~:text=For%20arms%20are%20of%20little%20value%20in%20the%20field%20unless%20there%20is%20wise%20counsel%20at%20home. Accessed 25 August 2022.

[458] Erwin Rommel, *The Rommel Papers* (New York: Harcourt Brace and Jovanovich, 1953), 191.

[459] Ibid, 243.

For his supposed concern for North Africa, Hitler's policy was a mix of vocal support and abject neglect. Rommel's belief that the German position toward Italy had been soft was supported by the arrival of adequate supplies after the Allied landings in November 1942. One hundred fifteen thousand two hundred tons of supplies were shipped, with 94,045 tons making port, a number than nearly matched the high from July 1942.[460] Rommel recorded:

> … in Tunisia - when, of course, it was too late - it became perfectly possible to double our supplies, but by that time the fact that we were up to our necks in trouble had penetrated even to the mainland... What we found really astonishing was to see the amount of material that they were suddenly able to ship to Tunisia, quantities out of all proportion to anything we had received in the past... All at once, it was possible to ship anything up to 60,000 tons a month to Tunis until March 1943, in spite of the fact that the British and Americans then had a far tighter grip on the Mediterranean than they had in 1941-42.[461]

Germany managed to ship more than just supplies across the sea from Europe. On 23 November 1942, the first three Tigers of the 501st landed in Bizerte, and given Hitler's interest in the tank, it would be reasonable to believe the German High Command would adequately support the battalion, but this was not the case. Rommel grasped the use of armored forces, including new technology, almost intuitively, and he believed fully in German doctrine: concentration of strength, a forced breakthrough, and penetration far into the enemy's strategic zones, where the 'soft' troops were located.[462] Rommel realized the potential which had been provided; High Command had not. Rommel believed:

> Of all the theaters of operation, North Africa was the one where the war took on its most modern shape. Here were opposed fully motorized formations for whose employment the flat desert, free of obstructions, offered hitherto unforeseen possibilities. Here only could the principles of motorized and tank warfare, as they had been taught before 1939, be

---

[460] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 370.

[461] Erwin Rommel, *The Rommel Papers* (New York: Harcourt Brace and Jovanovich, 1953), 192, 358, 513.

[462] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (New York: Stein and Day, 1978), 352-353.

> fully applied and, what was more important, further developed. Here only did the pure tank battle between large, armored formations actually occur.[463]

As the most capable tank killer on the battlefield in 1942 on any front, the Tiger should have been wildly successful in North Africa, and with its supporting units the Wehrmacht may have been able to have had greater success. With open terrain, the 88mm Kw.K L/56 cannon's flat trajectory, long range, and high velocity were more than capable of defeating all British armor in the theater at ranges well beyond their own effective range. For example, the American-built M3 Lee had frontal armor thickness of 57mm; the Tiger could penetrate 84mm of armor at 2000 meters.[464] But, the lack of adequate logistic and close-air support meant the German excursion was doomed from the start.

After unloading from the cargo ship *Aspromante*, the battalion commander, Major Hans-Georg Lüder, ordered the commander of the 1st Company, Captain Nikolai Baron von Nolde, to form a *Kampfgruppe* around the four Tigers.[465] This hastily formed battle group went into combat on 1 December at Tebourba, Tunisia, a town 12 kilometers west of Tunis.[466]

From December 1942 to March 1943, the 501st participated in minor offensive actions and several large-scale attacks. The battalion was slowly equipped with more Tigers, but as the majority were diverted to the Eastern Front, the 501st received its final shipment in January

---

[463] Erwin Rommel, *The Rommel Papers* (New York: Harcourt Brace and Jovanovich, 1953), 252.

[464] For the M3's armor figures, see: Robert Jackson, *Tanks and Armored Fighting Vehicles* (Bath: Parragon Publishing, 2007), 121. For the Tiger's ballistics tables, see: Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 8.

[465] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 41.

[466] Bruce O. Newsome, *The Tiger Tank and Allied Intelligence, vol 1: Großtraktor to Tiger 231, 1926-1943* (Coronado, CA: Tank Archives Press, 2020), 71.

1943.[467] Combat operations were generally undertaken in company-size strength until Operation Ox Head when the 501st deployed in battalion strength as part of an operation to recapture Medjez el Bab, El Aroussa, and Hunt's Gap, a position between the British First Army and the *Afrikakorps*.[468]

During Ox Head, the battalion was deployed piecemeal, as multiple points needed Tigers to blunt the advance of British and American forces.[469] Though the battalion maintained a 62% operational rate, it was found that the majority of Tigers lost were the result of mines and artillery action, with several rendered inoperable – and unrecoverable – through well-placed 6-pounder anti-tank fire.[470] One situation report outlines the employment of Tigers from 18-25 January 1943. It was reported:

> After the first breakdowns, every day we managed to keep three to five operational Tigers in combat. It would easily have been possible to repair and return damaged Panzers in far larger numbers, if the battalion had had the necessary repair parts on hand and if the workforce of the 2nd Platoon of the maintenance company still in Trapani had been transported to Tunisia… One Tiger was operational after the conclusion of the combat action. Six Tigers drove on the mines period of these six, one Tiger drove onto mines twice. It is this Tiger that was the last one that was operational. One Tiger fell on the first day in action because in idler wheel was damaged by a mine and no replacement was available. This Tiger was cannibalized to establish a reserve of necessary repair parts for the other damaged Tigers. Another Tiger fell out on the second day of action because it became stuck in a creek bed. In the attempt to free it, the transmission drive shaft failed, and a replacement was not available. After the conclusion of operations in this sector, the steering gear from the cannibalized Tiger was installed and the Tiger driven out. The battalion lost its first Tiger as a total write off on the last day of combat. An artillery shell hit the right side, passing through the last road wheel, and pushing into the

[467] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 41.

[468] David Rolf, *The Bloody Road to Tunis: Destruction of the Axis Forces in North Africa, November 1942-MAY 1943* (London: Greenhill Books, 2001), 152.

[469] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 42-44.

[470] Tiger 131, the last operational Tiger remaining, was damaged by 6-pounders and was abandoned by its crew while still drivable. Skillful use of the 6-pounder proved Allied gunners could defeat the Tiger while being unable to 'kill' it. See: Bruce O. Newsome, *The Tiger Tank and Allied Intelligence, vol III: Tiger 131 from Africa to Europe.* (Coronado, CA: Tank Archives Press, 2020), 40.

> whole side without penetration. This caused the fuel tank located in close proximity to the wall to leak period because this Tiger lay under enemy fire, it had to be driven out of this area in order not to fall into the hands of the pursuing enemy. After this attempt was successful, the fumes exploded. In spite of all attempts to extinguish the fire with the fire extinguishers on hand, the Tiger burned out completely.[471]

In North Africa, mud, artillery, and mines were far more of a danger than the Allied armor. Though the 501st reported the destruction of several enemy tanks, accurate artillery and well-positioned 6-pounders were able to prevent the Tiger from making an impact on the course of the campaign. As the above report noted, the maintenance sections were also widely dispersed, and the lack of FAMO heavy movers forced the battalion to destroy several Tigers, which could have been repaired. This last point also must assume the Tiger is in a recoverable position, as the prime recovery vehicle, the Sd.Kfz. 9 FAMO was an unarmored, eighteen-ton recovery vehicle that was both slow and defenseless. Thus, Tigers in need of rescue had to be in a secure position.[472]

The Allied defensive tactics continued to prove a reliable counter to the Tigers. In a manner similar to the Soviet concept of "deep operation," the Allies pulled back successively, laid minefields overwatched by anti-tank guns, then overwatched both with artillery. Once the Tigers encountered difficulty in the minefields, the artillery fired and destroyed or severely damaged the tank. This method was used particularly effectively in Ox Head, where seven Tigers were damaged heavily and were unable to be recovered.[473] This last action rendered the 501st combat ineffective, and with one remaining operational Tiger, they handed off their inventory to

---

[471] For reference, the location referred to as Trapani is a port city west of Palermo, in Sicily. "Technical Report No. 3, from Truppen-Ingenieur Panzer-Abteilung 501," reproduced in Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 50-51.

[472] Technical Report No. 4, from Truppen-Ingenieur Panzer-Abteilung 501," reproduced in Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 51-53.

[473] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 44.

include Tigers that could be repaired to the incoming s.Pz.Abt 504, which arrived in Tunisia in March 1943.[474]

In Tunis, Major August Seidensticker learned of the situation in central Tunisia near Sfax, where the Allies were attempting to drive to the sea along the Mareth Line, a system of fortifications from Chott el Djerid, a lake that nearly bisects central Tunisia, to El Hamma and Gabes - towns situated along the far eastern lakeshore and the Mediterranean, respectively. The Allies sought to cut the ten-kilometer-wide strip of land which connected northern and southern Tunisia. General Hans-Jürgen von Arnim, the *Afrikakorps* commander since 10 Marc^{h}, ordered the 504th to stop the Allied drive.[475]

From the 19th to the 24th of March, the battalion crossed over 400 kilometers from Tunis to Sfax with few major mechanical issues. Major Seidensticker had sent his maintenance company with the forward elements to ensure the Tigers were kept moving, and the critical Maknassy Pass was held through the night and the following day. The unit history claims the 504th destroyed thirty-five American tanks from the US 9th Armored Division on the 20th, with the official American report indicating the forces defending the Sened - Maknassy area had been strengthened significantly by the inclusion of "key German personnel."[476] From 25 March to 25

---

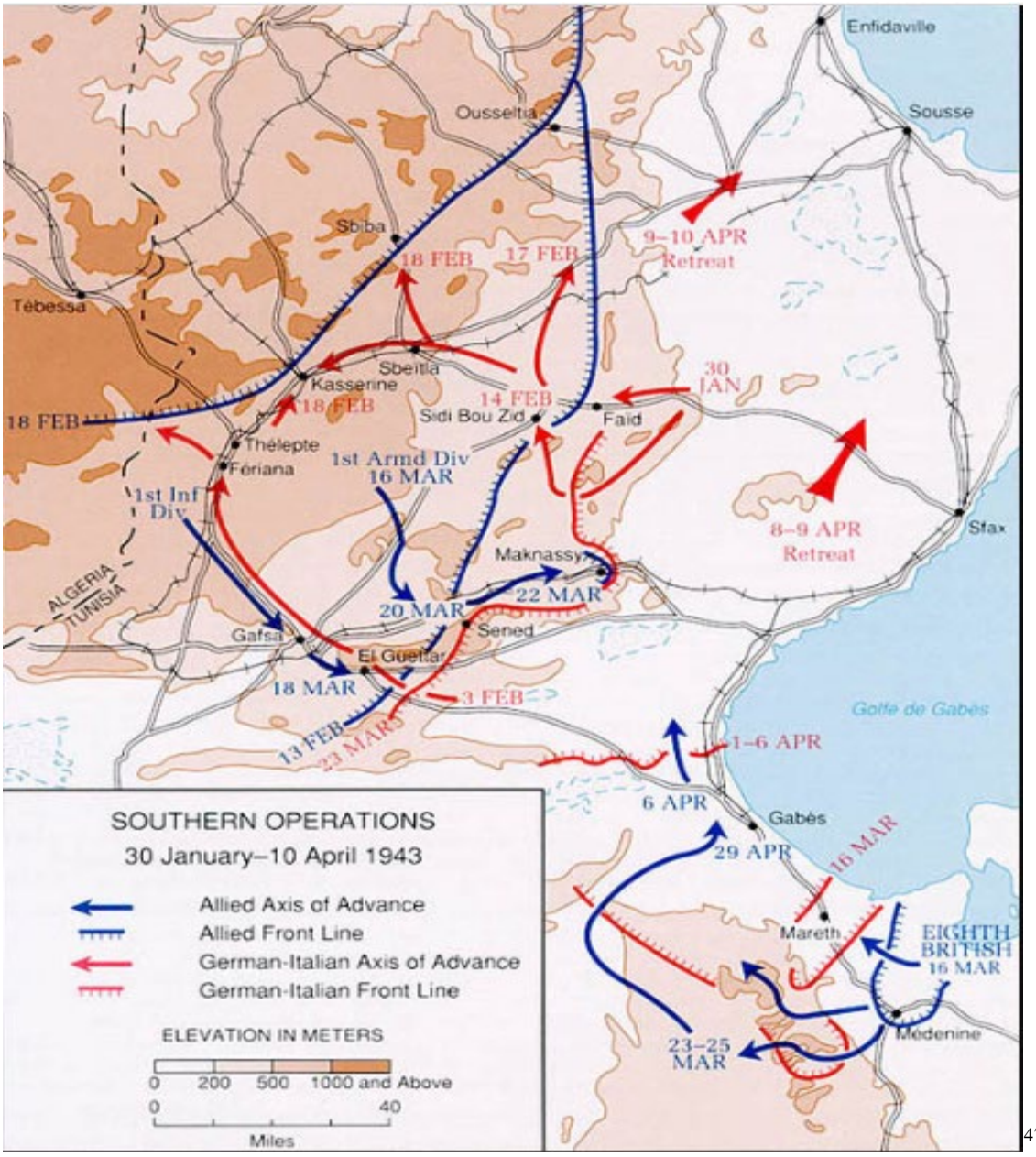
[474] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 60.

[475] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-45* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 35.

[476] The American division was more likely the 1st Armored Division. At the time, the 9th Armored was in the northern sector of Tunisia, outside Bizerte. Further, the official unit history for the 1st Armored lists a drive toward Gabes through the Maknassy Pass on 20 March 1943. See "Fort Bliss Units: 1ST Armored Division," Retrieved from https://home.army.mil/bliss/index.php/units-tenants/1st-armored-division, Accessed 28 August 2022. Further, operational reports for the II US Corps in Tunisia indicate that the 1st Armored was the participating unit. See: Lieutenant General George S Patton, "Report on Operation Conducted by II Corps United States Army Tunisia, 15 March – 10 April 1943," *Command and General Staff School, Ft. Leavenworth, Kansas* (1943). Retrieved from Ike Skelton Combined Arms Research Library Digital Library https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/4382/rec/1, accessed 28 August 2020.

April, the Tigers engaged and destroyed Allied armor and guns during continuous defensive operations. The *Wehrmacht* daily report for 25 April indicated the number of destroyed enemy tanks to be around 80, with the unit history claiming a further sixty-seventy by the end of April.[477]

[477] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-45* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 35.



[478]

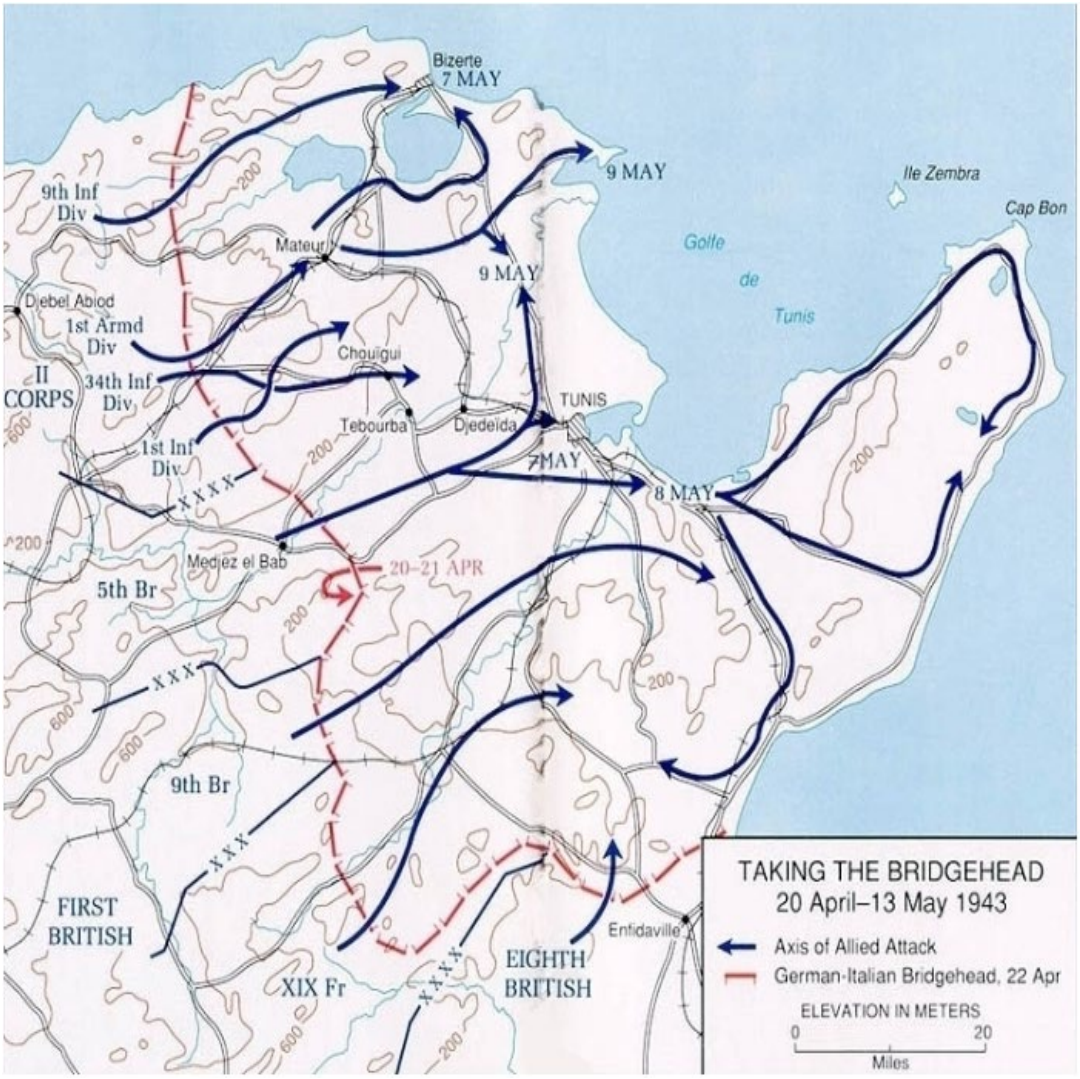
During the last month of the North African campaign, the 504th claimed more than one hundred destroyed tanks to the loss of one Tiger that was blown up after running out of fuel.[479] Maintenance was a constant issue, and the battalion managed to keep less than ten Tigers

[478] US Army Center of Military History, "Southern Operations, 30 January to 10 April 1943," retrieved from https://history.army.mil/brochures/tunisia/p16(map).jpg. Accessed 29 August 2020.

[479] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 195.

operational during this period. Despite low numbers, the 504th managed a successful blocking operation against British forces on 6 May, which prevented the Allies from advancing on the Tunisian capital from the west.[480] The official report to Berlin indicated six Tigers had been blown up after being immobilized by relatively minor damage in areas where the enemy could not be repulsed. Of these, artillery damaged two; one had a damaged final drive, one ran into a minefield while inspecting the Tiger with a damaged final drive, another was immobilized with a damaged engine, one the last suffered damaged teeth on a drive sprocket from a track malfunction.

[480] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-45* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 37.



[481]

The North African campaign proved the Tiger had high survivability but that it was vulnerable to damage from rounds that had no chance to penetrate the armor fully. Further, the lack of recovery assets, the lack of spare parts, and the lack of concentrated maintenance facilities – as were called for in the official doctrine – exacerbated the Tiger's mechanical weaknesses. Additionally, though the Tiger was successful in defensive operations, its offensive capabilities had been thwarted by successful Allied defense in depth, which relied on mines,

[481] US Army Center of Military History, "Taking the Southern Bridgehead," retrieved from https://history.army.mil/brochures/tunisia/p22-23(map).jpg. Accessed 29 August 2022.

artillery, and anti-tank guns once it was realized Allied armor could not be used against the Tiger effectively.

Italy

When the Axis surrendered North Africa, the 501st was destroyed as a fighting unit. However, the 504th had only sent its 1st Company and headquarters element to North Africa, which left the 2nd Company in Italy. The 2nd Company had sent the majority of its Panzer IIIs to Tunisia with the 1st Company, and while in the rear, it was outfitted with eight new Tigers.[482] The defeat in North Africa coincided with the decision to update to KStN 1150e/1176e, which removed the Panzer III and gave the heavy tank battalions a complement of forty-five Tigers.[483] In May 1943, the 508th was established and sent to assist in defense of Italy in early 1944.[484]

American historian and professor Dr. Robert Citino noted a shift in the nature of German officers from warrior-philosophers such as von Clausewitz and von Moltke to those who were not brilliant theorists but who were exceedingly efficient at the practical application of *bewegungskrieg* – men such as Erich von Manstein and Walther Model, both of which were highly aggressive. General Paul Conrath, commander of the Panzer Division *Hermann Göring*, was one such officer. When his superior, Field Marshal Albert Kesselring, made Conrath aware

[482] The 504th was attached to the Panzer Division *Hermann Göring*, whereas the 501st would not be reconstituted until September 1943. See: Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 44, 195.

[483] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 26.

[484] Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 5.

the Allies were likely to land in Sicily, Conrath replied, "You want an immediate, reckless rush at the enemy? I'm your man."[485]

Conrath was true to his word. When the Allies landed early in the morning of 10 July, his division was too far north to defend against the initial landing. However, despite losses on the winding coastal roads, the division reached the landing zone on the morning of 11 July, and with the Tigers from the 504th in the lead, Conrath attacked with sixty tanks. Lieutenant Colonel Derrill Daniel, a battalion Executive Officer with the 26th Infantry Regiment "Blue Spaders," 1st Infantry Division, recalled:

> …while confusion still reigned as a result of encountering this unexpected enemy position, the battalion was hit by a portion of the general counterattack launched by both German and Italian units. This counterattack began at 0800 hours on 11 July, extended across the entire front of the division, and lasted for two days…enemy tanks and infantry ploughed through the 3rd Battalion before artillery or naval gunfire support could be brought down (no anti-tank guns had yet reported to either the 3rd or 2nd Battalions)… by use of extreme measures, on the part of the battalion commander, he reformed enough of the battalion somewhat nearer to Gela, to prevent the enemy infantry from following the tanks, and with mortars, artillery, and naval gunfire finally dispersed the infantry. The tanks however proceeded on toward Gela… to the east of the Gela River, tanks and infantry swarmed over the positions that the 2nd Battalion had occupied the afternoon previously. These were taken under artillery and naval gunfire which dispersed the infantry and caused the tanks to exercise extreme caution. By mid-afternoon, the 23rd Field Artillery of the 26th Infantry, both in position east of the river, were firing over open sights at tanks literally within their positions. At least one tank penetrated to the main road about 1000 yards from the beach. By dark all of these tanks were destroyed or driven off. The shore penetration within 1000 yards of the beach evidently gave rise to the report that night by "Axis Sally" that the invaders had been driven into the sea at Gela.[486]

---

[485] Citino elaborated that this sentiment may be applied to nearly all German operations in 1943. See: Robert Citino, "Fighting a Lost War: The German Army in 1943," *US Army Heritage and Education Center* (2014). Retrieved from https://www.youtube.com/watch?v=1SdO-btKuds&t=1634s. Accessed 1 August 2022.

[486] The defensive position was referred to as Castle Hill and was built on the ruins of a castle and was reinforced with pillboxes, mines, and barbed wire. See: Lt. Col. Derrill Daniel, "Landings at Oran, Gela, and Omaha Beaches: An Infantry Battalion Commander's Observations," *Infantry Armed Forces Staff College, Norfolk, VA* (1947). Retrieved from https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/5743/rec/4. Accessed 29 August 2022.

For the Germans, naval bombardment and anti-tank gunnery were joined by aerial bombardment. Lieutenant Hummel, commander of the 2nd Company, 504th, remembered:

> We felt the Allied air superiority for the first time there. The Lightnings made things hot for us with bombs and machine guns. Our radio communications were jammed from the Allied ships and German-speaking radio operators gave us false messages. From then on, we used small tricks and terms that no foreigner would understand.[487]

During these operations, the Tigers were unable to accomplish the mission given to the *Herman Göring* Panzer Division. The appearance of the Tigers came when the 26th Infantry was in a state of confusion, but once it was reorganized, the Americans, along with naval and aerial bombardment, were able to repel the German attack. Further, the Tigers proved to be vulnerable to the American 'bazooka,' a man-portable, recoilless anti-tank rocket launcher. As a stop-gap weapon, the bazooka was effective against the Tiger's weaker side and rear armor, and though inaccurate, it was effective at close ranges.[488] The Tigers fought successful defensive operations until mid-August but given the small number of tanks on the island, the Tigers were unable to prevent the inevitable loss of Sicily to the Allied invasion.

The bazooka was used as a reasonably effective tool on the Western Front. Despite its low cost and relative inaccuracy, there were a number of occasions where bazookas were able to immobilize or destroy Tigers. There are accounts of Tigers being knocked out by a single shot to the side or rear, as well as recollections of Tigers immobilized by hits to their running gear or

---

[487] "Account of *Obertleutnant* Hummel," reproduced in Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-45* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 42.

[488] The Tiger referred to in Lt. Col Daniel's report was apparently struck by a bazooka round in the driver's vision slit. There are later accounts of the bazooka being used in a rather unconventional manner; as the Tigers had relatively thin armor at the top of its turret, Major Charles "Bazooka Charlie" Carpenter attached six bazookas to his L-4 Grasshopper airplane and was credited with destroying six Panzers, including two Tigers. See: Lt. Col. Derrill Daniel, "Landings at Oran, Gela, and Omaha Beaches: An Infantry Battalion Commander's Observations," *Infantry Armed Forces Staff College, Norfolk, VA* (1947). Retrieved from https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/5743/rec/4. Accessed 29 August 2022; Michael Green and Gladys Green, *Weapons of Patton's Armies* (Minneapolis, MN: Zenith Publishing, 2000), 38-39; "Piper Cub Tank Buster," *Popular Science* vol.146, no 2. (February 1945), p.84.

drive sprockets. One Medal of Honor citation, that of Technical Sergeant Charles Carey, recounts that Carey damaged an enemy tank with a rocket, a tank reported by his comrades as a Tiger.[489] Perhaps the most innovative use of the bazooka against the Tiger was during Lieutenant Colonel Charles Carpenter's flights when, in an L-4 Grasshopper, Lt. Col Carpenter attached three bazookas to each wing and used them to destroy two Tigers.[490] In his plane, "Rosie the Rocketer," Carpenter was credited with six destroyed tanks from the bazooka fire. A complete determination would require in-depth statistical analysis, but the loss of Tigers to bazookas was likely the most inexpensive way to lose so expensive a tank.

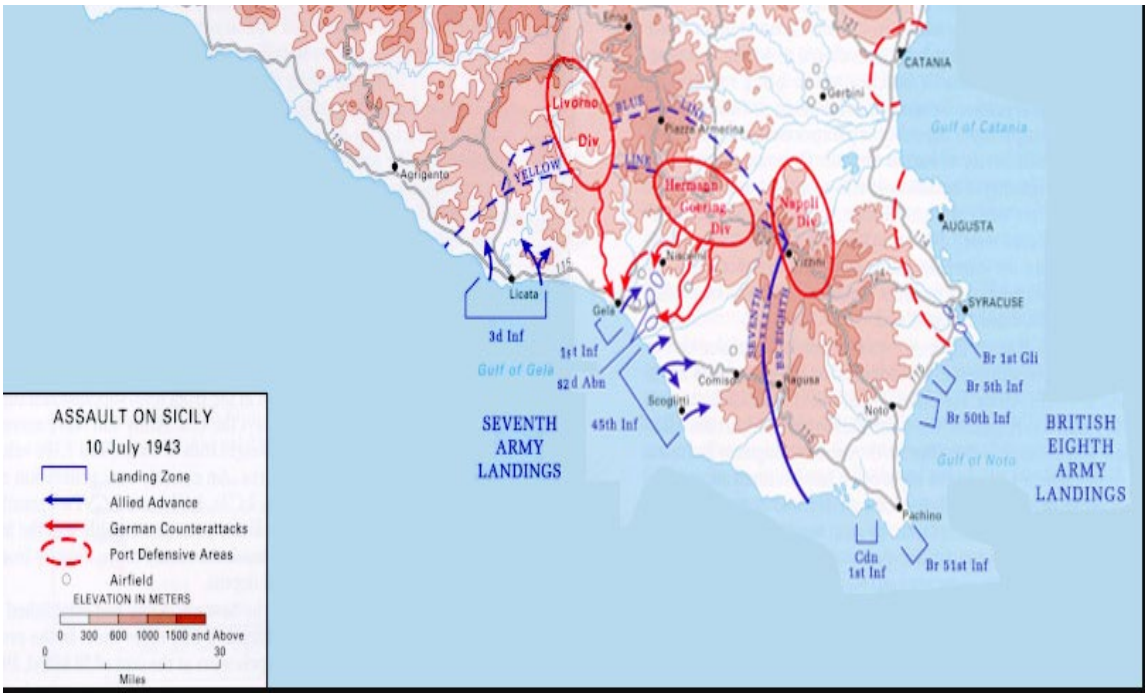
After the loss of Sicily, the 504th returned to Germany and was fully reconstituted. The former 3rd Company was transferred to the Eastern Front and became the 11th Company of Panzer Division *Großdeutschland*. The new battalion, commanded by Captain Kühn, was outfitted with forty-five new Tigers in accordance with the 5 March 1943 KStN and spent the remainder of 1943 training new personnel. It did not see action again until June 1944 in Italy.[491]

---

[489] Charles Noble, "On the Bazooka and the Tiger Tank," *90th Infantry Division Preservation Group* (2009). Retrieved from http://www.90thidpg.us/Equipment/Articles/BazookaTiger/index.html, accessed 18 September 2022.

[490] "Piper Cub Tank Buster," *Popular Science* vol.146, no 2. (February 1945), p.84.

[491] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 99.



492

The 508th arrived in Rome between the 8th and 12th of February, in time for the Allied landings at Anzio. The Allies had managed a successful landing but landed in reclaimed marshland, which had been known as the Pontine Marshes. The Italians had reclaimed the land, constructed dikes, and built pumping stations to drain the water during the 1930s.[493] The Germans realized the strategic opportunity, stopped the pumps, and opened the dikes, which allowed salt water conducive to the Anopheles mosquito to refill the marsh. This act of biological warfare not only encouraged the spread of malaria, but the Germans also sought to deny the Allies any access to food and fresh water.[494] General Lucian Truscott, commander of

[492] US Army Center of Military History, "Assault on Sicily, 10 July 1943," Retrieved from https://www.history.army.mil/brochures/72-16/map1.JPG. Accessed 29 August 2022.

[493] Frank Snowden, *The Conquest of Malaria: Italy, 1900-1962* (New Haven: Yale University Press, 2006), 157.

[494] Ibid, 186.

the American 3rd Infantry Division, had argued against the landing at Anzio, referring to it as a death trap. His superior, General Mark Clark, agreed, but Mediterranean Theater commander General Eisenhower, on the way to France to oversee Operation Overlord, left the decision to Churchill, who ordered it to commence.[495]

At Sicily, the Allies had faced one German Panzer Division; at Anzio, they had four Panzer Divisions and six infantry divisions counterattacking by 16 February.[496] The 508th was attached to the 26th Panzer Division, near the Alban Hills south of Rome, as a strategic reserve element.[497] Though this was strictly non-doctrinal, it was by necessity; the battalion had faced a 160-kilometer road march from its detrainment at Ficulle to its positions at Anzio, and the Tiger's mechanical difficulties made themselves known, with 60% of the battalion non-operational due to mechanical breakdown.[498]

As the battalion had dispersed, only the 2nd Company was involved in the fighting at Anzio, and it had only eight operational Tigers.[499] Once at Anzio, the Tigers were held to the roadways by the new marshland. The first action, on 16 February, was less than successful, as were other defensive actions that attempted to reduce the beachhead. The unit history claims several American Shermans were destroyed during this period, and though the battalion could not reduce the beachhead, it did assist in containing it.[500]

---

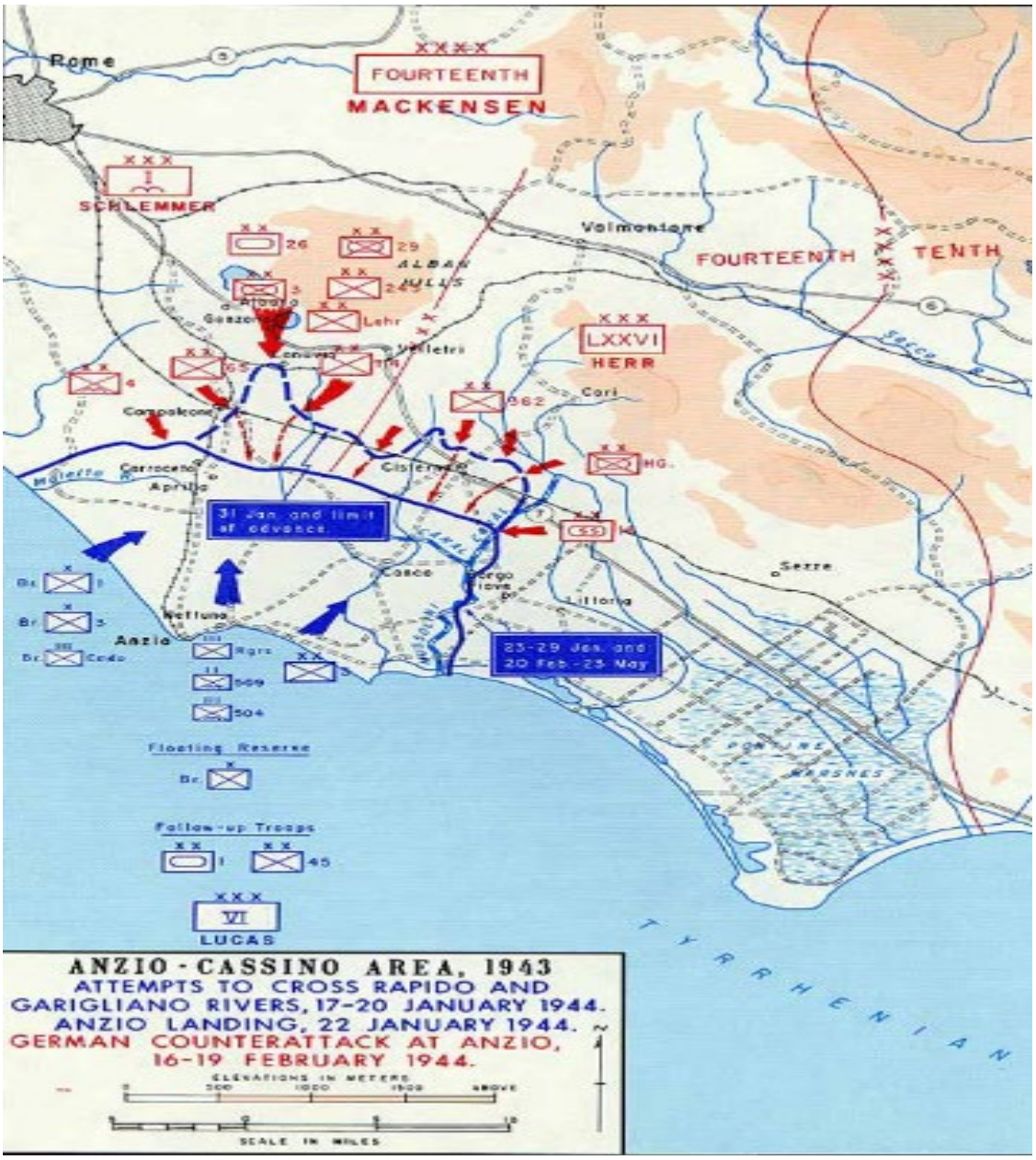
[495] Rick Atkinson, *The Day of Battle: The War in Sicily and Italy, 1943-1944* (New York: Henry Holt and Company, 2007), 324.

[496] Lloyd Clark, *Anzio: The Friction of War - Italy and the Battle for Rome* (London: Headline Publishing Group, 2006), 123.

[497] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 322.

[498] Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 33.

[500] Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol.2, 1943-1945* (Atglen, PA: Schiffer Military History, 1996), 144-147.



501

The final German effort to close the Anzio landing zone was on 29 February 1944. In this attempt, four Tigers were knocked out, and several more were immobilized by mines. As in North Africa, once the Tigers were immobilized, heavy artillery was called in to prevent the

[501] "Battle of Anzio," United States Government (Washington D.C.: United States Government Publishing Office, 1944). https://commons.wikimedia.org/wiki/File:Cassino%2BAnzio1943JanFeb.jpg. Accessed 6 December 2022. Image is Public Domain.

Germans from recovering their tanks or destroying the immobilized tanks, which could still fire on Allied positions.[502] This attack failed for a number of reasons, but the most significant was the restrictive terrain created by the ill-thought-out flooding of the Pontine Marshes, which forced the Tigers onto avenues of approach which could easily be covered by a pre-plotted artillery strike. The unit history reports that, of the damaged Tigers, three were so severely damaged by naval and artillery fire that they could not be repaired.[503]

The Battle of Anzio dragged into a stalemate by late February 1944, and the 508th was withdrawn to Rome to reorganize and rebuild its complement of Tigers.[504] While in Rome, the 508th was employed once more in a non-doctrinal role, employed in small groups or individual tanks where German commanders needed heavy firepower. On several occasions, fractions of the battalion were involved in fighting near Anzio, but never as an entire battalion and never as a breakthrough force directly against the beachhead.[505] One hastily organized company, *Sondereinheit Meyer*, commanded by Lieutenant Hans-Gert Meyer, had been sent to Italy ahead of the 508th in order to provide military "stiffening" of the faltering Mussolini government.[506] This *Tigerkompanie* of sixty men and eight Tigers was integrated into the 508th on 3 March 1944. Lieutenant Meyer's former command participated in the attack on the beachhead along the

---

[502] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 322.

[503] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 95.

[504] Anzio degraded into a pitched artillery duel while both sides rebuilt their fighting strength. There was no breakout at Anzio until 23 May. See: Lloyd Clark, *Anzio: The Friction of War - Italy and the Battle for Rome* (London: Headline Publishing Group, 2006), 281-282.

[505] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 322.

[506] Mussolini was deposed by King Victor Emmanuel on 25 July 1943. See: John Whittam, *Fascist Italy* (Manchester: Manchester University Press, 2005), 129-130.

Pontine Marsh roads and several defensive operations to prevent enemy breakthroughs.

Lieutenant Meyer recalled:

> … The operations of *Kompanie* Meyer in the Pontine Marshes were extremely problematic. In most cases, the Tiger's weight ruled out cross-country driving in the coastal area southeast of Rome, which had only been reclaimed in the 1930s. The partially drained area of marshes, up to 18 kilometers wide in places, was only bordered by trees and bushes on the side facing the sea. As a result, the Tigers were mainly restricted to the roads, which in places were insufficiently firm. Neither off the roads nor beside them were sufficient opportunities for concealment or camouflage. This was all the more serious given the enemies' mastery of the air, low-level air attacks, and heavy naval gunfire…From the summer of 1944 on, that is, during the retreat from Rome, the Tigers were used almost exclusively to reinforce the main line of resistance. The battle lines of the 508th extended from the Ligurian Sea to the coast of the Adriatic. As a result, we were forced to ignore the classical tenets of Panzer tactics, such as Guderian's maxim '*…nicht Kleckern, sondern Klotzen!*' This entailed enormous command and control and logistical difficulties. Given the great distances involved, even platoon leaders were unable to adequately control their crews, to say nothing of company or battalion commanders… following the successful landing by the Americans and British on 22 January 1944, *Kompanie* Meyer received the incomprehensible order not to carry out its recommended and planned attack against the landing forces. The order to attack was not issued until four days later. But then of course, the enemy had a firm foothold on the coast. To this day I still cannot understand why our counterattack, which at the time would have required little infantry support, was cancelled. At that point in time, our prospects of success would have been very good, especially since the transport ships and landing craft would have been in range of high explosive rounds from the selected positions.[507]

Lieutenant Meyer's account indicates that, as on the Eastern Front, Tigers were used more as local commanders saw fit that as a part of a larger strategy to defeat the Allied invasions, and these decisions were as inconsistent as the abilities of the individual commanders.

As the situation deteriorated, the men of the 508th noted the heroism of the *Fallschirmjäger* defending Monte Cassino, while their own position at Velletri – 35 kilometers from Anzio – was comparatively quiet.[508] However, the situation changed rapidly when Monte

[507] "Recollections of Hans Gert Meyer," in Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 126-128.

[508] "Recollections of Hans Bähr," in Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 34.

Cassino fell on 20 May 1944. Lieutenant Kurt Hirlinger, *Zugführer* in the 2nd Company, 508th, in mid-1944 wrote:

> …the southern front had broken. The Anglo-Americans were advancing on Rome. At that point, the Nettuno beachhead [shown in Anzio map, pg.169] also became active. The Anglo-American wall of flame began to advance in our sector. One night, the 2nd Company received operations orders…the enemy had launched an attack on a broad front. Our mission was to stop him and drive him back. No longer could he protect himself with his concealed minefields.[509]

In pure defensive operations, the 508th failed to stop the Anglo-American advance. The Allied advance precluded the use of defensive minefields, but the artillery was a decisive factor once more. In defensive counterattacks against the Allies from 23 May to the beginning of June, the battalion was often able to drive 3 to 5 kilometers into American territory, but the attacks would bog down under withering anti-tank and artillery fire that forced the Tigers to discharge smoke and retreat as rapidly as possible.[510] Though roughly thirty Shermans were dispatched, several Tigers were also destroyed, either through direct artillery fire or abandoned due to engine or transmission damage from the same.[511]

From the 23rd to the 25th of May, the 508th lost twenty-two Tigers, with all of these destroyed by their own crews after receiving minimal damage. Though they were technically recoverable, the Allied advance prevented any recovery efforts, and the crews chose to keep the Allies from recovering the Tigers intact. Major Helmut Hudel, the commander of the 508th, was summoned to the Führer headquarters and dismissed, as High Command blamed him for the

---

[509] Recollections of Kurt Hirlinger," in Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 34.

[510] Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 35.

[511] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 322-323.

failures of his battalion.[512] As the Tigers were prone to breakdown in the hilly terrain, this deployment was a tactical error at higher levels of command than the battalion commander.[513]

The tactical difficulties experienced by the 508th were shared by the 504th once they had returned to Italy. The 504th returned on 10 June 1944 and was in combat by the 20th.[514] The combat record indicated the 504th attempted several offensives between the 20th and 30th, but all of these were stopped by either maintenance issues or heavy artillery barrages, and in that ten-day period, though numerous Shermans were destroyed, only two Tigers were confirmed destroyed by Allied artillery.[515] This trend continued throughout the Italian Campaign.

The Tigers were often used in non-doctrinal roles throughout their time in Italy. The record of the 504th and 508th indicates that, at times, their tanks were used in an indirect fire role, though neither unit history nor surviving archival records indicate the mission requiring such pursuits.[516] The 504th and 508th were also not deployed as whole battalions for the majority of their time in Italy, which is contrary to doctrine as well. The number of Allied tanks in Italy required tank-killing tactics, and the Tigers were dispersed as they were the most capable vehicle in the German inventory in conducting such operations. In some cases, the battalions were so stretched that they could only manage a single Tiger for a deployment. Kurt Hirlinger recalled that:

---

[512] Ibid, 323.

[513] Kurt Hirlinger noted that the Tigers had difficulty on the narrow roads and often attempted to cross Roman-era bridges. See: Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 36.

[514] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 196-197.

[515] Ibid, 197.

[516] Ibid, 197.

> The constant mechanical problems with the vehicles demonstrated the need for properly trained and experienced specialists such as vehicle mechanics and welders and experienced truck drivers to serve as tank drivers. As a 20-year-old salesman by trade, I had no idea, for example, of what could be accomplished with a single cutting torch… whenever our heavy tanks were active, the enemy adopted the tactic of holding back their own numerically superior but technically inferior tanks, committing field artillery and fighter bombers instead. Nevertheless, some tank commanders succeeded in identifying concealed enemy tanks and knocking them out with one or two armor-piercing rounds. During that difficult defensive fighting, we were glad whenever we worked with the brave men of the 4th *Fallschirmjäger*. No enemy tank hunter-killer team was able to approach our vehicles.[517]

An in-depth analysis of existing unit histories indicated the 504th and 508th were consistently used contrary to doctrine, but this deployment type was more likely than not far more effective than attempting to concentrate an entire battalion, given the terrain restrictions and the inherent difficulty in deploying and withdrawing from positions only accessible via poor roads and bridges not rated for the weight of the Tiger. Both units' histories indicated that such impediments led to the loss of individual vehicles, and a battalion strength deployment could have led to the full complement of Tigers becoming stranded on the far side of a collapsed bridge or roadway.

From Anzio until the end of the war, the Tigers cannot be regarded as having been combat effective in their doctrinal role. The battalions were not used in accordance with doctrine, as has been previously discussed. However, this cannot be attributed to enemy armor, as the Tigers remained capable of destroying far more Shermans than were lost to Allied tank fire. The maintenance issues in poor terrain and the density of Allied artillery was the primary mitigating

[517] The 504th, for example, had a Tiger crash through a bridge on 25 June 1944, and it had to be destroyed by a German anti-tank gun. Further, the 504th history indicates all of the prime movers had recorded over 1800 kilometers of drivetime. The 508th history records one instance where a Tiger slipped off a partially collapsed bridge and landed 4 meters below in a stream, and others in the same movement recalled tracks thrown due to sharp turns on mountain roads. See: Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 196-197; Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 36.

factor. Small unit deployment in restrictive terrain was adequate, but the mechanical failures were a diminishing factor to the 504th or 508th being able to position themselves in a timely manner. Further, as on the Eastern Front, had either battalion concentrated in a single sector, the Allies would have elected to attack a sector free of Tigers. The strength of the tanks themselves was a limiting factor, as on the strategic level, it was far easier to move around a concentrated Tiger battalion than fight through it.

Maintenance issues became less of a problem once the German lines solidified along the Gothic Line. The 504th combat record indicated the battalion was at full or near-full operational strength in the last quarter of 1944, which indicates enemy artillery had been reduced as a factor due to limited movements away from the battalion's assembly areas. This served to both reduce the length of road marches, where the majority of mechanical failures were encountered, and that the Allies were no longer conducting operations where Tigers were expected. The static nature of the defensive operations in Italy from late 1944 until early 1945 was the greatest factor in the rise in operational strength.[518]

Lastly, the Tiger's own crew was its own greatest enemy. The lack of prime movers and the difficulty experienced on roads and bridges ill-suited to the Tiger's weight proved to be disastrous. During its time in Italy, the 508th lost seventy Tigers, with around fifty destroyed by their own crews to prevent the tanks from being captured by the Allies.[519] The 504th suffered heavier losses, as eighty-seven Tigers were destroyed during its deployment in Italy.[520] Of these,

---

[518] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 98-99.

[519] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 323-326; Kurt Hirlinger, ed., *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger I* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2001), 72-78.

[520] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 98-99.

seventy-four were killed by their own crews, with twenty-nine lost to German demolitions in April 1945 alone.[521] This statistic is perhaps the most damning of all: the Allies were less effective at destroying the Tigers than the Germans, despite overwhelming superiority in all accounts.

France and the End in the West

On 6 June 1944, the Allies launched Operation Overlord after delays due to poor weather. In France, the Germans had three heavy tank battalions available. The 503rd "Feldherrnhalle" deployed to the invasion front on 26 June.[522] Two battalions were attached to the I and II SS Panzer Corps – the 101st SS was attached to the I SS Panzer Corps, and the 102nd SS was attached to the II SS Panzer Corps.[523]

It is an understatement to assert that the German High Command had no idea the Invasion of Normandy was imminent. General Walter Warlimont wrote:

> …for 24 hours, more than 5000 ships had been on the move across the Channel toward the coast of Normandy, but there had been no reconnaissance to spot them. Equally, neither Rommel, von Rundstedt, nor OKW have made any appreciation pointing out that, in view of the weather and tides, landing in the immediate future was even probable… the German command organization at all levels was in fact working in the dark because of the complete inferiority of the Luftwaffe; this makes it all the more incomprehensible

---

[521] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 201-203.

[522] Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 255.

[523] The 13th Company of 1st SS Panzer Division *Leibstandarte* was expanded into a full battalion and redesignated the 501st Heavy SS Panzer Battalion in September 1944. The 13th Company of 2nd SS Panzer Division *Das Reich* was also expanded to battalion size and redesignated the 502nd Heavy SS Panzer Battalion in the same month. As a result, the s.Pz.Abt. 501 was redesignated first as the 424th on 21 December 1944, and after a second destruction to the reformed as the 512th Heavy Tank Destroyer Battalion in February 1945. S.Pz.Abt 502 was redesignated as the 511th in January 1945, and s.Pz.Abt 503 was redesignated "Feldherrnhalle" on 4 January 1945. In the interest of clarity, the new designation is added in parenthesis. For the SS nomenclature changes, see: Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 213, 271. For the three *Heer* battalions, see: Wolfgang Schneider, *Tigers in Combat I* (Guilford, CT: Stackpole Books, 2004), 47-48, 89, 138. Also see: Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 326.

> that comment in so far as I am aware, no notice was taken of the warning signs emanating from the intelligence service… all the headquarters concerned were fully aware that this phase of the war was up decisive importance, and they had been tireless in their efforts to get the defense to as high a pitch of efficiency as was possible in view of the severe gaps in our forces produced by five years of war; but Hitler's repeated raids on the West for forces for other theaters had upset the balance… General Blumentritt, Chief of Staff to Commander-in-Chief West, gave me the first indication that in all probability, this was the invasion and that Normandy was apparently the area. He urged on behalf of his commander-in-chief, Field Marshal von Rundstedt, that the so-called OKW reserves, consisting of four motorized or armored divisions, should be released so that they could move from their assembly areas to positions near the front. It was soon clear that Jodl was fully up to date with all the information but, in the light of the latest reports was not yet fully convinced that here and now the real invasion had begun. He did not therefore consider that the moment had arrived to let go our last reserves and felt that Commander-in-Chief West must first try to clear up the situation with the forces of Army Group B. General Jodl took this decision on his own responsibility, in other words without asking Hitler; forever after it was the cause of the most bitter accusations against OKW. The German defeat in Normandy with all its fatal consequences was, people said, primarily due to this failure to release the OKW reserves.[524]

As Warlimont further argued, blaming Jodl was an error, as it was inconceivable to release reserves before the first enemy landing. Further, the Allied air superiority made any movement even far behind the front impossible.[525]

During the 503rd's (*Feldherrnhalle*) reconstitution, the battalion was partially equipped with the new Tiger II. 1st Company became the first unit in the German Army to receive the new tanks; the other two companies in the battalion received the Tiger I.[526] The two SS battalions

[524] The reference was to Colonel General Alfred Jodl, the chief of the Operations Staff for OKW throughout the war. See: General Walter Warlimont, *Inside Hitler's Headquarters, 1939-1945* (Novato, CA: Presidio Press, 1960), 423-425.

[525] Hans Speidel, *Invasion 1944: Rommel and the Normandy Campaign* (Chicago: Regnery, 1950), 96.

[526] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 145.

continued to use the Tiger I.[527] These three battalions were attached to their specific units for the duration of the Normandy campaign, a drastic shift from the push/pull on the Eastern Front.[528]

The 101st (501st) SS was the first heavy tank battalion to enter combat in Normandy, on 13 June, at Villers-Bocage.[529] On the 12th, Allied forces had created a gap west of Tilly-sur-Seulles. The British 7th Armored Division flanked west through Trungy and approached Livry along the same general Axis of approach as the American 1st Infantry Division as it advanced southward toward Caumont.[530] SS General Sepp Dietrich recognized the danger on his left and ordered the only reserve available into the gap as quickly as possible. This was the 101st (501st) SS, and the march on the evening and night of the 12th into the 13th had left the crews exhausted, which was compounded by a naval bombardment that allowed for no sleep even after the movement. Even with only fourteen operational Tigers between the two Companies, General Dietrich ordered the battalion to defend the left flank of I SS Panzer Corps.

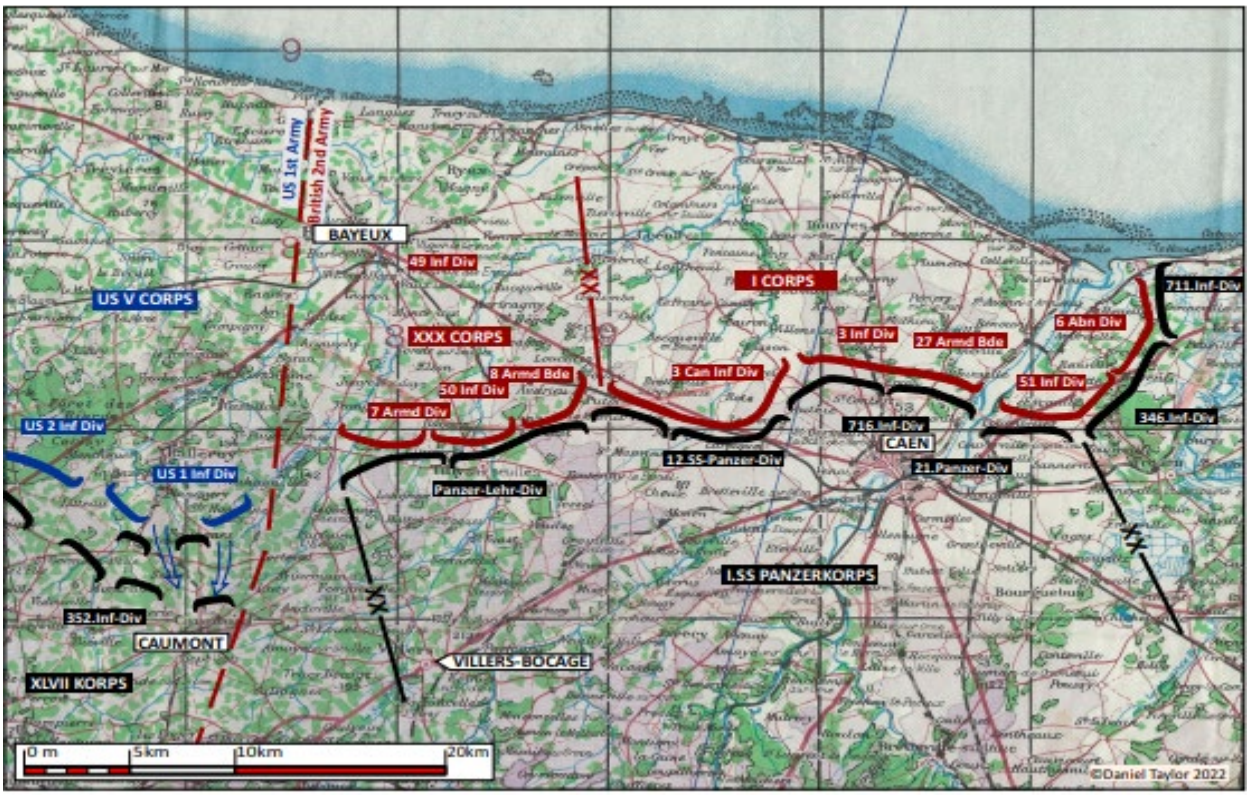
---

[527] Neither the 501st SS nor 502nd SS received Tiger II's until after 9 September, when they were ordered to refit and reorganize following the Normandy campaign. See: Michael Reynolds, *Steel Inferno: I SS Panzer Corps in Normandy* (New York: Sarpedon Publishing, 1997), 24; Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 271.

[528] *Feldherrnhalle* was kept in support of the 21st Panzer Division. See: Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 258.

[529] The Panzer *Lehr* Division was recorded as the first unit to be equipped with Tiger IIs, but Henschel informed the *Wehrmacht* that the tanks were not combat-ready and requested that Panzer *Lehr* conduct further trials with the tanks rather than deploying the tanks. The division went into combat in June, officially with three operational Tiger I's, but no official reports listing damaged Tigers exist. The exact fate of three Tigers and five Tiger IIs is unknown. See: Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 104.

[530] Michael Reynolds, *Steel Inferno: I SS Panzer Corps in Normandy* (New York: Sarpedon Publishing, 1997), 98-99.



531

Villers-Bocage was a small village among the farms of northern France, with little to distinguish it from any other small village among the hedgerows and farmland except French National Route 175, which went through the center of town. RN175 was of vital importance to both the Germans and the Allies, as it connected Avranches on the southwestern base of the Cotentin Peninsula with the strategically important city of Caen. When the Allies landed at Normandy, the British 'Gold,' 'Sword,' and 'Juno' beaches were all less than fifty kilometers from Villers-Bocage.

During the early morning of the 13th, the 1st Company of the 101st SS moved eight kilometers northeast of Villers-Bocage, along National Route 175, while the 2nd Company was

[531] Dan Taylor, *Battle of Villers-Bocage: Through the Lens* (Old Harlow, UK: Battle of Britain International, 2022), 9. Image used with Permission.

ordered to move two kilometers northeast to near Montbrocq and was ordered to strike against the Allies on the left flank immediately.[532] 2nd Company, led by SS-Lieutenant Michael Wittmann, had only five operational Tigers, and the Company assembled on Point 213, south of Panzer *Lehr*'s positions.[533]

On the evening of the 12th, the British 7th Armored Division received orders to advance south, clear out the Panzer *Lehr*, then advance northeast toward Caen along RN175. Field Marshal Bernard Montgomery, whom Eisenhower considered timid, was aware that a bold strike would challenge Eisenhower's perception of him.[534] Montgomery was so confident in his strategy that he wrote, "Will move on Villers-Bocage and Noyers tomorrow. All this very good, and Panzer *Lehr* may be in grave danger tomorrow."[535]

The lead element of the 7th Armored, the 4th County of London Yeomanry (CLY), had crept through the French countryside throughout the early morning. Expecting Germans, the British found only jubilation as they were met with French citizens overjoyed by their liberation. As they entered Villers-Bocage, British soldiers spotted a German eight-wheeled armored car observing the 4th CLY from a distance, but the only tank in position to fire at the Germans, a Cromwell, was so encumbered with external stowage it could not traverse its turret.

The 4th CLY, led by Viscount Lieutenant Colonel Arthur Cranley, was equipped with forty-nine Cromwell tanks, eleven M3A3 Stuart light tanks, and twelve M4A4 Sherman Firefly tanks. This Sherman variant had been retrofitted with a QF 17-pounder gun, one of the most

---

[532] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 205-206.

[533] Michael Reynolds, *Steel Inferno: I SS Panzer Corps in Normandy* (New York: Sarpedon Publishing, 1997), 100.

[534] Richard Overy, *Why the Allies Won* (New York: Norton Press, 1995), 164-166.

[535] "Letter to the Chief of Staff," quoted in Michael Reynolds, *Steel Inferno: I SS Panzer Corps in Normandy* (New York: Sarpedon Publishing, 1997), 99.

capable anti-tank guns in the Allied inventory, and its armor piercing, capped, ballistic capped (APCBC) round could penetrate 150 mm of armor at 1,000 meters – more than a match for the Tiger I.[536]

By 8:30, the 4th CLY had entered the village, encountered only two German soldiers – who immediately fled – and pushed its A Squadron along RN175 two kilometers further to Point 213, where little more than a German staff car was found.[537] The British, having not expected combat, had chosen to move along the road in column formation rather than in a combat formation.[538] In their rush to capture Point 213, which would have given an observation point and a defensive position, the reconnaissance units failed to conduct a thorough survey of the woods between Point 213 and Villers-Bocage.[539] The remainder of 4th CLY struggled to keep up with A Squadron, and they were strung out for two kilometers between the hill and the edge of the town.[540] The rapid advance and sudden stop to dispatch the staff car led to a traffic jam, and as frustration turned to boredom, crews left their vehicles. Many began to make tea; others wondered if there was fresh bread in the village below.[541] They were unaware that Michael Wittmann and his 2nd Company were positioned in an apple orchard just south of Point 213.[542]

---

[536] The APDS (armor piercing, discarding sabot) round could penetrate 256mm of armor at 500 meters and 223mm at 1000 meters. This was enough to penetrate the Tiger II, but there is no evidence that APDS rounds were used until late June. See: "Royal Armored Corps Training, vol III – Armament Pamphlet No. 7, SP 17-pr M10," *War Office* (July 1952), 100-124; Lorrin Bird and Robert Livingston, *WWII Ballistics: Armor and Gunnery* (Albany, NY: Overmatch Press, 2001), 60.

[537] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 130.

[538] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 206.

[539] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 130-135.

[540] Ibid, 135.

[541] Ibid, 135.

[542] David Porter, *I SS Panzer Corps at Villers-Bocage, 13 June 1944* (London: Amber Books, 2012), 132.

Michael Wittman had been serving since 1934 and joined the SS in 1936.[543] Assigned to *Leibstandarte* Adolf Hitler, Wittmann participated in the annexation of Austria and the Sudetenland in 1937 and 1938, respectively.[544] As a Sergeant, Wittmann commanded an armored car during the campaigns in Poland and France and was awarded the Iron Cross 2nd Class in 1941 for actions in Greece.[545] After the invasion of Russia in June 1941, Wittmann commanded both a StuG III and a Panzer III, and for combat actions, he was awarded the Iron Cross 1st Class and Wound Badge in black.[546] Wittmann was sent to a commissioning school for SS officers in December 1942, and over the course of the following year, Wittmann and his Tiger accumulated nearly seventy kills, many at the Battle of Kursk, where his platoon screened the *Leibstandarte*'s left flank.[547] Wittmann was awarded the Knight's Cross on 14 January 1944 and the Oak Leaves to the Knight's Cross on 30 January 1944, which made Wittmann the 380th member of the *Wehrmacht* to earn the second grade of the prestigious award.[548]

At 8:45, Wittman was warned of a column of British vehicles on RN175 moving toward Point 213, 200 meters to his north. Realizing he had likely already been spotted, Wittman ordered his company to hold fast, and he took the first operational Tiger he reached – Sergeant

---

[543] Peter Stockert, *Der Eichenlaubträger 1939-1945, Band IV* (Bad Friedrichshall, Germany: Friedrichshaller Rundblick, 1998), 338.

[544] Michael Reynolds, *Steel Inferno: I SS Panzer Corps in Normandy* (New York: Sarpedon Publishing, 1997), 4

[545] Ibid, 100.

[546] Patrick Atge, *Michael Wittmann and the Waffen-SS Tiger Commanders of the Leibstandarte in World War II, vol I* (Mechanicsburg, PA: Stackpole Books, 2006), 206.

[547] Tim Ripley, *The Waffen-SS at War: Hitler's Praetorians* (St. Paul, MN: Zenith Imprint, 2004), 150.

[548] Peter Stockert, *Der Eichenlaubträger 1939-1945, Band IV* (Bad Friedrichshall, Germany: Friedrichshaller Rundblick, 1998), 340.

(SS-*Unterscharführer*) Sowa's Tiger 222.[549] The other Tigers had mechanical issues, and none followed Wittmann on his individual action, but all managed to get into position to engage the enemy on Point 213.[550]

Little more than ten minutes later, Wittman's Tiger emerged from the woods and stopped on the soft shoulder of RN175.[551] Sergeant O'Conner of the 1st Rifle Brigade was in his half-track and managed to warn the stalled British column with the only recorded transmission of the morning: "For Christ's sake, get a move on! There's a Tiger running alongside us 50 yards away!"[552] Before the British armor crews could react, Wittmann destroyed a Cromwell, the last vehicle in the A Squadron's convoy, which prevented other vehicles from retreating.[553] A Firefly attempted to target the Tiger, but Wittman's gunner was faster, and the Sherman was also destroyed.[554] With two burning tanks blocking the road, the 4th CLY was unable to assist the elements of the 1st Rifle Brigade, 4th CLY's Headquarters section between Point 213 and the village, and the lead elements of B Squadron, which were entering the western edge of town.[555]

Wittman then turned his attention to the stalled column leading back to Villers-Bocage. Advancing along the road, he obliterated the majority of the 1st Rifle Brigade – thirteen M3 half-tracks, three Stuart light tanks, two Sherman forward observer tanks, the Brigade Surgeon's half-

---

[549] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 206.

[550] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 134-135.

[551] Michael Reynolds, *Steel Inferno: I SS Panzer Corps in Normandy* (New York: Sarpedon Publishing, 1997), 100.

[552] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 136.

[553] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 206.

[554] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 136.

[555] Ibid, 134-135.

track, and over twelve Bren and Lloyd gun carriers.[556] Vehicles burst into flame as 88mm shells and machine gun fire shredded the British, but there were relatively few casualties as the riflemen abandoned their vehicles for the safety of the ditches and hedgerows on the roadside.[557] Captain Christopher Milner of A Company recalled:

> The enemy attended first of all to the three motor platoons by…trundling back toward Villers, shooting up vehicles and riflemen section by section, with only the company's two 6-pounder anti-tank guns able to offer even a measure of resistance, which I learned afterwards they did with considerable bravery but with little effect.[558]

At the edge of town, Wittmann destroyed four more Stuart light tanks and three more Cromwells from the 4th CLY Regimental Headquarters. As he entered the village, the fourth Cromwell was in pursuit, hoping to strike the Tiger in its rear armor.[559] A shot from a 17-pounder that ricocheted off the front hull of the Tiger near the driver's vision block persuaded Wittmann to withdraw. Upon doing so, Wittmann encountered the fourth Cromwell, commanded by Captain Pat Dyas, 4th CLY's adjutant.[560] Dyas had little hope of damaging the Tiger, but his Cromwell managed two shots before it was destroyed.[561] As Wittmann's Tiger made its way toward the eastern edge of town, it was hit in the drive sprocket by a 6-pounder round that immobilized the tank but did not disable its gun. After spraying the immediate area with machine gun fire, Wittman and his crew bailed out, evaded capture, and managed their way to the Panzer *Lehr*'s

---

[556] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 206.

[557] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 136.

[558] Quoted in George Forty, *Desert Rats at War* (London: Ian Allen, 1977), 181.

[559] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 206.

[560] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 137.

[561] Ibid, 137.

divisional headquarters, where their battle report provided information for *Lehr*'s deployment against Villers-Bocage.[562]

On the same day, the 3rd Company, 101st SS (501st SS), attacked near Falaise and lost ten crewmen, including three tank commanders. The 1st Company destroyed nearly thirty tanks and armored carriers, and the remainder of Wittman's 2nd Company destroyed over ten tanks at Point 213.[563] Initially, the events of 13 June indicate either the British were unbelievably inept or the Germans were incredibly skilled; however, the truth is less clear-cut. Though Wittman has been recognized as a 'panzer ace' in literature from the mid-to-late Twentieth Century, recent analysis created a more nuanced narrative. Rather than being simply a "devastating, single-handed ambush" or "one of the most devastating ambushes in British military history," Wittmann's company and its tactical disposition – with a broken-down Tiger at the head of the column – was poor and was his solitary advance into Villers-Bocage with no gathered intelligence or concentration of forces was a grievous error.[564] Wolfgang Schneider, a German armor officer in the *Bundeswehr* and prolific German military historian, argued Wittmann's advance not only alerted the British to the presence of heavy tanks, which inhibited the effectiveness of the remainder of 2nd Company and Captain Rolf Möbius' 1st Company but cost the Germans the possibility of an even greater strategic victory against the Allies had they attacked in coordination.[565]

Moreover, the British position on the morning of the 13th was caused by a command error rather than ineptitude. When Wittmann began his attack, Colonel Cranley, 4th CLY's

---

[562] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 206.

[563] Ibid, 206.

[564] Henri Marie, *Villers-Bocage: Normandy 1944* (Bayeux: Heimdal, 2003), 159.

[565] Ibid, 159.

commander, was inspecting A Squadron's deployment on Point 213, Major Wright, commander of 1st Company, 1st Rifle Brigade, was also on Point 213, awaiting the officers and NCOs of his Operations Group, and A Company, 1st Rifle Brigade had parked their vehicles off-road, which limited the view of sentries posted along the road – sentries who were not expecting trouble and who were distracted by freshly brewed tea.[566] Thus, the command group for the 4th CLY and 1st Rifle Brigade were in no position to issue orders, which paralyzed their commands in a time of great need. Regardless of tactical errors on the Germans' part, the British errors were more critical, and the cost for this mistake was around two hundred twenty men killed, wounded, or captured, as well as almost thirty tanks. Many of the men captured were part of A Squadron, which had been cut off on Hill 213.[567] The Tiger was exceptionally effective in its given role, with some deviations from accepted doctrine, and the German propaganda campaign left an impression in Britain that the military worked to stamp out.[568] Michael Wittman was promoted to Captain (SS-*Hauptsturmführer*) and was awarded the Swords to his Knight's Cross, the 71st member of the Armed Forces awarded the third grade of the Knight's Cross.[569]

On a strategic level, the German achievement had been such that, though vastly outnumbered in the sector, they managed to force the British to feel insecure in their positions in

---

[566] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 134-135; Major RHWS Hastings, *The Rifle Brigade in the Second World War* (Aldershot: Gale & Polden, 1950), 350.

[567] There are a number of different reports regarding British casualties. Major RHWS Hastings and Daniel Taylor provide numbers that are generally similar, with Taylor claiming KIA figures are slightly higher than Hastings. See: Major RHWS Hastings, *The Rifle Brigade in the Second World War* (Aldershot: Gale & Polden, 1950), 352; Daniel Taylor, *Villers-Bocage: Through the Lens of the German War Photographer* (Old Harlow: Battle of Britain International, 1999), 85.

[568] David Porter, *7th Armored Division at Villers-Bocage:13 June 1944* (London: Amber Books, 2012), 137.

[569] Walther-Peer Fallgeibel, *Die Träger des Ritterkreuzes des Eisernen Kreuzes 1939-1945: Die Inhaber der höchsten Auszeichnung des Zweiten Weltkreiges aller Wehrmachtteile* (Freidberg, Germany: Podzun-Pallas, 2000), 43.

spite of having sufficient force to dominate the decisive points. The Germans were able to hold decisive points as long as they did because the British failed to realize Villers-Bocage was not a matter of inferiority but of poor leadership decisions in that instance and not a small measure of bad luck.[570]

At the end of June, the 503rd '*Feldherrnhalle'* left the training grounds at Ohrdruf en route to Caen, which was taken before the battalion could play a role. The battalion, attached to the 21st Panzer Division, established an assembly area ten kilometers away.[571] Early on the morning of 11 July, Lieutenant von Rosen, a *Zugführer* in the 503rd '*Feldherrnhalle'* received an alert order that indicated the British had broken through the German lines at Colombelles, a suburb of Caen on the northeast side of the city. In less than half an hour, the battalion was on the move.[572]

As the battalion commander was ill, the commander of the 3rd Company, Captain Scherf, filled in. This left Lieutenant von Rosen in command of the 3rd Company and the counterattack.[573] In a successful operation, von Rosen maneuvered 1st and 2nd Platoons with mutually supportive fire-and-maneuver tactics, which soon brought them within 200 meters of an enemy position outside Colombelles.[574] The company destroyed twelve Shermans, captured two more, and knocked out five anti-tank guns from the 148th Regiment of the Royal Armored

---

[570] Max Hastings, *Overlord: D-Day and the Battle for Normandy, 1944* (London, Pan Books, 1984), 163.

[571] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 145.

[572] Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 259.

[573] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 133.

[574] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 145.

Corps.[575] Any celebration was short-lived, however, as an artillery spotter plane appeared promptly, and shells began creeping toward the company. No Tigers were lost, and the company returned to its assembly area.[576]

Even with significant numerical inferiority, the Tigers were still able to engage any tank on the battlefield in mid-1944 effectively. But soon, the Tigers and their crews would encounter an enemy no tank could defeat – Allied bombing.

On 18 June, the British launched Operation Goodwood, a limited offensive aimed at fully capturing Caen and creating a breakthrough on Bourguebus Ridge.[577] Preliminary actions as part of Operations Greenline and Pomegranate were feints designed to fool the Germans into believing the main objective of Goodwood was west of the Orne River. If successful, these operations would remove the 9th and 10th SS Panzer Divisions from defending either against Goodwood or the American Operation Cobra.[578] Both operations were costly for the British, but the objectives were met and exceeded, as the 2nd Panzer Division also joined the defensive operations.[579]

Of Goodwood, Lieutenant von Rosen recalled:

> The offensive was prepared by 2,077 bombers, which dropped 7,800 tons of bombs, and 720 medium and heavy field pieces, which had 250,000 shells at their disposal. From 0545 to 0630, RAF bombers attacked the villages of Emieville and Cagny, as well as

---

[575] "Von Rosen's Report on the Operations of 3rd Company on 11 July 1944," reproduced in Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 259-263.

[576] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 133.

[577] J.R.M. Butler, ed., *Victory in the West: The Battle for Normandy* (London: Naval & Military Press, 1692), 331.

[578] Michael Reynolds, *Sons of the Reich: The History of the II SS Panzer Corps in Normandy, Arnhem, and on the Eastern Front* (Haverton, UK: Casemate Publishing, 2002), 46.

[579] J.R.M. Butler, ed., *Victory in the West: The Battle for Normandy* (London: Naval & Military Press, 1692), 334.

> Mandeville, the assembly area of the 3rd Company. That was a black day for Tiger battalion 503. Never before had such an Armada of bombers been employed. In comparison, in the attack on Dresden in February 1945, "only" 1,084 aircraft with the RAF and US Army Air Corps were employed, dropping 3,425 tons of ordinance… the battalion staff survived the carpet bombing in the tower of the old villa where the command post was located. The staff had no losses, but on that morning of 18 July, there was no communication with the staff of either the 22nd Panzer Regiment or the 21st Panzer Division. The 1st Company of 503 had lost tanks, but no personnel were killed. Just as was the case with the neighboring 1st Battalion of the 22nd Panzer Regiment, it was in the midst of a sea of craters. The tanks had to be dug out through intensive manual labor. There was no report from the 2nd Company. It appeared that it had been hit least by the carpet bombing. The 3rd Company seemed to be in the worst shape. Sergeant Westerhausen's tank had taken a direct hit and was thoroughly shredded. Sergeant Major Sachs' tank lay upside down on its turret… a number of tanks had such severe damage, especially to the running gear, that they were immobilized. Several had been pushed as much as a meter sideways by the air pressure. All of the tanks were buried in dirt and had to be dug out.[580]

Von Rosen led the 3rd Company with six Tigers – all the company had operational – in defensive positions near Maneville, where two Tigers were destroyed by friendly towed-88mm fire from Cagny.[581] With gun zeroes out of alignment from the shock of the heavy bombardment, the Tigers were able to repulse the British advance in all sectors, and the battalion was credited with over 40 tanks killed.[582] The battalion had taken substantial losses from the bombardment, but by the end of the 20th – the end of Goodwood – the battalion had thirty-two tanks operational.[583] 3rd Company ceased to be a viable fighting force, and as such, it handed over its last four Tigers to the 2nd Company. 3rd Company was transported to the rear to receive its Tiger II tanks. The unit

[580] "Report of Lieutenant von Rosen, 18 July 1944," in Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 262-263.

[581] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 133.

[582] Ibid, 133.

[583] Ibid, 133

history records that there were four hundred thirty-seven British tanks destroyed during Goodwood, though it only claims the battalion destroyed "many."[584]

Regardless of reasonable successes, the Germans recognized there were significant obstacles to moving the Tigers into and around Normandy. General Guderian recommended a change in tactics on 28 June, from concentration to dispersal, as well as close coordination with infantry and Panzergrenadiers in the hedgerows and vision-restrictive terrain.[585] In addition, all three battalions were used primarily as a mobile reserve, and they proved to be successful at countering enemy attacks. In dispersing the three battalions behind the divisional or Corps front line, each could quickly react to penetrations in the German defense. This was both a suitable employment as well as a pragmatic decision, as a concentrated Tiger battalion was likely to elicit a significant response from artillery and air support.[586]

One notable difference on the Western Front was that the Tigers were destroyed at a much higher rate than in Russia. This was not simply due to a greater concentration of airpower, as the three battalions lost thirty-two Tigers in direct combat from 8 July to 20 August.[587] This anomaly was due to a higher number of weapons fielded by the Americans and British that were capable of destroying a Tiger, especially in the close confines of the Normandy battlefields.[588]

---

[584] Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 269.

[585] Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol. 2, 1943-1945* (Atglen, PA: Schiffer Publishing, 1996), 182.

[586] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 145.

[587] Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1997), 110-111.

[588] Thomas Jentz, *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol. 2, 1943-1945* (Atglen, PA: Schiffer Publishing, 1996), 184-185.

Until the collapse of the Falaise pocket, the three battalions in Normandy were successful in destroying Allied tanks, and as General Guderian released improved doctrinal guidance, their employment became more effective. Doctrinal evolution allowed the Tigers to use the terrain to their advantage, and the battalions were able to counter or delay Allied advances. Their use as a mobile reserve widely dispersed along the entirety of the front facilitated little time lost when moving to counter the enemy. Reduced vehicle movement meant the battalions were able to minimize mechanical issues.[589] However, the Tigers could not alter the balance of power, shifting rapidly in favor of the Allies. After the collapse of the Falaise pocket, and by the end of August, the 503rd, 2nd, and 3rd Companies of the 101st SS and 102nd SS were lost to the Allies.[590] SS-Colonel Joachim Peiper stated:

> I am of the opinion that the Tiger would have fared better if one had not formed separate battalions. Instead, one should have incorporated an organic heavy company in every regiment. The Tigers would then have had a home, and they would have been employed with the lighter tanks in a more flexible and tactically more appropriate manner.[591]

The lost battalions were reconstituted and, bearing their new names, were deployed to their respective combat zones. 501st SS and the 506th were deployed to *Wacht am* Rhein, the offensive known as the Battle of the Bulge. 501st SS was attached to the 1st SS Panzer Division *Leibstandarte* as part of *Kampfgruppe* Peiper – the spearhead of the 6th Panzer Army. [592] The

---

[589] The units' histories for these battalions only mention maintenance issues inflicted through combat, either direct or indirect. See: Franz-Wilhelm Lochmann, Richard Freiherr von Rosen, and Alfred Rubbel, *The Combat History of the 503 in World War II* (Guilford, CT: Stackpole Books, 2000), 257-278; Wolfgang Schneider, *Tigers in Combat II* (Mechanicsburg, PA: Stackpole Books, 2005), 208-210, 266-268.

[590] 1st Company 101st SS had been in Paderborn, where they were trained on the Tiger II. They deployed to Paris for the duration of the Normandy Campaign, where they destroyed several Allied tanks. The majority of the Tigers lost were to bomb damage or falling into bomb craters, though two were lost to damage from Allied tanks. See: Wolfgang Schneider, *Tigers in Combat II* (Mechanicsburg, PA: Stackpole Books, 2005), 208-210,211-213, 266-268.

[591] Egon Kleine and Volkmar Kühn, *Tiger: The History of a Legendary Weapon, 1942-1945* (Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2004), 222.

[592] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 214.

506th, with twenty-two operational tanks, was attached as a mobile reserve for the 6th Panzer Army.[593]

During the last half year of warfare, the battalions as a whole were heavily engaged and were shifted from one front to another as a stop-gap force which fragmented their command capabilities and degraded effective record-keeping. In many cases, the Tigers were deployed to battle zones that were conducive to their strengths; the Ardennes Offensive was not such an operation. The winding tracks in the hilly terrain were soft, and the Tigers were unable to keep up the quick pace required of this offensive. Thus, SS-Colonel Peiper moved the 501st-SS to the rear of the formation.[594]

Both battalions played little part in this offensive, as they were too slow to keep up with the rapid advance, too heavy to travel off-road, and required heavy logistic and maintenance support. The 506th lost six Tigers in combat and another two to close air support, while the 501st-SS lost six as well but had to abandon ten due to lack of fuel.[595] Further, less than twenty Allied tanks were reported destroyed during the offensive.[596] This was not a reflection of the effectiveness of the Tiger against Allied tanks but instead of the deployment. Only a few Tigers were able to make it to the front, and there were similarly only a few Allied tanks with which to

---

[593] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 274.

[594] Patrick Agte, *Michael Wittmann and the Waffen-SS Tiger Commanders of the Leibstandarte in WWII, vol.II* (Guilford, CT: Stackpole Books, 2021), 272.

[595] See: Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 274-275; Gregory Walden, *Tigers in the Ardennes: The 501st Heavy SS Tank Battalion in the Battle of the Bulge* (Atglen, PA: Schiffer Publishing, 2014), 95-124.

[596] Wolfgang Schneider, *Tigers in Combat I* (Mechanicsburg, PA: Stackpole Books, 2004), 274-275; Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 214-216.

engage in combat. Their deployment here was not successful, and the Tigers lost could have been employed much more effectively in other pursuits.

Conclusion

From mid-1943 until the end of the war, the number of heavy tank battalions increased steadily in response to the progressively fraught situation on all fronts. The Tigers were deployed to every battle zone, and many battalions were destroyed and rebuilt more than once. In the fighting, their doctrinal role did not change, but their employment did; the Tigers were used in every role, from *schwerpunktwaffe* to front-line defense, to tactical reserve. Conceptually, the idea of concentration continued to remain problematic, as the Allies, with superior airpower, could effectively determine the position of heavy battalions with aerial reconnaissance and target them with naval or artillery bombardment or close air support. Defensively, the concentration principle was potentially valid, but in practice, the mechanical difficulties, extended ranges, and rugged terrain from one sector to another meant this principle inhibited the Tiger's overall effectiveness.

As in Russia, the Tigers were most effective in a reserve role when dispersed throughout different regiments or divisions, as Colonel Peiper had opined. This concept would have provided some mitigation to the restrictive terrain encountered in all theaters of the Western Front. Given the limited approaches northward through Italy, the Allies had few viable options short of launching successive amphibious operations over the length of the Italian Peninsula. Tigers proved more than capable against Allied ground forces in Italy, and their defense was crucial to holding Italy for the duration of the war.

Offensively, the heavy tank battalions continued to play havoc with the Allied armor, but they cannot be considered effective in their missions, as these tended to be either exceptionally

difficult or outright impossible given the capabilities of the *Wehrmacht* to provide adequate logistical support and a steady flow of spare parts. During this period – from early 1944 until the end of the war - the most significant success was in Operation Southwind and Operation Spring Awakening in Hungary, as in both offensives, the Tigers were highly effective, and they continued to be so in the delaying actions fought until their surrender on 20 Marc[h].[597]

The doctrines used by the Western Allies differed from the Soviets in regard to the Tigers. Whereas the Soviets had no qualms with attempting to close the gap with the Tigers to bring them within the kill radius of their guns, the British and Americans preferred to maneuver to avoid them. Thus, while there were undoubtedly confrontations between the Anglo-American and German armor, they happened with far less regularity.

The Western Allies also had an advantage the Soviets did not – the ability to bomb both German infrastructure and the heavy tank battalions. The Luftwaffe was, by 1944, overwhelmed on every front. Allied bombing was used not only to impede German manufacturing but to reduce the strength of armored formations as well. The effectiveness of British close air support is recalled by Horst Weber, an SS panzergrenadier of the 21st SS Panzergrenadier Regiment who fought with Kampfgruppe Knaust south of Arnhem during Operation Market Garden. During fighting with the British 43rd Wessex Division, Weber remembered:

> We had four Tiger tanks and three Panther tanks…we were convinced that we would gain another victory, that we would smash the enemy forces…then the Typhoons dropped these rockets on our tanks and shot all seven to bits. And we cried…we would see two black dots in the sky and that always meant rockets, then the rockets would hit the tanks which would burn. The soldiers would come out all burnt and screaming with pain.[598]

---

[597] Wolfgang Schneider, *Tigers in Combat II* (Guilford, CT: Stackpole Books, 2005), 217.

[598] The story of Horst Weber plays a central role in the presentation of the German experience as part of the Arnhem Adventure Tour. The founder, Ingrid Maan, focused her project on the lives of those in the city, not the political aspects. Horst Weber quoted in Antony Beevor, *Arnhem: The Battle for the Bridges*, 1944 (London: Penguin Books, 2019), 302. The original quote is found in Ingrid Mann, *Weggemoffeld!* (Alten, Netherlands: Fagus Publishing, 2015).

Close air support had a tremendous effect on the German formations and their ability to wage war. On 10 July, outside Mortain, Typhoons dropped eighty tons of bombs and fired nearly twenty-one hundred rockets in an attack that ended the German counterthrust before it had time to develop.[599] The 30th Infantry Division was able to hold on due to the close air support, and after the battle, General Eisenhower stated, "the chief credit in smashing the enemy's spearhead must go to the rocket-firing Typhoon aircraft of the Second Tactical Air Force…the result of the strafing was that the enemy attack was effectively brought to a halt, and a threat was turned into a great victory."[600]

Overall, on the Western Front, the Tiger battalions were inhibited by poor terrain, poor deployment methodology, inadequate support, and missions for which they were unqualified. The destruction of enemy tanks was not enough to rescue Germany from the fate that was, by mid-1944, decided.

[599] Richard Hallion, *The US Army Air Forces in World War II: D-Day 1944, Air Power over the Normandy Beaches* (Washington, DC: US GPO, 1994), 31-33.

[600] General Dwight Eisenhower quoted in Richard Hallion, "Airpower, from the Ground Up," *Air Force Magazine: The Journal of the Air Force Association* vol 83 (Summer 2000), 39-43.

Chapter Five

Conclusion

> We were in a patch of woods…working on our Jagdtigers. The news came that the Americans were in the village. We blew up the barrels of the assault guns. I had the company assemble for the last time. I cannot express in words how I felt at this last formation and what the faces of the soldiers revealed to me when we said goodbye…for me, the war was really over.[601]
>
> Lieutenant Otto Carius, 7 May 1945

An army is more than a simple collection of men; it is the sum of their collective experiences. The Tiger tanks were no exception; not only was each vehicle a collection of parts manufactured by firms across Germany the crews were men who had learned warfare across the various battlefields of Europe. As the individual infantryman learned to trust the men to his right and left, so too did the men in the Tigers learn to trust one another and their sixty-ton beast.

The purpose of this research was threefold. First, it was to establish that the Tigers were not combat-effective in the offensive role for which they were created. Secondly, the Allied research and development response created weapons that were effective against the Tiger and more lethal to less heavily armored German tanks. Lastly, the Tiger's most effective role was in the defense, dispersed along a wider front where a movement to contact could be limited. As the criteria for combat effectiveness eliminated kill claims due to reporting inaccuracy, the primary responsibility of the Tiger – the destruction of other tanks - where it undoubtedly excelled cannot be considered.

The Tiger program was not only ineffective in the offensive role for which it was created, but the tank also created more problems for Germany, which the Reich had no ability to solve, particularly in the aspects of logistics and manufacturing. Furthermore, the Tigers' success in the defense only served to influence the Allies to produce larger caliber guns or more effective close

---

[601] Otto Carius, *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius* (Lanham, MD: Stackpole Books, 1992), 224-227.

air support aircraft, both of which created greater dangers to the entirety of the German army. Lastly, the program as a whole was not cost-effective. There was very little benefit to the German war effort in destroying a Sherman that cost less than 20% of a Tiger when the US built over 50,000 of the M4. As the Americans built more Shermans in 1943 alone than the number of Panzer III, Tiger I, Tiger II, and Panther that the Germans built in total meant there would never be a number of destroyed tanks that made the Allied morale waver.

When taken as a whole, the Tiger was a costly tank that was complicated to build, difficult to maintain in combat conditions, and required rail transport for movement from one sector of the front to another. This latter detail was further complicated by the need for railcars designed for the heavy weight of the tank and their availability in a conflict spanning a continent, not to mention the thousands of kilograms of repair parts and petroleum products required per month per battalion placed a heavy strain on German logistics.

The Tiger was exceptionally effective at destroying other tanks, but as a breakthrough tank, it had been designed and built for an offensive war Germany was no longer fighting when it debuted outside Leningrad in mid-1942. Only two major offensives were launched while the Tigers were in service – the Kursk Offensive and the 1944 Ardennes Offensive. At Kursk, the battalions achieved mixed results. The 505th failed, as the doctrine plainly stated that the battalion could not operate effectively with only infantry support.[602] In the south, the 503rd was split, and each division in III Panzer Corps received a company of Tigers. Though this violated the doctrinal concentration principle, the Tigers were used in the initial assault, which failed in large part due to extensive minefields supported by pre-plotted artillery. The II SS Panzer Corps

[602] Lloyd Clark, *Kursk: The Greatest Battle, Eastern Front* (London: Headline Publishing Group, 2012), 195.

had the greatest success, as the engineers had cleared avenues through the minefields the night before the offensive. Based on the Soviet force distribution after the engagement at Prokhorovka, it is likely that Army Group South's tank forces would have been able to drive closer to Kursk had the offensive not been halted. However, this would not have led to victory at Kursk as the German planners failed to understand that the strategic reserve could quickly replenish front-line units to full strength.[603]

In the 1944 Ardennes Offensive, the Tiger II was so ill-equipped for the terrain that the 501st-SS was sent to the rear of the formation so as not to hold up the offensive, and the 506th was used as a mobile reserve for the 6th Panzer Army. Neither battalion played a large role, as only twenty Allied tanks were reported destroyed, at the cost of twenty-two Tiger IIs. Just in terms of cost per tank, this is extraordinarily disproportionate. When adjusted for inflation to 2022, each Sherman cost around $922,982 based on an average 1943 cost of $55,000 each. With similar parameters, a Tiger II, which cost $300,000 to produce in 1943, is the modern equivalent of $5,034,450.[604] Based on these numbers, in terms of tank value, the operation cost the Germans over $92 million modern American dollars in Tiger II losses alone. The tank was so unsuited to this mission the only explanation justifying its use was that the Wehrmacht had reached the point of desperation.[605]

---

[603] Mark Healy, *Zitadelle: The German Offensive Against the Kursk Salient, 4-17 July 1943* (Stroud, UK: History Press Limited, 2010), 109.

[604] "AEIR Cost of Living Calculator," *American Institute for Economic Research* (2022). Retrieved from https://www.aier.org/cost-of-living-calculator/?utm_source=Google%20Ads&utm_medium=Google%20CPC&utm_campaign=COLA&gclid=Cj0KCQjwkOqZBhDNARIsAACsbfIqveHgGOYEp8D8wnaoh6r1l2GwxB-0Pa3b7oCTgbG1YXqhx_L-kowaAgWqEALw_wcB. Accessed 3 October 2022.

[605] Gregory Walden, *Tigers in the Ardennes: The 501st Heavy SS Tank Battalion in the Battle of the Bulge* (Atglen, PA: Schiffer Military Publishing, 2014), 7.

In terms of cost, the figures from the Ardennes Offensive underpin the larger situation facing the German war effort. In 1944, when the Tiger II was first deployed, the United States produced as many weapons as all Axis powers combined, equivalent to 40% of the entire armaments production for all combatants on every front in the Second World War.[606] Given the strategic realities Germany faced by 1944, it is almost a miracle German production continued at all and that ammunition and vehicles continued to reach the front. Even so, Allied bombing severely inhibited production by late 1944, and the loss of crucial factories in the west and the loss of resources in the east strangled Tiger production. Five bomber raids between 22 September and 7 October 1944 destroyed 95% of the Henschel factory, resulting in the loss of six hundred fifty-seven Tiger IIs.[607] Another raid in December 1944 delayed production, but manufacturing limped along until Henschel shut down in March 1944.[608] These tanks may not have turned the tide, but they certainly would have been capable of defeating Allied tanks to defend Germany from the encroaching enemy armies.

During the war, the Tiger's necessity was questioned, as the war was no longer offensive in nature. One officer, General of the Artillery Fritz Brand, argued, "…the Wehrmacht had been in transition to an artillery battle since the middle of 1943. All efforts had to be directed towards this; all projects of over armament, such as tanks or close air support planes, were to be

[606] Max Hastings, *Armageddon: The Battle for Germany, 1944-1945* (New York: Alfred A. Knopf, 2004), 5.

[607] William Manchester, *The Arms of Krupp, 1587-1968: The Rise and Fall of the Industrial Dynasty that Armed Germany at War* (Boston: Back Bay Books, 1968), 498.

[608] Thomas Jentz and Hilary Doyle, *Kingtiger Heavy Tank, 1942-1945* (Oxford: Osprey Publishing, 1993), 17.

liquidated."[609] The same report claimed that one Tiger I contained enough steel to produce twenty-one 10.5 cm light field howitzers, the standard artillery piece for the German military.

From a tactical perspective, the heavy tank battalions were impeded by a flawed doctrine that was never updated and the failure of General Guderian's Inspectorate of Armored Forces to provide a defensive doctrine once it was apparent Germany was not going to regain the offensive initiative. The concentration principle, which was adhered to in German offensive warfare, was not appropriate for a vehicle the size of the Tiger. Demanding a full battalion attack a singular avenue of approach was an obvious indication of Germany's point of main effort, and once this became obvious, it was not difficult to shift defensive reserves to counter the Tigers.

By their nature and the cost of parts and maintenance – not to mention initial production – the Tigers were unlikely candidates for a feigned assault, even if using them as such may have drawn in a significant portion of the defending army. Further, the Tigers were not designed to exploit their own breakthrough rapidly. As witnessed at Kursk, the II SS Panzer Corps had broken through the first two defensive perimeters, but the supporting panzer divisions were unable to create their own breakthroughs to support the continued offensive. Aside from this, the Tiger's limited combat radius and constant maintenance concerns meant they were unsuitable for fighting beyond the *Schwerpunkt* in any case.

The Tigers were also used in ways that, while non-doctrinal, were commonly accepted, and this caused the unnecessary loss of valuable equipment. Their deployment against minefields is the primary example. It was acceptable to preserve manpower by allowing Tigers to plow through minefields, but this led to greater losses than were necessary once the tactic of defense in depth, where artillery and anti-tank guns fired with withering effect on Tigers disabled by mines

[609] Markus Pöhlman, *Der Panzer und die Mechanisierung des Kreiges: Eine deutsche Geschichte 1890 bis 1945* (Paderborn: Ferdinand Schöningh, 2016), 400.

became common practice, as was discussed in the North African campaign. The first Tiger captured by the British, Tiger 131 of the 504th, was captured in such a way; minimal damage caused the crew to bail out, and the tank, still operational, was able to be recovered by the British.[610]

The Tigers were most effective in the defensive, in a widely dispersed formation scattered among the panzer divisions operating along the same defensive line. As noted in Chapter Three, Tiger formations were often able to hold bridgeheads, such as at Narva, or pockets that had been completely encircled, as in the Courland Pocket. In the last case, the pocket held out for almost a year, and even though the bulk of the Soviet forces had bypassed the pocket on their way to Germany, the pocket still repelled six major attacks and remained intact until the end of the war.

Defensive operations suited the Tiger well in North Africa and Italy as well. In Italy, the Allies were only able to diminish the strength of the Tiger battalions by drawing them into local attacks, luring them into minefields, then hammering the disabled tanks with artillery and anti-tank guns. This tactic was in use in Italy as well, but due to the canalizing terrain, a company could hold up an Allied advance until it was forced to withdraw due to artillery and close air support.

On the Western Front, the Tigers had more to fear from the Allied air superiority than they did from the Allied tanks. The Sherman was woefully under-armored, but its weakness was not its gun but rather its armor and armament compared to the Tiger. Contrary to popular myth, the 75mm was not unable to damage the Tiger; instead, the Sherman was able to penetrate the

[610] Bruce Newsome, *The Tiger Tank and Allied Intelligence, vol III: Tiger 131 from Africa to Europe* (Coronado, CA: Tank Archies Press, 2020), 56.

Tiger's side armor at ranges of 650 meters with the M61 APCBC round in 1943.[611] While this distance is respectable, the fact remains that the Tiger I could penetrate the Sherman's 75mm frontal armor at over 2000 meters, and the Tiger II's longer barreled L/71 8.8cm cannon was hypothetically able to penetrate the Sherman at 3000 meters or more, though in gunnery tests the farthest target was 2500 meters, and shots penetrated 176 mm of armor – more than double the Sherman's armor thickness – at 2000 meters.[612] This disparity forced Allied planners to bypass the Tigers wherever it was possible and rely on bombing and close air support – or improvised hand-held rocket launchers, in one instance – to defeat the tanks in a manner in which the Germans could not retaliate.

The realization that the Tigers were largely impenetrable in 1943 led the Soviets and Western Allies to develop heavier caliber tank and assault gun armaments capable of leveling the battlefield. The Soviets developed the SU-152 in mid-1943, and it proved more than capable of penetrating 105mm of 90-degree armor at 1500 meters – more than a match for the Tiger's 60 mm side plates or 100 mm frontal armor, as was its successor, the ISU-152, which carried the same gun on an IS-2 chassis.[613]

The Western Allies also developed several weapons capable of countering both Tiger I and II based on extensive studies of Tiger 131 and Tiger 231 from the 504th and 501st,

---

[611] "US Army Ballistics Report," reproduced by Peter Samsonov, "Sherman vs. Tiger," *Tank Archives* (2013). Retrieved from http://www.tankarchives.ca/2013/03/sherman-vs-tiger.html. Accessed 3 October 2020.

[612] For the Tiger I ballistics table, see: Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Publishing, 1996), 9; for the Tiger II, see: Thomas Jentz and Hilary Doyle, *Kingtiger Heavy Tank, 1942-1945* (Oxford: Osprey Publishing, 1993), 23.

[613] A.G. Solyankin, M.V. Pavlov, I.V. Pavlov, I.G. Zheltov, and Anatoly Sorokin, trans., "Self-Propelled Gun ISU-152," *Russian Federation Publishing Center* (2005), 48. Retrieved from http://armor.kiev.ua/Tanks/WWII/isu152/1/. Accessed 5 October 2022.

respectively.[614] Some of these, such as the M26 Pershing, were hypothetically more than capable of defeating both Tiger I and II but saw limited action due to the American tendency to focus on General Leslie J. McNair's tank destroyer doctrine, which argued American tanks were primarily for infantry support and breakthrough exploitation while tank destroyers were the primary anti-tank vehicle; this doctrine limited advancements in American tank technology, such as upgrading existing platforms or producing tanks with larger caliber guns.[615] Thus, while the Soviets and British worked steadily to improve the tanks they fielded against the Germans, leading to an arms race of sorts by late 1943 when the British began development of the Centurion and the Soviets researched improvements that led to the T-34-85 and the IS series, American tank development stagnated.

The American complacency was based on the idea that the M4 Sherman was superior to the Panzer III and IV, a concept that was flawed after the Germans introduced the 7.5cm KwK L/40 cannon. However, it was believed this threat was minimal, as was the threat posed by the Tiger and Panther, which had appeared only in limited numbers by that point in the war.[616] The result was that the major development in tank research from 1943-1944 was the T23 electric transmission.[617]

There may have been little interest in upgrading tanks, but the American tank destroyers, particularly the M36 tank destroyer, had success against the Tiger and Panther. [618] The M36,

---

[614] Bruce Newsome, *The Tiger Tank and Allied intelligence vol. III: Tiger 131 from Africa to Europe* (Coronado, CA: Tank Archives Press, 2020), 87-89.

[615] Steven Zaloga, *Armored Thunderbolt* (Lanham, MD: Stackpole Books, 2008), 102–108.

[616] Ibid, 78-85.

[617] R.P. Hunnicutt, *Pershing: A History of the American Medium Tank T20 Series* (Novato, CA: Presidio Press, 1999), 81-82.

[618] George Forty, *Tiger Tank Battalions in World War II* (Minneapolis, MN: Zenith Press, 2008), 109-111.

with a 90mm cannon, was able to destroy German heavy tanks at the range, and despite its light armor, was an effective counter against the German heavy tanks, except the Tiger II, which it could only penetrate in certain spots along the rear armor.[619] This vehicle entered service in 1944 and was used extensively by the US First, Ninth, and Third Armies, which replaced the M10 tank destroyer and towed anti-tank guns with this vehicle.[620]

The British created several variants of American vehicles that were far more effective than the tanks and tank destroyers produced by the Americans. One, the Sherman Firefly, mounted a QF 17-pounder on the M4A1, the M4A3, and the M4A4 to produce multiple variants of the weapon system.[621] The British did not improve the Sherman's vulnerable armor, but the 17-pounder was more than capable of defeating both the Panther and Tiger, which influenced Field Marshall Bernard Montgomery to equip the 21st Army Group with the Firefly prior to the Normandy amphibious landings.[622]

As the Firefly was a stopgap weapon, certain deficiencies were never ironed out. For example, the 17-pounder created a large plume of smoke and dust when it fired, which gave away its position during the day. At night, the muzzle flash "…was so brilliant that both gunner and commander need to blink at the moment of firing. The muzzle flash spurts out so much that, after a shot or two, the hedge or undergrowth is likely to start burning."[623] The Germans realized

---

[619] Harry Yeide, *The Tank Killers: A History of America's Tank Destroyer Force* (Drexel Hill: Casemate Publishing, 2007), 174-175.

[620] Ibid, 175.

[621] George Forty, *Tiger Tank Battalions in World War II* (Minneapolis, MN: Zenith Press, 2008), 112.

[622] Marc Milner, *Stopping the Panzers* (Lawrence, KS: University Press of Kansas, 2014), 1.

[623] The author was a member of the 1st Northamptonshire Yeomanry and was a Firefly gunnery and commander in Normandy. See: Ken Tout, *Tanks, Advance!* (New York: HarperCollins Publishers, 1989), 130.

the longer barreled tanks posed a greater threat to their own armor, so British crews went to great lengths to conceal their barrels and generally sought a new position after one or two shots.[624]

The most significant aspect of all these weapons is their firepower. With the Tiger, the Germans had sought to reclaim the qualitative advantage over their enemy – an advantage one could argue never existed at all based on statistical data from the French tanks compared to the German armor during the 1940 Campaign. But the Tigers did accomplish this goal spectacularly and held that advantage until these new Allied weapons began to emerge from their factories and were deployed on the battlefield. They were not just capable of defeating the Tigers but every other German tank on the field as well.

As discussed, the Germans had begun the war with the belief that the Panzer III would be the primary tank versus tank weapon, while the Panzer IV would support the infantry in its breakthrough operations. Yet, by 1943 the Panzer III was phased out of service after a six-year production run of 5,775 tanks.[625] This indicates the tactical situation had shifted beyond being outgunned by the KV-1 and T-34, but that armored warfare had progressed to a point much like the Dreadnought naval arms race prior to the First World War for Germany in particular – Hitler wanted heavier tanks with larger armaments that were able to defeat any opposing vehicle and survive the encounter, at least until after Kursk, when only the designs for the Tiger II survived his newfound infatuation with the StuG.[626]

---

[624] David Fletcher, *Sherman Firefly* (Oxford: Osprey Publishing, 2008), 61–68.

[625] See: Robert Jackson, *Tanks and Armored Fighting Vehicles* (Bath, UK: Parragon Publishing, 2007), 73; Thomas Jentz and Hilary Doyle, *Panzer Tracts 23: Panzer Production from 1933 – 1945* (Boyds, MD: Panzerwrecks Publishing, 2002), 7.

[626] Albert Speer, "Führer Conference Notes," as quoted in Eric Muirhead, "The Tiger Gap: Culture Contradiction, and Clausewitz in German Armored Warfare in World War II." *University of Tennessee* (2019), 65. Accessed 15 November 2021. https://trace.tennessee.edu/cgi/viewcontent.cgi?article=6850&context=utk_gradthes

Until mid-1943, the decision to produce the Tiger seemed to be reasonable. Germany had been pushed back from Stalingrad, but the Russian counteroffensives had been halted due in no small part to the Tigers, and even if Germany no longer had the ability to launch offensives on the scale of Barbarossa, it certainly could launch localized offensives that could drag the war into a stalemate. In May 1943, Germany controlled vast swathes of the Russian heartland and the majority of Europe. The war was not going as planned, but the situation was manageable; Germany still had the ability to implement strategies that would improve efficiency across the armaments industry. Instead, Hitler threw his faith behind the Tiger program, as he ordered the termination of the Tiger I in favor of the untested, more expensive Tiger II.

By 1944, the Tiger could no longer be considered a *Schwerpunktwaffe*, as it was being used wherever it was deemed necessary, regardless of the existence of adequate maintenance facilities or supply. This put the Tiger battalions in a difficult position; if they were successful despite their mistreatment, the heavy tank battalions would be cast into increasingly difficult – or impossible – missions for which the Tigers were not created. Every victory would have fed the German propaganda machine further, and this would have had the additional effect of encouraging the Allies to target the battalions and their required support facilities more heavily. Propaganda had used men like Michael Wittman, sitting on their Tigers in pictures that resembled crusading knights mounted on their steeds, to paint the war as an all-or-nothing struggle of 'us' versus 'them.' Newsreels featured footage of the battles and depicted the German soldier as defiant against the might of the Allied onslaught.[627] This forced Germany to continue

[627] "Die Deutsche Wochenschau 1944," No. 726 (August 1944). *Net-Film.ru Newsreel Collection* (item no. 55104). Retrieved from https://www.net-film.ru/en/film-55104/?search=q55104. Accessed 7 October 2022.

the Tiger regardless of any misgivings they may have had due to the control Hitler held over the armaments industry.

The soldiers in the Tiger battalions had grown concerned over the negative effects of continued Tiger production as well. While senior commanders continued to order the battalions into inadvisable engagements, convinced the Tiger's firepower would prove to be an insurmountable obstacle, the reports from junior officers paint a far different story. After a failed defense in January 1944, Captain Lange of the 506th lamented:

> our understanding still remains the same as a year ago, that the Tiger is a battering ram in the attack and a bump stop to be used at the *Schwerpunkt* in the defense. It is to stand ready in sufficient numbers for the higher command to use at the decisive moment. However, this can occur only if, in between the main battles, time is given for care and maintenance instead of being continuously employed as mobile bunkers…it is not bearable that the Tigers must continuously stand as morale support behind the forward line.[628]

Captain Lange was alluding to the use of Tigers to bolster morale amongst the poorly trained infantry. As tanks were forbidden to hold positions while under anti-tank and artillery fire, the Tigers pulled back as soon as an enemy assault began, which also pulled the infantry away from their defensive positions. Thus, the forward lines were not defended to the fullest unless the panzers held firm as well.

Officers in battalions refitted with Tiger II's – the 501st, 505th, and 506th - were no more satisfied with the conditions on the front, particularly with the treatment of the battalions, than they had been prior to their destruction during Operation Bagration. In a report dated 25 November 1944, Captain Fromme of the 503rd complained:

…the action was limited to small tasks, especially counterthrusts with weak infantry forces against the enemy…however, these caused the Russians to forbid their units from conducting any major combat attacks where Tigers were located. During this week…the

[628] "Battle Report of Captain Lange, 15 January 1944," reproduced in Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 142-144.

Abteilung was not given enough time to perform maintenance in spite of urgent requests being continually made. This was partially due to the situation, but also partially due to the lack of understanding of the higher command to which the unit was subordinated…As a result of a lack of towing capacity, the Abteilung was faced with either blowing up the broken-down Tigers beyond the main battle line or recovering them with Tigers that were still operational. Naturally, this resulted in mechanical breakdowns…the few operational Tigers that were left were shoved from division to division and given tasks that were not achievable and could not be carried out.[629]

Interwar German tank design had been based on the concept of expanding and mechanizing the infiltration and stormtrooper tactics from World War I as a way to prevent an attritional war, but the lessons had been all but ignored. One senior German officer, Colonel Kurt Thorbeck, the head of the Rifle Testing Commission, complained disgustedly to the General Staff in 1920 that "the German General Staff did not properly recognize the material demands of a world war and therefore did not correctly prepare for the war in peace." His report further excoriated the General Staff, which, while filled with tacticians, included no technicians to present reports of equipment deficiencies.[630] Thorbeck's most damning condemnation, however, may as well have been written as a post-WWII analysis: that the General Staff wasted money and effort on equipment it did not need, or that was unlikely to provide any real benefit, such as the 82.5 million Marks spent on infantry body armor which could have been spent on tank development.[631]

The failures in the Soviet Union led the German logistical system to realize its resource and industrial capabilities were flawed, and rather than alter the framework, German military

---

[629] Report of Captain Fromme, 25 November 1944," reproduced in Thomas Jentz, *Germany's Tiger Tanks: Tiger I & II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 152-153.

[630] Colonel Kurt Thorbeck, *The Technical and Tactical Lessons of the World War* quoted in James Corum, *The Roots of Blitzkrieg: Hans von Seekt and German Military Reform* (Lawrence, KS: The University Press of Kansas, 1992), 23.

[631] Ibid, 23.

planners chose to revert to the mantra drilled into their military profession since the mid-1800s – that of the offensive. Thus, the Tiger was not only a product of a flawed theoretical framework, but it was also created in a nation that had a history of failing to learn the lessons from previous wars where its focus on research and development was concerned. The concept was relatively understandable, given that Germany was in no position to enter another war that developed into attritional combat, and it was incredibly appealing. Invulnerable tanks need relatively low replacement numbers, and if this tank came equipped with a cannon that could destroy any enemy tank, the result would be an economic war of attrition that undermines the enemy's long-term ability to wage war.

An increased focus on the Panther would have allowed the panzer divisions to become more flexible than they were given when Tiger battalions were attached. As a predecessor to the modern main battle tank, the Panther statistically satisfied almost every requirement.[632] It had the same engine as the Tiger I, which gave it the speed and maneuverability of a light tank, but with sloped frontal armor, it had the protection of a heavy tank. Its long-barreled 7.5cm KwK 42 L/70 was extraordinarily powerful, even when compared to tanks with cannons of a higher caliber, and all these features came packed in a tank weighing under 50 tons.[633] From Germany's perspective, the Panther, unlike the Tiger, was designed with standards of increased production efficiency in mind.[634] The major drawback, outside of the 'teething troubles' witnessed with initial production models, was the thin side armor, which made the Panther vulnerable to

[632] Steven Zaloga, *Panther vs. Sherman: Battle of the Bulge 1944* (Oxford: Osprey Publishing, 2008), 75.

[633] Thomas Jentz, *Germany's Panther Tank: The Quest for Combat Superiority* (Atglen, PA: Schiffer Military Publishing, 1995), 23, 127-129; Comparison between the Tiger I and Panther can be found in Thomas Jentz, *Germany's Tiger Tanks: Tiger I and II Combat Tactics* (Atglen, PA: Schiffer Military History, 1997), 13-14.

[634] Mark Healy, *Zitadelle: The German Offensive against the Kursk Salient 4-17 July 1943* (Stroud, UK: The History Press Limited, 2010), 135-148.

flanking fire and thus unsuitable for breakthrough assaults. However, this issue could have been mitigated by the much lower cost in terms of time and resources, as Germany would have been able to focus more heavily on artillery and StuGs as a means to achieve a breakthrough.

The reality was that the Tiger program only served to undermine the German industrial pool, which could have served to focus on the production of more efficient tanks, on producing fuel that was desperately needed by the Luftwaffe, or on raw materials that could have been allocated to more effective weapons. The Tiger, rather than becoming a vehicle that inspired future innovation, was the first stumbling block on a path to obsolescent that was the eventual fate of the heavy tank on a global scale. In an echo of the naval arms race that preceded the First World War, tank armor and armament would reach a point where no amount of armor could keep a heavy tank alive on the modern battlefield.

Appendix A

Abbreviations

schwere Panzerabteilung - s.Pz.Abt; heavy tank battalion

schwere SS-Panzerabteilung - s.SS-Pz.Abt; heavy tank battalion assigned to the SS

schwere Panzer-Kompanie – S.Pk; heavy tank company

Kriegsstärkenachweisung – KStN; Table of Organization

Sonderkraftfahrzeug – Sd.Kfz – special purpose vehicle; numbers were assigned to armored, tracked, and half-tracked vehicles. Sd.Kfz 181 was assigned to the *Pz.Kpfw VI Ausf. E* "Tiger"; Sd.Kfz. 182 was the *Pz.Kpfw* Tiger *Ausf. B* "Tiger II."

Panzerkampfwagen – Pz.Kpfw; armored fighting vehicle

Ausführung – Ausf.; variant

Appendix B

Heereswaffenampt Offices

As mentioned in Chapter Two, HWA was broken in thirteen offices and their responsibilities were either in armaments development or testing. The offices are as follows:

Wa Prüf I: ammunition

Wa Prüf II: infantry light weapons and general equipment

Wa Prüf III: Chief Design office

Wa Prüf IV: artillery

Wa Prüf V: engineering equipment

Wa Prüf VI: tank design and development

Wa Prüf VII: signaling equipment

Wa Prüf VIII: optics and observation equipment

Wa Prüf IX: chemical weapons

Wa Prüf X: rockets

Wa Prüf XI: administration

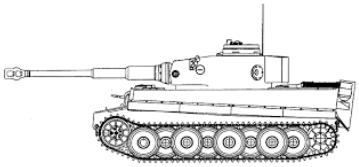
Wa Prüf *Fest*: equipment and armaments for fortifications

Wa Prüf *Forschung*: research

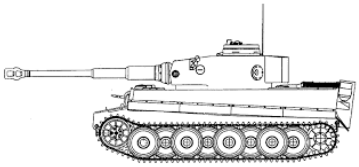
Appendix C

KStN 1150d, May 8,1942

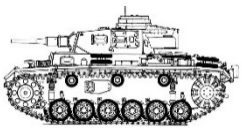
N. Zug



Tiger



Tiger



Panzer III

L. Zug

Panzer III

Panzer III

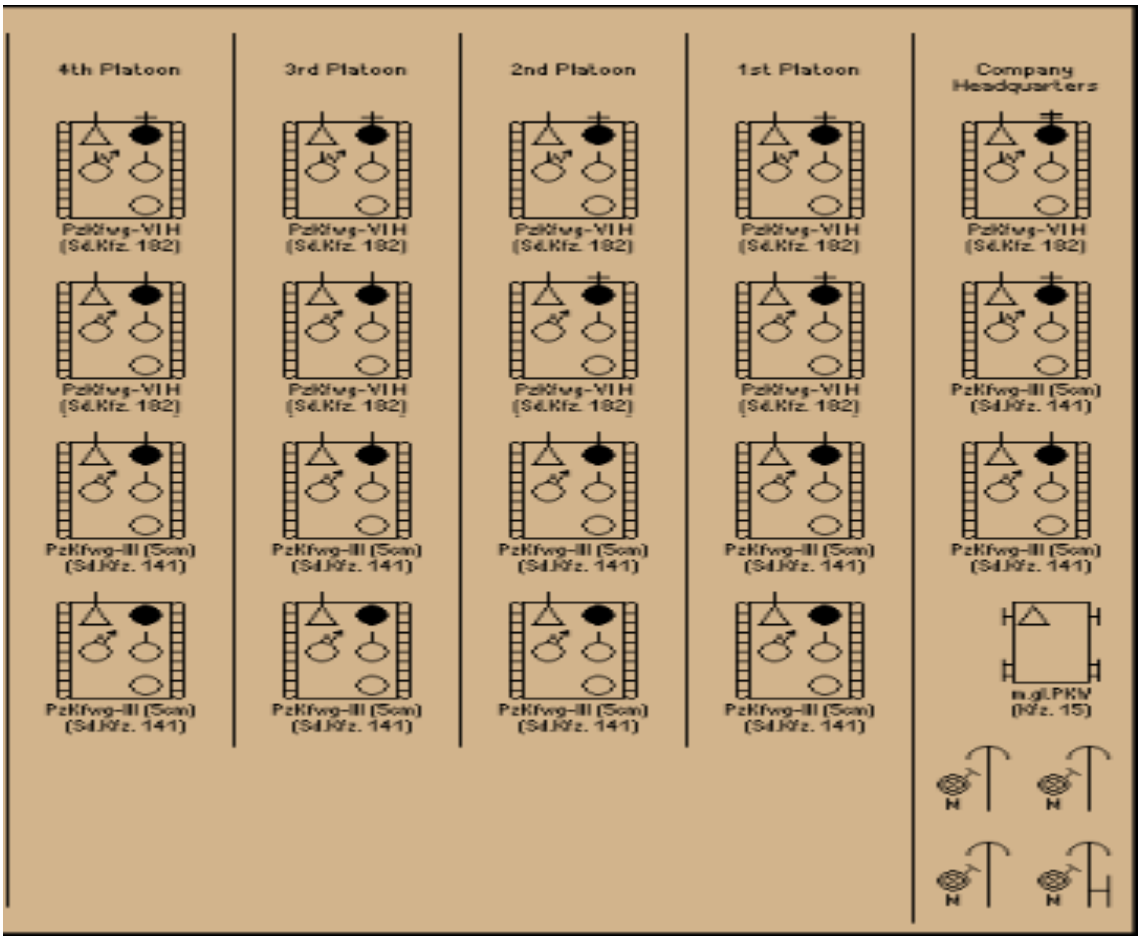
Panzer III

Panzer III

Panzer III

Appendix D

KStN 1176d, December 15, 1942

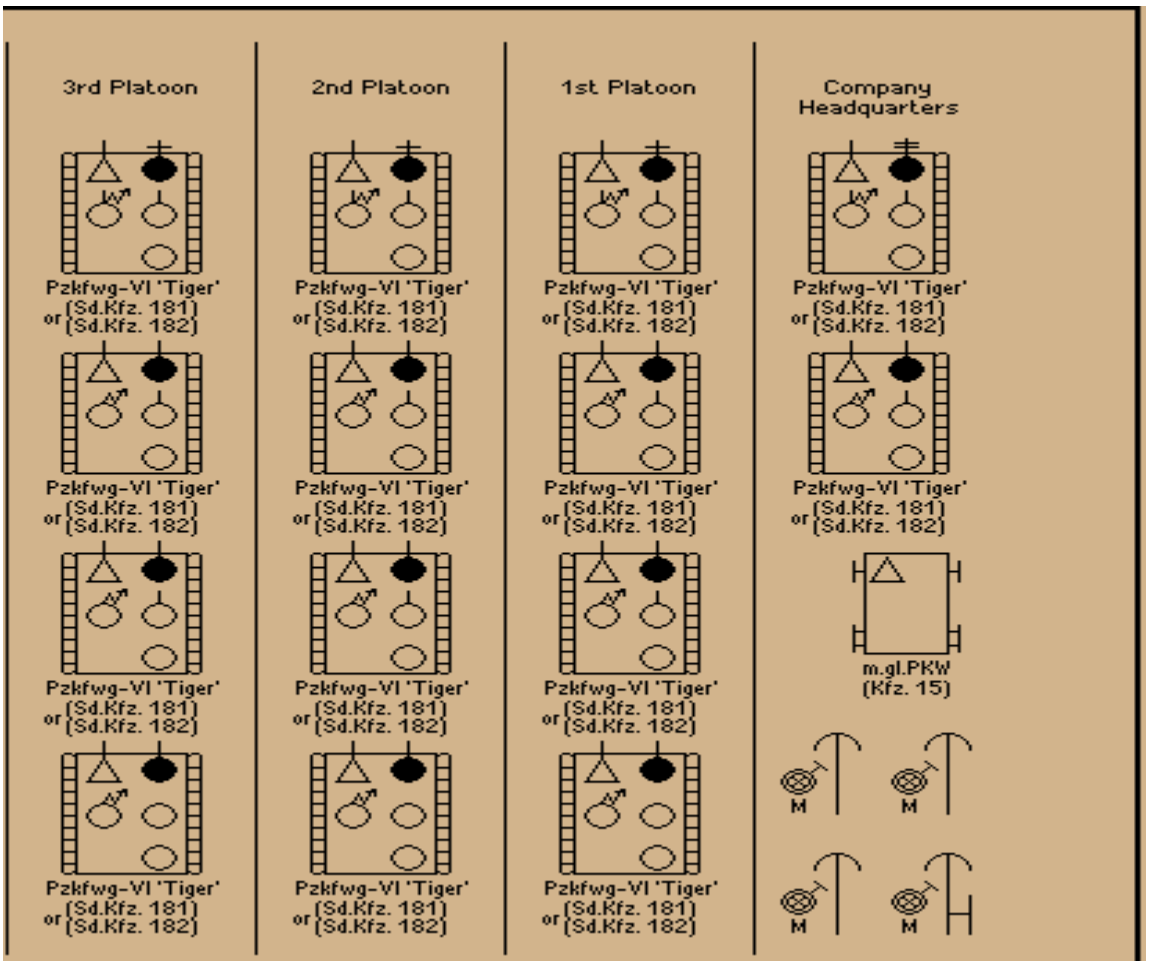


635

[635] KStN 1176d reproduced by Dr. Leo Niehorster, "World War II Armed Forces: Orders of Battle and Organizations," *www.niehorster.org/index.htm*. Accessed 5 May 2022.

Appendix E

KStN 1150e and 1176e, March 5, 1943



636

[636] KStN 1150e and 1176e reproduced by Dr. Leo Niehorster, "World War II Armed Forces: Orders of Battle and Organizations," *www.niehorster,org/index.htm*. Accessed 5 May 2022.

Appendix F

Merkblatt 47/a29, May 20, 1943

A: Purpose, Tasks, and Organization of the *schwere Panzer-Kompanie*

1. The great firepower, strong armor, high terrain crossing ability even in winter, and strong overrunning power are the characteristics of the *schweren Panzerkampfwagen* in the *Tiger-Kompanie*. They enable the company to:

a.to attack in the first wave against strong defenses
b. to destroy heavy enemy tanks and other armored targets already at long ranges
c. to decisively defeat the enemy defenses
d. to break through positions reinforced by defensive works

2. The *schwere Panzer-Kompanie* is the strongest combat weapon in the *Panzerwaffe*. As a rule, they will be employed within the *schwere Panzer-Abteilung* in order to quickly break enemy resistance and penetrate into their defenses by utilizing concentrated effective fire superiority while protected by string armor.

3. The heavy weight of the *schwere Panzerkampfwagen* restricts the use of many bridges, calls for reinforcing bridges, or preparation of special road and bridging equipment and advance scouting of fords.

4. The *Kompanie* is organized as:

a. *Kampfstaffel* (combat echelon)
Kompanietrupp (company headquarters) with two Pz.Kpfw. VI
1.-3. *Zug* (1st to 3rd Platoon) each with four Pz.Kpfw VI
b. *Raederstaffel* (wheeled echelon)
Kompanietrupp (company headquarters
Sanitaets-Dienst (medics)
Kfz. Instandsetzungsgruppe (vehicle maintenance section)
Gefechtsross I (combat trains I)
Gefechtsross II (combat trains II)
Gefechtsross III (combat trains III)

B: Training on the *Panzerkampfwagen*

5. Training on the *Panzerkampfwagen VI* is conducted in accordance with the following manuals:

a. *Merkblatt* for the training on the *Panzerkampfwagen VI Tiger*
b. D 214 equipment instruction for the 8.8 cm Kw.K. 36
c. Firing instructions and firing exercises for the *Panzerkampfwagen VI Tiger*
d. D656/22 equipment description and operating instructions for the Pz.Kpfw. VI turret

e. D656/21 equipment description and operating instructions for the chassis

f. Handbook for the driver of the *Panzerkampfwagen VI Tiger* D656/23 (including preventative maintenance guide)

g. Panzer radio operation H.Dv. 421/4, D613/12, and D10008/1

h. D659/2 loading for rail transport

i. D659/4 recovery of *Panzerkampfwagen*

C: The individual *Panzerkampfwagen*

6. The individual *Panzerkampfwagen IV* accomplishes its combat missions within the *Zug*, as an exception, in *Halbzeuge* (sections) and as individual Panzers to guard the rest and assembly areas of its own unit. The loss of the platoon leader or section leader, loss of contact with the platoon leader or section leader, rapidly changing battles, as well as close terrain an often demand independent handling of individual *Panzerkampfwagen.*

7. With its main weapon, the 8.8 cm Kw.K, the Pz.Kpfw. VI engages as priority: 1. Armored targets and bunker embrasures with *Panzer-grenaten* (armor-piercing shells), 2. Nests of resistance, anti-tank guns, artillery positions, and massed targets (such as columns and reserves) with *Sprenggrenaten* (high explosive shells), 3. The long range of the 8.8 cm Kw.K makes it possible to bring effective fire down on targets already at long distances.

8. Using a gunner's quadrants, long range fire is possible at long ranges of up to 9000 meters. Worthwhile employment of the weapon against enemy artillery or massed targets comes into question only at ranges up to 5000 meters by good observation if the *Panzerkampfwagen* cannot drive any closer to the target because of barricades and terrain obstacles or if the targets will be available only for a moment.

9. The 8.8 cm Kw.K will be fired while halted. The *schwere Panzerkampfwagen* is to be brought into firing position with its front facing toward the enemy fire (striking angle and thicker armor protection). Take up hidden and hull-down firing positions.

10. The flat trajectory of the 8.8 cm shells requires special attention to safety when firing over our own troops.

11. With the turret and hull machine guns, the Pz.Kpfw. VI charges into the firefight at close and short ranges, engaging unarmored targets. Massed targets can also be successfully engaged at ranges of up to 800 meters.

D. The *Zug* (platoon)

I. General

12. The *Zugführer* (platoon leader) is responsible for the combat readiness of his platoon. Following orders from the company commander, he leads the platoon by radio, example, and signals.

13. The *Zug* consists of four *Panzerkampfwagen VI.* It is organized as two *Halbzeuge*. During separate employments, the *Zugführer* commands the *1. Halbzug* and *Halbzugführer* (section leader) the *2. Halbzug*.

II. Formations and Movements

14. The following are descriptions of the optimal formations for the *Tiger Zug*: 1. *Reihe:* used for marches and assembly, formation was as a straight line from north to south when viewed from above. Intervals for assembly was 10 meters and for marches 15 marches. 2. *Linie*: used for assembly, formation was as a straight line from east to west when viewed from above. 3. *Doppelreihe* – used for approach marches and attacks. Intervals in combat were 150 meters between sections and one hundred meters in depth. The formation was as a square, with the *Zugführer* at either the upper right or upper left corner when viewed from above, dependent upon the position from where he could best direct the platoon, and the *Halbzugführer* was at the other upper corner, at a position from which he could assume leadership of the platoon. 4. *Keil*: the most useful attack formation. Intervals were set at one hundred meters to the front and sides. When viewed from above, the *Keil* resembled the *Doppelreihe*, and only differed in the lower two Tigers were a 45-degree angle offset from the lead *Panzerkampfwagen*.

III. Combat

15. The *Zug* builds a combat unit within the *Kompanie*. Employment with or attachment to a *mittlere Panzer-Kompanie* (medium tank company) or *Panzer-Grenadier* (heavy, mechanized infantry) creates the exception. It can be necessary to reinforce the *mittlere Panzer-Kompanie* for special missions (as the point element), to support the *Panzer-Grenadiere*, by crossing rivers and engaging a position reinforced with defensive works.

16. The *Zug* conducts an attack by continuously shifting rapidly between fire and movement. The *Halbzeuge* and individual Panzers mutually support and guard each other's advance. Short halts to fire and rapidly driving to the next firing position are recommended. Long bounds are to be made, never under two hundred meters. The direction of travel and the firing positions are to be frequently changed by utilizing cover offered by the terrain.

E. The *Kompanie*

I. General

17. One of the two Pz.Kpfw. VI found in the *Kompanietrupp* serves as the commander's vehicle, and the other as a reserve vehicle. The three motorcycle passengers found in the *Kompanietrupp* are used to deliver orders. When an action starts, along with the commander's car, they are to join *Gefechstoss I* (first battle push).

II. Formations and Marches

18. The following are descriptions of the optimal formations for the *schwere Panzer-Kompanie*. 1. *Kolonne*: When viewed from above, this formation, used for assembly, appeared as three rows of vehicles. At the head of the three rows were the *Zugführer*, with the remaining three Tigers aligned. At the center row was the *Kompanieführer* and the second Tiger from the headquarters, which made the center row six vehicles and the other two rows four vehicles. 2. *Doppelreihe*: Used for approach marches, all Tigers were in a row facing the direction of travel, with the exception of one *Zug*, which would travel beside the formation on the side of the most likely enemy attack. 3. *Keil*: as described above, this formation was a narrow attack formation. A *Zug* was in the lead, the other two *Zuge* were at a 45-degree angle behind the lead *Zug*, and the two Command Tigers were in the center. This formation occupied an area seven hundred meters wide and four hundred meters deep. 4. *Breitkeil*: Similar to the *Keil* in area

and composition, the *Breitkeil* found two *Zuge* in the lead, the command element in the center, and the third *Zug* to the rear.

III. Command

19. The same principles that apply for leading a *mittlere Panzer-Kompanie* apply in general to leading the *schwere Panzer-Kompanie*.

IV. Marches

20. The march route requires especially thorough scouting because of the width, length, and weight of the *schwere Panzerkampfwagen*. Aerial photographs are to be used to spot hairpin curves, narrow angled streets in villages, and narrows.

In general, the *schwere Panzerkampfwagen* can drive over every short bridge that will carry the Pz.Kpfw IV.

21. On long stretches, the *Tiger-Kompanie* cannot march within the columns of motorized or other Panzer units, especially not in unknown terrain, because bridges and narrows can be obstacles for the Tigers that will endanger the flow of the march for the entire unit.

22. During night marches, especially on dark nights, it is useful to have a crew member sit on the forward outer corner of the track guards of the *schwere Panzerkampfwagen* in order to instruct the driver by shouting through the open driver's hatch.

23. The *schwere Panzerkampfwagen* requires many maintenance halts. A maintenance halt is to be ordered after the first five kilometers and then every 10 to 15 kilometers.

24. Basically, soft lanes should be used for marches because the hard surfaced and high crowned roads cause heavy stress on the running gear, especially the inner roadwheels. The average speed for a daytime march in 10-15 milometers per hour, by night 7-10 kilometers per hour.

V. Preparing for Action

25. The unmistakable howling of the *schwere Panzerkampfwagen*'s engine, especially heard at long distances at night, requires attention to the wind direction and to location of assembly areas far distant from the front in order to preserve the element of surprise.

26. Then after leaving the assembly area it is often necessary to take a short halt within our own lines to again refuel in order to be able to totally exploit the small radius of action in enemy territory.

27. After driving into the assembly area, the identifying wide and deep tracks and furrow made by the *schwere Panzerkampfwagen* must be eradicated to conceal the presence of *schwere Panzerkampfwagen* from enemy aerial reconnaissance.

28. If the assembly area must be entered during the day, the *Kompanie* is to be widely dispersed. During marches, the *schwere Panzerkampfwagen* are to be camouflaged with branches or tarpaulins.

VI. Combat

A. Attacks

29. The strength of the *schwere Panzer-Kompanie*'s attack lies in concentrated employment within the *schwere Panzer-Abteilung*.

30. As a rule, the *Kompanie*'s attack formation is the *Breitkeil*.

31. Continuously switching between fire and movement, the *Kompanie* breaks into the opponent's position; quickly charges through the enemy zone of resistance; engages and silences armored targets, defensive weapons, nests of resistance, and heavy weapons; and destroys the enemy artillery. Here it is important to destroy every anti-tank weapon within the *Kompanie*'s command sector.

32. The company commander must strive to bring all of the weapons of the *schwere Panzerkampfwagen* to unified effect.

33. Flank protection requires special attention,

VII. Tank versus Tank Combat

34.The most important task of the *schwere Panzer-Kompanie* is the engagement of enemy tanks. It always has priority over every other assignment.

35. Independent, swift handling by the company commander and strict control of the company with short, clear orders are the basis for success. Immediately attacking is usually the best solution.

36. The enemy is to be repeatedly fooled and confused by constant changes in the methods of attack. The following tactics aid in the"

a. Opening fire from ambush out of favorable positions (hull down or positions along the edges of forest, towns, etc.) at effective ranges and from unexpected directions.

b. During counterattacks by enemy tanks, build a fire front and send elements to engage them with flanking fire. Let the enemy tanks close range. Shut down the engines in order to head better. Destroy the enemy with a counterstrike.

c. Envelop or bypass through difficult terrain.

d. Go into action against the flanks and read by exploiting the sun's position, the wind direction, and the ground cover.

e. If a strong defensive front is unexpectedly encountered, along with tank obstacles, immediately withdraw from the enemy fire and renew the attack from an unexpected position. Use smoke cleverly.

f. During attacks in close terrain or fight in built-up areas, send out *Panzer-Grenadiere* or reconnaissance troops on foot in order to locate enemy tanks early and determine a favorable attack direction in a timely manner or gain a favorable firing position while advancing under mutually supporting cover fire.

g. Withdrawing enemy tanks are to be pursued without delay and destroyed.

37. Knocked out or immobilized enemy tanks are to be blown up during retreats.

Appendix G

Copyright Information

Diagram of the Henschel factory on page 68 is used by permission of Alan Hamby. Copyright 2003.

Map of Soviet Winter Offensives, 1941-1942 on page 109 is property of the United States Government and is public domain.

Map of Kursk and Vicinity on page 133 is property of the United States Government and is public domain.

Map of the Battle of Prokhorovka on page 139 is used by permission of Armchair General webmaster. Copyright 2009.

Map of the North African campaign on page 177 is property of the United States Government and is public domain.

Map of operations in Tunisia on page 179 is property of the United States Government and is public domain.

Map of the Invasion of Sicily on page 184 is property of the United States Government and is public domain.

Map of the Anzio beachhead on page 186 is property of the United States Government and is public domain.

Map of the vicinity of Caen and Villers-Bocage is used by permission of Dan Taylor. Copyright 2022.

KStN diagrams on pages 230, 231, and 232 are used by permission of Dr. Leo Niehorster. Copyright 2016.

Bibliography

""Map of the Soviet Winter Offensive, 13 December 1942 - 18 February 1943." *United States Government.* January 14, 2007. https://commons.wikimedia.org/wiki/File:Ww2_map25_Dec42_Feb43.jpg (accessed July 24, 2022).

History in Images: Pictures of War, WWII. n.d. https://historyimages.blogspot.com/2012/02/eastern-front-ww2-maps-color.html (accessed July 28, 2022).

Aberdeen Proving Ground, U.S. Army. *Tank Archives.* November 2012. http://www.tankarchives.ca/2013/04/aberdeen-t-34-and-kv-1-test.html (accessed December 2012).

Academy, United States Military. "World War II European Theater." *United States Military Academy.* n.d. https://www.westpoint.edu/academics/academic-departments/history/world-war-two-europe (accessed September 18, 2022).

Adam, Wilhelm , and Otto Ruhle. *With Paulus at Stalingrad.* Barnsley, UK: Pen and Sword Books, 2015.

Admininstration, National Archives and Records. *SS Officer Personnel Files.* Lorenz, Karl-Heinz 03-Jul-1917, College Park Maryland: National Arcvhives Microfilm Publication A3343, Series SSO, roll227A, 1943.

Agte, Patrick. *Michael Wittman and the Waffen-SS Tiger Commanders of the Leibstandarte in WWII.* Lanham, MD: Stackpole Boooks, 1996.

—. *Michael Wittman and the Waffen-SS Tiger Commanders of the Leibstandarte in WWII, vol 1.* Lanham, MD: Stackpole Books, 1996.

Anderson, Thomas. *Tiger.* Oxford: Osprey Publishing, 2013.

Antill, Peter. *Stalingrad 1942.* Oxford: Osprey Publishing, 2007.

Archive, The Map. "Stalingrad Area: 19 November-28 December 1942." *The Map Archive.* n.d. https://www.themaparchive.com/product/stalingrad-area-19-november-28-december/ (accessed July 20, 2022).

Atkinson, Rick. *The Day of Battle: The War in Sicily and Italy, 1943-1944.* New York: Henry Holt and Company, 2007.

Balsamo, Larry. "Germany's Armed Forces In the Second World War: Manpower, Armaments, and Supply." *History Teacher*, 1991: 263-277.

Barnett, Correlli. *Hitler's Generals.* New York: Grove Weidenfeld, 1989.

Barron, Leo, and Don Cygan. *No Silent Night: The Christmas Battle for Bastogne.* London: New American Library, 2012.

Battistielli, Pier. *Heinz Guderian: Leadership, Strategy, Conflict.* Oxford: Osprey Publishing, 2011.

"Battle of Prokhorovka." *Armchair General.* October 15, 2009. http://armchairgeneral.com/rkkaww2/maps/maps1943SW.htm#Prokhorovka (accessed July 31, 2022).

Beevor, Antony. *Arnhem: The Battle for the Bridges, 1944.* London: Penguin Books, 2019.

—. *Stalingrad.* London: Penguin Books, 1999.

—. *Stalingrad: The Fateful Siege, 1942-1943.* New York: Penguin Books, 1998.

—. *The Second World War.* New York: Back Bay Books, 2012.

Bell, Kelly. "Struggle for Stalin's Skies." *WWII History*, 2006: 62-63.

Belov, Fedor. *The History of a Soviet Collective Farm.* New York: Praeger, 1955.

Berghahn, Volker. "Preface." In *War of Extermination*, by Klaus Naumann, & Hannes Heer, xiv. New York: Berghahn Books, 2004.

Bergstrom, Christer. *Stalingrad: The Air Battle, 1942-January 1943.* London: Chevron Publishing, 2007.

Bird, Lorrin, and Robert Livingston. *WWII Ballistics: Armor and Gunnery.* Albany, NY: Overmatch Press, 2001.

Bishop, Chris, and Chris McNab. *Campaigns of World War II Day by Day.* London: Amber Books, 2003.

Bradley, Omar N. *A Soldier's Story.* New York: Henry Holt and Co. Inc., 1951.

Brand, Deiter. "60 Years Ago: Prokhorovka." *Austrian Military Journal, no. 6*, 2003.

Brand, Wulf D. *Tigerfibel: The Original Tiger Tank Manual.* Branchville, N.J. : Portrayal Press, 2000.

Buchner, Alex. *Ostfront 1944: The German Defensive Battles on the Russian Front, 1944.* Mechanicsburg, PA: Schiffer Publishing, 1995.

Butler, ed., J.R.M. *Victory in the West: The Battle for Normandy.* London: Naval & Military Press, 1962.

Buttar, Prit. *The Reckoning: The Defeat of Army Group South, 1944.* Oxford: Osprey Publishing, 2020.

Carius, Otto. *Tigers in the Mud: The Combat Career of German Panzer Commander Otto Carius.* Lanham, MD: Stackpole Books, 1992.

Carruthers, Bob. *Tiger I in Combat: Hitler's War Machine.* Berkshire, UK: Archive Media Publishing LTD, 2011.

Carruthers, Bob, ed. *The German Army in Normandy.* Barnsley, UK: Pen & Sword Military, 2013.

Ciano, Count Galeazzo. *The Ciano Diaries, 1939-1943.* New York: Doubleday, 1946.

Cicero, M. Tullius. "De Officiis." *Perseus Digital Library, Tufts University.* 1913. http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A2007.01.0048%3Abook%3D1%3Asection%3D76#text_main:~:text=For%20arms%20are%20of%20little%20value%20in%20the%20field%20unless%20there%20is%20wise%20counsel%20at%20home. (accessed August 25, 2022).

Citino, Robert. *Death of the Wehrmacht: The German Campaigns of 1942.* Lawrence, KS: University Press of Kansas, 2007.

—. *Forgotten Army, Lost Victories.* February 9, 2010. https://www.historynet.com/forgotten-army-lost-victories/?f (accessed November 26, 2022).

Citino, Robert. "New Gang in Town: The Rise of the German Panzer Division." *MHQ: The Quarterly Journal of Military History, vol. 28, no. 2*, 2016.

—. *The German War of War.* Lawrence, KS: University Press of Kansas, 2005.

—. *The Wehrmacht Retreats: Fighting a Lost War, 1943.* Lawrence, KS: University Press of Kansas, 2012.

—. *The Wehrmacht's Last Stand: The German Campaigns of 1944-1945.* Lawrence, KS: University Press of Kansas, 2017.

—. *US Army Heritage and Education Center.* May 21, 2014. https://www.youtube.com/watch?v=1SdO-btKuds&t=1634s (accessed August 1, 2022).

Clark, Alan. *Barbarossa: The Russian-German Conflict, 1941-1945.* New York: Quill, 1965.

Clark, Lloyd. *Anzio: The Friction of War - Italy and the Battle for Rome.* London: Headline Publishing Group, 2006.

—. *Kursk: The Greatest Battle, Eastern Front.* London: Headline Publishing Group, 2012.

Command, German Armed Forces High. *Adolf Hitler Material Guidance.* Executive Order, College Park, MD: National Archives Microfilm Publication T77, serial 194, roll 194, item Wi/IF 5.900, 1942.

Connolly, SGT. "The Campaign in Normandy, 1944." *Imperial War Museum.* July 1944. https://www.iwm.org.uk/collections/item/object/205206112 (accessed September 5, 2022).

Cooper, Matthew. *The German Army, 1933-1945: Its Political and Military Failures.* New York: Stein and Day, 1978.

Cornwell, John. *Hitler's Scientists: Science, War, and the Devil's Pact.* New York: Viking Penguin, 2003.

Corum, James. *Hans von Seekt and the German Military Reform.* Lawrence, KS: University Press of Kansas, 1992.

Craig, William. *Enemy at the Gates: The Battle for Stalingrad.* Old Saybrook, CT: Konecky & Konecky, 1973.

Daniel, Lt. Col. Derrill. "Landings at Oran, Gela, and Omaha Beaches: An Infantry Battalion Commander's Observations." *Ike Skelton Combined Arms Research Library Digital Library.* September 1947. https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/5743/rec/4 (accessed August 29, 2022).

Deighton, Len. *Blood, Tears, and Folly: An Objective Look at WWII.* New York: Castle Books, 1999.

D'Este, Carlo. *Decision in Normandy: The Real Story of Montgomery and the Allied Campaign.* London: Pengiun, 1983.

"Deutsche Reichsbahn: The German State Railway ." *Feldgrau: German Armed Forces Research, 1918-1945.* n.d. https://www.feldgrau.com/ww2-german-state-railway-deutsche-reichsbahn/ (accessed October 2, 2022).

"Die Deutsche Wochenschau no. 726." *Net-Film.ru.* August 1944. https://www.net-film.ru/en/film-55104/?search=q55104 (accessed October 7, 2022).

Doherty, Richard. *El Alamein 1942: Turning Point in the Desert.* Barnsley, UK: Pen & Sword Military, 2017.

Dunn, Walter. *Hitler's Gamble, 1943.* London: Praeger Publishers, 1997.

Dunstan, Simon. *Mechanized Warfare.* Edison, N.J.: Chartwell Books, 2005.

Dupuy, Trevor N. *A Genius for War: The German Army and General Staff, 1807-1945.* Falls Church, VA: Nove Publications, 1984.

—. *Hitler's Last Gamble: The Battle of the Bulge, December 1944-Jumary 1945.* New York: Harper Collins Books, 1944.

Earle, Edward Mead. *Makers of Modern Strategy.* Princeton: Princeton University Press, 1943.

Ellis, Colonel Burton F. "Accounts by General Sepp Dietrich and Colonel Joachim Pieper." *Ike Skelton Combined Arms Research Library Digital Library .* May 1, 1953. https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/2431 (accessed June 1, 2022).

Elstob, Peter. *Hitler's Last Offensive.* Barnsley, UK: Pen & Sword Books, 2014.

Encyclopedia, D-Day and Battle of Normandy. *Plan of Operation Goodwood.* 2021. https://www.dday-overlord.com/en/battle-of-normandy/allied-operations/goodwood (accessed September 5, 2022).

Estes, Kenneth. *A European Anabasis - Western Volunteers in the German Army, 1940-1945.* New York: Columbia University Press, 2001.

Fallgeibel, Walther-Peer. *Die Träger des Ritterkreuzes des Eisernen Kreuzes 1939-1945: Die Inhaber der höchsten Auszeichnung des Zweiten Weltkreiges aller Wehrmachtteile.* Freidberg, Germany: Podzun-Pallas, 2000.

Faust, Wolfgang. *Tiger Tracks: Three Days on the Eastern Front.* New York: Beyern Clasic Publications, 2016.

Fletcher, David. *Sherman Firefly.* Oxford: Osprey Publishing, 2008.

—. *Tiger! The Tiger Tank - A British View.* London: Her Majesty's Stationery Office, 1986.

Fletcher, David, et al. *Panzerkampfwagen VI Tiger I Ausf. E.* Somerset, UK: Haynes Publishing, 2017.

Ford, Ken. *Battleaxe Division: From Arfica to Italy with the 78th Division, 1942-1945.* Gloucestershire, UK: Stroud, 1999.

Fort Bliss Units. 2022. https://home.army.mil/bliss/index.php/units-tenants/1st-armored-division (accessed August 28, 2022).

Fowler, Will. *Kursk: The Vital 24 Hours.* London: Amber Books, 2005.

Freiser, Karl-Heinz. "Schlagen aud der Nachhand - Schlagen aus der Vorhand: Die Schlachten von Ch'arkow und Kursk 1943." In *Gezweitenwechsel im Zweiten Weltkreig? Die Schlachten von Ch'arkow und Kursk im Früjahr und Sommer 1943 in operativer Anlage, Verlauf und politiscer Bedeutung*, by Roland Foerster, ed., 110-113. Berlin: E.S. Mittler, 1996.

Freiser, Karl-Heinz, Klaus Schmidt, Klaus Schörner, Gerhard Schreiber, Kristian Ungvary, and Bernd Wegner. *Die Ostfront 1943/44: Der Kreig im Osten und an den Nebenfronten.* München: Deutsch Verlag-Anhalt, 2007.

Fremdenblatt, Hamburger. "Generalfeldmarschall Paulus." *Hamburgisches Welt-Wirtschafts-Archiv.* February 1, 1943. https://dfg-viewer.de/show?tx_dlf%5Bdouble%5D=0&tx_dlf%5Bid%5D=https%3A%2F%2Fpm20.zbw.eu%2Ffolder%2Fpe%2F0133xx%2F013314%2Fpublic.mets&tx_dlf%5Bpage%5D=2&cHash=ed97453ddf223a5691752794216cd6a1 (accessed July 20, 2022).

Fretter-Pico, Maximillian. *Mißbrauchte Infanterie: Deutsche Infanterie-Divisionen im ousteuropäischen Großraum 1941 bis 1944.* Frankfurt am Main: Verlag für Wehrwesen Bernard & Graefe, 1957.

Fuller, J.F.C. *Conduct of War.* New York: Funk and Wagnalls, 1961.

GABTU. "Comparative Penetration." *Tacnk Archives.* January 09, 2017. https://andrewbek-1974.livejournal.com/120699.html (accessed July 31, 2022).

—. "Report on the shooting of German tanks with AP and HE shells from tank guns." *Tank Archives.* 1943. http://www.tankarchives.ca/2013/05/f-24-vs-german-tanks.html (accessed July 18, 2022).

—. "Topic 2VV-2: Investigation of the armor of tanks of the German Army, April 1943." *Tank Archives.* April 1943. http://www.tankarchives.ca/2013/03/gabtus-answers-to-tiger.html (accessed July 18, 2022).

Glantz, David. "Soviet Defensive Tactics at Kursk, July 1943." *U.S. Army Command and General Staff College*, 1986: 1-20.

Glantz, David. "Soviet Military Strategy During the Second Period of War(November 1942 - December 1943): A Reappraisal." *The Journal of Military History*, 1996: 115-150.

—. *The Battle for Leningrad 1941-1944.* Lawrence, KS: University Press of Kansas, 2002.

Glantz, David, and Harold Orenstein. *The Battle for Kursk, 1943: The Soviet General Staff Study.* London: Frank Cass, 1999.

Glantz, David, and Jonathan House. *The Battle of Kursk.* Lawrence, KS: University Press of Kansas, 1999.

—. *When Titans Clashed: How the Red Army Stopped Hitler.* Lawrence, KS: University Press of Kansas, 1995.

Glatter, Goetz, Josef. "Tigerfibel." *Internet Archive.* July 20, 2014. https://archive.org/details/tigerfibel/page/n1/mode/2up (accessed June 3, 2022).

Goerlitz, Walter. *History of the German General Staff, 1657-1945.* Boulder, CO: Westview Press, 1985.

Gooderson, Ian. "Allied Fighter-Bombers versus German Armour in North-West Europe 1944–1945: Myths and Realities." *Journal of Strategic Studies*, 1991: 210-231.

Government, United States. *Map of the Soviet Winter Offensive, 13 December 1942- 18 February 1943.* Washington, D.C., January 14, 2007.

Graves, Donald. *Blood and Steel 2: The Wehrmacht Archive, Retreat to the Reich, September to December 1944.* London: Frontline Books, 2015.

—. *Blood and Steel: The Wehrmacht Archive, Normandy 1944.* London: Frontline Books, 2013.

Green, Michael, and Gladys Green. *Weapons of Patton's Armies.* Minneapolis, MN: Zenith Publishing, 2000.

Grier, Howard. *Hitler, Dönitz, and the Baltic Sea: The Third Reich's Last Hope, 1944-1945.* Annapolis: Naval Institute Press, 2007.

GSI. "Record of Allied Operational and Occupation Headquarters, World War II." *National Archives.* May 28, 1945. https://www.archives.gov/research/guide-fed-records/groups/331.html#331.10 (accessed June 15, 2022).

Guderian, Heinz. *Achtung - Panzer!* London: Cassell Books, 1999.

—. *Erinnernungen des Soldaten.* Munich: Motorbuch, 2001.

—. *Panzer Leader.* New York: Da Capo Press, 1996.

Habeck, MARY. *Storm of Steel: The Development of Armor Doctrine in Germany and the Soviet Union, 1919-1939.* Ithaca, NY: Cornell University Press, 2003.

Halder, Franz. *The Halder War Diary, 1939-1942.* Novato, CA: Presido Press, 1988.

Hallion, Richard. *The US Army Air Forces in World War II: D-Day 1944, Air Power over the Normandy Beaches.* Washington, D.C.: US GPO, 1994.

Hamby, Alan. "The Maybach Engine." *Tiger I Information Center.* 2003. http://www.alanhamby.com/maybach.shtml (accessed October 1, 2022).

—. *Tiger I Information Center.* 2003. http://www.alanhamby.com/tiger.html (accessed July 9, 2022).

Hans-Joachim, Jung. *Panzer Soldiers for "God, Honor, Fatherland," The History of Panzerregiment "Grossdeutschland:" The German Army's Elite Panzer Formation, trans. David Johnson.* Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2000.

Harris, J.P. *Men, Ideas, and Tanks: British Military Thought and Armored Forces.* Manchester: Manchester University Press, 1995.

Hart, Russell. *Clash of Arms: How the Allies Won Normandy.* London: Rienner Publishers, 2001.

Hastings, Major H.R.W.S. *The Rifle Brigade in the Second World War.* Aldershot: Gale & Polden, 1950.

Hastings, Max. *Armageddon: The Battle for Germany, 1944-1945.* New York: Alfred A. Knopf, 2004.

—. *Das Reich: The March of the 2nd SS Panzer Division Through France, June 1944.* Minneapolis, MN: Zenith Press, 2013.

—. *Inferno: The World at War, 1939-1945.* New York: Vintage Books, 2012.

—. *Overlord: D-Day and the Battle for Normandy, 1944.* London : Pan Books, 1984.

Haupt, Werner. *Heeresgruppe Nord: Der Kampf in Nordabschnitt der Ostfront 1941-1945.* Eggolsheim, Germany: Dörfler Verlag, 1967.

—. *Panzerabwehrgeschütze 1935-1945.* West Chester, PA: Schiffer Publishing, 1990.

Healy, Mark. *Zitadelle: The German Offensive against the Kursk Salient 4-17 July 1943.* Stroud, UK: The History Press Limited, 2010.

Heereswaffenamt. *Merkblatt für den Einsatz der sch. Panzer-Abteilung "Tiger".* technical manual, Berlin: Heereswaffenamt, 1943.

Hinze, Rolf. *To the Bitter End: The Final Battles of Army Groups North Ukraine, A, Centre, Eastern Front 1944-45.* Solihull, UK: Helion & Company, LTD, 2005.

Hirlinger, Kurt, ed. *The Combat History of schwere Panzer-Abteilung 508: In Action in Italy with the Tiger.* Winnipeg, Manitoba: J.J. Fedorowicz Publishing, Inc, 2001.

Historical Division, European Command. "German Maintenance in World War II." *DA-PAM 20-202*, 1954: 17.

History, US Army Center of Military. *Sicily.* 1943. https://www.history.army.mil/brochures/72-16/map1.JPG (accessed August 29, 2022).

—. *Tunisia.* 1943. https://history.army.mil/brochures/tunisia/p22-23(map).jpg (accessed August 29, 2022).

—. *Tunisia.* 1943. https://history.army.mil/brochures/tunisia/p16(map).jpg (accessed August 29, 2022).

Hitler, Adolf. "Fuhrer Directive 41." *Führer Directives and other Top-Level Directives of the German Armed Forces, 1942-1945.* March 24, 2022. https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/2359 (accessed July 20, 2022).

Hook, Patrick, Michael Sharpe, and Brian Davis. *Waffenn-SS: Elite Forces II.* London: Compendium Publishing, 2007.

Hoth, Hermann. "Statement by the Commander-in-Chief of the 4th Panzer Army to a Request from the Commander-in-Chief of Army Group South." In *Die Stabilisierung der Ostfrontnach Stalingrad: Manstein's Gegenschlag zweischen Donez und Dnjepr im Früjahr 1943* , by Eberhard Schwartz, 285. Göttingen: Muster-Schmidt Verlag, 1985.

Hudson, Ian. "The Tiger Collection." *North Africa Veteran Reg Hunt Remembers.* June 2017. https://blog.tiger-tank.com/people/north-africa-veteran-reg-hunt/#:~:text=In%20June%202017%20North%20Africa,the%20Army%20in%20April%201939. (accessed August 24, 2022).

Hull, Isabelle. *Absolute Destruction: Military Culture and the Practices of the War in Imperial Germany.* Ithaca, NY: Cornell University Press, 2005.

Hunnicutt, R.P. *Pershing: A History of the American Medium Tank T20.* Novato, CA: Presidio Press, 1999.

Isayav, Alexey. *No Surprise: The History of the Second World War, 1942-1943.* Moscow: Eksmo, 2007.

Isserson, Georgii Samilovich. *The Evolution of Operational Art.* Fort Leavenworth, KS: Combat Studies Institute Press, 2013.

Jackson, Robert. *Tanks and Armored Fighting Vehicles.* Bath: Parragon Publishing, 2007.

Jentz, Thomas. *Germany's Panther Tank: The Quest for Combat Supremacy.* Atglen, PA: Schiffer Military History, 1995.

—. *Germany's Tiger Tanks.* Atglen, PA: Schiffer Publishing, 1997.

—. *Germany's Tiger Tanks: D.W. to Tiger I.* Atglen, PA: Schiffer Publishing, 2000.

—. *Germany's Tiger Tanks: Tiger I & II Combat Tactics.* Atglen, PA: Schiffer Publishing, 1997.

—. *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol. 1, 1933-1945.* Atglen, PA: Schiffer Publishing, 1996.

—. *Panzer Truppen: The Complete Guide to the Creation & Combat Employment of Germany's Tank Force, vol. 2, 1943-1945.* Atglen, PA: Schiffer Publishing, 1996.

—. *Tiger Tanks at the Front.* Atglen, PA: Schiffer Military History, 2001.

Jentz, Thomas, and Hilary Doyle. *Germany's Panzers in World War II from Pz.Kpfw.I to Tiger II.* Atglen, PA: Schiffer Military History, 2001.

—. *Germany's Tiger Tanks: VK45.02 to Tiger II, Design, Production & Modifications.* Atglen, PA: Schiffer Publishing, 1997.

—. *Kingtiger Heavy Tank, 1942-1945.* Oxford: Osprey Publishing, 1993.

—. *Panzer Tracts 23: Panzer Production from 1933-1945.* Boyds, MD: Panzerwrecks Publishing, 2002.

—. *Panzerkampfwagen IV Ausf. G, H, and J* . Oxford: Osprey Publishing, 2001.

—. *Tiger I Heavy Tank, 1942-1945.* Oxford: Osprey Publishing, 1993.

Jukes, Geoffrey. *Stalingrad to Kursk: Triumph of the Red Army.* Barnsley, UK: Pen & Sword Books, Ltd, 2011.

Kast, Bernhard. *Tiger Logistics.* 2020. https://youtu.be/htD5NEGRwKk (accessed September 7, 2022).

Kast, Bernhard, and Christoph Bergs. *German Army Regulation on the Medium Tank Company H.Dv. 470/7 Mittlere Panzerkompanie.* London: Bernhard Kast, 2020.

Katukov, Mikhail. *At the Spearhead of the Main Blow.* Moscow: Voyenizdat, 1974.

Keegan, John. *The Second World War.* New York: Penguin Books, 1989.

Kesselring, Albert. *Manual for Command and Combat Employment of Smaller Units: MS #P-06B.* Archival manuscript, Washington, D.C.: Department of the Army, Office of the Chief of Military History, 1952.

Kolyvanov, Georgy G. "Mars: In the Shadow of Uranus." *The Independent.* Febraru 2005. https://nvo.ng.ru/history/2005-12-02/5_mars.html (accessed July 16, 2022).

Krivosheev, Grigory, Vladimir Andronikov, and Petr Burikov. *Russia and the USSR in the Wars of the Twentieth Century.* Moscow: Veche, 2010.

Laar, Mart. *Estonia in World War II.* Talinn: Grenader Press, 2005.

Lawrence, Christopher. *Kursk: The Battle of Prokhorovka.* Sheridan, CO: Aberdeen Books, 2015.

—. "Panzer Aces Wittmann and Staudegger at Kursk." *DuPuy Institute.* July 9, 2018. http://www.dupuyinstitute.org/blog/2018/07/09/panzer-aces-wittmann-and-staudegger-at-kursk-part-1/ (accessed July 31, 2022).

—. *The Battle of Prokhorovka: The Tank Battle at Kursk, the Largest Clash of Armor in History.* Guilford, CT: Stackpole Books, 2015.

Liddell Hart, B.H. *A History of the Second World War.* New York: Putnam, 1971.

—. *The German Generals Talk.* New York: Quill, 1979.

—. *The Other Side of the Hill.* London: Cassell, 1951.

Lochmann, Franz-Wilhelm, Nordewin von Diest-Korber, Ulrich Koppe, Richard Freiherr von Rosen, and Alfred Rubbel. *The Combat History of Schwere Panzer-Abteilung 503: In Action on the East and West with the Tiger I and II* . Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2000.

Lochmann, Franz-Wilhelm, Richard Freiherr von Rosen, and Alfred Rubbel. *The Combat History of German Tiger Tank Battalion 503 in WWII.* Guilford, CT: Stackpole Books, 2000.

Lucas, James. *Das Reich: The Military Role of the 2nd SS Division.* London: Arms and Armour Press, 1991.

—. *World War II through German Eyes.* New York: Sterling Publishing, 1987.

Macksey, Kenneth. *Why the Germans Lose at War: The Myth of German Military Superiority.* New York: Greenhill Books, 1996.

MacLean, French L. *Waffen-SS Tiger Crews at Kursk: The Men of SS Panzer Regiments 1, 2, & 3 in Operation Citadel, July 5-15, 1943.* Atglen, PA: Schiffer Military , 2020.

Maier, Helmut. *Forschung als Waffe: Rüstungsforschung in der Kaiser Wilhelm Gesselschaft und das Kaiser Wilhelm Institut für Matallforschung 1900-1945* . Göttingen: Wallstein Verlag, 2007.

Malmassari, Paul. "Les Maxi-Chars au-dela du Char Lourd, 1re partie – 1916-1927: Du char derupture au char de fortresse." *Histoire de Guerre, Blindes & Materiel*, 2013: 39-48.

Mann, Ingrid. *Weggemoffeld!* Alten, Netherlands: Fagus Publishing, 2015.

Marie, Henri. *Villers-Bocage: Normandy 1944.* Bayeux: Heimdal, 2003.

May, Ernst. *Strange Victories.* New York: Hill & Wang, 2000.

McNab, Chris. *Hitler's Armies: A History of the German War Machine, 1939-45.* Oxford: Osprey Publishing, 2011.

Mearsheimer, John. *Liddell Hart and the Weight of History.* Ithaca: Cornell University Press, 1988.

Megargee, Geoffrey. *Inside Hitler's High Command.* Lawrence, KS: University Press of Kansas, 2000.

"Military.com." *Battle of Anzio.* 1944. http://www.military.com/Resources/ResourceFileView?file=worldwarii_europe_maps_map49.htm (accessed August 29, 2022).

Milner, Marc. *Stopping the Panzers.* Lawrence, KS: University Press of Kansas, 2014.

Mitcham, Samuel. *German Order of Battle Volume Three: Panzer, Panzer Grenadier, and Waffen-SS Divisions in WWII.* Guilford, CT: Stackpole Books, 2007.

—. *German Order of Battle, vol 1: 1st-290th Infantry Divisions in World War II* . Oxford: Osprey Publishing, 2007.

—. *Retreat to the Reich: The German Defeat in France, 1944.* Mechanicsburg, PA: Stackpole Books, 2000.

—. *The Rise of the Wehrmacht: The German Armed Forces in World War II.* New York: Praeger International, 2008.

Mitcham, Samuel, and Gene Mueller. *Hitler's Commanders: Officers of the Wehrmacht, Luftwaffe, the Kriegsmarine, and the Waffen-SS.* Lanham, MD: Rowman & Littlefield, 2012.

Moore, Daniel. *Blitzkrieg to Götterdämmerung: Combined Arms Warfare, Deep Operation, and the Flaws of German Doctrine, 1860-1945.* Charles Town, WV: American Public University, 2017.

Muirhead, Eric V. "The Tiger Gap: Culture, Contradiction, and Clausewitz in German Armored Warfare in World War II." *University of Tennessee.* 2019. https://trace.tennessee.edu/utk_gradthes/5442/ (accessed November 15, 2021).

Müller, Klaus-Jürgen. "The Structure and Nature of the National Conservative Opposition in Germany up to 1940." In *Aspects of the Third Recih*, by H.W. Koch, 158-159. London: MacMillan, 1985.

Murray, Williamson, and Allen Millet. *A War to be Won: Fighting the Second Waorld War.* London: Belknap Press, 2000.

Museum, United States Holocaust. *Gleichschaltung: Coordinating the Nazi State.* January 23, 2020. https://encyclopedia.ushmm.org/content/en/article/gleichschaltung-coordinating-the-nazi-state (accessed November 26, 2022).

Naveh, Shimon. *In Pursuit of Military Excellence: The Evolution of Operational Theory.* London: Francass, 1997.

Newsome, Bruce O. *The Tiger Tank and Allied Intelligence, vol. I: Großtraktor to Tiger 231, 1926-1943.* Coronado, CA: Tank Archives Press, 2020.

—. *The Tiger Tank and Allied Intelligence, vol. II: The Tunisian Tigers.* Coronado, CA: Tank Archives Press, 2020.

—. *The Tiger Tank and Allied Intelligence, vol. III: Tiger 131 From Africa to Europe.* Coronado, CA: Tank Archives Press, 2020.

—. *The Tiger Tank and Allied Intelligence, vol. IV: Capabilities and Performance.* Coronado, CA: Tank Archives Press, 2020.

Niehorster, Leo. *World War II Armed Forces: Orders of Battle and Organizations.* 2010. http://www.niehorster.org/index.htm (accessed May 5, 2022).

Noble, Alastair. "The Phantom Barrier: Ostwallblau 1944-1945." *War in History*, 2001: 442-467.

Noble, Charles. "On the Bazooka and the Tiger Tank." *90th Infantry Division Preservation Group*, 2009.

of, American Institute. *American Institute for Economic Research.* 2022. https://www.aier.org/cost-of-living-calculator/?utm_source=Google%20Ads&utm_medium=Google%20CPC&utm_campaign=COLA&gclid=Cj0KCQjwkOqZBhDNARIsAACsbfIqveHgGOYEp8D8wnaoh6r1l2GwxB-0Pa3b7oCTgbG1YXqhx_L-kowaAgWqEALw_wcB (accessed October 3, 2022).

Office, War. "Royal Armored Corps Training, vol III - Armament Pamphlet No. 7, SP 17-pr M10." *War Office*, 1952: 100-124.

OKH. "Schiessverfahren bei Pz. Bekämpfung." National Archives Microfilm Publication, 1943.

OKH. *Schiessverfahren bei Pz. Bekämpfung.* Ordnance report, College Park, MD: National Archives Microfilm Publication, 1943.

Oliver, Dennis. *Death Ride of the Panzers: German Armor and the Retreat in the West 1944-1945.* New York: Skyhorse Publishing, 2018.

—. *Tiger I and Tiger II Tanks: German Army and Waffen-SS, The Last Battles in the East 1945.* Barnsley, UK : Pen & Sword Books, 2020.

—. *Tiger I and Tiger II Tanks: The German Army and the Waffen-SS, The Last Battles in the West 1945.* Barnsley, UK: Pen & Sword Press, 2019.

—. *Tiger I: Germany Army Heavy Tank, Eastern Front Summer 1943.* Barnsley, UK: Pen & Sword Books, 2019.

Ost, Fremde Heere. *Kraftegegenubersellerung Stand: 1.4.43; Anglage 4b zu Abt. Fr. H. Ost (I) no. 80/43g.* German Manpower on the Eastern Front, Alexandria, VA: National Archives Microfilm Series T078, roll 552, 1943.

—. "Panzerverluste Ost, 5 Juli 1943 - 31 August 1943." *Der Panzeroffizier beim Chef des Generalstabes des Heeres.* Berlin, Germany: Bundesarchiv, RH 2/1933: Panzerverluste Ost, BL.99, October 1943.

"Ostrogozhsko-Rossosh' Offensive Operations of Voronezh Front Forces." *SVIMVOV*, 1953.

Overy, Richard. "Hitler and Air Strategy." *Journal of Contemporary History*, 1980: 405-421.

—. *Why the Allies Won.* New York: Norton Press, 1995.

Parker, Danny. "German Tiger tanks were at the Bulge, but not in the numbers usually cited for them." *World War II*, 1990: 8.

Patton, George S. "Ike Skelton Combined Arms Research Library Digital Library." *Report on Operation Conducted by II Corps United States Army Tunisia.* April 10, 1943. https://cgsc.contentdm.oclc.org/digital/collection/p4013coll8/id/4382/rec/1 (accessed August 28, 2020).

Pinter, Evan. "Franz Staudegger: German Tiger Ace in the Battle of Kursk." *War Hitory Online.* Apr 22, 2017. https://www.warhistoryonline.com/guest-bloggers/franz-staudegger-german-tiger-ace-battle-kursk.html?chrome=1 (accessed July 31, 2022).

"Piper Cub Tank Buster." *Popular Science*, 1945: 84-85.

Pöhlmann, Markus. *Der Panzer und die Mechanisierung des Kreiges: Eine Deutsche Geschichte 1890 bis 1945.* Paderborn, Deutschland: Verlag Ferdinand Schöningh, 2016.

Porter, David. *7th Armoured Division at Villers-Bocage, 13 June 1944.* London: Amber Books, Ltd, 2012.

—. *I SS Panzer Corps at Villers-Bocage, 13 June 1944.* London: Amber Books, 2012.

Raus, Erhard. *Panzers on the Eastern Front: General Erhard Raus and his Panzer Divisions in Russia 1941-1945.* Mechanicsburg., PA: Military Book Club, 2022.

Restayn, Jean. *Tiger I on the Eastern Front.* Paris: Histoire & Collections, 2007.

—. *Tiger I on the Western Front.* Paris: Histoire & Collections, 2001.

Reynold, Michael. *Sons of the Reich: The History of the II SS Panzer Corps in Normandy, Arnhem, and on the Eastern Front.* Haverton, UK: Casemate Publishing, 2002.

Reynolds, Michael. *Steel Inferno: 1st SS Panzer Corps in Normandy.* New York: Da Capo Press, 1997.

Ripley, Tim. *The Waffen-SS at War: Hitler's Praetorians 1925-1945.* St.Paul, MN: Zenith Press, 2004.

Ritter, Dale Richard. *Charging Knights on the Eastern Front: The Combat History of schwere Panzer-Abteilung 505.* Winnipeg, Manitoba: J.J. Fedoroxicz Publishing, Inc., 2019.

—. *The Tiger Project, book I: Alfred Rubbel, schwere Panzer-Abteilung 503.* Atglen, PA: Schiffer Military History, 2004.

—. *The Tiger Project, book II: Horst Krönke, schwere Panzer-Abteilung 505.* Atglen, PA: Schiffer Military History, 2004.

Rokossovsky, Konstantin. *A Soldier's Duty.* Moscow: Voyenizdat, 1997.

Rommel, Erwin. *The Rommel Papers.* New York: Harcourt Brace and Jovanovich, 1953.

Rotmistrov, Pavel. "Tanks Against Tanks." In *Main Front: Soviet Leaders Look Back in World War II*, by John Erickson, 106-109. London: Brassey's Ltd., 1987.

Rudel, Hans-Ulrich. *Mein Leneb in Kreig und Freiden.* Rosenheim, Germany: Deutsche Verlagsgessellschaft, 1994.

Ruffner, Kevin Conley. *Luftwaffe Field Divisions, 1941-45.* Oxford: Osprey Publishing, 1990.

Sadarananda, Dana. *Beyond Stalingrad: Manstein and the Operations of Army Group Don.* New York : Praeger Publishers, 1990.

Samsonov, Peter. "Sherman vs. Toger." *Tank Archives.* March 4, 2013. http://www.tankarchives.ca/2013/03/sherman-vs-tiger.html (accessed October 3, 2022).

Schafer, Robin. *War History Online.* November 2012. https://www.warhistoryonline.com/articles/tiger-panzer-vi-combat-and-operational-evaluation-1-252-hits-taken-in-combat-ww2-by-rob-schafer.html, accessed 12 December 2021. (accessed December 12, 2021).

Schiebert, H. *Die Tiger Familie.* Friedberg, West Germany: Waffen-Arsenal, 1979.

Schneider, Helmut, ed. *Tiger Battalion 507.* Barnsley, UK: Pen & Sword Books, 2020.

Schneider, Wolfgang. *Das Reich Tigers.* Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2006.

—. *Tigers in Combat I.* Mechanicsburg, PA: Stackpole Books, 2004.

—. *Tigers in Combat II.* Mechanicsburg, PA: Stackpole Books, 2005.

—. *Tigers in Combat III.* Solihull, UK: Helion & Company, Ltd., 2016.

—. *Totenkopf Tigers.* Winnipeg, Manitoba: J.J. Fedorowicz Publishing, 2011.

School of Tank Technology, Military College of Science. *Pz Kw VI (Tiger): The Official Wartime Reports.* Coronado, CA: Tank Archives Press, 2020.

Seale, Alaric. "A Very Special Relationship: Basil Liddell Hart, Wehrmacht Generals, and the Debate on West German Rearmament." *War in History*, 1998: 327-357.

Shera, Neal. "Amazing Feats of the Tiger Tank." *Firearms News*, August 2019.

Shirer, William. *Rise and Fall of the Third Recih.* New York: Simon and Schuster, 1960.

Showalter, Dennis. *Hitler's Panzers: The Lightning Attacks that Revolutionized Warfare.* New York: Berkley Caliber, 2009.

Silverstein, Ken. "Ford and the Führer." *The Nation*, 2000.

Smelser, Ronald, and Edward Davies. *The Myth of the Eastern Front.* New York: Cambridge University Press, 2008.

Snowden, Frank. *The Conquest of Malaria: Italy, 1900-1962.* New Haven: Yale University Press, 2006.

Sokolov, B.V. *Stalin: Power and Blood.* Moscow: AST-Press, 2004.

Solyankin, A.G., M.V. Pavlov, I.V. Pavlov, I.G. Zheltov, and Anatoly Sorokin, trans. "Self-Propelled Gun ISU-152." *Russian Federation Publishing Cneter*, 2005: 48.

Speer, Albert. "Führer Conference Notes." *Records of the Reich Ministry for Armaments and War Production, National Archives Microfil Publication T73, serial 182, roll 192, item RmfRuk 2096.* Captured German Record Collection, National Archives College Park Maryland, June 23, 1942.

Speer, Albert. *Führer Conference Notes 5-6 March 1942.* Conference Notes, College Park, MD: Records of the Reich Ministry for Armaments and War Production, National Archives Microfilm Publication T73, serial 192, roll 192, item RmfRuk 2096, Captured German Records Collection, National Archives College Park Maryland , 1942.

—. *Inside the Third Reich: Memoirs.* New York: The MacMillan Company, 1970.

Speer, Albert. *Speech Compariing Industrial Production.* Speech, College Park, MD: Captured German Records Collection, National Archives, 1944.

Speidel, Hans. *Normandy 1944: Rommel and the Normandy Campaign.* Chucago: Regnery, 1950.

Spielberger, Walter J, and Hillary Doyle. *Tigers I and II and their Variants.* Atglen, P.A.: Schifffer Publishing, 2007.

Staff, German General. "Map of the German General Staff of the Environs of Rostov-on-Don in 1941." *clubklad.ru.* 1941. http://clubklad.ru/maps/182/#map (accessed June 22, 2022).

Stahel, David. *The Battle for Moscow.* Cambridge: Cambridge University Press, 2015.

Stockert, Peter. *Der Eichenlaubträger 1939-1945, Band IV .* Bad Friedrichshall, Germany: Friedrichshaller Rundblick, 1998.

Stolfi, R.H.S. *German Panzers in the Offensive: Russian Front, North Africa, 1941-1942.* Atglen, PA: Schiffer Military History, 2003.

Swain, Richard. "Reviewed Work: Liddell Hart and the Weight of History." *Albion: A Quarterly Journal Concerned with British Studies*, 1991: 801-804.

Taylor, Dan. *Battle of Villers-Bocage: Through the Lens of the German War Photographer.* Old Harlow, UK: Battle of Britain International, 1999.

Tessin, Georg. *Verbände und Truppen der deutschen Wehrmacht und Waffen-SS im Zweiten Weltkreig, 1933-1945.* Onasbruck: Biblio Verlag, 1973.

"The Voronezh-Kasternoe Offensive Operations of Forces of the Voronezh and left wing of the Briansk Fronts." *SVIMVOV*, 1954: 1-121.

Thomas, David. "Foreign Armies East and German Military Intelligence in Russia 1941-1945." *The Journal of Contemporary History*, April 1987: 261-301.

Thyssen, Mike. "A Desperate Struggle to Save a Condemned Army: A Critical Review of the Stalingrad Airlift." *Air Command and Staff College.* March 1, 1997. https://apps.dtic.mil/sti/pdfs/ADA397944.pdf (accessed June 9, 2022).

Toland, John. *Adolf Hitler Volume II.* Garden City, NY: Doubleday & Company, 1976.

Töppel, Roman. *Kursk, 1943: The Second Greatest Tank Battle of the Second World War.* Warwick, UK: Helion & Company, 2018.

—. "The War, One Great Adventure: The Writer and 'Historian' Franz Kurowski." *Academia.edu.* 2018. https://www.academia.edu/37429738/The_War_One_Great_Adventure_The_Writer_and_Historian_Franz_Kurowski_2018_ accessed January 17, 2022 (accessed January 17, 2022).

Tout, Ken. *Tanks, Adavnce!* New York: HarperCollins Publishers, 1989.

Tucker-Jones, Anthony. *Stalin's Armour, 1941-1945: Soviet Tanks at War.* Barnsley, UK: Pen & Sword Military, 2021.

—. *Stalin's Revenge: Operation Bagration & the Annihilation of Army Group Center.* Barnsley, UK: Pen & Sword Military, 2009.

Turner, Henry Ashby. *Hitler's Thirty Days to Power: January 1933.* New York: Castle Books, 2003.

Utenkov, F.N. *On the Northwestern Front.* Moscow: USSR Academy of Sciences, 1969.

Vasilevsky, Aleksandr. *The Matter of my Whole Life.* Moscow: Politizdat, 1978.

Vitruk, A. "Bronia protiv broni." *VIZh*, June 1983: 72-79.

von Bock, Field Marshall Fedor. *Generalfeldmarschall Fedor von Bock: The War Diary, 1939-1945.* Atglen, PA: Schiffer Military History, 1996.

von Eimannsberger, Ludwig Ritter. *Der Kampfwagenkrieg.* Munich: J.F. Lehmanns Verlag, 1934.

von Luck, Hans. *Panzer Commander: The Memoirs of Colonel Hans von Luck.* New York: Random House, 1989.

von Manstein, Field Marshal Erich. *Lost Victories: The War Memoirs of Hitler's Most Brilliant General.* Novato, CA: Presidio Press, 1982.

von Mellenthin, Major General F.W. *Panzer Battles.* Norman, OK: University of Oklahoma Press, 1955.

von Rosen, Richard Freiherr. *Panzer Ace: The Memoirs of an Iron Cross Panzer Commander from Barbarossa to Normandy.* Yorkshire, UK: Greenhill Books, 2018.

Walden, Gregory. *Tigers in the Ardennes: The 501st Heavy Tank Battalion in the Battle of the Bulge.* Atglen, PA: Schiffer Publishing, 2014.

Walker, David. "OSS and Operation Torch." *Journal of Contemporary History*, 1987: 667-679.

War Department, U.S. *TM 30-506 German Military Dictionary.* Washington, D.C.: War Department, 1944.

Warlimont, Walter. *Inside Hitler's Headquarters, 1939-1945.* Novato, CA: Presidio Press, 1962.

Wehrmacht, Oberkommando des. "Merkblatt 47a/30." *Panzerworld.* 1943. https://panzerworld.com/tiger-abteilung-employment (accessed June 19, 2022).

Westphal, Siegfried. *The German Army in the West.* London: Cassell, 1951.

Wetterman, Ralph. "Kursk: The Greatest Tank Battle in History Might have Ended Differently had it not been for the Action in the Air." *Smithsonian Magazine*, 2015.

Wheeler-Barnett, John. *The Nemesis of Power: The German Army in Politics, 1918-1945.* London: MacMillan, 1967.

Whiting, Charles. *'44: In Combat from Normandy to the Ardennes.* New York: Military Heritage Press, 1984.

—. *Ardennes: The Secret War.* New York: Stein and Day, 1984.

Whittam, John. *Fascist Italy.* Manchester: Manchester University Press, 2005.

Wilbeck, Christopher. *Sledgehammers: Strengths and Flaws of Tiger Tank Battalions in World War II.* Bedford, PA: Aberjona Press, 2004.

Williamson, Gordon. *The SS: Hitler's Instrument of Power.* New York: Amber Books, 2006.

Wilson, Dale. *Treat em Rough! The Birth of American Armor, 1917-1920.* Novato, CA: Presidio Press, 1990.

Winchester, Charles. *Advancing Backwards: The Demodernization of the German Army in World War II.* Oxford: Osprey Publishing, 2002.

Wood, Ian Michael. *Tigers of the Death's Head: SS-Totenkopf Division's Tiger Company.* Mechanicsburg, PA: Stackpole Books, 2013.

Woolner, Frank. *Spearhead in the West, 1941-1945: The Third Armored Division.* Uttar Predesh, India: Lucknow Publishing, 2016.

Yeide, Harry. *The Tank Killers: A History of America's World War II Tank Destroyer Force.* Drexel Hill: Casemate Publishing, 2007.

Yeryomenko, Andrey. *Stalingrad.* Moscow: Voyenizdat, 1961.

Zaloga, Steven. *Armored Champion: The Top Tanks of World War II.* Mechanicsburg, PA: Stackpole Books, 2015.

—. *Armored Thunderbolt.* Lanham, MD: Stackpole Books, 2008.

—. *Bagration 1944: The Destruction of Army Group Center.* Oxford: Osprey Publishing, 1996.

—. *Panther vs Sherman: Battle of the Bulge 1944.* Oxford: Osprey Publishing, 2008.

Zaloga, Steven. "Review of Sledgehammers: Strengths and Flaws of Tiger Battalions in World War II." *The Journal of Military History*, 2004: 1283-1284.

—. *Smashing Hitler's Panzers: The Defeat of the Hitler Youth Panzer Division in the Battle of the Bulge.* Guilford, CT: Stackpole Books, 2019.

—. *Tanks in the Battle of the Bulge.* Oxford: Osprey Publishing, 2020.

—. *The T-34/76 Medium Tank, 1941-1945.* Oxford: Osprey Publishing, 1994.

Zarzecki, Thomas W. *Arms Diffusion: The Spread of Military Innovations in the International System.* New York: Routledge, 2002.

Zeitzler, Kurt. "Battle of Stalingrad." In *The Fatal Decisions: Six Decisive Battles of the Second World War from the Viewpoint of the Vanquished*, by William Richardson, & Seymour Freidlin, 151-168. Barnsley, UK: Pen and Sword Books, 2012.

Zetterling, Niklas, and Anders Frankson. *Kursk 1943: A Statistical Analysis.* London: Frank Cass, 2000.

Zheltov, Igor. "Iosif Stalin." *Tankomaster Special Issue*, 2002: 33.

Zhukov, Georgy. *Marshal of Victory, vol II.* Barnsley, UK: Pen and Sword Books, 1974.

—. *Recollections and Reflections.* Moscow: Novosti, 1992.

Zuber, Terence. *The Moltke Myth: Prussian War Planning, 1857-1871.* Lanham, MD: University Press of America, 2008.